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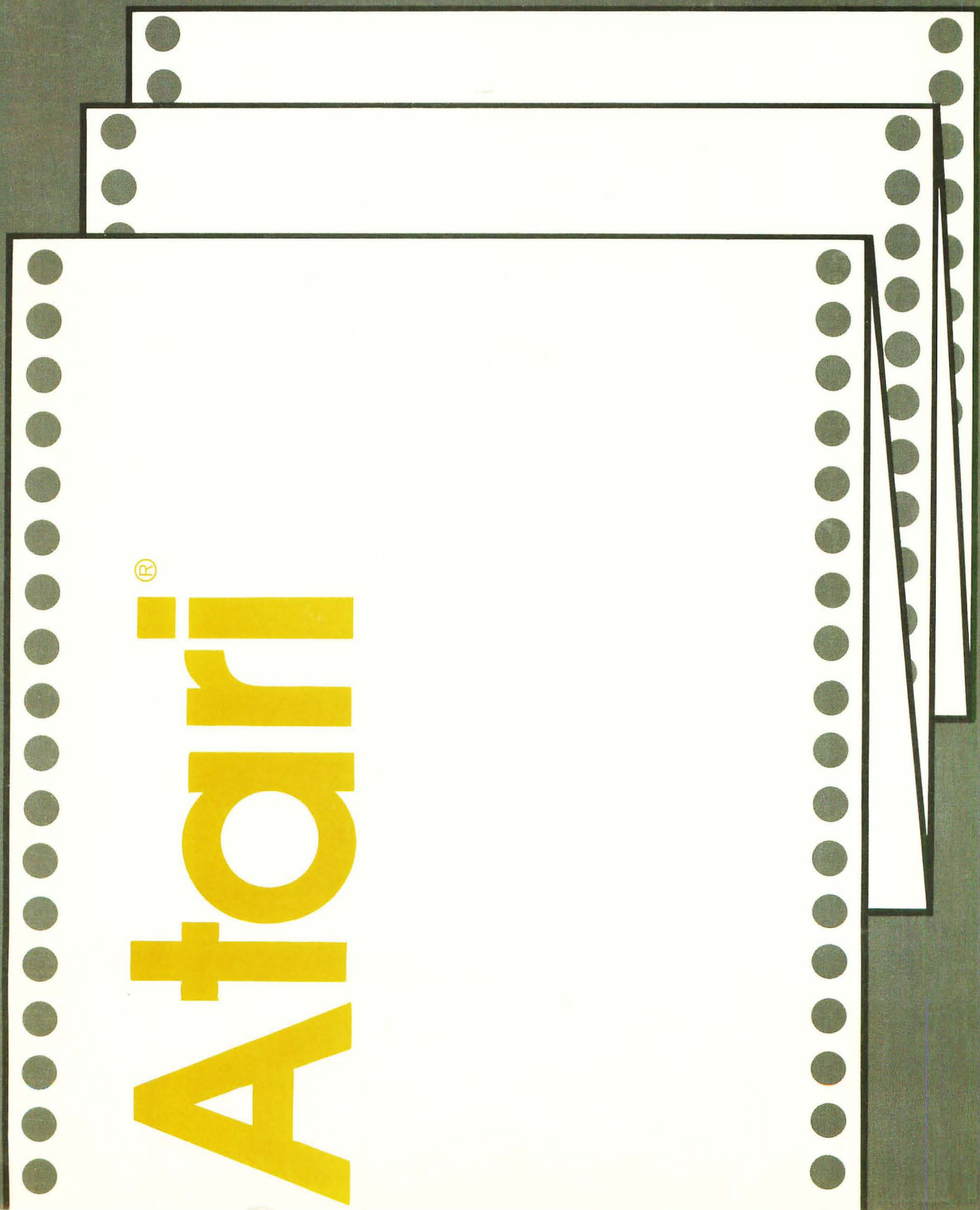
Mostly BASIC: Applications for Your Atari® Book 2

By Howard Berenbon



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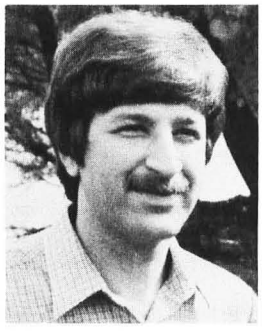

Howard Berenbon is a graduate of Wayne State University with a Bachelor of Science in Electrical Engineering. He is a full-time freelance technical writer, spending much time developing new programs for microcomputers. His articles have appeared in many of the popular electronics and microcomputer publications. He is the author of *Mostly BASIC: Applications for Your Apple® II, Books 1 and 2; Mostly BASIC: Applications for Your TRS-80®, Books 1 and 2; Mostly BASIC: Applications for Your Atari®, Book 1; Mostly BASIC: Applications for Your IBM PC, Books 1 and 2;* and *Mostly BASIC: Applications for Your PET, Books 1 and 2.*

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Applications for Your Atari®

Book 2

by

Howard Berenbon

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Preface

This book is a companion volume to *Mostly BASIC: Applications for Your Atari, Book 1.* Written for the Atari* 400/800/1200XL personal computer hobbyist, it consists of 38 chapters, with 84 complete computer programs written in BASIC. It can help you learn history, budget your household expenses, prepare for retirement, analyze your utility costs, and aid in stock market investment, to mention a few.

As an added feature, two types of educational fantasy games are included. The first program is a single-level dungeon called The Time Dungeon. As you wander through the maze you will be teleported to different dates in history, to answer questions relating to actual events from the past. You will receive gold for a correct response and lose gold for an incorrect response. The second and similar program is called The Algebra Dungeon, where you must solve algebraic equations as you wander through a two-level dungeon.

Also included is a fantasy game called the Dungeon of Danger. Here, you must fight monsters that roam the chambers and corridors of the dungeon. Your goal is to find the way out, unharmed, with as much gold as possible.

The last section in the book includes several programs on graphics and sound. Included is a chapter on redefining the character set to demonstrate character set animation in the text mode. Another chapter uses the SOUND statement to generate thirty-two different sound effects. There is a chapter on animation using Player-Missile Graphics, and another describing over eighty useful PEEK and POKE locations in your machine.

Note portions of some of the programs are identical. However, to avoid confusion, especially for the beginning operator, the complete program listing is given for each version. Thus, there is no need to input part of a program from one listing and then skip to another to complete the desired program.

The programs are written in Atari BASIC. Many of the programs are easily modified to run in other microcomputer BASICs. In some cases the programs contain additional lines to ensure some compatibility with the many dialects of BASIC.

I hope that this book will help stimulate your imagination and aid you in the development of some of your own applications for your home computer.

HOWARD BERENBON

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In memory of my grandmothers, Shirley Diem and Lilly Berenbon.

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SECTION II

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SECTION I

Educational Programs

An important application for the home computer is its use as an educational aid. This section consists of eleven chapters, with sixteen educational programs written in BASIC.

The section begins with an educational fantasy called The Time Dungeon. Here, the player is teleported to different dates in history to answer questions relating to actual events from the past. There are six separate programs including American History, 1607 to 1850; American History, 1848 to 1914; American History, 1916 to 1975; World History, World War I; World History, World War II; and Ancient History, Middle East, 4000 B.C. to 6 B.C. All six programs are identical except for the subject and date at line 100 and the question DATA sets at lines 483 to 532. After entering one complete program, you need only change line 100 and the DATA set to complete the entry of all six games. But each program is listed separately to avoid confusion.

Next is a Relativistic Mass Simulation for physics students. The perception testing program tests for eidetic imagery. There are two memory test games: one that generates random letters and another that displays words. The word association program is a test for children. The Student Grader program will aid the teacher. The algebra test program generates simple algebra problems, and the Algebra Dungeon is an educational fantasy game. The State Capitals program tests your knowledge of the capitals. Finally, the Presidents of the United States program tests for dates in office.

CHAPTER 1

The Time Dungeon

The Time Dungeon is an educational fantasy game where you must answer history questions while wandering through the chambers and corridors of the 64-chamber dungeon. When you enter an active time portal, you will be teleported to an event in history. There, you will be asked a question. There are six complete programs in this chapter. They are written in BASIC for your microcomputer. See Program 1-1 for American History, 1607 to 1850; Program 1-2 for American History, 1848 to 1914; Program 1-3 for American History, 1916 to 1975; Program 1-4 for World History, World War I; Program 1-5 for World History, World War II; and Program 1-6 for Ancient History, Middle East, 4000 B.C. to 6 B.C.

THE PROGRAM

You are given 1000 gold pieces and then teleported to a random location in the dungeon. Your goal is to find your way out, with as much gold as possible. Gold pieces are acquired by correctly answering questions about events in history. When you enter a chamber that is an active time portal, you will be teleported to a specific year. Then a question relating to that year is displayed. You will receive a random amount of gold if a correct answer is entered, and you will lose gold for an incorrect response. See Fig. 1-1 for a sample run.

ACTIONS OR MOVES

In your trip through the dungeon you will encounter active time portals, alien travelers, inactive time portals, time traps, secret doors leading to north-south or east-west corridors, maps, a crystal key, and exit portals.

After you run the program, enter your name, or your favorite fantasy character's name, for your trip into history. Then enter the present year. In a few seconds you will be teleported to an inactive time portal, somewhere in the dungeon.

You now have a choice of six actions. Enter the letter in parentheses for the following actions or moves in the dungeon:

(N)ORTH movement (up)
(E)AST movement (right)
(S)OUTH movement (down)
(W)EST movement (left)
E(X)IT (when you are at an exit portal and have the crystal key)
(G)OLD pieces left

Mapping the Dungeon

Before you proceed, it is a good idea to begin mapping out the dungeon. Find your way to a corner, to orient yourself. Draw an eight (8) by eight (8) checkerboard, and make a note of the contents of each square using the following symbols:

0 = inactive portal
AP = active portal
NS = north-south corridor
EW = east-west corridor
A = alien traveler
X = exit portal
T = time trap
=P= = your location in the dungeon

It must be noted that after you answer a question correctly (in an active time portal) that portal becomes inactive. But an incorrect answer leaves the portal active for future use. Also, after encountering an alien traveler, that chamber becomes an inactive portal. But the alien can reappear elsewhere in the dungeon.

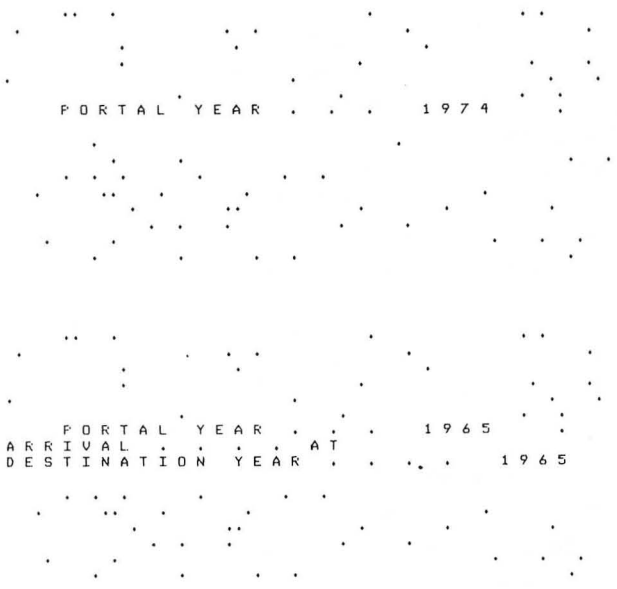
Mapping the dungeon will allow you to find all the active time portals, keep track of time traps (so you can avoid them), and identify exit portal locations. On occasion, maps can be found on glowing screens within corridors. But this will be discussed later in the text.

North Movement (UP)

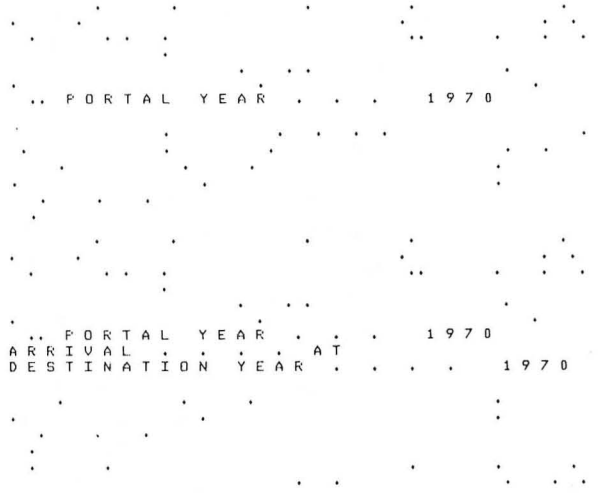
Entering an N allows you to move north through the dungeon. You may not move north under the following conditions:

1. If you reach the North Wall, you cannot pass through it.

```
THE TIME DUNGEON: AMERICAN HISTORY
COPYRIGHT (C) 1980 BY HOWARD BERENSON

AN EDUCATIONAL FANTASY GAME



YOU WILL BE TELEPORTED TO . . .

THE TIME DUNGEON . . . .
TO STUDY AMERICAN HISTORY

ENTER YOUR CHARACTER'S NAME?
? SARGON
ENTER PRESENT YEAR
? 1981

SARGON . . . YOU ARE ON YOUR WAY



YOU HAVE ARRIVED AT . . . .

THE TIME DUNGEON: AMERICAN HISTORY
FOR THE YEARS:    1916 TO 1975

YOU CARRY 1000 GOLD PIECES

YOU WILL ENCOUNTER . . .
TIME PORTALS WHICH TELEPORT
YOU TO EVENTS IN AMERICAN HISTORY



YOU ARE IN A GLOWING TIME PORTAL

THE LIGHT FADES . . . . . .
THE PORTAL IS INACTIVE . . . .

SARGON,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH
(W)EST, E(X)IT, (G)OLD
? N


YOU ENTER INTO A BLUE HAZY . . .
. . . . . TIME PORTAL . . .

A PULSATING GLOW . . . . . .
. . . . INDICATES ACTIVATION

PRESENT YEAR . . .   1981
```



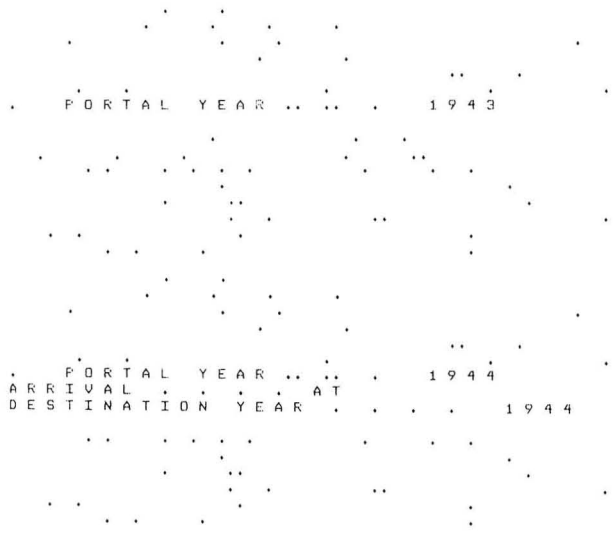

```
YOU HAVE ARRIVED AT THE YEAR  1965
. . . . . IN AMERICAN HISTORY

YOU MUST ANSWER THIS QUESTION . . TO CONTINUE YOUR JOURNEY
-------------------------------------------------------------
THE YEAR IS:  1965

RACE RIOTS ERUPTED IN THE .... SECTION OF LOS ANGELES?:
WHITE            POOR
OLD              WATTS
-------------------------------------------------------------
QUESTION TYPE: *** MULTIPLE CHOICE ?
ENTER CORRECT ANSWER?
? WATTS


CORRECT
YOU WIN  237  GOLD PIECES

SARGON,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH
(W)EST, E(X)IT, (G)OLD
? E


YOU ENTER INTO A BLUE HAZY . . .
. . . . . TIME PORTAL . . .

A PULSATING GLOW . . . . . .
. . . . INDICATES ACTIVATION

PRESENT YEAR . . .   1965
```



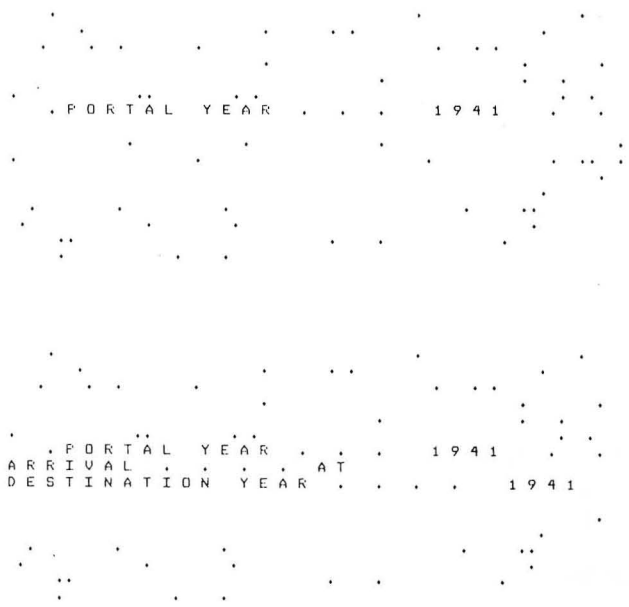

```
YOU HAVE ARRIVED AT THE YEAR  1970
. . . . . IN AMERICAN HISTORY

YOU MUST ANSWER THIS QUESTION . . TO CONTINUE YOUR JOURNEY
-------------------------------------------------------------
THE YEAR IS:  1970

U.S. AND S. VIETNAMESE TROOPS ENTERED WHAT CITY
-------------------------------------------------------------
QUESTION TYPE: PEOPLE, PLACES, OR THINGS ?
ENTER CORRECT ANSWER?
? CAMBODIA


CORRECT
YOU WIN  260  GOLD PIECES

SARGON,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH
(W)EST, E(X)IT, (G)OLD
? S
```

Fig. 1-1. The Time Dungeon

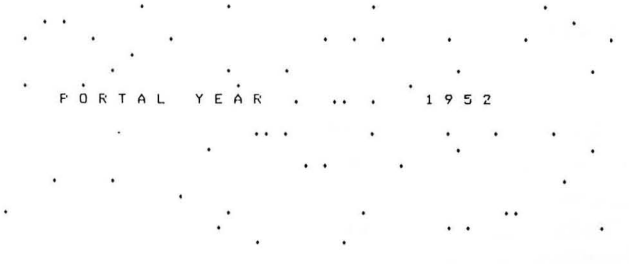
```
YOU ENTER A NORTH-SOUTH CORRIDOR
THRU A SECRET DOOR

THE DOOR CLOSES AND LOCKS BEHIND YOU

ON THE WALL IS A GLOWING SCREEN
BELOW THE SCREEN IS A RED BUTTON


DO YOU WISH TO PUSH THE BUTTON?
ENTER  (Y)ES  OR  (N)O
? Y


THE TIME DUNGEON * * * MAP

?   AP  0   0   0   ?   0   ?
NS  0   0   ?   ?   AP  ?   AP
X   AP  NS  NS  AP  AP  AP  0
EW  EW  AP  X   ?   AP  NS  NS
0   0   0   AP  0   AP  0   AP
AP  NS  AP  ?   NS  EW  NS  AP
EW  0   AP  AP  0   0   0   0
EW  NS  0   0   0   0   =P=  AP


YOU ENTER INTO A BLUE HAZY . . .
. . . . . TIME PORTAL . . .

A PULSATING GLOW . . . . . .
. . . . INDICATES ACTIVATION

PRESENT YEAR . . .   1942
```




```
YOU HAVE ARRIVED AT THE YEAR  1944
. . . . . IN AMERICAN HISTORY

YOU MUST ANSWER THIS QUESTION . . TO CONTINUE YOUR JOURNEY
------------------------------------------------------------
THE YEAR IS:  1944

THE .... INVADED EUROPE AND FREED FRANCE-BELGIUM-& LUXEMBOURG
------------------------------------------------------------
QUESTION TYPE: PEOPLE, PLACES, OR THINGS ?
ENTER CORRECT ANSWER?
? ALLIES


CORRECT
YOU WIN  308  GOLD PIECES

SARGON,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH
(W)EST, E(X)IT, (G)OLD
? N


YOU ENTER INTO A BLUE HAZY . . .
. . . . . TIME PORTAL . . .

A PULSATING GLOW . . . . . .
. . . . INDICATES ACTIVATION

PRESENT YEAR . . .   1944
```




```
YOU HAVE ARRIVED AT THE YEAR  1941
. . . . . IN AMERICAN HISTORY

YOU MUST ANSWER THIS QUESTION . . TO CONTINUE YOUR JOURNEY
------------------------------------------------------------
THE YEAR IS:  1941

ROOSEVELT AND CHURCHILL ISSUED THE .... CHARTER OF POSTWAR ARMS?
:
PACIFIC          FREEDOM
ATLANTIC         WESTERN
------------------------------------------------------------
QUESTION TYPE: *** MULTIPLE CHOICE ?
ENTER CORRECT ANSWER?
? ATLANTIC


CORRECT
YOU WIN  240  GOLD PIECES

YOU SEARCH THE CHAMBER . . . AND
FIND . . . . THE CRYSTAL KEY

SARGON,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH
(W)EST, E(X)IT, (G)OLD
? W


YOU ARE AT AN EXIT PORTAL

(A KEY IS REQUIRED)

SARGON,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH
(W)EST, E(X)IT, (G)OLD
? X


YOU ENTER THE EXIT PORTAL AND
INSERT THE CRYSTAL KEY INTO THE SLOT

THE MACHINE BEGINS TO HUM . . . .
```



sample run.

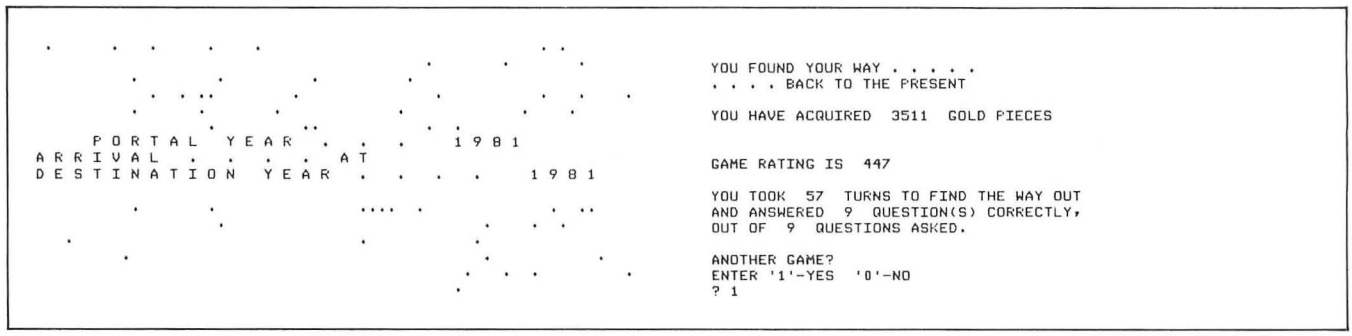


Fig. 1-1—cont. The Time Dungeon sample run.

2. If you enter an east-west corridor (through a secret door), movement north is not allowed.

East Movement (RIGHT)

Entering an E allows you to move east. You may not move east under the following conditions:

1. If you reach the East Wall, you cannot pass through it.
2. If you enter a north-south corridor (through a secret door), movement east is not allowed.

South Movement (DOWN)

Entering an S allows you to move south. You may not move south under the following conditions:

1. If you reach the South Wall, you cannot pass through it.
2. If you enter an east-west corridor (through a secret door), movement south is not allowed.

West Movement (LEFT)

Entering a W allows you to move west. You may not move west under the following conditions:

1. If you reach the West Wall, you cannot pass through it.
2. If you enter a north-south corridor (through a secret door), movement west is not allowed.

Exiting the Dungeon

Entering an X, when you are at an exit portal and have the crystal key, allows you to be teleported back to the present. If you haven't found the key, or you are not at an exit portal, you may not exit the dungeon.

To find the crystal key, you must correctly answer a random number of history questions. But, on occasion, you may find the key when encountering unfriendly alien travelers.

Gold Pieces Left

Entering a G will display the number of gold pieces you have with you. You will start out with 1000 and can gain or lose gold during your trip. But if you lose all your gold pieces, you will lose the game.

Active Portals

When you encounter an active time portal, the year in which you currently are will be displayed, and then a star background will be generated, indicating activation. The portal year will be displayed at the center of the screen as it decrements or increments from the present year to your new destination year. When approaching the destination year this action will slow down, and it will stop when the year is reached.

The question is displayed along with the year that you were teleported to. It is chosen randomly from a list of 50 and will not be repeated until all other questions are asked (for at least two or three games).

A correct answer wins you a random amount of gold, up to 625 pieces, then the portal becomes inactive. If your answer is incorrect, then the correct answer is displayed and you lose a random amount of gold (up to 425 pieces). But the time portal remains active for future use.

The questions are high-school and college level.

Question Types

There are four types of questions possible:

1. People, places, or things.
2. True or false.
3. Who am I (name).
4. Multiple choice.

Type 1 questions may be on any subject relating to the portal destination year. Enter the word or group of words that apply. It can be a fill-in-the-blank type or just a question.

Type 2 requires a true or false response. Enter the letter T for true, or F for false, when requested.

Type 3 requires a last-name entry. Enter the last name only.

Type 4 is a multiple-choice question. It will display a question with four possible answers, one of which is correct. Enter the correct answer.

Question types 1, 3, and 4 require that your answer be spelled correctly, otherwise an incorrect response will be indicated.

The Crystal Key

You will find the crystal key after you answer a random number of questions correctly (you need the key to exit the dungeon).

ALIEN TRAVELERS

When you encounter an alien traveler, he may be friendly or unfriendly. The friendly alien will give you a random number of gold pieces as he leaves. The unfriendly alien will take some of your gold. In this encounter, however, there is a chance that you may find the crystal key.

When the alien leaves, the chamber becomes an inactive portal, but the alien may reappear elsewhere in the dungeon.

TIME TRAPS

Some of the chambers contain time traps, which may, or may not, activate. If they activate, then you will be teleported to an unknown location in the dungeon and lose all but 100 gold pieces. When you discover time traps, avoid them.

NORTH-SOUTH AND EAST-WEST CORRIDORS

North-south and east-west corridors may be entered from any direction (through secret doors), but will limit your next move to the corridor direction displayed.

Corridor Objects

It is possible to find maps or gold inside a corridor. On occasion you will discover a glowing screen on the wall, with a red button below the screen. Depressing this button will result in one of three happenings:

1. A map of the dungeon will be displayed for a random number of seconds. The following symbols will be printed for the 64-chamber dungeon:

   0 = inactive portal
   AP = active portal
   NS = north-south corridor
   EW = east-west corridor
   ? = unknown contents (either an alien traveler or time trap)
   X = exit portal
   =P= = your location in the dungeon

2. Nothing happens.
3. You will receive gold pieces each time you push the button, but the corridor narrows at the same time. There is a possibility of getting stuck in the corridor. If that happens, you lose the game.

See Fig. 1-2 for a sample map.

```
THE TIME DUNGEON * * * MAP

?   AP  0   0   0   ?   0   ?
NS  0   0   0   ?   AP  ?   AP
X   AP  NS  =P= 0   0   0   0
EW  EW  AP  X   0   AP  NS  NS
?   0   0   0   0   AP  0   0
AP  NS  AP  ?   NS  EW  NS  0
EW  0   AP  AP  0   0   0   0
EW  NS  0   0   0   ?   NS  AP
```

Fig. 1-2. The Time Dungeon sample map.

INACTIVE PORTALS

Inactive portals are, normally, empty chambers. Occasionally, however, you will find a door inside the chamber. Trying the door will result in one of three happenings:

1. The door opens, and you find gold inside the closet.
2. The door won't open.
3. The door opens, and the chamber begins to spin. You are teleported, momentarily, into another dimension, where you can lose up to half of your gold and waste up to 20 moves.

GAME RATING

After you complete the game, a game rating is displayed along with the number of gold pieces acquired, the number of history questions answered correctly out of the number of questions asked, and the number of turns (moves) taken. The rating is a number from approximately −600 to +2000, depending on the above statistics. The higher the rating number, the better is the game rating. A negative number indicates a poor rating.

Program 1-1. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
100 PRINT CHR$(125):DIM BZ$(16),BW$(12):BZ$="AMERICAN HISTORY":BW$
="1607 TO 1850"
101 DIM A$(50),M1$(1):PRINT "THE TIME DUNGEON: ";BZ$
102 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
103 PRINT "ATARI":DIM E$(25),K$(1)
104 PRINT :DIM QD$(100),AD$(25),I1$(25),I2$(25),I3$(25)
105 PRINT "AN EDUCATIONAL FANTASY GAME"
106 GT=5:GOSUB 134:Q3=0
107 PRINT CHR$(125):DIM A(9,9),B(50):GOSUB 451
108 PRINT "YOU WILL BE TELEPORTED TO . . ."
109 PRINT
110 PRINT "THE TIME DUNGEON . . . ."
111 PRINT "TO STUDY ";BZ$
112 PRINT
114 CA=0:G=1000:M1=1:K=0:KL=1:TT=0:TR=0
115 PRINT "ENTER YOUR CHARACTER'S NAME?"
116 INPUT A$
117 PRINT "ENTER PRESENT YEAR"
118 INPUT Y2:YY=Y2:IF Y2>2000 THEN 117
119 PRINT :PRINT A$;" . . . YOU ARE ON YOUR WAY"
120 GT=2:GOSUB 134
121 GOSUB 143
122 PRINT CHR$(125)
123 PRINT "YOU HAVE ARRIVED AT . . . ."
124 PRINT
125 PRINT "THE TIME DUNGEON: ";BZ$
126 PRINT "FOR THE YEARS:    ";BW$
127 PRINT
128 PRINT "YOU CARRY 1000 GOLD PIECES":PRINT
129 PRINT "YOU WILL ENCOUNTER . . ."
130 PRINT "TIME PORTALS WHICH TELEPORT"
131 PRINT "YOU TO EVENTS IN ";BZ$
132 GT=8:GOSUB 134
133 GOTO 199
134 FOR ZZ=1 TO 300*GT
135 NEXT ZZ
136 RETURN
137 PRINT "0   ";:RETURN
138 PRINT "AP  ";:RETURN
139 PRINT "?   ";:RETURN
140 PRINT "NS  ";:RETURN
141 PRINT "EW  ";:RETURN
142 PRINT "X   ";:RETURN
143 REM SET UP DUNGEON
144 FOR X=1 TO 8
145 FOR Y=1 TO 8
146 A(X,Y)=INT(RND(0)*7+1)
147 NEXT Y
148 NEXT X
149 REM TRAPS
150 H=INT(RND(0)*3+1)+1
151 FOR N=1 TO H
152 X=INT(RND(0)*8+1)
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
153 Y=INT(RND(0)*8+1)
154 A(X,Y)=8
155 NEXT N
156 REM EXITS
157 S=INT(RND(0)*4+1)+1
158 FOR N=1 TO S
159 X=INT(RND(0)*8+1)
160 Y=INT(RND(0)*8+1)
161 A(X,Y)=9
162 NEXT N
163 RETURN
164 R6=INT(RND(0)*4+1):PRINT QD$;"?:"
165 ON R6 GOSUB 167,168,169,170
166 GOTO 433
167 PRINT AD$,I1$:PRINT I2$,I3$:RETURN
168 PRINT I2$,AD$:PRINT I1$,I3$:RETURN
169 PRINT I1$,I2$:PRINT AD$,I3$:RETURN
170 PRINT I3$,I1$:PRINT I2$,AD$:RETURN
171 PRINT CHR$(125)
173 GT=1
174 GOSUB 134
175 FOR B=1 TO 70:B4=INT(RND(0)*23+1)
176 B7=INT(RND(0)*37+1):POSITION B7,B4
177 PRINT ".";:NEXT B
178 GT=5.0E-03:Y5=25
179 IF Y3=YY THEN PRINT "ALREADY AT . . . .":GOTO 196
180 IF Y3<YY THEN 188
181 IF (Y3-YY)<=50 THEN 185
182 Y3=Y3-Y5
183 GOSUB 382
184 IF Y3=YY THEN 195
185 IF (Y3-YY)<=50 THEN Y5=1
186 IF (Y3-YY)<=5 THEN GT=0.4
187 GOTO 182
188 IF (YY-Y3)<=50 THEN 192
189 Y3=Y3+Y5
190 GOSUB 382
191 IF Y3=YY THEN 195
192 IF (YY-Y3)<=50 THEN Y5=1
193 IF (YY-Y3)<=5 THEN GT=0.4
194 GOTO 189
195 PRINT "ARRIVAL . . . . AT"
196 PRINT "DESTINATION YEAR . . . . ";YY
197 GT=4:GOSUB 134
198 PRINT CHR$(125):RETURN
199 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1):A(C,D)=1
200 K4=INT(RND(0)*4+1)+3
201 PRINT CHR$(125):A=A(C,D):GT=1:GOSUB 134
202 ON A GOSUB 292,300,410,410,306,330,335,338,362
203 IF KL=0 THEN 567
204 PRINT :IF TT=1 THEN TT=0:GOTO 201
205 IF G<=0 THEN 264
206 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
207 PRINT
208 PRINT "(N)ORTH, (E)AST, (S)OUTH"
209 PRINT "(W)EST, E(X)IT, (G)OLD"
210 INPUT M1$
211 M1=M1+1:IF K=0 AND M1>70 THEN 371
212 IF M1$="N" THEN 220
213 IF M1$="E" THEN 225
214 IF M1$="S" THEN 230
215 IF M1$="W" THEN 235
216 IF M1$="X" THEN 240
217 IF M1$="G" THEN 251
218 PRINT
219 GOTO 204
220 REM NORTH
221 IF A=7 THEN 255
222 IF (D-1)=0 THEN 281
223 D=D-1
224 GOTO 201
225 REM EAST
226 IF A=6 THEN 260
227 IF (C+1)=9 THEN 286
228 C=C+1
229 GOTO 201
230 REM SOUTH
231 IF A=7 THEN 255
232 IF (D+1)=9 THEN 288
233 D=D+1
234 GOTO 201
235 REM WEST
236 IF A=6 THEN 260
237 IF (C-1)=0 THEN 290
238 C=C-1
239 GOTO 201
240 PRINT CHR$(125)
241 IF A<>9 THEN 248
242 IF K=1 THEN 387
243 PRINT "YOU CANNOT EXIT THE TIME DUNGEON"
244 PRINT "YOU DON'T HAVE THE CRYSTAL KEY"
245 GT=2:GOSUB 134
246 PRINT
247 GOTO 204
248 PRINT "YOU ARE NOT AT AN EXIT PORTAL"
249 GT=2:GOSUB 134
250 GOTO 204
251 REM GOLD
252 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
253 PRINT
254 GOTO 204
255 REM EW
256 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
257 PRINT "YOU CAN ONLY GO EAST OR WEST"
258 PRINT
259 GOTO 204
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
260 REM NS
261 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
262 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
263 GOTO 258
264 REM GOLD ZERO
265 GT=2:GOSUB 134
266 PRINT
267 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
268 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
269 PRINT " . . . THE TIME DUNGEON . . . . ."
270 PRINT
271 PRINT
272 GT=3:GOSUB 134
273 GOSUB 402
274 PRINT
275 PRINT "ANOTHER GAME?"
276 PRINT "ENTER '1'-YES  '0'-NO"
277 INPUT AA
278 IF AA<>1 THEN 280
279 PRINT CHR$(125):GOTO 108
280 END
281 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
282 PRINT "YOU CANNOT PASS THROUGH"
283 PRINT
284 PRINT "TRY ANOTHER DIRECTION?"
285 GOTO 204
286 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
287 GOTO 282
288 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
289 GOTO 282
290 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
291 GOTO 282
292 KT=INT(RND(0)*9+1)
293 PRINT "YOU ARE IN A GLOWING TIME PORTAL"
294 GT=1:GOSUB 134
295 PRINT
296 PRINT "THE LIGHT FADES . . . . . ."
297 PRINT "THE PORTAL IS INACTIVE . . . ."
298 IF A=1 AND KT>=8 THEN 570
299 RETURN
300 PRINT "YOU ARE IN A DUST FILLED PORTAL"
301 GT=1:GOSUB 134
302 PRINT
303 PRINT "A BRIGHT LIGHT IS ACTIVATED AND . ."
304 PRINT
305 GOTO 296
306 PRINT CHR$(125)
307 PRINT "AN ALIEN TRAVELER IS IN THIS CHAMBER"
308 A(C,D)=INT(RND(0)*2+1):GOSUB 478
309 GT=1:GOSUB 134
310 TD=INT(RND(0)*10+1)
311 G4=INT(RND(0)*350+1)
312 Y=INT(RND(0)*8+1)
```

```
313 IF Y<=5 THEN 320
314 PRINT :IF (G-G4)<0 THEN G4=G
315 PRINT "HE IS UNFRIENDLY . . . . AND AS HE"
316 PRINT "LEAVES . . . HE TAKES ";G4;" GOLD PIECES"
317 PRINT :G=G-G4
318 IF TD=5 AND K=0 THEN 325
319 RETURN
320 PRINT
321 PRINT "HE IS FRIENDLY . . . . . AND GIVES YOU";
322 PRINT ". . ";G4;" GOLD PIECES, WHICH YOU ACCEPT"
323 PRINT :G=G+G4
324 GOTO 318
325 PRINT :GT=2:GOSUB 134
326 PRINT "YOU SEARCH THE CHAMBER . . . AND"
327 GT=1:GOSUB 134
328 PRINT "FIND . . . . THE CRYSTAL KEY"
329 K=1:RETURN
330 PRINT CHR$(125)
331 PRINT "YOU ENTER A NORTH-SOUTH CORRIDOR"
332 PRINT "THRU A SECRET DOOR":PRINT :GOSUB 380
333 KT=INT(RND(0)*9+1):IF KT>=7 THEN 545
334 RETURN
335 PRINT CHR$(125)
336 PRINT "YOU ENTER AN EAST-WEST CORRIDOR"
337 GOTO 332
338 REM TRAP
339 PRINT "YOU ENCOUNTER . . . A TIME TRAP"
340 PRINT ". . . . . IN THIS CHAMBER":GT=1:GOSUB 134
341 TD=INT(RND(0)*9+1)
342 IF TD>=7 THEN 347
343 PRINT
344 PRINT "BUT YOU'RE LUCKY . . . . ."
345 PRINT ". . . IT DIDN'T ACTIVATE"
346 RETURN
347 TT=1:PRINT "AND IT ACTIVATED . . . . .":GT=2:GOSUB 134
348 FOR A=1 TO 250
349 PRINT "*        %";
350 NEXT A
351 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1)
352 PRINT
353 PRINT :G=100
354 PRINT "YOU HAVE BEEN TELEPORTED TO . . . ."
355 PRINT ". . . . AN UNKNOWN LOCATION . . . ."
356 PRINT
357 PRINT "AND YOU LOST MOST OF YOUR GOLD"
358 PRINT
359 PRINT "YOU HAVE . . . ";G;" GOLD PIECES LEFT"
360 GT=6:GOSUB 134
361 RETURN
362 PRINT "YOU ARE AT AN EXIT PORTAL"
363 PRINT
364 PRINT "(A KEY IS REQUIRED)"
365 PRINT
```

```
366 RETURN
367 H=1:O=9:W=8
368 B=0:E=5:R=14
369 C=0:PR=0
370 GOTO 216
371 PRINT :GT=2:GOSUB 134
372 PRINT "BUT BEFORE YOU PROCEED . ."
373 PRINT "YOU LOOK TO THE GROUND AND . . ."
374 PRINT " . . . FIND THE CRYSTAL KEY . .":K=1
375 GT=3:GOSUB 134
376 GOTO 212
377 PRINT "YOU ANSWERED ";CA;" QUESTION(S) CORRECTLY"
378 PRINT " . . . . . IN ";M1;" TURNS,"
379 GOTO 409
380 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GT=1:GOSUB 134
381 RETURN
382 REM TIME DISPLAY
383 POSITION 5,12:PRINT "PORTAL YEAR . . . ";Y3
385 GOSUB 134
386 RETURN
387 PRINT CHR$(125):REM EXIT PORTAL
388 PRINT "YOU ENTER THE EXIT PORTAL AND"
389 PRINT "INSERT THE CRYSTAL KEY INTO THE SLOT"
390 PRINT :GT=4:GOSUB 134
391 PRINT "THE MACHINE BEGINS TO HUM . . . ."
392 PRINT :GT=2:GOSUB 134
393 YY=Y2:GOSUB 171
394 PRINT
395 PRINT "YOU FOUND YOUR WAY . . . . ."
396 PRINT ". . . . BACK TO THE PRESENT"
397 PRINT
398 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
399 PRINT
400 GOSUB 402
401 GOTO 274
402 GG=G+100
403 R=INT((GG*CA-7000+1)/M1)
404 PRINT
405 PRINT "GAME RATING IS ";R
406 PRINT :IF G<=0 OR KL=0 THEN 377
407 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT"
408 PRINT "AND ANSWERED ";CA;" QUESTION(S) CORRECTLY,"
409 PRINT "OUT OF ";TR;" QUESTIONS ASKED.":RETURN
410 PRINT CHR$(125):Y3=YY
411 GOSUB 444
412 Q3=Q3+1
413 IF Q3>50 THEN Q3=0:GOTO 415
414 GOTO 416
415 GOSUB 451
416 Q=INT(RND(0)*50+1)
417 IF B(Q)=1 THEN 416
418 B(Q)=1
419 PRINT
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
420 FOR AB=1 TO Q
421 READ YY,QD$,ID,AD$,I1$,I2$,I3$
422 NEXT AB
423 RESTORE
424 GOSUB 171
425 PRINT CHR$(125):TR=TR+1
426 PRINT "YOU HAVE ARRIVED AT THE YEAR ";YY
427 PRINT ". . . . . IN ";BZ$:PRINT
428 PRINT "YOU MUST ANSWER THIS QUESTION"
429 PRINT " . . TO CONTINUE YOUR JOURNEY"
430 PRINT "-------------------------------------";
431 PRINT "THE YEAR IS: ";YY:PRINT :IF ID=4 THEN 164
432 PRINT QD$
433 PRINT "-------------------------------------";
434 PRINT "QUESTION TYPE: "
435 ON ID GOSUB 455,456,457,458
436 GOSUB 459
437 IF E$=AD$ THEN 441
438 PRINT "INCORRECT"
439 GOSUB 471
440 RETURN
441 PRINT "CORRECT"
442 GOSUB 463
443 RETURN
444 PRINT "YOU ENTER INTO A BLUE HAZY . . ."
445 PRINT ". . . . . TIME PORTAL . . . "
446 PRINT :GT=1:GOSUB 134
447 PRINT "A PULSATING GLOW . . . . . ."
448 PRINT ". . . . INDICATES ACTIVATION":PRINT
449 PRINT "PRESENT YEAR . . .  ";Y3:GT=3:GOSUB 134
450 RETURN
451 FOR I=1 TO 50
452 B(I)=0
453 NEXT I
454 RETURN
455 PRINT "PEOPLE, PLACES, OR     THINGS ?":RETURN
456 PRINT "*** (T)RUE OR (F)ALSE  ?":RETURN
457 PRINT "*** WHO AM I (LAST NAME) ?":RETURN
458 PRINT "*** MULTIPLE CHOICE ?":RETURN
459 PRINT "ENTER CORRECT ANSWER?"
460 INPUT E$
461 G4=INT(RND(0)*500+1)+125
462 RETURN
463 G=G+G4
464 PRINT "YOU WIN ";G4;" GOLD PIECES"
465 A(C,D)=INT(RND(0)*2+1)
466 CA=CA+1:IF K=1 THEN RETURN
467 IF CA=K4 THEN 469
468 RETURN
469 GOSUB 325
470 RETURN
471 PRINT :G4=INT(RND(0)*400+1)+25
472 PRINT "THE CORRECT ANSWER IS '";AD$;"'"
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
473 PRINT :IF (G-G4)<0 THEN G4=G
474 G=G-G4
475 GT=1:GOSUB 134
476 PRINT "YOU LOSE ";G4;" GOLD PIECES"
477 RETURN
478 ZT=5
479 X=INT(RND(0)*8+1):Y=INT(RND(0)*8+1)
480 IF A(X,Y)<=2 THEN A(X,Y)=5:RETURN
481 ZT=ZT-1:IF ZT=0 THEN RETURN
482 GOTO 479
483 DATA 1619,IN WHAT COLONY BEGAN THE SALE OF SLAVES FROM AFRICA,
4,VIRGINIA,NEW HAMPSHIRE,PLYMOUTH,CONNECTICUT
484 DATA 1620,WHAT GROUP OF PEOPLE FOUNDED THE      PLYMOUTH COLON
Y,4,SEPARATISTS,MORMONS,ENGLISH,CONFORMISTS
485 DATA 1607,LONDON CO. EXPEDITION SENT 3 SHIPS-GODSPEED-SARAH CO
NSTANT-& ...,4,DISCOVERY,ENTERPRISE,BRITAIN,HOPE
486 DATA 1607,CAPT. CHRISTOPHER .... COMMANDED THE  1ST LONDON CO.
 EXPEDITION,4,NEWPORT,PIKE,SMITH,WILLIAMS
487 DATA 1607,JAMESTOWN IS NAMED AFTER THE ENGLISH  KING-JAMES I,2
,T,0,0,0
488 DATA 1630,WHAT GROUP BEGAN THE COLONY OF        MASSACHUSETTS
BAY,4,PURITANS,SEPARATISTS,MORMONS,LOYALISTS
489 DATA 1630,THE PURITANS WERE NOT WELL EQUIPPED TO SETTLE IN MAS
SACHUSETTS,2,F,0,0,0
490 DATA 1635,WHAT COLONY DID REVEREND THOMAS HOOK  HELP ESTABLISH
,4,CONNECTICUT,VIRGINIA,PLYMOUTH,MASSACHUSETTS
491 DATA 1635,I WAS BANISHED FROM MASSACHUSETTS BAY FOR MY RELIGIO
US BELIEFS,3,WILLIAMS,0,0,0
492 DATA 1783,WHAT DOCUMENT ENDED THE WAR OF        INDEPENDENCE?,
1,TREATY OF PARIS,0,0,0
493 DATA 1781,I SURRENDERED MY ENTIRE ARMY DURING   THE WAR OF IND
EPENDENCE,3,CORNWALLIS,0,0,0
494 DATA 1766,WHAT COLONIAL TAX DID THE BRITISH     REPEAL,4,STAMP
 ACT,WOOLEN ACT,SHIP TAX,FOOD TAX
495 DATA 1690,BRITISH PASSED THE .... ACT TO STOP   THE MANUFACTUR
E OF TEXTILES,4,WOOLEN,COTTON,RAYON,CLOTHS
496 DATA 1782,AT WHAT CITY WAS THE AMERICAN VICTORY THAT SHOCKED T
HE BRITISH,4,YORKTOWN,JAMESTOWN,ALBANY,SARATOGA
497 DATA 1786,AT WHAT CITY BEGAN THE ALTERING OF THE ARTICLES OF C
ONFEDERATION,4,ANNAPOLIS,SARATOGA,NEW YORK,YORK
498 DATA 1636,I FOUNDED THE SETTLEMENT CALLED       PROVIDENCE,3,W
ILLIAMS,0,0,0
499 DATA 1638,NEW HAMPSHIRE WAS BUILT BY OVERFLOW OF PEOPLE FROM M
ASSACHUSETTS,2,T,0,0,0
500 DATA 1679,IN 1679-WHAT COLONY RECEIVED A CHARTER FROM THE KING
,4,NEW HAMPSHIRE,PLYMOUTH,VIRGINIA,CONNECTICUT
501 DATA 1649,LORD BALTIMORE PERSUADED THE VIRGINIA COLONY TO PASS
 A TOLERATION ACT,2,F,0,0,0
502 DATA 1649,.... AND WILLIAMS ESTABLISHED THE     TOLERATION ACT
,4,BALTIMORE,WASHINGTON,JEFFERSON,FRANKLIN
503 DATA 1649,TOLERATION ACT ALLOWS CATHOLICS &     PROTESTANTS RE
LIGIOUS FREEDOM,2,T,0,0,0
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
504 DATA 1624,NEW YORK HAD BEEN FOUNDED AS NEW      NETHERLAND-A D
UTCH COLONY,2,T,0,0,0
505 DATA 1760,I WAS KNOWN FOR MY EXPERIMENTS WITH   ELECTRICITY,3,
FRANKLIN,0,0,0
506 DATA 1760,I WROTE THE BOOK CALLED 'NOTES ON     VIRGINIA',3,JE
FFERSON,0,0,0
507 DATA 1763,THE FRENCH & INDIAN WAR ENDED WITH THE SIGNING OF WH
AT DOCUMENT,1,PEACE OF PARIS,0,0,0
508 DATA 1777,MAIN BATTLE BETWEEN CONTINENTALS &    BURGOYNE'S FOR
CES WAS NEAR?,4,SARATOGA,LONDON,YORKTOWN,ALBANY
509 DATA 1785,CONFEDERATIONS 1ST LAND ORDINANCE WAS CALLED-LAND OR
DINANCE OF 1785,2,T,0,0,0
510 DATA 1787,NORTHWEST ORDINANCE ALLOWED CREATION  OF NEW STATES
IN THE WEST,2,T,0,0,0
511 DATA 1787,THE CONSTITUTION OF THE UNITED STATES WAS COMPLETED
IN 1785,2,F,0,0,0
512 DATA 1791,WHAT WERE THE 1ST 10 AMENDMENTS TO THE CONSTITUTION
CALLED,1,BILL OF RIGHTS,0,0,0
513 DATA 1790,THOMAS JEFFERSON AND JAMES MADISON    FOUNDED THE ..
.. PARTY,1,REPUBLICAN,0,0,0
514 DATA 1812,WAR OF 1812 RESULTED FROM BRITISH     VIOLATING AMER
ICAN TRADE RIGHTS,2,T,0,0,0
515 DATA 1807,WHAT AMERICAN SHIP DID THE BRITISH    OPEN FIRE UPON
,4,CHESAPEAKE,SARATOGA,DISCOVERY,GODSPEED
516 DATA 1812,WHO COMMANDED THE BATTLE OF NEW       ORLEANS,4,JACK
SON,BALTIMORE,LINCOLN,WASHINGTON
517 DATA 1806,HE FOLLOWED THE MISSISSIPPI RIVER     NORTHWARD TO I
TS SOURCE,4,PIKE,SMITH,ROGERS,JAMES
518 DATA 1845,WHAT GROUP OF PEOPLE MIGRATED TO THE  GREAT SALT LAK
E,4,MORMONS,SEPARATISTS,LOYALISTS,INDIANS
519 DATA 1845,I LEAD THE MORMON MIGRATION TO THE    UTAH TERRITORY
,3,YOUNG,0,0,0
520 DATA 1850,BETWEEN 1830 AND 1850-2 MILLION       EUROPEONS IMMI
GRATED TO THE U.S.,2,T,0,0,0
521 DATA 1807,I INVENTED THE STEAMBOAT-WHICH MADE   WATER TRANSPOR
TATION EASIER,3,FULTON,0,0,0
522 DATA 1812,BY 1812-STEAMBOATS SERVED ON THE OHIO AND MISSISSIPP
I RIVERS,2,T,0,0,0
523 DATA 1816,I CREATED THE 'ERA OF GOOD FEELING' IN POLITICS,3,MO
NROE,0,0,0
524 DATA 1832,I FEARED THE BANK OF THE UNITED STATES AS TOO POWERF
UL,3,JACKSON,0,0,0
525 DATA 1830,I SPOKE BEFORE THE SENATE IN SUPPORT  OF 'UNIONS',3,
WEBSTER,0,0,0
526 DATA 1812,THE WAR OF 1812 WAS OFTEN CALLED THE  SECOND WAR FOR
 INDEPENDENCE,2,T,0,0,0
527 DATA 1803,.... PURCHASE WAS AN ACHIEVEMENT OF   JEFFERSON'S AD
MINISTRATION,4,LOUISIANA,NORTHWEST,SOUTHERN,VIRG
528 DATA 1825,THE GREATEST NUMBER OF PEOPLE MIGRATED TO NORTHERN-M
OHAWK VALLEY,2,T,0,0,0
529 DATA 1790,IN 1790-THERE WERE 8 MILLION PEOPLE IN THE UNITED ST
ATES,2,F,0,0,0
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
530 DATA 1850,THERE WERE 8 MILLION PEOPLE BEYOND THE APPALACHIAN M
OUNTAINS,2,T,0,0,0
531 DATA 1825,THE .... CANAL-CONNECTING ALBANY WITH THE GREAT LAKE
S-WAS OPENED,4,ERIE,NEW YORK,MICHIGAN,ST CLARE
532 DATA 1810,THE MACON BILL NO. 2 ALLOWED TRADE    WITH FRANCE AN
D ENGLAND,2,T,0,0,0
533 PRINT CHR$(125);"THE TIME DUNGEON * * * MAP"
534 PRINT
535 FOR Q=1 TO 8
536 FOR N=1 TO 8
537 IF C=N AND D=Q THEN PRINT "=P= ";:GOTO 540
538 S1=A(N,Q)
539 ON S1 GOSUB 137,137,138,138,139,140,141,139,142
540 NEXT N
541 PRINT
542 NEXT Q
543 GT=INT(RND(0)*8+1)+INT(RND(0)*(CA+5)+1):GOSUB 134
544 PRINT CHR$(125):RETURN
545 PRINT :PRINT "ON THE WALL IS A GLOWING SCREEN"
546 PRINT "BELOW THE SCREEN IS A RED BUTTON":PRINT
547 KT=INT(RND(0)*9+1):KL=INT(RND(0)*15+1)+2
548 GOSUB 565
549 INPUT K$
550 IF K$="Y" THEN 552
551 RETURN
552 IF KT>=6 THEN 533
553 IF KT<=4 THEN 562
554 PRINT :G4=INT(RND(0)*100+1)+25:G=G+G4
555 PRINT "YOU RECEIVE ";G4;" GOLD PIECES . . ."
556 PRINT "BUT . . . . . THE CORRIDOR NARROWS":GT=3:GOSUB 134
557 KL=KL-1:IF KL=0 THEN RETURN
558 GOSUB 565
559 INPUT K$
560 IF K$="Y" THEN 554
561 RETURN
562 PRINT :PRINT "NOTHING HAPPENS"
563 GT=1:GOSUB 134
564 RETURN
565 PRINT :PRINT "DO YOU WISH TO PUSH THE BUTTON?"
566 PRINT "ENTER  (Y)ES  OR  (N)O":RETURN
567 PRINT CHR$(125);"YOU ARE STUCK IN THE NARROW CORRIDOR"
568 PRINT ". . . . . AND . . .":PRINT :GT=3:GOSUB 134
569 GOTO 264
570 PRINT :PRINT "YOU NOTICE A DOOR TO YOUR RIGHT"
571 PRINT
572 KT=INT(RND(0)*9+1)
573 PRINT "DO YOU WISH TO OPEN THE DOOR?"
574 PRINT "ENTER  (Y)ES  OR  (N)O"
575 INPUT K$
576 IF K$="Y" THEN 578
577 RETURN
578 PRINT :PRINT "YOU TRY THE DOOR . . . . .":GT=1:GOSUB 134
579 IF KT>=7 THEN 589
```

Program 1-1-cont. The Time Dungeon: American History, 1607 to 1850, Program Listing

```
580 IF KT<=4 THEN 587
581 PRINT :G4=INT(RND(0)*100+1)+25
582 PRINT "THE DOOR OPENS . . . . . ."
583 PRINT "REVEALING A CLOSET . . . ."
584 PRINT :G=G+G4
585 PRINT "WHERE YOU FIND ";G4;" GOLD PIECES"
586 PRINT :RETURN
587 PRINT "BUT THE DOOR WON'T OPEN . . . ."
588 PRINT ". . . . IT MUST BE LOCKED":RETURN
589 PRINT :PRINT "THE DOOR OPENS . . . AND SUDDENLY"
590 PRINT "THE CHAMBER BEGINS TO . . . SPIN"
591 G7=INT(G/2):G4=INT(RND(0)*G7+1):MM=INT(RND(0)*20+1)
592 GT=4:GOSUB 134:G=G-G4
593 FOR K9=1 TO 250
594 PRINT "+    =    +";
595 NEXT K9
596 PRINT CHR$(125);"YOU WERE TELEPORTED INTO . . . ."
597 PRINT ". . . . ANOTHER DIMENSION . . . ."
598 PRINT ". . AND RETURNED IN AN INSTANT . ."
599 PRINT :PRINT "BUT YOU DROPPED ";G4;" GOLD PIECES"
600 PRINT ". . . AND WASTED ";MM;" MOVES . . ."
601 M1=M1+MM
602 GT=4:GOSUB 134
603 RETURN
```

Program 1-2. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
100 PRINT CHR$(125):DIM BZ$(16),BW$(12):BZ$="AMERICAN HISTORY":BW$
="1848 TO 1914"
101 DIM A$(50),M1$(1):PRINT "THE TIME DUNGEON: ";BZ$
102 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
103 PRINT "ATARI":DIM E$(25),K$(1)
104 PRINT :DIM QD$(100),AD$(25),I1$(25),I2$(25),I3$(25)
105 PRINT "AN EDUCATIONAL FANTASY GAME"
106 GT=5:GOSUB 134:Q3=0
107 PRINT CHR$(125):DIM A(9,9),B(50):GOSUB 451
108 PRINT "YOU WILL BE TELEPORTED TO . . ."
109 PRINT
110 PRINT "THE TIME DUNGEON . . . ."
111 PRINT "TO STUDY ";BZ$
112 PRINT
114 CA=0:G=1000:M1=1:K=0:KL=1:TT=0:TR=0
115 PRINT "ENTER YOUR CHARACTER'S NAME?"
116 INPUT A$
117 PRINT "ENTER PRESENT YEAR"
118 INPUT Y2:YY=Y2:IF Y2>2000 THEN 117
119 PRINT :PRINT A$;" . . . YOU ARE ON YOUR WAY"
120 GT=2:GOSUB 134
121 GOSUB 143
122 PRINT CHR$(125)
123 PRINT "YOU HAVE ARRIVED AT . . . ."
124 PRINT
125 PRINT "THE TIME DUNGEON: ";BZ$
126 PRINT "FOR THE YEARS:    ";BW$
127 PRINT
128 PRINT "YOU CARRY 1000 GOLD PIECES":PRINT
129 PRINT "YOU WILL ENCOUNTER . . ."
130 PRINT "TIME PORTALS WHICH TELEPORT"
131 PRINT "YOU TO EVENTS IN ";BZ$
132 GT=8:GOSUB 134
133 GOTO 199
134 FOR ZZ=1 TO 300*GT
135 NEXT ZZ
136 RETURN
137 PRINT "0   ";:RETURN
138 PRINT "AP  ";:RETURN
139 PRINT "?   ";:RETURN
140 PRINT "NS  ";:RETURN
141 PRINT "EW  ";:RETURN
142 PRINT "X   ";:RETURN
143 REM SET UP DUNGEON
144 FOR X=1 TO 8
145 FOR Y=1 TO 8
146 A(X,Y)=INT(RND(0)*7+1)
147 NEXT Y
148 NEXT X
149 REM TRAPS
150 H=INT(RND(0)*3+1)+1
151 FOR N=1 TO H
152 X=INT(RND(0)*8+1)
```

```
153 Y=INT(RND(0)*8+1)
154 A(X,Y)=8
155 NEXT N
156 REM EXITS
157 S=INT(RND(0)*4+1)+1
158 FOR N=1 TO S
159 X=INT(RND(0)*8+1)
160 Y=INT(RND(0)*8+1)
161 A(X,Y)=9
162 NEXT N
163 RETURN
164 R6=INT(RND(0)*4+1):PRINT QD$;"?:"
165 ON R6 GOSUB 167,168,169,170
166 GOTO 433
167 PRINT AD$,I1$:PRINT I2$,I3$:RETURN
168 PRINT I2$,AD$:PRINT I1$,I3$:RETURN
169 PRINT I1$,I2$:PRINT AD$,I3$:RETURN
170 PRINT I3$,I1$:PRINT I2$,AD$:RETURN
171 PRINT CHR$(125)
173 GT=1
174 GOSUB 134
175 FOR B=1 TO 70:B4=INT(RND(0)*23+1)
176 B7=INT(RND(0)*37+1):POSITION B7,B4
177 PRINT ".";:NEXT B
178 GT=5.0E-03:Y5=25
179 IF Y3=YY THEN PRINT "ALREADY AT . . . .":GOTO 196
180 IF Y3<YY THEN 188
181 IF (Y3-YY)<=50 THEN 185
182 Y3=Y3-Y5
183 GOSUB 382
184 IF Y3=YY THEN 195
185 IF (Y3-YY)<=50 THEN Y5=1
186 IF (Y3-YY)<=5 THEN GT=0.4
187 GOTO 182
188 IF (YY-Y3)<=50 THEN 192
189 Y3=Y3+Y5
190 GOSUB 382
191 IF Y3=YY THEN 195
192 IF (YY-Y3)<=50 THEN Y5=1
193 IF (YY-Y3)<=5 THEN GT=0.4
194 GOTO 189
195 PRINT "ARRIVAL . . . . AT"
196 PRINT "DESTINATION YEAR . . . . ";YY
197 GT=4:GOSUB 134
198 PRINT CHR$(125):RETURN
199 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1):A(C,D)=1
200 K4=INT(RND(0)*4+1)+3
201 PRINT CHR$(125):A=A(C,D):GT=1:GOSUB 134
202 ON A GOSUB 292,300,410,410,306,330,335,338,362
203 IF KL=0 THEN 567
204 PRINT :IF TT=1 THEN TT=0:GOTO 201
205 IF G<=0 THEN 264
206 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
```

Program 1-2-cont. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
207 PRINT
208 PRINT "(N)ORTH, (E)AST, (S)OUTH"
209 PRINT "(W)EST, E(X)IT, (G)OLD"
210 INPUT M1$
211 M1=M1+1:IF K=0 AND M1>70 THEN 371
212 IF M1$="N" THEN 220
213 IF M1$="E" THEN 225
214 IF M1$="S" THEN 230
215 IF M1$="W" THEN 235
216 IF M1$="X" THEN 240
217 IF M1$="G" THEN 251
218 PRINT
219 GOTO 204
220 REM NORTH
221 IF A=7 THEN 255
222 IF (D-1)=0 THEN 281
223 D=D-1
224 GOTO 201
225 REM EAST
226 IF A=6 THEN 260
227 IF (C+1)=9 THEN 286
228 C=C+1
229 GOTO 201
230 REM SOUTH
231 IF A=7 THEN 255
232 IF (D+1)=9 THEN 288
233 D=D+1
234 GOTO 201
235 REM WEST
236 IF A=6 THEN 260
237 IF (C-1)=0 THEN 290
238 C=C-1
239 GOTO 201
240 PRINT CHR$(125)
241 IF A<>9 THEN 248
242 IF K=1 THEN 387
243 PRINT "YOU CANNOT EXIT THE TIME DUNGEON"
244 PRINT "YOU DON'T HAVE THE CRYSTAL KEY"
245 GT=2:GOSUB 134
246 PRINT
247 GOTO 204
248 PRINT "YOU ARE NOT AT AN EXIT PORTAL"
249 GT=2:GOSUB 134
250 GOTO 204
251 REM GOLD
252 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
253 PRINT
254 GOTO 204
255 REM EW
256 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
257 PRINT "YOU CAN ONLY GO EAST OR WEST"
258 PRINT
259 GOTO 204
```

Program 1-2-cont. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
260 REM NS
261 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
262 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
263 GOTO 258
264 REM GOLD ZERO
265 GT=2:GOSUB 134
266 PRINT
267 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
268 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
269 PRINT " . . . THE TIME DUNGEON . . . . ."
270 PRINT
271 PRINT
272 GT=3:GOSUB 134
273 GOSUB 402
274 PRINT
275 PRINT "ANOTHER GAME?"
276 PRINT "ENTER '1'-YES  '0'-NO"
277 INPUT AA
278 IF AA<>1 THEN 280
279 PRINT CHR$(125):GOTO 108
280 END
281 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
282 PRINT "YOU CANNOT PASS THROUGH"
283 PRINT
284 PRINT "TRY ANOTHER DIRECTION?"
285 GOTO 204
286 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
287 GOTO 282
288 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
289 GOTO 282
290 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
291 GOTO 282
292 KT=INT(RND(0)*9+1)
293 PRINT "YOU ARE IN A GLOWING TIME PORTAL"
294 GT=1:GOSUB 134
295 PRINT
296 PRINT "THE LIGHT FADES . . . . . ."
297 PRINT "THE PORTAL IS INACTIVE . . . ."
298 IF A=1 AND KT>=8 THEN 570
299 RETURN
300 PRINT "YOU ARE IN A DUST FILLED PORTAL"
301 GT=1:GOSUB 134
302 PRINT
303 PRINT "A BRIGHT LIGHT IS ACTIVATED AND . ."
304 PRINT
305 GOTO 296
306 PRINT CHR$(125)
307 PRINT "AN ALIEN TRAVELER IS IN THIS CHAMBER"
308 A(C,D)=INT(RND(0)*2+1):GOSUB 478
309 GT=1:GOSUB 134
310 TD=INT(RND(0)*10+1)
311 G4=INT(RND(0)*350+1)
312 Y=INT(RND(0)*8+1)
```

Program 1-2-cont. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
313 IF Y<=5 THEN 320
314 PRINT :IF (G-G4)<0 THEN G4=G
315 PRINT "HE IS UNFRIENDLY . . . . AND AS HE"
316 PRINT "LEAVES . . . HE TAKES ";G4;" GOLD PIECES"
317 PRINT :G=G-G4
318 IF TD=5 AND K=0 THEN 325
319 RETURN
320 PRINT
321 PRINT "HE IS FRIENDLY . . . . . AND GIVES YOU";
322 PRINT ". . ";G4;" GOLD PIECES, WHICH YOU ACCEPT"
323 PRINT :G=G+G4
324 GOTO 318
325 PRINT :GT=2:GOSUB 134
326 PRINT "YOU SEARCH THE CHAMBER . . . AND"
327 GT=1:GOSUB 134
328 PRINT "FIND . . . . THE CRYSTAL KEY"
329 K=1:RETURN
330 PRINT CHR$(125)
331 PRINT "YOU ENTER A NORTH-SOUTH CORRIDOR"
332 PRINT "THRU A SECRET DOOR":PRINT :GOSUB 380
333 KT=INT(RND(0)*9+1):IF KT>=7 THEN 545
334 RETURN
335 PRINT CHR$(125)
336 PRINT "YOU ENTER AN EAST-WEST CORRIDOR"
337 GOTO 332
338 REM TRAP
339 PRINT "YOU ENCOUNTER . . . A TIME TRAP"
340 PRINT ". . . . . IN THIS CHAMBER":GT=1:GOSUB 134
341 TD=INT(RND(0)*9+1)
342 IF TD>=7 THEN 347
343 PRINT
344 PRINT "BUT YOU'RE LUCKY . . . . ."
345 PRINT ". . . IT DIDN'T ACTIVATE"
346 RETURN
347 TT=1:PRINT "AND IT ACTIVATED . . . . .":GT=2:GOSUB 134
348 FOR A=1 TO 250
349 PRINT "*        %";
350 NEXT A
351 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1)
352 PRINT
353 PRINT :G=100
354 PRINT "YOU HAVE BEEN TELEPORTED TO . . . ."
355 PRINT ". . . . AN UNKNOWN LOCATION . . . ."
356 PRINT
357 PRINT "AND YOU LOST MOST OF YOUR GOLD"
358 PRINT
359 PRINT "YOU HAVE . . . ";G;" GOLD PIECES LEFT"
360 GT=6:GOSUB 134
361 RETURN
362 PRINT "YOU ARE AT AN EXIT PORTAL"
363 PRINT
364 PRINT "(A KEY IS REQUIRED)"
365 PRINT
```

```
366 RETURN
367 H=1:O=9:W=8
368 B=0:E=5:R=14
369 C=0:PR=0
370 GOTO 216
371 PRINT :GT=2:GOSUB 134
372 PRINT "BUT BEFORE YOU PROCEED . ."
373 PRINT "YOU LOOK TO THE GROUND AND . . ."
374 PRINT " . . . FIND THE CRYSTAL KEY . .":K=1
375 GT=3:GOSUB 134
376 GOTO 212
377 PRINT "YOU ANSWERED ";CA;" QUESTION(S) CORRECTLY"
378 PRINT " . . . . . IN ";M1;" TURNS,"
379 GOTO 409
380 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GT=1:GOSUB 134
381 RETURN
382 REM TIME DISPLAY
383 POSITION 5,12:PRINT "PORTAL YEAR . . . ";Y3
385 GOSUB 134
386 RETURN
387 PRINT CHR$(125):REM EXIT PORTAL
388 PRINT "YOU ENTER THE EXIT PORTAL AND"
389 PRINT "INSERT THE CRYSTAL KEY INTO THE SLOT"
390 PRINT :GT=4:GOSUB 134
391 PRINT "THE MACHINE BEGINS TO HUM . . . ."
392 PRINT :GT=2:GOSUB 134
393 YY=Y2:GOSUB 171
394 PRINT
395 PRINT "YOU FOUND YOUR WAY . . . . ."
396 PRINT ". . . . BACK TO THE PRESENT"
397 PRINT
398 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
399 PRINT
400 GOSUB 402
401 GOTO 274
402 GG=G+100
403 R=INT((GG*CA-7000+1)/M1)
404 PRINT
405 PRINT "GAME RATING IS ";R
406 PRINT :IF G<=0 OR KL=0 THEN 377
407 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT"
408 PRINT "AND ANSWERED ";CA;" QUESTION(S) CORRECTLY,"
409 PRINT "OUT OF ";TR;" QUESTIONS ASKED.":RETURN
410 PRINT CHR$(125):Y3=YY
411 GOSUB 444
412 Q3=Q3+1
413 IF Q3>50 THEN Q3=0:GOTO 415
414 GOTO 416
415 GOSUB 451
416 Q=INT(RND(0)*50+1)
417 IF B(Q)=1 THEN 416
418 B(Q)=1
419 PRINT
```

Program 1-2-cont. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
420 FOR AB=1 TO Q
421 READ YY,QD$,ID,AD$,I1$,I2$,I3$
422 NEXT AB
423 RESTORE
424 GOSUB 171
425 PRINT CHR$(125):TR=TR+1
426 PRINT "YOU HAVE ARRIVED AT THE YEAR ";YY
427 PRINT ". . . . . IN ";BZ$:PRINT
428 PRINT "YOU MUST ANSWER THIS QUESTION"
429 PRINT " . . TO CONTINUE YOUR JOURNEY"
430 PRINT "----------------------------------";
431 PRINT "THE YEAR IS: ";YY:PRINT :IF ID=4 THEN 164
432 PRINT QD$
433 PRINT "----------------------------------";
434 PRINT "QUESTION TYPE: "
435 ON ID GOSUB 455,456,457,458
436 GOSUB 459
437 IF E$=AD$ THEN 441
438 PRINT "INCORRECT"
439 GOSUB 471
440 RETURN
441 PRINT "CORRECT"
442 GOSUB 463
443 RETURN
444 PRINT "YOU ENTER INTO A BLUE HAZY . . ."
445 PRINT ". . . . . TIME PORTAL . . . "
446 PRINT :GT=1:GOSUB 134
447 PRINT "A PULSATING GLOW . . . . . ."
448 PRINT ". . . . INDICATES ACTIVATION":PRINT
449 PRINT "PRESENT YEAR . . .  ";Y3:GT=3:GOSUB 134
450 RETURN
451 FOR I=1 TO 50
452 B(I)=0
453 NEXT I
454 RETURN
455 PRINT "PEOPLE, PLACES, OR     THINGS ?":RETURN
456 PRINT "*** (T)RUE OR (F)ALSE  ?":RETURN
457 PRINT "*** WHO AM I (LAST NAME) ?":RETURN
458 PRINT "*** MULTIPLE CHOICE ?":RETURN
459 PRINT "ENTER CORRECT ANSWER?"
460 INPUT E$
461 G4=INT(RND(0)*500+1)+125
462 RETURN
463 G=G+G4
464 PRINT "YOU WIN ";G4;" GOLD PIECES"
465 A(C,D)=INT(RND(0)*2+1)
466 CA=CA+1:IF K=1 THEN RETURN
467 IF CA=K4 THEN 469
468 RETURN
469 GOSUB 325
470 RETURN
471 PRINT :G4=INT(RND(0)*400+1)+25
472 PRINT "THE CORRECT ANSWER IS '";AD$;"'"
```

Program 1-2-cont. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
473 PRINT :IF (G-G4)<0 THEN G4=G
474 G=G-G4
475 GT=1:GOSUB 134
476 PRINT "YOU LOSE ";G4;" GOLD PIECES"
477 RETURN
478 ZT=5
479 X=INT(RND(0)*8+1):Y=INT(RND(0)*8+1)
480 IF A(X,Y)<=2 THEN A(X,Y)=5:RETURN
481 ZT=ZT-1:IF ZT=0 THEN RETURN
482 GOTO 479
483 DATA 1850,SLAVE TRADE WAS ABOLISHED IN          WASHINGTON DC,
2,T,0,0,0
484 DATA 1848,THE .... RUSH STARTED IN CALIFORNIA,4,GOLD,SILVER,TI
N,BRASS
485 DATA 1852,I PUBLISHED 'UNCLE TOM'S CABIN',3,STOWE,0,0,0
486 DATA 1853,WHAT ALLOWED PURCHASE OF LAND FROM    MEXICO,1,GADSD
EN PURCHASE,0,0,0
487 DATA 1854,I ENACTED THE KANSAS & NEBRASKA ACT,3,DOUGLAS,0,0,0
488 DATA 1856,WHAT POLITICAL PARTY WAS FORMED THIS  YEAR,4,REPUBLI
CAN,DEMOCRATIC,WHIGS,PROGRESSIVE
489 DATA 1857,THE SUPREME COURT RULED THE MISSOURI  COMPROMISE CON
STITUTIONAL,2,F,0,0,0
490 DATA 1858,HE DEBATED SENATOR DOUGLAS ON SLAVERY,4,LINCOLN,PLES
SY,STOWE,LEE
491 DATA 1859,I TRIED TO SEIZE THE FEDERAL ARSENAL  AT HARPERS FER
RY,3,BROWN,0,0,0
492 DATA 1860,LINCOLN WAS ELECTED PRESIDENT IN THIS YEAR,2,T,0,0,0
493 DATA 1861,WHO WAS PRESIDENT OF THE 'CONFEDERATE STATES OF AMER
ICA',4,DAVIS,LEE,BROWN,LINCOLN
494 DATA 1861,S. CAROLINA TROOPS FIRED ON FORT .....-STARTING THE
CIVIL WAR,1,SUMTER,0,0,0
495 DATA 1861,NORTH CAROLINA WAS A CONFEDERATE STATE,2,T,0,0,0
496 DATA 1862,THE EMANCIPATION PROCLAMATION WAS TO  TAKE EFFECT IN
 JANUARY-1863,2,T,0,0,0
497 DATA 1863,GENERAL MEADE'S UNION FORCES DEFEATS  GENERAL LEE'S
AT?,4,GETTYSBURG,NEW YORK,APPOMATTOX,WASHINGTON
498 DATA 1864,HE BECAME COMMANDER OF THE UNION      ARMIES,4,GRANT
,LEE,DAVIS,JACKSON
499 DATA 1865,THE .... AMENDMENT-ABOLISHING SLAVERY-WAS RATIFIED,4
,13TH,2ND,20TH,5TH
500 DATA 1865,WHO ASSASSINATED LINCOLN-ON APRIL 14TH,1,BOOTH,0,0,0
501 DATA 1865,GENERAL LEE SURRENDERED AT ..... COURT HOUSE,1,APPOM
ATTOX,0,0,0
502 DATA 1866,IN WHAT STATE WAS THE KU KLUX KLAN    FORMED,4,TENNE
SSEE,VIRGINIA,TEXAS,GEORGIA
503 DATA 1867,WHAT LAND WAS PURCHASED FROM RUSSIA   THIS YEAR,4,AL
ASKA,HAWAII,OREGON,TEXAS
504 DATA 1867,WHAT WERE THE NORTHERNERS CALLED WHO  HELPED TO REBU
ILD THE SOUTH,1,CARPETBAGGERS,0,0,0
505 DATA 1870,THE 15TH AMENDMENT GAVE 'BLACKS' THE  RIGHT TO ....,
1,VOTE,0,0,0
506 DATA 1871,A DISASTROUS FIRE DESTROYED WHAT CITY,4,CHICAGO,DETR
OIT,NEW YORK,BOSTON
```

```
507 DATA 1875,CIVIL RIGHTS ACT PASSED AGAINST PUBLIC DISCRIMINATIO
N OF BLACKS,2,T,0,0,0
508 DATA 1876,MY TROOPS WERE MASSACRED BY SITTING   BULL-AT LITTLE
 BIGHORN,3,CUSTER,0,0,0
509 DATA 1881,WHAT PRESIDENT WAS SHOT THIS YEAR,4,GARFIELD,LINCOLN
,TAFT,DAVIS
510 DATA 1886,HE WAS PRESIDENT OF THE AMERICAN      FEDERATION OF
LABOR,4,GOMPERS,MONROE,TAFT,FRICK
511 DATA 1883,THE ..... ACT ESTABLISHED THE CIVIL   SERVICE SYSTEM
,4,PENDLETON,LABOR,TRADE,WORKERS
512 DATA 1890,THE ..... ANTI-TRUST ACT BECAME LAW   THIS YEAR,4,SH
ERMAN,PULLMAN,PENDLETON,TAFT
513 DATA 1894,WHAT STRIKE BROUGHT FEDERAL           INTERVENTION,4
,PULLMAN,COAL,FARMERS,GRAIN
514 DATA 1895,SOUTHERN STATES USED .... CLAUSES-TO  DEPRIVE BLACKS
 VOTING RIGHTS,1,GRANDFATHER,0,0,0
515 DATA 1896,SUPREME COURT-PLESSY V. FERGUSON-     UPHELD LOUISIA
NA SEGRAGATION LAW,2,T,0,0,0
516 DATA 1897,KLONDIKE .... RUSH BEGAN THIS YEAR,4,GOLD,SILVER,URA
NIUM,DIAMOND
517 DATA 1898,SPANISH-AMERICAN WAR BEGAN WHEN WHAT  SHIP EXPLODED-
HAVANA HARBOR,4,MAINE,UNION,YORK,ATLANTIC
518 DATA 1898,THE UNITED STATES ANNEXED THE ..... ISLANDS,1,HAWAII
AN,0,0,0
519 DATA 1899,THE UNITED STATES PARTICIPATED IN THE 1ST ..... CONF
ERENCE,1,HAGUE,0,0,0
520 DATA 1900,SAMOAN ISLANDS WERE DIVIDED BETWEEN   THE UNITED STA
TES & ....,4,GERMANY,RUSSIA,FRANCE,ITALY
521 DATA 1901,I BECAME PRESIDENT AFTER MCKINLEY WAS SHOT,3,ROOSEVE
LT,0,0,0
522 DATA 1902,WHAT DID ROOSEVELT PLEDGE FOR BOTH    LABOR & INDUST
RY,1,SQUARE DEAL,0,0,0
523 DATA 1903,THE ..... BROTHERS FLEW THE 1ST       SUCCESSFUL AIR
PLANE FLIGHT,1,WRIGHT,0,0,0
524 DATA 1906,EARTHQUAKE AND FIRE DESTROYED WHAT    CITY,4,SAN FRA
NCISCO,CHICAGO,BOSTON,RICHMOND
525 DATA 1907,GENTLEMANS AGREEMENT-WITH JAPAN-      ALLOWED LABORE
RS TO MIGRATE HERE,2,F,0,0,0
526 DATA 1908,I WAS ELECTED PRESIDENT THIS YEAR,3,TAFT,0,0,0
527 DATA 1909,HE DISCOVERED THE NORTH POLE THIS YEAR,4,PEARY,LOUIS
,SMITH,PIKE
528 DATA 1912,ROOSEVELT WAS WHAT PARTY'S CANDIDATE  FOR PRESIDENT,
1,PROGRESSIVE,0,0,0
529 DATA 1913,THE FEDERAL .... SYSTEM WAS           ESTABLISHED TH
IS YEAR,1,RESERVE,0,0,0
530 DATA 1914,THE FEDERAL .... COMMISSION WAS       ESTABLISHED TH
IS YEAR,1,TRADE,0,0,0
531 DATA 1914,THE UNITED STATES CLAIMED NEUTRALITY  TO WORLD WAR I
,2,T,0,0,0
532 DATA 1913,WILSON WON A REDUCTION OF THE ....    AFTER A HARD F
IGHT,1,TARIFF,0,0,0
533 PRINT CHR$(125);"THE TIME DUNGEON * * * MAP"
534 PRINT
```

Program 1-2-cont. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
535 FOR Q=1 TO 8
536 FOR N=1 TO 8
537 IF C=N AND D=Q THEN PRINT "=P= ";:GOTO 540
538 S1=A(N,Q)
539 ON S1 GOSUB 137,137,138,138,139,140,141,139,142
540 NEXT N
541 PRINT
542 NEXT Q
543 GT=INT(RND(0)*8+1)+INT(RND(0)*(CA+5)+1):GOSUB 134
544 PRINT CHR$(125):RETURN
545 PRINT :PRINT "ON THE WALL IS A GLOWING SCREEN"
546 PRINT "BELOW THE SCREEN IS A RED BUTTON":PRINT
547 KT=INT(RND(0)*9+1):KL=INT(RND(0)*15+1)+2
548 GOSUB 565
549 INPUT K$
550 IF K$="Y" THEN 552
551 RETURN
552 IF KT>=6 THEN 533
553 IF KT<=4 THEN 562
554 PRINT :G4=INT(RND(0)*100+1)+25:G=G+G4
555 PRINT "YOU RECEIVE ";G4;" GOLD PIECES . . ."
556 PRINT "BUT . . . . . THE CORRIDOR NARROWS":GT=3:GOSUB 134
557 KL=KL-1:IF KL=0 THEN RETURN
558 GOSUB 565
559 INPUT K$
560 IF K$="Y" THEN 554
561 RETURN
562 PRINT :PRINT "NOTHING HAPPENS"
563 GT=1:GOSUB 134
564 RETURN
565 PRINT :PRINT "DO YOU WISH TO PUSH THE BUTTON?"
566 PRINT "ENTER  (Y)ES  OR  (N)O":RETURN
567 PRINT CHR$(125);"YOU ARE STUCK IN THE NARROW CORRIDOR"
568 PRINT ". . . . . AND . . .":PRINT :GT=3:GOSUB 134
569 GOTO 264
570 PRINT :PRINT "YOU NOTICE A DOOR TO YOUR RIGHT"
571 PRINT
572 KT=INT(RND(0)*9+1)
573 PRINT "DO YOU WISH TO OPEN THE DOOR?"
574 PRINT "ENTER  (Y)ES  OR  (N)O"
575 INPUT K$
576 IF K$="Y" THEN 578
577 RETURN
578 PRINT :PRINT "YOU TRY THE DOOR . . . . .":GT=1:GOSUB 134
579 IF KT>=7 THEN 589
580 IF KT<=4 THEN 587
581 PRINT :G4=INT(RND(0)*100+1)+25
582 PRINT "THE DOOR OPENS . . . . . ."
583 PRINT "REVEALING A CLOSET . . . ."
584 PRINT :G=G+G4
585 PRINT "WHERE YOU FIND ";G4;" GOLD PIECES"
586 PRINT :RETURN
587 PRINT "BUT THE DOOR WON'T OPEN . . . ."
```

Program 1-2-cont. The Time Dungeon: American History, 1848 to 1914, Program Listing

```
588 PRINT ". . . . IT MUST BE LOCKED":RETURN
589 PRINT :PRINT "THE DOOR OPENS . . . AND SUDDENLY"
590 PRINT "THE CHAMBER BEGINS TO . . . SPIN"
591 G7=INT(G/2):G4=INT(RND(0)*G7+1):MM=INT(RND(0)*20+1)
592 GT=4:GOSUB 134:G=G-G4
593 FOR K9=1 TO 250
594 PRINT "+    =    +";
595 NEXT K9
596 PRINT CHR$(125);"YOU WERE TELEPORTED INTO . . . ."
597 PRINT ". . . . ANOTHER DIMENSION . . . ."
598 PRINT ". . AND RETURNED IN AN INSTANT . ."
599 PRINT :PRINT "BUT YOU DROPPED ";G4;" GOLD PIECES"
600 PRINT ". . . AND WASTED ";MM;" MOVES . . ."
601 M1=M1+MM
602 GT=4:GOSUB 134
603 RETURN
```

Program 1-3. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
100 PRINT CHR$(125):DIM BZ$(16),BW$(12):BZ$="AMERICAN HISTORY":BW$
="1916 TO 1975"
101 DIM A$(50),M1$(1):PRINT "THE TIME DUNGEON: ";BZ$
102 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
103 PRINT "ATARI":DIM E$(25),K$(1)
104 PRINT :DIM QD$(100),AD$(25),I1$(25),I2$(25),I3$(25)
105 PRINT "AN EDUCATIONAL FANTASY GAME"
106 GT=5:GOSUB 134:Q3=0
107 PRINT CHR$(125):DIM A(9,9),B(50):GOSUB 451
108 PRINT "YOU WILL BE TELEPORTED TO . . ."
109 PRINT
110 PRINT "THE TIME DUNGEON . . . ."
111 PRINT "TO STUDY ";BZ$
112 PRINT
114 CA=0:G=1000:M1=1:K=0:KL=1:TT=0:TR=0
115 PRINT "ENTER YOUR CHARACTER'S NAME?"
116 INPUT A$
117 PRINT "ENTER PRESENT YEAR"
118 INPUT Y2:YY=Y2:IF Y2>2000 THEN 117
119 PRINT :PRINT A$;" . . . YOU ARE ON YOUR WAY"
120 GT=2:GOSUB 134
121 GOSUB 143
122 PRINT CHR$(125)
123 PRINT "YOU HAVE ARRIVED AT . . . ."
124 PRINT
125 PRINT "THE TIME DUNGEON: ";BZ$
126 PRINT "FOR THE YEARS:    ";BW$
127 PRINT
128 PRINT "YOU CARRY 1000 GOLD PIECES":PRINT
129 PRINT "YOU WILL ENCOUNTER . . ."
130 PRINT "TIME PORTALS WHICH TELEPORT"
131 PRINT "YOU TO EVENTS IN ";BZ$
132 GT=8:GOSUB 134
133 GOTO 199
134 FOR ZZ=1 TO 300*GT
135 NEXT ZZ
136 RETURN
137 PRINT "0   ";:RETURN
138 PRINT "AP  ";:RETURN
139 PRINT "?   ";:RETURN
140 PRINT "NS  ";:RETURN
141 PRINT "EW  ";:RETURN
142 PRINT "X   ";:RETURN
143 REM SET UP DUNGEON
144 FOR X=1 TO 8
145 FOR Y=1 TO 8
146 A(X,Y)=INT(RND(0)*7+1)
147 NEXT Y
148 NEXT X
149 REM TRAPS
150 H=INT(RND(0)*3+1)+1
151 FOR N=1 TO H
152 X=INT(RND(0)*8+1)
```

```
153 Y=INT(RND(0)*8+1)
154 A(X,Y)=8
155 NEXT N
156 REM EXITS
157 S=INT(RND(0)*4+1)+1
158 FOR N=1 TO S
159 X=INT(RND(0)*8+1)
160 Y=INT(RND(0)*8+1)
161 A(X,Y)=9
162 NEXT N
163 RETURN
164 R6=INT(RND(0)*4+1):PRINT QD$;"?:"
165 ON R6 GOSUB 167,168,169,170
166 GOTO 433
167 PRINT AD$,I1$:PRINT I2$,I3$:RETURN
168 PRINT I2$,AD$:PRINT I1$,I3$:RETURN
169 PRINT I1$,I2$:PRINT AD$,I3$:RETURN
170 PRINT I3$,I1$:PRINT I2$,AD$:RETURN
171 PRINT CHR$(125)
173 GT=1
174 GOSUB 134
175 FOR B=1 TO 70:B4=INT(RND(0)*23+1)
176 B7=INT(RND(0)*37+1):POSITION B7,B4
177 PRINT ".";:NEXT B
178 GT=5.0E-03:Y5=25
179 IF Y3=YY THEN PRINT "ALREADY AT . . . .":GOTO 196
180 IF Y3<YY THEN 188
181 IF (Y3-YY)<=50 THEN 185
182 Y3=Y3-Y5
183 GOSUB 382
184 IF Y3=YY THEN 195
185 IF (Y3-YY)<=50 THEN Y5=1
186 IF (Y3-YY)<=5 THEN GT=0.4
187 GOTO 182
188 IF (YY-Y3)<=50 THEN 192
189 Y3=Y3+Y5
190 GOSUB 382
191 IF Y3=YY THEN 195
192 IF (YY-Y3)<=50 THEN Y5=1
193 IF (YY-Y3)<=5 THEN GT=0.4
194 GOTO 189
195 PRINT "ARRIVAL . . . . AT"
196 PRINT "DESTINATION YEAR . . . . ";YY
197 GT=4:GOSUB 134
198 PRINT CHR$(125):RETURN
199 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1):A(C,D)=1
200 K4=INT(RND(0)*4+1)+3
201 PRINT CHR$(125):A=A(C,D):GT=1:GOSUB 134
202 ON A GOSUB 292,300,410,410,306,330,335,338,362
203 IF KL=0 THEN 567
204 PRINT :IF TT=1 THEN TT=0:GOTO 201
205 IF G<=0 THEN 264
206 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
207 PRINT
208 PRINT "(N)ORTH, (E)AST, (S)OUTH"
209 PRINT "(W)EST, E(X)IT, (G)OLD"
210 INPUT M1$
211 M1=M1+1:IF K=0 AND M1>70 THEN 371
212 IF M1$="N" THEN 220
213 IF M1$="E" THEN 225
214 IF M1$="S" THEN 230
215 IF M1$="W" THEN 235
216 IF M1$="X" THEN 240
217 IF M1$="G" THEN 251
218 PRINT
219 GOTO 204
220 REM NORTH
221 IF A=7 THEN 255
222 IF (D-1)=0 THEN 281
223 D=D-1
224 GOTO 201
225 REM EAST
226 IF A=6 THEN 260
227 IF (C+1)=9 THEN 286
228 C=C+1
229 GOTO 201
230 REM SOUTH
231 IF A=7 THEN 255
232 IF (D+1)=9 THEN 288
233 D=D+1
234 GOTO 201
235 REM WEST
236 IF A=6 THEN 260
237 IF (C-1)=0 THEN 290
238 C=C-1
239 GOTO 201
240 PRINT CHR$(125)
241 IF A<>9 THEN 248
242 IF K=1 THEN 387
243 PRINT "YOU CANNOT EXIT THE TIME DUNGEON"
244 PRINT "YOU DON'T HAVE THE CRYSTAL KEY"
245 GT=2:GOSUB 134
246 PRINT
247 GOTO 204
248 PRINT "YOU ARE NOT AT AN EXIT PORTAL"
249 GT=2:GOSUB 134
250 GOTO 204
251 REM GOLD
252 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
253 PRINT
254 GOTO 204
255 REM EW
256 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
257 PRINT "YOU CAN ONLY GO EAST OR WEST"
258 PRINT
259 GOTO 204
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
260 REM NS
261 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
262 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
263 GOTO 258
264 REM GOLD ZERO
265 GT=2:GOSUB 134
266 PRINT
267 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
268 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
269 PRINT " . . . THE TIME DUNGEON . . . . ."
270 PRINT
271 PRINT
272 GT=3:GOSUB 134
273 GOSUB 402
274 PRINT
275 PRINT "ANOTHER GAME?"
276 PRINT "ENTER '1'-YES  '0'-NO"
277 INPUT AA
278 IF AA<>1 THEN 280
279 PRINT CHR$(125):GOTO 108
280 END
281 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
282 PRINT "YOU CANNOT PASS THROUGH"
283 PRINT
284 PRINT "TRY ANOTHER DIRECTION?"
285 GOTO 204
286 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
287 GOTO 282
288 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
289 GOTO 282
290 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
291 GOTO 282
292 KT=INT(RND(0)*9+1)
293 PRINT "YOU ARE IN A GLOWING TIME PORTAL"
294 GT=1:GOSUB 134
295 PRINT
296 PRINT "THE LIGHT FADES . . . . . ."
297 PRINT "THE PORTAL IS INACTIVE . . . ."
298 IF A=1 AND KT>=8 THEN 570
299 RETURN
300 PRINT "YOU ARE IN A DUST FILLED PORTAL"
301 GT=1:GOSUB 134
302 PRINT
303 PRINT "A BRIGHT LIGHT IS ACTIVATED AND . ."
304 PRINT
305 GOTO 296
306 PRINT CHR$(125)
307 PRINT "AN ALIEN TRAVELER IS IN THIS CHAMBER"
308 A(C,D)=INT(RND(0)*2+1):GOSUB 478
309 GT=1:GOSUB 134
310 TD=INT(RND(0)*10+1)
311 G4=INT(RND(0)*350+1)
312 Y=INT(RND(0)*8+1)
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
313 IF Y<=5 THEN 320
314 PRINT :IF (G-G4)<0 THEN G4=G
315 PRINT "HE IS UNFRIENDLY . . . . AND AS HE"
316 PRINT "LEAVES . . . HE TAKES ";G4;" GOLD PIECES"
317 PRINT :G=G-G4
318 IF TD=5 AND K=0 THEN 325
319 RETURN
320 PRINT
321 PRINT "HE IS FRIENDLY . . . . . AND GIVES YOU";
322 PRINT ". . ";G4;" GOLD PIECES, WHICH YOU ACCEPT"
323 PRINT :G=G+G4
324 GOTO 318
325 PRINT :GT=2:GOSUB 134
326 PRINT "YOU SEARCH THE CHAMBER . . . AND"
327 GT=1:GOSUB 134
328 PRINT "FIND . . . . THE CRYSTAL KEY"
329 K=1:RETURN
330 PRINT CHR$(125)
331 PRINT "YOU ENTER A NORTH-SOUTH CORRIDOR"
332 PRINT "THRU A SECRET DOOR":PRINT :GOSUB 380
333 KT=INT(RND(0)*9+1):IF KT>=7 THEN 545
334 RETURN
335 PRINT CHR$(125)
336 PRINT "YOU ENTER AN EAST-WEST CORRIDOR"
337 GOTO 332
338 REM TRAP
339 PRINT "YOU ENCOUNTER . . . A TIME TRAP"
340 PRINT ". . . . . IN THIS CHAMBER":GT=1:GOSUB 134
341 TD=INT(RND(0)*9+1)
342 IF TD>=7 THEN 347
343 PRINT
344 PRINT "BUT YOU'RE LUCKY . . . . ."
345 PRINT ". . . IT DIDN'T ACTIVATE"
346 RETURN
347 TT=1:PRINT "AND IT ACTIVATED . . . . .":GT=2:GOSUB 134
348 FOR A=1 TO 250
349 PRINT "*        %";
350 NEXT A
351 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1)
352 PRINT
353 PRINT :G=100
354 PRINT "YOU HAVE BEEN TELEPORTED TO . . . ."
355 PRINT ". . . . AN UNKNOWN LOCATION . . . ."
356 PRINT
357 PRINT "AND YOU LOST MOST OF YOUR GOLD"
358 PRINT
359 PRINT "YOU HAVE . . . ";G;" GOLD PIECES LEFT"
360 GT=6:GOSUB 134
361 RETURN
362 PRINT "YOU ARE AT AN EXIT PORTAL"
363 PRINT
364 PRINT "(A KEY IS REQUIRED)"
365 PRINT
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
366 RETURN
367 H=1:O=9:W=8
368 B=0:E=5:R=14
369 C=0:PR=0
370 GOTO 216
371 PRINT :GT=2:GOSUB 134
372 PRINT "BUT BEFORE YOU PROCEED . ."
373 PRINT "YOU LOOK TO THE GROUND AND . . ."
374 PRINT " . . . FIND THE CRYSTAL KEY . .":K=1
375 GT=3:GOSUB 134
376 GOTO 212
377 PRINT "YOU ANSWERED ";CA;" QUESTION(S) CORRECTLY"
378 PRINT " . . . . . IN ";M1;" TURNS,"
379 GOTO 409
380 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GT=1:GOSUB 134
381 RETURN
382 REM TIME DISPLAY
383 POSITION 5,12:PRINT "PORTAL YEAR . . . ";Y3
385 GOSUB 134
386 RETURN
387 PRINT CHR$(125):REM EXIT PORTAL
388 PRINT "YOU ENTER THE EXIT PORTAL AND"
389 PRINT "INSERT THE CRYSTAL KEY INTO THE SLOT"
390 PRINT :GT=4:GOSUB 134
391 PRINT "THE MACHINE BEGINS TO HUM . . . ."
392 PRINT :GT=2:GOSUB 134
393 YY=Y2:GOSUB 171
394 PRINT
395 PRINT "YOU FOUND YOUR WAY . . . . ."
396 PRINT ". . . . BACK TO THE PRESENT"
397 PRINT
398 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
399 PRINT
400 GOSUB 402
401 GOTO 274
402 GG=G+100
403 R=INT((GG*CA-7000+1)/M1)
404 PRINT
405 PRINT "GAME RATING IS ";R
406 PRINT :IF G<=0 OR KL=0 THEN 377
407 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT"
408 PRINT "AND ANSWERED ";CA;" QUESTION(S) CORRECTLY,"
409 PRINT "OUT OF ";TR;" QUESTIONS ASKED.":RETURN
410 PRINT CHR$(125):Y3=YY
411 GOSUB 444
412 Q3=Q3+1
413 IF Q3>50 THEN Q3=0:GOTO 415
414 GOTO 416
415 GOSUB 451
416 Q=INT(RND(0)*50+1)
417 IF B(Q)=1 THEN 416
418 B(Q)=1
419 PRINT
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
420 FOR AB=1 TO Q
421 READ YY,QD$,ID,AD$,I1$,I2$,I3$
422 NEXT AB
423 RESTORE
424 GOSUB 171
425 PRINT CHR$(125):TR=TR+1
426 PRINT "YOU HAVE ARRIVED AT THE YEAR ";YY
427 PRINT ". . . . . IN ";BZ$:PRINT
428 PRINT "YOU MUST ANSWER THIS QUESTION"
429 PRINT " . . TO CONTINUE YOUR JOURNEY"
430 PRINT "-------------------------------------";
431 PRINT "THE YEAR IS: ";YY:PRINT :IF ID=4 THEN 164
432 PRINT QD$
433 PRINT "-------------------------------------";
434 PRINT "QUESTION TYPE: "
435 ON ID GOSUB 455,456,457,458
436 GOSUB 459
437 IF E$=AD$ THEN 441
438 PRINT "INCORRECT"
439 GOSUB 471
440 RETURN
441 PRINT "CORRECT"
442 GOSUB 463
443 RETURN
444 PRINT "YOU ENTER INTO A BLUE HAZY . . ."
445 PRINT ". . . . . TIME PORTAL . . . "
446 PRINT :GT=1:GOSUB 134
447 PRINT "A PULSATING GLOW . . . . . ."
448 PRINT ". . . . INDICATES ACTIVATION":PRINT
449 PRINT "PRESENT YEAR . . .  ";Y3:GT=3:GOSUB 134
450 RETURN
451 FOR I=1 TO 50
452 B(I)=0
453 NEXT I
454 RETURN
455 PRINT "PEOPLE, PLACES, OR     THINGS ?":RETURN
456 PRINT "*** (T)RUE OR (F)ALSE  ?":RETURN
457 PRINT "*** WHO AM I (LAST NAME) ?":RETURN
458 PRINT "*** MULTIPLE CHOICE ?":RETURN
459 PRINT "ENTER CORRECT ANSWER?"
460 INPUT E$
461 G4=INT(RND(0)*500+1)+125
462 RETURN
463 G=G+G4
464 PRINT "YOU WIN ";G4;" GOLD PIECES"
465 A(C,D)=INT(RND(0)*2+1)
466 CA=CA+1:IF K=1 THEN RETURN
467 IF CA=K4 THEN 469
468 RETURN
469 GOSUB 325
470 RETURN
471 PRINT :G4=INT(RND(0)*400+1)+25
472 PRINT "THE CORRECT ANSWER IS '";AD$;"'"
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
473 PRINT :IF (G-G4)<0 THEN G4=G
474 G=G-G4
475 GT=1:GOSUB 134
476 PRINT "YOU LOSE ";G4;" GOLD PIECES"
477 RETURN
478 ZT=5
479 X=INT(RND(0)*8+1):Y=INT(RND(0)*8+1)
480 IF A(X,Y)<=2 THEN A(X,Y)=5:RETURN
481 ZT=ZT-1:IF ZT=0 THEN RETURN
482 GOTO 479
483 DATA 1917,UNITED STATES SEVERED RELATIONS WITH  WHAT COUNTRY,4
,GERMANY,CANADA,RUSSIA,FRANCE
484 DATA 1916,HE PURSUED PANCHO VILLA INTO MEXICO-  WITHOUT SUCCES
S,4,PERSHING,YORK,HILL,SINCLAIR
485 DATA 1917,CONGRESS DECLARED WAR ON GERMANY-APRIL 6-1917,2,T,0,
0,0
486 DATA 1920,HE ORDERED MASS ARRESTS DURING THE    'RED SCARE' PE
RIOD,4,PALMER,SCOPES,MARSHALL,MCCARTHY
487 DATA 1920,THE 19TH AMENDMENT-WOMEN'S ....-WAS   RATIFIED THIS
YEAR,1,SUFFRAGE,0,0,0
488 DATA 1923,I BECAME PRESIDENT AFTER HARDING DIED,3,COOLIDGE,0,0
,0
489 DATA 1925,I WAS CONVICTED FOR TEACHING EVOLUTION IN TENNESSEE,
3,SCOPES,0,0,0
490 DATA 1923,WHAT SWINDLE ENVOLVED OIL RESERVES    LEASED TO SINC
LAIR BY SEC. FALL,1,TEAPOT DOME,0,0,0
491 DATA 1927,I MADE THE 1ST NONSTOP SOLO FLIGHT    FROM NEW YORK
TO PARIS,3,LINDBERGH,0,0,0
492 DATA 1929,WHAT CRASH GREW INTO THE 'GREAT       DEPRESSON',1,S
TOCK MARKET,0,0,0
493 DATA 1933,ROOSEVELT ADOPTED WHAT POLICIES FOR   ECONOMIC & SOC
IAL WELFARE,1,NEW DEAL,0,0,0
494 DATA 1933,A SEVERE DROUGHT CONVERTED THE GREAT  PLAINS INTO WH
AT,1,DUST BOWL,0,0,0
495 DATA 1934,THE FBI KILLED WHAT WELL KNOWN        GANGSTER-IN CH
ICAGO,1,DILLINGER,0,0,0
496 DATA 1939,SCIENTISTS-INCLUDING EINSTEIN-TOLD    ROOSEVELT THAT
 AN ATOMIC BOMB WAS     POSSIBLE,2,T,0,0,0
497 DATA 1939,U.S. PLEDGED NEUTRALITY AFTER THE WAR BEGAN IN EUROP
E,2,T,0,0,0
498 DATA 1940,WHAT ACT MADE IT UNLAWFUL TO ADVOCATE THE OVERTHROW
OF THE U.S.,4,SMITH,TRUMAN,TAFT,GUN
499 DATA 1941,JAPANESE ATTACKED .... HARBOR-ON      DECEMBER 7-194
1,1,PEARL,0,0,0
500 DATA 1941,ROOSEVELT AND CHURCHILL ISSUED THE ... CHARTER OF PO
STWAR ARMS,4,ATLANTIC,PACIFIC,FREEDOM,WESTERN
501 DATA 1941,THE UNITED STATES DECLARED WAR ON WHAT COUNTRY,1,JAP
AN,0,0,0
502 DATA 1942,JAPANESE-AMERICANS WERE RELOCATED TO  WESTERN .... C
AMPS IN 1942,4,DETENTION,SAFETY,SECURITY,FREEDOM
503 DATA 1944,THE .... INVADED EUROPE AND FREED     FRANCE-BELGIUM
-& LUXEMBOURG,1,ALLIES,0,0,0
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
504 DATA 1945,THE U.S. DROPPED ATOMIC BOMBS ON      HIROSHIMA AND
.....,1,NAGASAKI,0,0,0
505 DATA 1947,I PROPOSED A PLAN FOR EUROPEAN        RECOVERY-THIS
YEAR,3,MARSHALL,0,0,0
506 DATA 1948,HE ACCUSED ALGER HISS OF GIVING       DOCUMENTS TO T
HE RUSSIANS,4,CHAMBERS,TRUMAN,MCCARTHY,ROOSEVELT
507 DATA 1947,THE ....-HARTLEY ACT LIMITED POWER OF LABOR,4,TAFT,S
MITH,SHERMAN,BROWN
508 DATA 1949,THE NORTH .... TREATY ORGANIZATION WAS APPROVED THIS
 YEAR,4,ATLANTIC,PACIFIC,WEST,AMERICAN
509 DATA 1950,TRUMAN SENT U.S. TROOPS TO WHAT      COUNTRY,4,KORE
A,ISRAEL,TURKEY,ITALY
510 DATA 1950,SENATOR ... CHARGED THAT THE STATE   DEPT WAS INFIL
TRATED BY COMMUNISTS,4,MCCARTHY,BROWN,TAFT,FORD
511 DATA 1954,THE SUPREME COURT OUTLAWED ....       SEGREGATION IN
 PUBLIC SCHOOLS,1,RACIAL,0,0,0
512 DATA 1955,THE AFL AND .... MERGED INTO ONE LABOR ORGANIZATION,
4,CIO,NRA,CIA,FBI
513 DATA 1956,I REFUSED TO GIVE MY BUS SEAT TO A    WHITE MAN-IN M
ONTGOMERY,3,PARKS,0,0,0
514 DATA 1957,THE TRUMAN DOCTRINE WAS EXTENDED TO   AID WHAT MIDDL
E EAST COUNTRY,4,JORDAN,ISRAEL,IRAN,EGYPT
515 DATA 1957,THE .... RIGHTS ACT WAS PASSED-DEALING WITH MINORITI
ES,1,CIVIL,0,0,0
516 DATA 1959,THE STATES OF .... AND HAWAII WERE    ADMITTED TO TH
E UNION,1,ALASKA,0,0,0
517 DATA 1960,I FLEW THE U-2 SPY PLANE THAT WAS SHOT DOWN OVER RUS
SIA,3,POWERS,0,0,0
518 DATA 1961,THE ANTI-CASTRO INVASION AT 'BAY OF   PIGS' WAS SUCC
ESSFUL,2,F,0,0,0
519 DATA 1962,HE WAS THE 1ST AMERICAN TO ORBIT THE  EARTH,4,GLENN,
POWERS,ARMSTRONG,ALDRIN
520 DATA 1963,IN WHAT CITY WAS PRESIDENT KENNEDY    ASSASSINATED,4
,DALLAS,WASHINGTON,BOSTON,CHICAGO
521 DATA 1964,WHAT AMENDMENT-ABOLISHING POLL TAX-WAS RATIFIED,4,24
TH,20TH,31ST,29TH
522 DATA 1965,U.S. TROOP BUILD-UP IN VIETNAM CAUSED ANTI-WAR DEMON
STRATIONS,2,T,0,0,0
523 DATA 1965,RACE RIOTS ERUPTED IN THE .... SECTION OF LOS ANGELE
S,4,WATTS,POOR,OLD,WHITE
524 DATA 1968,REV. MARTIN LUTHER .... WAS          ASSASSINATED T
HIS YEAR,1,KING,0,0,0
525 DATA 1968,SENATOR ROBERT F. .... WAS           ASSASSINATED T
HIS YEAR,1,KENNEDY,0,0,0
526 DATA 1967,HE WAS THE 1ST BLACK ELECTED TO THE   SUPREME COURT,
4,MARSHALL,COSBY,CARVER,KING
527 DATA 1969,ARMSTRONG AND ALDRIN WERE THE 1ST TO  LAND ON THE MO
ON,2,T,0,0,0
528 DATA 1970,U.S. AND S. VIETNAMESE TROOPS ENTERED WHAT CITY,1,CA
MBODIA,0,0,0
529 DATA 1971,THE 26TH AMENDMENT ALLOWED VOTING     RIGHTS TO ....
 YEAR OLDS,4,18,20,17,16
```

Program 1-3-cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
530 DATA 1972,WHAT SCANDAL WAS 'COVERED UP' BY NIXON,1,WATERGATE,0
,0,0
531 DATA 1975,THE WAR IN .... ENDED THIS YEAR,1,VIETNAM,0,0,0
532 DATA 1974,PRESIDENT NIXON RESIGNED BECAUSE OF   THE .... SCAND
AL,1,WATERGATE,0,0,0
533 PRINT CHR$(125);"THE TIME DUNGEON * * * MAP"
534 PRINT
535 FOR Q=1 TO 8
536 FOR N=1 TO 8
537 IF C=N AND D=Q THEN PRINT "=P= ";:GOTO 540
538 S1=A(N,Q)
539 ON S1 GOSUB 137,137,138,138,139,140,141,139,142
540 NEXT N
541 PRINT
542 NEXT Q
543 GT=INT(RND(0)*8+1)+INT(RND(0)*(CA+5)+1):GOSUB 134
544 PRINT CHR$(125):RETURN
545 PRINT :PRINT "ON THE WALL IS A GLOWING SCREEN"
546 PRINT "BELOW THE SCREEN IS A RED BUTTON":PRINT
547 KT=INT(RND(0)*9+1):KL=INT(RND(0)*15+1)+2
548 GOSUB 565
549 INPUT K$
550 IF K$="Y" THEN 552
551 RETURN
552 IF KT>=6 THEN 533
553 IF KT<=4 THEN 562
554 PRINT :G4=INT(RND(0)*100+1)+25:G=G+G4
555 PRINT "YOU RECEIVE ";G4;" GOLD PIECES . . ."
556 PRINT "BUT . . . . . THE CORRIDOR NARROWS":GT=3:GOSUB 134
557 KL=KL-1:IF KL=0 THEN RETURN
558 GOSUB 565
559 INPUT K$
560 IF K$="Y" THEN 554
561 RETURN
562 PRINT :PRINT "NOTHING HAPPENS"
563 GT=1:GOSUB 134
564 RETURN
565 PRINT :PRINT "DO YOU WISH TO PUSH THE BUTTON?"
566 PRINT "ENTER  (Y)ES  OR  (N)O":RETURN
567 PRINT CHR$(125);"YOU ARE STUCK IN THE NARROW CORRIDOR"
568 PRINT ". . . . . AND . . .":PRINT :GT=3:GOSUB 134
569 GOTO 264
570 PRINT :PRINT "YOU NOTICE A DOOR TO YOUR RIGHT"
571 PRINT
572 KT=INT(RND(0)*9+1)
573 PRINT "DO YOU WISH TO OPEN THE DOOR?"
574 PRINT "ENTER  (Y)ES  OR  (N)O"
575 INPUT K$
576 IF K$="Y" THEN 578
577 RETURN
578 PRINT :PRINT "YOU TRY THE DOOR . . . . .":GT=1:GOSUB 134
579 IF KT>=7 THEN 589
580 IF KT<=4 THEN 587
```

Program 1-3–cont. The Time Dungeon: American History, 1916 to 1975, Program Listing

```
581 PRINT :G4=INT(RND(0)*100+1)+25
582 PRINT "THE DOOR OPENS . . . . . ."
583 PRINT "REVEALING A CLOSET . . . ."
584 PRINT :G=G+G4
585 PRINT "WHERE YOU FIND ";G4;" GOLD PIECES"
586 PRINT :RETURN
587 PRINT "BUT THE DOOR WON'T OPEN . . . ."
588 PRINT ". . . . IT MUST BE LOCKED":RETURN
589 PRINT :PRINT "THE DOOR OPENS . . . AND SUDDENLY"
590 PRINT "THE CHAMBER BEGINS TO . . . SPIN"
591 G7=INT(G/2):G4=INT(RND(0)*G7+1):MM=INT(RND(0)*20+1)
592 GT=4:GOSUB 134:G=G-G4
593 FOR K9=1 TO 250
594 PRINT "+    =    +";
595 NEXT K9
596 PRINT CHR$(125);"YOU WERE TELEPORTED INTO . . . ."
597 PRINT ". . . . ANOTHER DIMENSION . . . ."
598 PRINT ". . AND RETURNED IN AN INSTANT . ."
599 PRINT :PRINT "BUT YOU DROPPED ";G4;" GOLD PIECES"
600 PRINT ". . . AND WASTED ";MM;" MOVES . . ."
601 M1=M1+MM
602 GT=4:GOSUB 134
603 RETURN
```

Program 1-4. The Time Dungeon: World History, World War I, Program Listing

```
100 PRINT CHR$(125):DIM BZ$(18),BW$(12):BZ$="WORLD HISTORY-WW I":B
W$="1894 TO 1919"
101 DIM A$(50),M1$(1):PRINT "THE TIME DUNGEON: ";BZ$
102 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
103 PRINT "ATARI":DIM E$(25),K$(1)
104 PRINT :DIM QD$(100),AD$(25),I1$(25),I2$(25),I3$(25)
105 PRINT "AN EDUCATIONAL FANTASY GAME"
106 GT=5:GOSUB 134:Q3=0
107 PRINT CHR$(125):DIM A(9,9),B(50):GOSUB 451
108 PRINT "YOU WILL BE TELEPORTED TO . . ."
109 PRINT
110 PRINT "THE TIME DUNGEON . . . ."
111 PRINT "TO STUDY ";BZ$
112 PRINT
114 CA=0:G=1000:M1=1:K=0:KL=1:TT=0:TR=0
115 PRINT "ENTER YOUR CHARACTER'S NAME?"
116 INPUT A$
117 PRINT "ENTER PRESENT YEAR"
118 INPUT Y2:YY=Y2:IF Y2>2000 THEN 117
119 PRINT :PRINT A$;" . . . YOU ARE ON YOUR WAY"
120 GT=2:GOSUB 134
121 GOSUB 143
122 PRINT CHR$(125)
123 PRINT "YOU HAVE ARRIVED AT . . . ."
124 PRINT
125 PRINT "THE TIME DUNGEON: ";BZ$
126 PRINT "FOR THE YEARS:    ";BW$
127 PRINT
128 PRINT "YOU CARRY 1000 GOLD PIECES":PRINT
129 PRINT "YOU WILL ENCOUNTER . . ."
130 PRINT "TIME PORTALS WHICH TELEPORT"
131 PRINT "YOU TO EVENTS IN ";BZ$
132 GT=8:GOSUB 134
133 GOTO 199
134 FOR ZZ=1 TO 300*GT
135 NEXT ZZ
136 RETURN
137 PRINT "0   ";:RETURN
138 PRINT "AP  ";:RETURN
139 PRINT "?   ";:RETURN
140 PRINT "NS  ";:RETURN
141 PRINT "EW  ";:RETURN
142 PRINT "X   ";:RETURN
143 REM SET UP DUNGEON
144 FOR X=1 TO 8
145 FOR Y=1 TO 8
146 A(X,Y)=INT(RND(0)*7+1)
147 NEXT Y
148 NEXT X
149 REM TRAPS
150 H=INT(RND(0)*3+1)+1
151 FOR N=1 TO H
152 X=INT(RND(0)*8+1)
```

```
153 Y=INT(RND(0)*8+1)
154 A(X,Y)=8
155 NEXT N
156 REM EXITS
157 S=INT(RND(0)*4+1)+1
158 FOR N=1 TO S
159 X=INT(RND(0)*8+1)
160 Y=INT(RND(0)*8+1)
161 A(X,Y)=9
162 NEXT N
163 RETURN
164 R6=INT(RND(0)*4+1):PRINT QD$;"?:"
165 ON R6 GOSUB 167,168,169,170
166 GOTO 433
167 PRINT AD$,I1$:PRINT I2$,I3$:RETURN
168 PRINT I2$,AD$:PRINT I1$,I3$:RETURN
169 PRINT I1$,I2$:PRINT AD$,I3$:RETURN
170 PRINT I3$,I1$:PRINT I2$,AD$:RETURN
171 PRINT CHR$(125)
173 GT=1
174 GOSUB 134
175 FOR B=1 TO 70:B4=INT(RND(0)*23+1)
176 B7=INT(RND(0)*37+1):POSITION B7,B4
177 PRINT ".";:NEXT B
178 GT=5.0E-03:Y5=25
179 IF Y3=YY THEN PRINT "ALREADY AT . . . .":GOTO 196
180 IF Y3<YY THEN 188
181 IF (Y3-YY)<=50 THEN 185
182 Y3=Y3-Y5
183 GOSUB 382
184 IF Y3=YY THEN 195
185 IF (Y3-YY)<=50 THEN Y5=1
186 IF (Y3-YY)<=5 THEN GT=0.4
187 GOTO 182
188 IF (YY-Y3)<=50 THEN 192
189 Y3=Y3+Y5
190 GOSUB 382
191 IF Y3=YY THEN 195
192 IF (YY-Y3)<=50 THEN Y5=1
193 IF (YY-Y3)<=5 THEN GT=0.4
194 GOTO 189
195 PRINT "ARRIVAL . . . . AT"
196 PRINT "DESTINATION YEAR . . . . ";YY
197 GT=4:GOSUB 134
198 PRINT CHR$(125):RETURN
199 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1):A(C,D)=1
200 K4=INT(RND(0)*4+1)+3
201 PRINT CHR$(125):A=A(C,D):GT=1:GOSUB 134
202 ON A GOSUB 292,300,410,410,306,330,335,338,362
203 IF KL=0 THEN 567
204 PRINT :IF TT=1 THEN TT=0:GOTO 201
205 IF G<=0 THEN 264
206 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
```

```
207 PRINT
208 PRINT "(N)ORTH, (E)AST, (S)OUTH"
209 PRINT "(W)EST, E(X)IT, (G)OLD"
210 INPUT M1$
211 M1=M1+1:IF K=0 AND M1>70 THEN 371
212 IF M1$="N" THEN 220
213 IF M1$="E" THEN 225
214 IF M1$="S" THEN 230
215 IF M1$="W" THEN 235
216 IF M1$="X" THEN 240
217 IF M1$="G" THEN 251
218 PRINT
219 GOTO 204
220 REM NORTH
221 IF A=7 THEN 255
222 IF (D-1)=0 THEN 281
223 D=D-1
224 GOTO 201
225 REM EAST
226 IF A=6 THEN 260
227 IF (C+1)=9 THEN 286
228 C=C+1
229 GOTO 201
230 REM SOUTH
231 IF A=7 THEN 255
232 IF (D+1)=9 THEN 288
233 D=D+1
234 GOTO 201
235 REM WEST
236 IF A=6 THEN 260
237 IF (C-1)=0 THEN 290
238 C=C-1
239 GOTO 201
240 PRINT CHR$(125)
241 IF A<>9 THEN 248
242 IF K=1 THEN 387
243 PRINT "YOU CANNOT EXIT THE TIME DUNGEON"
244 PRINT "YOU DON'T HAVE THE CRYSTAL KEY"
245 GT=2:GOSUB 134
246 PRINT
247 GOTO 204
248 PRINT "YOU ARE NOT AT AN EXIT PORTAL"
249 GT=2:GOSUB 134
250 GOTO 204
251 REM GOLD
252 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
253 PRINT
254 GOTO 204
255 REM EW
256 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
257 PRINT "YOU CAN ONLY GO EAST OR WEST"
258 PRINT
259 GOTO 204
```

Program 1-4-cont. The Time Dungeon: World History, World War I, Program Listing

```
260 REM NS
261 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
262 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
263 GOTO 258
264 REM GOLD ZERO
265 GT=2:GOSUB 134
266 PRINT
267 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
268 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
269 PRINT " . . . THE TIME DUNGEON . . . . ."
270 PRINT
271 PRINT
272 GT=3:GOSUB 134
273 GOSUB 402
274 PRINT
275 PRINT "ANOTHER GAME?"
276 PRINT "ENTER '1'-YES  '0'-NO"
277 INPUT AA
278 IF AA<>1 THEN 280
279 PRINT CHR$(125):GOTO 108
280 END
281 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
282 PRINT "YOU CANNOT PASS THROUGH"
283 PRINT
284 PRINT "TRY ANOTHER DIRECTION?"
285 GOTO 204
286 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
287 GOTO 282
288 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
289 GOTO 282
290 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
291 GOTO 282
292 KT=INT(RND(0)*9+1)
293 PRINT "YOU ARE IN A GLOWING TIME PORTAL"
294 GT=1:GOSUB 134
295 PRINT
296 PRINT "THE LIGHT FADES . . . . . ."
297 PRINT "THE PORTAL IS INACTIVE . . . ."
298 IF A=1 AND KT>=8 THEN 570
299 RETURN
300 PRINT "YOU ARE IN A DUST FILLED PORTAL"
301 GT=1:GOSUB 134
302 PRINT
303 PRINT "A BRIGHT LIGHT IS ACTIVATED AND . ."
304 PRINT
305 GOTO 296
306 PRINT CHR$(125)
307 PRINT "AN ALIEN TRAVELER IS IN THIS CHAMBER"
308 A(C,D)=INT(RND(0)*2+1):GOSUB 478
309 GT=1:GOSUB 134
310 TD=INT(RND(0)*10+1)
311 G4=INT(RND(0)*350+1)
312 Y=INT(RND(0)*8+1)
```

```
313 IF Y<=5 THEN 320
314 PRINT :IF (G-G4)<0 THEN G4=G
315 PRINT "HE IS UNFRIENDLY . . . . AND AS HE"
316 PRINT "LEAVES . . . HE TAKES ";G4;" GOLD PIECES"
317 PRINT :G=G-G4
318 IF TD=5 AND K=0 THEN 325
319 RETURN
320 PRINT
321 PRINT "HE IS FRIENDLY . . . . . AND GIVES YOU";
322 PRINT ". . ";G4;" GOLD PIECES, WHICH YOU ACCEPT"
323 PRINT :G=G+G4
324 GOTO 318
325 PRINT :GT=2:GOSUB 134
326 PRINT "YOU SEARCH THE CHAMBER . . . AND"
327 GT=1:GOSUB 134
328 PRINT "FIND . . . . THE CRYSTAL KEY"
329 K=1:RETURN
330 PRINT CHR$(125)
331 PRINT "YOU ENTER A NORTH-SOUTH CORRIDOR"
332 PRINT "THRU A SECRET DOOR":PRINT :GOSUB 380
333 KT=INT(RND(0)*9+1):IF KT>=7 THEN 545
334 RETURN
335 PRINT CHR$(125)
336 PRINT "YOU ENTER AN EAST-WEST CORRIDOR"
337 GOTO 332
338 REM TRAP
339 PRINT "YOU ENCOUNTER . . . A TIME TRAP"
340 PRINT ". . . . . . . . IN THIS CHAMBER":GT=1:GOSUB 134
341 TD=INT(RND(0)*9+1)
342 IF TD>=7 THEN 347
343 PRINT
344 PRINT "BUT YOU'RE LUCKY . . . . ."
345 PRINT ". . . IT DIDN'T ACTIVATE"
346 RETURN
347 TT=1:PRINT "AND IT ACTIVATED . . . . .":GT=2:GOSUB 134
348 FOR A=1 TO 250
349 PRINT "*        %";
350 NEXT A
351 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1)
352 PRINT
353 PRINT :G=100
354 PRINT "YOU HAVE BEEN TELEPORTED TO . . . ."
355 PRINT ". . . . AN UNKNOWN LOCATION . . . ."
356 PRINT
357 PRINT "AND YOU LOST MOST OF YOUR GOLD"
358 PRINT
359 PRINT "YOU HAVE . . . ";G;" GOLD PIECES LEFT"
360 GT=6:GOSUB 134
361 RETURN
362 PRINT "YOU ARE AT AN EXIT PORTAL"
363 PRINT
364 PRINT "(A KEY IS REQUIRED)"
365 PRINT
```

Program 1-4-cont. The Time Dungeon: World History, World War I, Program Listing

```
366 RETURN
367 H=1:O=9:W=8
368 B=0:E=5:R=14
369 C=0:PR=0
370 GOTO 216
371 PRINT :GT=2:GOSUB 134
372 PRINT "BUT BEFORE YOU PROCEED . ."
373 PRINT "YOU LOOK TO THE GROUND AND . . ."
374 PRINT " . . . FIND THE CRYSTAL KEY . .":K=1
375 GT=3:GOSUB 134
376 GOTO 212
377 PRINT "YOU ANSWERED ";CA;" QUESTION(S) CORRECTLY"
378 PRINT " . . . . . IN ";M1;" TURNS,"
379 GOTO 409
380 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GT=1:GOSUB 134
381 RETURN
382 REM TIME DISPLAY
383 POSITION 5,12:PRINT "PORTAL YEAR . . . ";Y3
385 GOSUB 134
386 RETURN
387 PRINT CHR$(125):REM EXIT PORTAL
388 PRINT "YOU ENTER THE EXIT PORTAL AND"
389 PRINT "INSERT THE CRYSTAL KEY INTO THE SLOT"
390 PRINT :GT=4:GOSUB 134
391 PRINT "THE MACHINE BEGINS TO HUM . . . ."
392 PRINT :GT=2:GOSUB 134
393 YY=Y2:GOSUB 171
394 PRINT
395 PRINT "YOU FOUND YOUR WAY . . . . ."
396 PRINT ". . . . BACK TO THE PRESENT"
397 PRINT
398 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
399 PRINT
400 GOSUB 402
401 GOTO 274
402 GG=G+100
403 R=INT((GG*CA-7000+1)/M1)
404 PRINT
405 PRINT "GAME RATING IS ";R
406 PRINT :IF G<=0 OR KL=0 THEN 377
407 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT"
408 PRINT "AND ANSWERED ";CA;" QUESTION(S) CORRECTLY,"
409 PRINT "OUT OF ";TR;" QUESTIONS ASKED.":RETURN
410 PRINT CHR$(125):Y3=YY
411 GOSUB 444
412 Q3=Q3+1
413 IF Q3>50 THEN Q3=0:GOTO 415
414 GOTO 416
415 GOSUB 451
416 Q=INT(RND(0)*50+1)
417 IF B(Q)=1 THEN 416
418 B(Q)=1
419 PRINT
```

Program 1-4-cont. The Time Dungeon: World History, World War I, Program Listing

```
420 FOR AB=1 TO Q
421 READ YY,QD$,ID,AD$,I1$,I2$,I3$
422 NEXT AB
423 RESTORE
424 GOSUB 171
425 PRINT CHR$(125):TR=TR+1
426 PRINT "YOU HAVE ARRIVED AT THE YEAR ";YY
427 PRINT ". . . . . IN ";BZ$:PRINT
428 PRINT "YOU MUST ANSWER THIS QUESTION"
429 PRINT " . . TO CONTINUE YOUR JOURNEY"
430 PRINT "--------------------------------------";
431 PRINT "THE YEAR IS: ";YY:PRINT :IF ID=4 THEN 164
432 PRINT QD$
433 PRINT "--------------------------------------";
434 PRINT "QUESTION TYPE: "
435 ON ID GOSUB 455,456,457,458
436 GOSUB 459
437 IF E$=AD$ THEN 441
438 PRINT "INCORRECT"
439 GOSUB 471
440 RETURN
441 PRINT "CORRECT"
442 GOSUB 463
443 RETURN
444 PRINT "YOU ENTER INTO A BLUE HAZY . . ."
445 PRINT ". . . . . TIME PORTAL . . . "
446 PRINT :GT=1:GOSUB 134
447 PRINT "A PULSATING GLOW . . . . . ."
448 PRINT ". . . . INDICATES ACTIVATION":PRINT
449 PRINT "PRESENT YEAR . . .  ";Y3:GT=3:GOSUB 134
450 RETURN
451 FOR I=1 TO 50
452 B(I)=0
453 NEXT I
454 RETURN
455 PRINT "PEOPLE, PLACES, OR     THINGS ?":RETURN
456 PRINT "*** (T)RUE OR (F)ALSE  ?":RETURN
457 PRINT "*** WHO AM I (LAST NAME) ?":RETURN
458 PRINT "*** MULTIPLE CHOICE ?":RETURN
459 PRINT "ENTER CORRECT ANSWER?"
460 INPUT E$
461 G4=INT(RND(0)*500+1)+125
462 RETURN
463 G=G+G4
464 PRINT "YOU WIN ";G4;" GOLD PIECES"
465 A(C,D)=INT(RND(0)*2+1)
466 CA=CA+1:IF K=1 THEN RETURN
467 IF CA=K4 THEN 469
468 RETURN
469 GOSUB 325
470 RETURN
471 PRINT :G4=INT(RND(0)*400+1)+25
472 PRINT "THE CORRECT ANSWER IS '";AD$;"'"
```

Program 1-4-cont. The Time Dungeon: World History, World War I, Program Listing

```
473 PRINT :IF (G-G4)<0 THEN G4=G
474 G=G-G4
475 GT=1:GOSUB 134
476 PRINT "YOU LOSE ";G4;" GOLD PIECES"
477 RETURN
478 ZT=5
479 X=INT(RND(0)*8+1):Y=INT(RND(0)*8+1)
480 IF A(X,Y)<=2 THEN A(X,Y)=5:RETURN
481 ZT=ZT-1:IF ZT=0 THEN RETURN
482 GOTO 479
483 DATA 1894,FRANCE AND .... FORMED A MILITARY     ALLIANCE,4,RUS
SIA,ITALY,GERMANY,SPAIN
484 DATA 1904,AGREEMENT BETWEEN ENGLAND & FRANCE WAS CALLED ....,4
,ENTENTE CORDIALE,NEW EUROPE,FREE EUROPE,AMI ICI
485 DATA 1902,GREAT BRITAIN AND .... FORMED AN      ALLIANCE THIS
YEAR,4,JAPAN,U.S.,CANADA,GERMANY
486 DATA 1905,ENGLAND BUILT THE .... BATTLESHIP THIS YEAR,4,DREADN
OUGHT,DISCOVERY,FREEDOM,BRITAIN
487 DATA 1899,THE 1ST PEACE CONFERENCE WAS HELD AT  THE ....,1,HAG
UE,0,0,0
488 DATA 1907,THE HAGUE PEACE CONFERENCES WERE NOT  EFFECTIVE,2,T,
0,0,0
489 DATA 1905,FRANCE TRIED TO OCCUPY .... THIS YEAR,4,MOROCCO,HOLL
AND,TURKEY,SPAIN
490 DATA 1911,ITALY DECLARED WAR ON ....-AND SEIZED TRIPOLI,4,TURK
EY,SPAIN,JAPAN,RUMANIA
491 DATA 1912,THE BALKAN WARS PREPARED EUROPE FOR   WW I,2,T,0,0,0
492 DATA 1914,JUNE 28-THE ARCHDUKE FRANCIS .... WAS ASSASSINATED,1
,FERDINAND,0,0,0
493 DATA 1914,ARCHDUKE FERDINAND WAS SHOT IN WHAT   CITY,1,SARAJEV
O,0,0,0
494 DATA 1914,JULY 28-AUSTRIA-HUNGARY DECLARED WAR  ON ....,4,SERB
IA,U.S.,SPAIN,ITALY
495 DATA 1914,AUG 1-GERMANY DECLARED WAR ON ....,1,RUSSIA,0,0,0
496 DATA 1914,AUG 4-ENGLAND DECLARED WAR ON ....,1,GERMANY,0,0,0
497 DATA 1914,AUG 3-GERMANY DECLARED WAR ON ....,1,FRANCE,0,0,0
498 DATA 1914,THE CENTRAL POWERS WERE STRONGER THAN THE ALLIES,2,F
,0,0,0
499 DATA 1914,SEPT 6-THE 1ST BATTLE OF THE ....     RIVER,4,MARNE,
SEINE,TEMPS,HAGUE
500 DATA 1914,GERMANS TRY TO CAPTURE PARIS-BUT FAIL,2,T,0,0,0
501 DATA 1914,AUG-RUSSIANS LOST THE BATTLE OF ....,4,TANNENBERG,SE
INE,HINDENBURG,AUSTRIA
502 DATA 1914,I COMMANDED THE GERMANS AT THE BATTLE OF TANNENBERG,
3,HINDENBURG,0,0,0
503 DATA 1915,ALLIES HOPED TO TIGHTEN THE ....-TO   LIMIT SUPPLIES
 TO THE ENEMY,1,BLOCKADE,0,0,0
504 DATA 1915,SPRING-GERMANS LAUNCHED A HEAVY       OFFENSIVE ON T
HE EASTERN FRONT,2,T,0,0,0
505 DATA 1915,THE BRITISH CAMPAIGN IN THE MIDDLE    EAST WAS A SUC
CESS,2,F,0,0,0
506 DATA 1916,RUSSIAN FORCES HIT AUSTRIA-& TOOK     ABOUT 300000 P
RISONERS,2,T,0,0,0
```

```
507 DATA 1916,MOST OF RUMANIA WAS OCCUPIED BY THE   CENTRAL POWERS
,2,T,0,0,0
508 DATA 1915,GERMANS DECLARED THE SEAS AROUND THE  BRITISH ISLES
A ...,4,WAR ZONE,HAZARD,NEUTRAL ZONE,BOMB ZONE
509 DATA 1915,MAY-BRITISH LINER .... WAS TORPEDOED  BY THE GERMANS
,4,LUSITANIA,CONCORD,BRITAIN,ALLENBY
510 DATA 1916,DEC 12-GERMANY CONTACTED THE ALLIES TO SUGGEST PEACE
 TALKS,2,T,0,0,0
511 DATA 1916,DEC 30-ALLIES AGREE TO MAKE PEACE WITH GERMANY,2,F,0
,0,0
512 DATA 1917,APRIL 6-U.S. DECLARED WAR ON ....,1,GERMANY,0,0,0
513 DATA 1916,MY SLOGAN WAS 'HE KEPT US OUT OF WAR',3,WILSON,0,0,0
514 DATA 1917,JAN 19-GERMANY BEGINS .... WARFARE-   UNRESTRICTED,4
,SUBMARINE,LAND,AIR,ALL OUT
515 DATA 1917,I COMMANDED THE AMERICAN EXPEDITIONARY FORCE,3,PERSH
ING,0,0,0
516 DATA 1917,BRITISH GENERAL .... WON THE HOLY LAND,4,ALLENBY,THO
MAS,SMYTH,ROGERS
517 DATA 1918,WILSON'S '14 POINTS' OUTLINED A       LASTING PEACE,
2,T,0,0,0
518 DATA 1918,THE AMERICAN 2ND DIVISION STOPPED THE GERMANS AT ...
.-FRANCE,4,CHATEAUTHIERRY,HAGUE,NICE,CAAN
519 DATA 1918,JULY-2ND BATTLE OF THE MARNE PUSHED   BACK THE GERMA
NS,2,T,0,0,0
520 DATA 1918,OCT-THE .... LINE WAS BROKEN IN MANY  PLACES,4,HINDE
NBURG,EASTERN,FRONT,WESTERN
521 DATA 1918,OCT-GENERAL ALLENBY CONQUERED ....,4,TURKEY,IRAN,JOR
DAN,EGYPT
522 DATA 1918,NOV 3-AUSTRIA ASKED FOR AN ARMISTICE,2,T,0,0,0
523 DATA 1919,JAN 18-THE .... PEACE CONFERENCE      OPENED THIS DA
Y,4,PARIS,LONDON,NEW YORK,HAGUE
524 DATA 1919,THE PARIS CONFERENCE PRODUCED FIVE    PEACE ....,1,T
REATIES,0,0,0
525 DATA 1919,THE TREATY OF .... WAS SIGNED BETWEEN GERMANY & THE
ALLIES,1,VERSAILLES,0,0,0
526 DATA 1919,TREATY OF VERSAILLES WAS SIGNED IN THE ....,1,HALL O
F MIRRORS,0,0,0
527 DATA 1918,NOV-KAISER WILLIAM II WAS FORCED TO   ....,1,ABDICAT
E,0,0,0
528 DATA 1918,NOV 11-GERMANS SIGNED AN ARMISTICE IN A RAILROAD CAR
,2,T,0,0,0
529 DATA 1918,TOTAL COST OF THE WAR WAS ABOUT 300   BILLION DOLLAR
S,2,T,0,0,0
530 DATA 1919,ALL OF WILSON'S '14 POINTS' WERE      ACCEPTED,2,F,0
,0,0
531 DATA 1919,CLEMENCEAU OF FRANCE WANTED TO KEEP   GERMANY ....,4
,WEAK,UNDIVIDED,DIVIDED,STRONG
532 DATA 1919,WILSON'S POINT 14 GAVE RISE TO THE    'LEAGUE OF NAT
IONS',2,T,0,0,0
533 PRINT CHR$(125);"THE TIME DUNGEON * * * MAP"
534 PRINT
535 FOR Q=1 TO 8
536 FOR N=1 TO 8
```

Program 1-4-cont. The Time Dungeon: World History, World War I, Program Listing

```
537 IF C=N AND D=Q THEN PRINT "=P= ";:GOTO 540
538 S1=A(N,Q)
539 ON S1 GOSUB 137,137,138,138,139,140,141,139,142
540 NEXT N
541 PRINT
542 NEXT Q
543 GT=INT(RND(0)*8+1)+INT(RND(0)*(CA+5)+1):GOSUB 134
544 PRINT CHR$(125):RETURN
545 PRINT :PRINT "ON THE WALL IS A GLOWING SCREEN"
546 PRINT "BELOW THE SCREEN IS A RED BUTTON":PRINT
547 KT=INT(RND(0)*9+1):KL=INT(RND(0)*15+1)+2
548 GOSUB 565
549 INPUT K$
550 IF K$="Y" THEN 552
551 RETURN
552 IF KT>=6 THEN 533
553 IF KT<=4 THEN 562
554 PRINT :G4=INT(RND(0)*100+1)+25:G=G+G4
555 PRINT "YOU RECEIVE ";G4;" GOLD PIECES . . ."
556 PRINT "BUT . . . . . THE CORRIDOR NARROWS":GT=3:GOSUB 134
557 KL=KL-1:IF KL=0 THEN RETURN
558 GOSUB 565
559 INPUT K$
560 IF K$="Y" THEN 554
561 RETURN
562 PRINT :PRINT "NOTHING HAPPENS"
563 GT=1:GOSUB 134
564 RETURN
565 PRINT :PRINT "DO YOU WISH TO PUSH THE BUTTON?"
566 PRINT "ENTER  (Y)ES  OR  (N)O":RETURN
567 PRINT CHR$(125);"YOU ARE STUCK IN THE NARROW CORRIDOR"
568 PRINT ". . . . . AND . . .":PRINT :GT=3:GOSUB 134
569 GOTO 264
570 PRINT :PRINT "YOU NOTICE A DOOR TO YOUR RIGHT"
571 PRINT
572 KT=INT(RND(0)*9+1)
573 PRINT "DO YOU WISH TO OPEN THE DOOR?"
574 PRINT "ENTER  (Y)ES  OR  (N)O"
575 INPUT K$
576 IF K$="Y" THEN 578
577 RETURN
578 PRINT :PRINT "YOU TRY THE DOOR . . . . .":GT=1:GOSUB 134
579 IF KT>=7 THEN 589
580 IF KT<=4 THEN 587
581 PRINT :G4=INT(RND(0)*100+1)+25
582 PRINT "THE DOOR OPENS . . . . . ."
583 PRINT "REVEALING A CLOSET . . . ."
584 PRINT :G=G+G4
585 PRINT "WHERE YOU FIND ";G4;" GOLD PIECES"
586 PRINT :RETURN
587 PRINT "BUT THE DOOR WON'T OPEN . . . ."
588 PRINT ". . . . IT MUST BE LOCKED":RETURN
589 PRINT :PRINT "THE DOOR OPENS . . . AND SUDDENLY"
```

Program 1-4-cont. The Time Dungeon: World History, World War I, Program Listing

```
590 PRINT "THE CHAMBER BEGINS TO . . . SPIN"
591 G7=INT(G/2):G4=INT(RND(0)*G7+1):MM=INT(RND(0)*20+1)
592 GT=4:GOSUB 134:G=G-G4
593 FOR K9=1 TO 250
594 PRINT "+    =    +";
595 NEXT K9
596 PRINT CHR$(125);"YOU WERE TELEPORTED INTO . . . ."
597 PRINT ". . . . ANOTHER DIMENSION . . . ."
598 PRINT ". . AND RETURNED IN AN INSTANT . ."
599 PRINT :PRINT "BUT YOU DROPPED ";G4;" GOLD PIECES"
600 PRINT ". . . AND WASTED ";MM;" MOVES . . ."
601 M1=M1+MM
602 GT=4:GOSUB 134
603 RETURN
```

Program 1-5. The Time Dungeon: World History, World War II, Program Listing

```
100 PRINT CHR$(125):DIM BZ$(19),BW$(12):BZ$="WORLD HISTORY-WW II":
BW$="1933 TO 1945"
101 DIM A$(50),M1$(1):PRINT "THE TIME DUNGEON: ";BZ$
102 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
103 PRINT "ATARI":DIM E$(25),K$(1)
104 PRINT :DIM QD$(100),AD$(25),I1$(25),I2$(25),I3$(25)
105 PRINT "AN EDUCATIONAL FANTASY GAME"
106 GT=5:GOSUB 134:Q3=0
107 PRINT CHR$(125):DIM A(9,9),B(50):GOSUB 451
108 PRINT "YOU WILL BE TELEPORTED TO . . ."
109 PRINT
110 PRINT "THE TIME DUNGEON . . . ."
111 PRINT "TO STUDY ";BZ$
112 PRINT
114 CA=0:G=1000:M1=1:K=0:KL=1:TT=0:TR=0
115 PRINT "ENTER YOUR CHARACTER'S NAME?"
116 INPUT A$
117 PRINT "ENTER PRESENT YEAR"
118 INPUT Y2:YY=Y2:IF Y2>2000 THEN 117
119 PRINT :PRINT A$;" . . . YOU ARE ON YOUR WAY"
120 GT=2:GOSUB 134
121 GOSUB 143
122 PRINT CHR$(125)
123 PRINT "YOU HAVE ARRIVED AT . . . ."
124 PRINT
125 PRINT "THE TIME DUNGEON: ";BZ$
126 PRINT "FOR THE YEARS:    ";BW$
127 PRINT
128 PRINT "YOU CARRY 1000 GOLD PIECES":PRINT
129 PRINT "YOU WILL ENCOUNTER . . ."
130 PRINT "TIME PORTALS WHICH TELEPORT"
131 PRINT "YOU TO EVENTS IN ";BZ$
132 GT=8:GOSUB 134
133 GOTO 199
134 FOR ZZ=1 TO 300*GT
135 NEXT ZZ
136 RETURN
137 PRINT "0   ";:RETURN
138 PRINT "AP  ";:RETURN
139 PRINT "?   ";:RETURN
140 PRINT "NS  ";:RETURN
141 PRINT "EW  ";:RETURN
142 PRINT "X   ";:RETURN
143 REM SET UP DUNGEON
144 FOR X=1 TO 8
145 FOR Y=1 TO 8
146 A(X,Y)=INT(RND(0)*7+1)
147 NEXT Y
148 NEXT X
149 REM TRAPS
150 H=INT(RND(0)*3+1)+1
151 FOR N=1 TO H
152 X=INT(RND(0)*8+1)
```

```
153 Y=INT(RND(0)*8+1)
154 A(X,Y)=8
155 NEXT N
156 REM EXITS
157 S=INT(RND(0)*4+1)+1
158 FOR N=1 TO S
159 X=INT(RND(0)*8+1)
160 Y=INT(RND(0)*8+1)
161 A(X,Y)=9
162 NEXT N
163 RETURN
164 R6=INT(RND(0)*4+1):PRINT QD$;"?:"
165 ON R6 GOSUB 167,168,169,170
166 GOTO 433
167 PRINT AD$,I1$:PRINT I2$,I3$:RETURN
168 PRINT I2$,AD$:PRINT I1$,I3$:RETURN
169 PRINT I1$,I2$:PRINT AD$,I3$:RETURN
170 PRINT I3$,I1$:PRINT I2$,AD$:RETURN
171 PRINT CHR$(125)
173 GT=1
174 GOSUB 134
175 FOR B=1 TO 70:B4=INT(RND(0)*23+1)
176 B7=INT(RND(0)*37+1):POSITION B7,B4
177 PRINT ".";:NEXT B
178 GT=5.0E-03:Y5=25
179 IF Y3=YY THEN PRINT "ALREADY AT . . . .":GOTO 196
180 IF Y3<YY THEN 188
181 IF (Y3-YY)<=50 THEN 185
182 Y3=Y3-Y5
183 GOSUB 382
184 IF Y3=YY THEN 195
185 IF (Y3-YY)<=50 THEN Y5=1
186 IF (Y3-YY)<=5 THEN GT=0.4
187 GOTO 182
188 IF (YY-Y3)<=50 THEN 192
189 Y3=Y3+Y5
190 GOSUB 382
191 IF Y3=YY THEN 195
192 IF (YY-Y3)<=50 THEN Y5=1
193 IF (YY-Y3)<=5 THEN GT=0.4
194 GOTO 189
195 PRINT "ARRIVAL . . . . AT"
196 PRINT "DESTINATION YEAR . . . . ";YY
197 GT=4:GOSUB 134
198 PRINT CHR$(125):RETURN
199 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1):A(C,D)=1
200 K4=INT(RND(0)*4+1)+3
201 PRINT CHR$(125):A=A(C,D):GT=1:GOSUB 134
202 ON A GOSUB 292,300,410,410,306,330,335,338,362
203 IF KL=0 THEN 567
204 PRINT :IF TT=1 THEN TT=0:GOTO 201
205 IF G<=0 THEN 264
206 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
```

Program 1-5-cont. The Time Dungeon: World History, World War II, Program Listing

```
207 PRINT
208 PRINT "(N)ORTH, (E)AST, (S)OUTH"
209 PRINT "(W)EST, E(X)IT, (G)OLD"
210 INPUT M1$
211 M1=M1+1:IF K=0 AND M1>70 THEN 371
212 IF M1$="N" THEN 220
213 IF M1$="E" THEN 225
214 IF M1$="S" THEN 230
215 IF M1$="W" THEN 235
216 IF M1$="X" THEN 240
217 IF M1$="G" THEN 251
218 PRINT
219 GOTO 204
220 REM NORTH
221 IF A=7 THEN 255
222 IF (D-1)=0 THEN 281
223 D=D-1
224 GOTO 201
225 REM EAST
226 IF A=6 THEN 260
227 IF (C+1)=9 THEN 286
228 C=C+1
229 GOTO 201
230 REM SOUTH
231 IF A=7 THEN 255
232 IF (D+1)=9 THEN 288
233 D=D+1
234 GOTO 201
235 REM WEST
236 IF A=6 THEN 260
237 IF (C-1)=0 THEN 290
238 C=C-1
239 GOTO 201
240 PRINT CHR$(125)
241 IF A<>9 THEN 248
242 IF K=1 THEN 387
243 PRINT "YOU CANNOT EXIT THE TIME DUNGEON"
244 PRINT "YOU DON'T HAVE THE CRYSTAL KEY"
245 GT=2:GOSUB 134
246 PRINT
247 GOTO 204
248 PRINT "YOU ARE NOT AT AN EXIT PORTAL"
249 GT=2:GOSUB 134
250 GOTO 204
251 REM GOLD
252 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
253 PRINT
254 GOTO 204
255 REM EW
256 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
257 PRINT "YOU CAN ONLY GO EAST OR WEST"
258 PRINT
259 GOTO 204
```

```
260 REM NS
261 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
262 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
263 GOTO 258
264 REM GOLD ZERO
265 GT=2:GOSUB 134
266 PRINT
267 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
268 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
269 PRINT " . . . THE TIME DUNGEON . . . . ."
270 PRINT
271 PRINT
272 GT=3:GOSUB 134
273 GOSUB 402
274 PRINT
275 PRINT "ANOTHER GAME?"
276 PRINT "ENTER '1'-YES  '0'-NO"
277 INPUT AA
278 IF AA<>1 THEN 280
279 PRINT CHR$(125):GOTO 108
280 END
281 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
282 PRINT "YOU CANNOT PASS THROUGH"
283 PRINT
284 PRINT "TRY ANOTHER DIRECTION?"
285 GOTO 204
286 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
287 GOTO 282
288 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
289 GOTO 282
290 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
291 GOTO 282
292 KT=INT(RND(0)*9+1)
293 PRINT "YOU ARE IN A GLOWING TIME PORTAL"
294 GT=1:GOSUB 134
295 PRINT
296 PRINT "THE LIGHT FADES . . . . . ."
297 PRINT "THE PORTAL IS INACTIVE . . . ."
298 IF A=1 AND KT>=8 THEN 570
299 RETURN
300 PRINT "YOU ARE IN A DUST FILLED PORTAL"
301 GT=1:GOSUB 134
302 PRINT
303 PRINT "A BRIGHT LIGHT IS ACTIVATED AND . ."
304 PRINT
305 GOTO 296
306 PRINT CHR$(125)
307 PRINT "AN ALIEN TRAVELER IS IN THIS CHAMBER"
308 A(C,D)=INT(RND(0)*2+1):GOSUB 478
309 GT=1:GOSUB 134
310 TD=INT(RND(0)*10+1)
311 G4=INT(RND(0)*350+1)
312 Y=INT(RND(0)*8+1)
```

```
313 IF Y<=5 THEN 320
314 PRINT :IF (G-G4)<0 THEN G4=G
315 PRINT "HE IS UNFRIENDLY . . . . AND AS HE"
316 PRINT "LEAVES . . . HE TAKES ";G4;" GOLD PIECES"
317 PRINT :G=G-G4
318 IF TD=5 AND K=0 THEN 325
319 RETURN
320 PRINT
321 PRINT "HE IS FRIENDLY . . . . . AND GIVES YOU";
322 PRINT ". . ";G4;" GOLD PIECES, WHICH YOU ACCEPT"
323 PRINT :G=G+G4
324 GOTO 318
325 PRINT :GT=2:GOSUB 134
326 PRINT "YOU SEARCH THE CHAMBER . . . AND"
327 GT=1:GOSUB 134
328 PRINT "FIND . . . . THE CRYSTAL KEY"
329 K=1:RETURN
330 PRINT CHR$(125)
331 PRINT "YOU ENTER A NORTH-SOUTH CORRIDOR"
332 PRINT "THRU A SECRET DOOR":PRINT :GOSUB 380
333 KT=INT(RND(0)*9+1):IF KT>=7 THEN 545
334 RETURN
335 PRINT CHR$(125)
336 PRINT "YOU ENTER AN EAST-WEST CORRIDOR"
337 GOTO 332
338 REM TRAP
339 PRINT "YOU ENCOUNTER . . . A TIME TRAP"
340 PRINT ". . . . . IN THIS CHAMBER":GT=1:GOSUB 134
341 TD=INT(RND(0)*9+1)
342 IF TD>=7 THEN 347
343 PRINT
344 PRINT "BUT YOU'RE LUCKY . . . . ."
345 PRINT ". . . IT DIDN'T ACTIVATE"
346 RETURN
347 TT=1:PRINT "AND IT ACTIVATED . . . . .":GT=2:GOSUB 134
348 FOR A=1 TO 250
349 PRINT "*        %";
350 NEXT A
351 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1)
352 PRINT
353 PRINT :G=100
354 PRINT "YOU HAVE BEEN TELEPORTED TO . . . ."
355 PRINT ". . . . AN UNKNOWN LOCATION . . . ."
356 PRINT
357 PRINT "AND YOU LOST MOST OF YOUR GOLD"
358 PRINT
359 PRINT "YOU HAVE . . . ";G;" GOLD PIECES LEFT"
360 GT=6:GOSUB 134
361 RETURN
362 PRINT "YOU ARE AT AN EXIT PORTAL"
363 PRINT
364 PRINT "(A KEY IS REQUIRED)"
365 PRINT
```

```
366 RETURN
367 H=1:O=9:W=8
368 B=0:E=5:R=14
369 C=0:PR=0
370 GOTO 216
371 PRINT :GT=2:GOSUB 134
372 PRINT "BUT BEFORE YOU PROCEED . ."
373 PRINT "YOU LOOK TO THE GROUND AND . . ."
374 PRINT " . . . FIND THE CRYSTAL KEY . .":K=1
375 GT=3:GOSUB 134
376 GOTO 212
377 PRINT "YOU ANSWERED ";CA;" QUESTION(S) CORRECTLY"
378 PRINT " . . . . . IN ";M1;" TURNS,"
379 GOTO 409
380 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GT=1:GOSUB 134
381 RETURN
382 REM TIME DISPLAY
383 POSITION 5,12:PRINT "PORTAL YEAR . . . ";Y3
385 GOSUB 134
386 RETURN
387 PRINT CHR$(125):REM EXIT PORTAL
388 PRINT "YOU ENTER THE EXIT PORTAL AND"
389 PRINT "INSERT THE CRYSTAL KEY INTO THE SLOT"
390 PRINT :GT=4:GOSUB 134
391 PRINT "THE MACHINE BEGINS TO HUM . . . ."
392 PRINT :GT=2:GOSUB 134
393 YY=Y2:GOSUB 171
394 PRINT
395 PRINT "YOU FOUND YOUR WAY . . . . ."
396 PRINT ". . . . BACK TO THE PRESENT"
397 PRINT
398 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
399 PRINT
400 GOSUB 402
401 GOTO 274
402 GG=G+100
403 R=INT((GG*CA-7000+1)/M1)
404 PRINT
405 PRINT "GAME RATING IS ";R
406 PRINT :IF G<=0 OR KL=0 THEN 377
407 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT"
408 PRINT "AND ANSWERED ";CA;" QUESTION(S) CORRECTLY,"
409 PRINT "OUT OF ";TR;" QUESTIONS ASKED.":RETURN
410 PRINT CHR$(125):Y3=YY
411 GOSUB 444
412 Q3=Q3+1
413 IF Q3>50 THEN Q3=0:GOTO 415
414 GOTO 416
415 GOSUB 451
416 Q=INT(RND(0)*50+1)
417 IF B(Q)=1 THEN 416
418 B(Q)=1
419 PRINT
```

Program 1-5-cont. The Time Dungeon: World History, World War II, Program Listing

```
420 FOR AB=1 TO Q
421 READ YY,QD$,ID,AD$,I1$,I2$,I3$
422 NEXT AB
423 RESTORE
424 GOSUB 171
425 PRINT CHR$(125):TR=TR+1
426 PRINT "YOU HAVE ARRIVED AT THE YEAR ";YY
427 PRINT ". . . . . IN ";BZ$:PRINT
428 PRINT "YOU MUST ANSWER THIS QUESTION"
429 PRINT " . . TO CONTINUE YOUR JOURNEY"
430 PRINT "-------------------------------------";
431 PRINT "THE YEAR IS: ";YY:PRINT :IF ID=4 THEN 164
432 PRINT QD$
433 PRINT "-------------------------------------";
434 PRINT "QUESTION TYPE: "
435 ON ID GOSUB 455,456,457,458
436 GOSUB 459
437 IF E$=AD$ THEN 441
438 PRINT "INCORRECT"
439 GOSUB 471
440 RETURN
441 PRINT "CORRECT"
442 GOSUB 463
443 RETURN
444 PRINT "YOU ENTER INTO A BLUE HAZY . . ."
445 PRINT ". . . . . TIME PORTAL . . . "
446 PRINT :GT=1:GOSUB 134
447 PRINT "A PULSATING GLOW . . . . . ."
448 PRINT ". . . . INDICATES ACTIVATION":PRINT
449 PRINT "PRESENT YEAR . . .  ";Y3:GT=3:GOSUB 134
450 RETURN
451 FOR I=1 TO 50
452 B(I)=0
453 NEXT I
454 RETURN
455 PRINT "PEOPLE, PLACES, OR     THINGS ?":RETURN
456 PRINT "*** (T)RUE OR (F)ALSE  ?":RETURN
457 PRINT "*** WHO AM I (LAST NAME) ?":RETURN
458 PRINT "*** MULTIPLE CHOICE ?":RETURN
459 PRINT "ENTER CORRECT ANSWER?"
460 INPUT E$
461 G4=INT(RND(0)*500+1)+125
462 RETURN
463 G=G+G4
464 PRINT "YOU WIN ";G4;" GOLD PIECES"
465 A(C,D)=INT(RND(0)*2+1)
466 CA=CA+1:IF K=1 THEN RETURN
467 IF CA=K4 THEN 469
468 RETURN
469 GOSUB 325
470 RETURN
471 PRINT :G4=INT(RND(0)*400+1)+25
472 PRINT "THE CORRECT ANSWER IS '";AD$;"'"
```

```
473 PRINT :IF (G-G4)<0 THEN G4=G
474 G=G-G4
475 GT=1:GOSUB 134
476 PRINT "YOU LOSE ";G4;" GOLD PIECES"
477 RETURN
478 ZT=5
479 X=INT(RND(0)*8+1):Y=INT(RND(0)*8+1)
480 IF A(X,Y)<=2 THEN A(X,Y)=5:RETURN
481 ZT=ZT-1:IF ZT=0 THEN RETURN
482 GOTO 479
483 DATA 1945,FROM 1939 TO 1945 NAZIS MURDERED 6    MILLION JEWS,2
,T,0,0,0
484 DATA 1933,HITLER AND HIS .... BECAME GERMANY'S  GOVERNMENT,4,N
AZIS,NATIONALS,DEMOCRATICS,COMMUNISTS
485 DATA 1933,HITLER BLAMED THE .... FOR MOST OF    GERMANY'S ILLS
,4,JEWS,ENGLISH,CATHOLICS,PROTESTANTS
486 DATA 1935,THE .... LAWS DEPRIVED ALL JEWS OF    CITIZENSHIP,1,
NUREMBERG,0,0,0
487 DATA 1934,HITLER'S SECRET POLICE WAS CALLED THE ....,4,GESTAPO
,CIA,KGB,SPO
488 DATA 1936,THE SPANISH .... WAR BEGINS,4,CIVIL,COLD,GERMAN,RUSS
IAN
489 DATA 1938,HITLER'S TROOPS RODE INTO .... AUSTRIA THIS YEAR,1,V
IENNA,0,0,0
490 DATA 1938,GERMANS WORKED ON FORTIFICATIONS      CALLED THE ...
. LINE,4,SIEGFRIED,MAGINOT,FRONT,WESTERN
491 DATA 1939,AUG 23-RUSSIA SIGNED A .... PACT WITH GERMANY,1,NONA
GGRESSION,0,0,0
492 DATA 1939,SEPT 1-GERMAN FORCES INVADED ....,4,POLAND,FRANCE,RU
SSIA,ENGLAND
493 DATA 1939,SEPT 3-GREAT BRITAIN AND .... DECLARED WAR ON GERMAN
Y,1,FRANCE,0,0,0
494 DATA 1939,GERMANS OCCUPYING POLAND KILLED 3    MILLION .... B
Y 1945,4,JEWS,COMMUNISTS,SOCIALISTS,TURKS
495 DATA 1945,THE NUREMBERG .... TRIED NAZI LEADERS FOR WAR CRIME
S,1,TRIALS,0,0,0
496 DATA 1940,MARCH-.... LOST SOME OF HER BEST LAND TO RUSSIA,4,FI
NLAND,HOLLAND,FRANCE,ITALY
497 DATA 1939,DEC-BRITISH SHIPS TRAP GERMAN SHIP    .... IN MONTEV
IDEO HARBOR,4,GRAF SPEE,NUREMBERG,NORD,HERTZ
498 DATA 1940,APRIL 9-THE NAZIS INVADED .... &      NORWAY,1,DENMA
RK,0,0,0
499 DATA 1940,APRIL-I WAS A NAZI SYMPATHIZER IN    NORWAY,3,QUISL
ING,0,0,0
500 DATA 1940,MAY-HITLER BEGAN THE INVASION OF THE  NETHERLANDS- L
UXEMBERG- & ....,4,BELGIUM,NORWAY,DENMARK,FRANCE
501 DATA 1940,BY MAY 10-GERMANS BROKE THRU THE ....-AT SEDAN,1,MAG
INOT LINE,0,0,0
502 DATA 1940,JUNE-GERMAN TROOPS OCCUPIED ....,4,FRANCE,ENGLAND,EG
YPT,RUSSIA
503 DATA 1940,JUNE 18-BATTLE OF .... BEGAN AFTER THE FALL OF FRANC
E,4,BRITAIN,FREEDOM,FRANCE,GERMANY
504 DATA 1941,HITLER LOST THE BATTLE OF BRITAIN,2,T,0,0,0
```

Program 1-5-cont. The Time Dungeon: World History, World War II, Program Listing

```
505 DATA 1940,THE GERMAN .... (AIR FORCE) GREATLY   HURT BRITAIN,1
,LUFTWAFFE,0,0,0
506 DATA 1940,OCT-ITALIAN TROOPS INVADED ....,1,GREECE,0,0,0
507 DATA 1941,JUNE 22-HITLER ATTACKED THE SOVIET    UNION,2,T,0,0,
0
508 DATA 1941,BY 1941-HITLER CONTROLLED THE .... AND WESTERN EUROP
E,1,BALKANS,0,0,0
509 DATA 1941,DEC 7-THE JAPANESE ATTACKED ....      HARBOR,1,PEARL
,0,0,0
510 DATA 1941,NOV-CONGRESS REPEALED THE .... ACT,1,NEUTRALITY,0,0,
0
511 DATA 1942,JAN 1-THE .... NATIONS WAS CREATED    DURING WW II,1
,UNITED,0,0,0
512 DATA 1942,JUNE-AMERICANS HELD OFF THE JAPANESE  AT .... ISLAND
,1,MIDWAY,0,0,0
513 DATA 1942,GERMANS FAILED TO TAKE ....-IN RUSSIA,1,STALINGRAD,0
,0,0
514 DATA 1943,JAN-ROOSEVELT & CHURCHILL MET IN ....-MOROCCO,1,CASA
BLANCA,0,0,0
515 DATA 1943,I WAS CALLED THE DESERT FOX (GERMAN),3,ROMMEL,0,0,0
516 DATA 1943,EARLY IN 1943-AMERICANS BEGAN AN      OFFENSIVE IN T
HE ....,1,ALEUTIANS,0,0,0
517 DATA 1944,JUNE 4-GENERAL CLARK'S AMERICAN TROOPS MARCHED INTO
....,4,ROME,FLORENCE,VENICE,NAPLES
518 DATA 1944,GERMANS V-1 ROCKET WAS KNOWN IN       BRITAIN AS THE
 ....,4,BUZZ BOMB,FLY BOMB,ROCKET BOMB,DEAD BOMB
519 DATA 1944,SEPT-ALLIES FREED BELGIUM-LUXEMBURG- & MOST OF ....,
1,FRANCE,0,0,0
520 DATA 1944,SEPT 12-THE BATTLE OF .... BEGAN,4,GERMANY,FRANCE,OK
INAWA,EGYPT
521 DATA 1945,MAY 7-GERMANS SIGNED A SURRENDER      AGREEMENT IN .
...-CITY,4,REIMS,LONDON,PARIS,NICE
522 DATA 1944,JUNE 6-'D-DAY' WAS THE ALLIED INVASION OF ....,4,FRA
NCE,GERMANY,ITALY,SPAIN
523 DATA 1945,THE JAPANESE USED .... OR SUICIDE    PLANES,1,KAMIK
AZE,0,0,0
524 DATA 1945,JUNE-AMERICANS WON THE JAPANESE ISLAND OF ....,4,OKI
NAWA,KAMIKAZE,NAGASAKI,HIROSHIMA
525 DATA 1945,JULY-ALLIES ISSUED THE ....           DECLARATION,4,
POTSDAM,FREEDOM,FINAL,LAST
526 DATA 1945,AUG 6-AN ATOMIC BOMB WAS DROPPED ON   ....-CITY,1,HI
ROSHIMA,0,0,0
527 DATA 1945,AUG 9-AN ATOMIC BOMB WAS DROPPED ON   ....-CITY,1,NA
GASAKI,0,0,0
528 DATA 1945,AUG 14-JAPAN SURRENDERED AFTER THE    ATOMIC DEVASTA
TION,2,T,0,0,0
529 DATA 1945,SEPT 2-JAPAN FORMALLY SURRENDERED ON  THE AMERICAN S
HIP ....,4,MISSOURI,MIDWAY,ENTERPRISE,OHIO
530 DATA 1944,THE INVASION OF FRANCE TOOK PLACE     BETWEEN CHERBO
URG & ....,4,LE HAVRE,NICE,CANNES,PARIS
531 DATA 1945,GENOCIDE OF THE JEWS-IN NAZI          CONCENTRATION
CAMPS-WAS REVEALED,2,T,0,0,0
```

Program 1-5-cont. The Time Dungeon: World History, World War II, Program Listing

```
532 DATA 1944,DEC 16-GERMANS COUNTER OFFENSIVE WAS  THE 'BATTLE OF
 THE ....',4,BULGE,BOLD,RHINE,SWINE
533 PRINT CHR$(125);"THE TIME DUNGEON * * * MAP"
534 PRINT
535 FOR Q=1 TO 8
536 FOR N=1 TO 8
537 IF C=N AND D=Q THEN PRINT "=P= ";:GOTO 540
538 S1=A(N,Q)
539 ON S1 GOSUB 137,137,138,138,139,140,141,139,142
540 NEXT N
541 PRINT
542 NEXT Q
543 GT=INT(RND(0)*8+1)+INT(RND(0)*(CA+5)+1):GOSUB 134
544 PRINT CHR$(125):RETURN
545 PRINT :PRINT "ON THE WALL IS A GLOWING SCREEN"
546 PRINT "BELOW THE SCREEN IS A RED BUTTON":PRINT
547 KT=INT(RND(0)*9+1):KL=INT(RND(0)*15+1)+2
548 GOSUB 565
549 INPUT K$
550 IF K$="Y" THEN 552
551 RETURN
552 IF KT>=6 THEN 533
553 IF KT<=4 THEN 562
554 PRINT :G4=INT(RND(0)*100+1)+25:G=G+G4
555 PRINT "YOU RECEIVE ";G4;" GOLD PIECES . . ."
556 PRINT "BUT . . . . . THE CORRIDOR NARROWS":GT=3:GOSUB 134
557 KL=KL-1:IF KL=0 THEN RETURN
558 GOSUB 565
559 INPUT K$
560 IF K$="Y" THEN 554
561 RETURN
562 PRINT :PRINT "NOTHING HAPPENS"
563 GT=1:GOSUB 134
564 RETURN
565 PRINT :PRINT "DO YOU WISH TO PUSH THE BUTTON?"
566 PRINT "ENTER  (Y)ES  OR  (N)O":RETURN
567 PRINT CHR$(125);"YOU ARE STUCK IN THE NARROW CORRIDOR"
568 PRINT ". . . . . AND . . .":PRINT :GT=3:GOSUB 134
569 GOTO 264
570 PRINT :PRINT "YOU NOTICE A DOOR TO YOUR RIGHT"
571 PRINT
572 KT=INT(RND(0)*9+1)
573 PRINT "DO YOU WISH TO OPEN THE DOOR?"
574 PRINT "ENTER  (Y)ES  OR  (N)O"
575 INPUT K$
576 IF K$="Y" THEN 578
577 RETURN
578 PRINT :PRINT "YOU TRY THE DOOR . . . . .":GT=1:GOSUB 134
579 IF KT>=7 THEN 589
580 IF KT<=4 THEN 587
581 PRINT :G4=INT(RND(0)*100+1)+25
582 PRINT "THE DOOR OPENS . . . . . ."
583 PRINT "REVEALING A CLOSET . . . ."
```

Program 1-5-cont. The Time Dungeon: World History, World War II, Program Listing

```
584 PRINT :G=G+G4
585 PRINT "WHERE YOU FIND ";G4;" GOLD PIECES"
586 PRINT :RETURN
587 PRINT "BUT THE DOOR WON'T OPEN . . . ."
588 PRINT ". . . . IT MUST BE LOCKED":RETURN
589 PRINT :PRINT "THE DOOR OPENS . . . AND SUDDENLY"
590 PRINT "THE CHAMBER BEGINS TO . . . SPIN"
591 G7=INT(G/2):G4=INT(RND(0)*G7+1):MM=INT(RND(0)*20+1)
592 GT=4:GOSUB 134:G=G-G4
593 FOR K9=1 TO 250
594 PRINT "+    =    +";
595 NEXT K9
596 PRINT CHR$(125);"YOU WERE TELEPORTED INTO . . . ."
597 PRINT ". . . . ANOTHER DIMENSION . . . ."
598 PRINT ". . AND RETURNED IN AN INSTANT . ."
599 PRINT :PRINT "BUT YOU DROPPED ";G4;" GOLD PIECES"
600 PRINT ". . . AND WASTED ";MM;" MOVES . . ."
601 M1=M1+MM
602 GT=4:GOSUB 134
603 RETURN
```

Program 1-6. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
100 PRINT CHR$(125):DIM BZ$(27),BW$(15):BZ$="ANCIENT HISTORY-MIDDL
E EAST":BW$="4000 BC TO 6 BC"
101 DIM A$(50),M1$(1):PRINT "THE TIME DUNGEON: ";BZ$
102 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
103 PRINT "ATARI":DIM E$(25),K$(1)
104 PRINT :DIM QD$(100),AD$(25),I1$(25),I2$(25),I3$(25)
105 PRINT "AN EDUCATIONAL FANTASY GAME"
106 GT=5:GOSUB 134:Q3=0
107 PRINT CHR$(125):DIM A(9,9),B(50):GOSUB 451
108 PRINT "YOU WILL BE TELEPORTED TO . . ."
109 PRINT
110 PRINT "THE TIME DUNGEON . . . ."
111 PRINT "TO STUDY ";BZ$
112 PRINT
114 CA=0:G=1000:M1=1:K=0:KL=1:TT=0:TR=0
115 PRINT "ENTER YOUR CHARACTER'S NAME?"
116 INPUT A$
117 PRINT "ENTER PRESENT YEAR"
118 INPUT Y2:YY=Y2:IF Y2>2000 THEN 117
119 PRINT :PRINT A$;" . . . YOU ARE ON YOUR WAY"
120 GT=2:GOSUB 134
121 GOSUB 143
122 PRINT CHR$(125)
123 PRINT "YOU HAVE ARRIVED AT . . . ."
124 PRINT
125 PRINT "THE TIME DUNGEON: ";BZ$
126 PRINT "FOR THE YEARS:    ";BW$
127 PRINT
128 PRINT "YOU CARRY 1000 GOLD PIECES":PRINT
129 PRINT "YOU WILL ENCOUNTER . . ."
130 PRINT "TIME PORTALS WHICH TELEPORT"
131 PRINT "YOU TO EVENTS IN ";BZ$
132 GT=8:GOSUB 134
133 GOTO 199
134 FOR ZZ=1 TO 300*GT
135 NEXT ZZ
136 RETURN
137 PRINT "0   ";:RETURN
138 PRINT "AP  ";:RETURN
139 PRINT "?   ";:RETURN
140 PRINT "NS  ";:RETURN
141 PRINT "EW  ";:RETURN
142 PRINT "X   ";:RETURN
143 REM SET UP DUNGEON
144 FOR X=1 TO 8
145 FOR Y=1 TO 8
146 A(X,Y)=INT(RND(0)*7+1)
147 NEXT Y
148 NEXT X
149 REM TRAPS
150 H=INT(RND(0)*3+1)+1
151 FOR N=1 TO H
152 X=INT(RND(0)*8+1)
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
153 Y=INT(RND(0)*8+1)
154 A(X,Y)=8
155 NEXT N
156 REM EXITS
157 S=INT(RND(0)*4+1)+1
158 FOR N=1 TO S
159 X=INT(RND(0)*8+1)
160 Y=INT(RND(0)*8+1)
161 A(X,Y)=9
162 NEXT N
163 RETURN
164 R6=INT(RND(0)*4+1):PRINT QD$;"?:"
165 ON R6 GOSUB 167,168,169,170
166 GOTO 433
167 PRINT AD$,I1$:PRINT I2$,I3$:RETURN
168 PRINT I2$,AD$:PRINT I1$,I3$:RETURN
169 PRINT I1$,I2$:PRINT AD$,I3$:RETURN
170 PRINT I3$,I1$:PRINT I2$,AD$:RETURN
171 PRINT CHR$(125)
173 GT=1
174 GOSUB 134
175 FOR B=1 TO 70:B4=INT(RND(0)*23+1)
176 B7=INT(RND(0)*37+1):POSITION B7,B4
177 PRINT ".";:NEXT B
178 GT=5.0E-03:Y5=25
179 IF Y3=YY THEN PRINT "ALREADY AT . . . .":GOTO 196
180 IF Y3<YY THEN 188
181 IF (Y3-YY)<=50 THEN 185
182 Y3=Y3-Y5
183 GOSUB 382
184 IF Y3=YY THEN 195
185 IF (Y3-YY)<=50 THEN Y5=1
186 IF (Y3-YY)<=5 THEN GT=0.4
187 GOTO 182
188 IF (YY-Y3)<=50 THEN 192
189 Y3=Y3+Y5
190 GOSUB 382
191 IF Y3=YY THEN 195
192 IF (YY-Y3)<=50 THEN Y5=1
193 IF (YY-Y3)<=5 THEN GT=0.4
194 GOTO 189
195 PRINT "ARRIVAL . . . . AT"
196 PRINT "DESTINATION YEAR . . . . ";YY
197 GT=4:GOSUB 134
198 PRINT CHR$(125):RETURN
199 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1):A(C,D)=1
200 K4=INT(RND(0)*4+1)+3
201 PRINT CHR$(125):A=A(C,D):GT=1:GOSUB 134
202 ON A GOSUB 292,300,410,410,306,330,335,338,362
203 IF KL=0 THEN 567
204 PRINT :IF TT=1 THEN TT=0:GOTO 201
205 IF G<=0 THEN 264
206 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
207 PRINT
208 PRINT "(N)ORTH, (E)AST, (S)OUTH"
209 PRINT "(W)EST, E(X)IT, (G)OLD"
210 INPUT M1$
211 M1=M1+1:IF K=0 AND M1>70 THEN 371
212 IF M1$="N" THEN 220
213 IF M1$="E" THEN 225
214 IF M1$="S" THEN 230
215 IF M1$="W" THEN 235
216 IF M1$="X" THEN 240
217 IF M1$="G" THEN 251
218 PRINT
219 GOTO 204
220 REM NORTH
221 IF A=7 THEN 255
222 IF (D-1)=0 THEN 281
223 D=D-1
224 GOTO 201
225 REM EAST
226 IF A=6 THEN 260
227 IF (C+1)=9 THEN 286
228 C=C+1
229 GOTO 201
230 REM SOUTH
231 IF A=7 THEN 255
232 IF (D+1)=9 THEN 288
233 D=D+1
234 GOTO 201
235 REM WEST
236 IF A=6 THEN 260
237 IF (C-1)=0 THEN 290
238 C=C-1
239 GOTO 201
240 PRINT CHR$(125)
241 IF A<>9 THEN 248
242 IF K=1 THEN 387
243 PRINT "YOU CANNOT EXIT THE TIME DUNGEON"
244 PRINT "YOU DON'T HAVE THE CRYSTAL KEY"
245 GT=2:GOSUB 134
246 PRINT
247 GOTO 204
248 PRINT "YOU ARE NOT AT AN EXIT PORTAL"
249 GT=2:GOSUB 134
250 GOTO 204
251 REM GOLD
252 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
253 PRINT
254 GOTO 204
255 REM EW
256 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
257 PRINT "YOU CAN ONLY GO EAST OR WEST"
258 PRINT
259 GOTO 204
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
260 REM NS
261 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
262 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
263 GOTO 258
264 REM GOLD ZERO
265 GT=2:GOSUB 134
266 PRINT
267 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
268 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
269 PRINT " . . . THE TIME DUNGEON . . . . ."
270 PRINT
271 PRINT
272 GT=3:GOSUB 134
273 GOSUB 402
274 PRINT
275 PRINT "ANOTHER GAME?"
276 PRINT "ENTER '1'-YES  '0'-NO"
277 INPUT AA
278 IF AA<>1 THEN 280
279 PRINT CHR$(125):GOTO 108
280 END
281 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
282 PRINT "YOU CANNOT PASS THROUGH"
283 PRINT
284 PRINT "TRY ANOTHER DIRECTION?"
285 GOTO 204
286 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
287 GOTO 282
288 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
289 GOTO 282
290 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
291 GOTO 282
292 KT=INT(RND(0)*9+1)
293 PRINT "YOU ARE IN A GLOWING TIME PORTAL"
294 GT=1:GOSUB 134
295 PRINT
296 PRINT "THE LIGHT FADES . . . . . ."
297 PRINT "THE PORTAL IS INACTIVE . . . ."
298 IF A=1 AND KT>=8 THEN 570
299 RETURN
300 PRINT "YOU ARE IN A DUST FILLED PORTAL"
301 GT=1:GOSUB 134
302 PRINT
303 PRINT "A BRIGHT LIGHT IS ACTIVATED AND . ."
304 PRINT
305 GOTO 296
306 PRINT CHR$(125)
307 PRINT "AN ALIEN TRAVELER IS IN THIS CHAMBER"
308 A(C,D)=INT(RND(0)*2+1):GOSUB 478
309 GT=1:GOSUB 134
310 TD=INT(RND(0)*10+1)
311 G4=INT(RND(0)*350+1)
312 Y=INT(RND(0)*8+1)
```

```
313 IF Y<=5 THEN 320
314 PRINT :IF (G-G4)<0 THEN G4=G
315 PRINT "HE IS UNFRIENDLY . . . . AND AS HE"
316 PRINT "LEAVES . . . HE TAKES ";G4;" GOLD PIECES"
317 PRINT :G=G-G4
318 IF TD=5 AND K=0 THEN 325
319 RETURN
320 PRINT
321 PRINT "HE IS FRIENDLY . . . . . AND GIVES YOU";
322 PRINT ". . ";G4;" GOLD PIECES, WHICH YOU ACCEPT"
323 PRINT :G=G+G4
324 GOTO 318
325 PRINT :GT=2:GOSUB 134
326 PRINT "YOU SEARCH THE CHAMBER . . . AND"
327 GT=1:GOSUB 134
328 PRINT "FIND . . . . THE CRYSTAL KEY"
329 K=1:RETURN
330 PRINT CHR$(125)
331 PRINT "YOU ENTER A NORTH-SOUTH CORRIDOR"
332 PRINT "THRU A SECRET DOOR":PRINT :GOSUB 380
333 KT=INT(RND(0)*9+1):IF KT>=7 THEN 545
334 RETURN
335 PRINT CHR$(125)
336 PRINT "YOU ENTER AN EAST-WEST CORRIDOR"
337 GOTO 332
338 REM TRAP
339 PRINT "YOU ENCOUNTER . . . A TIME TRAP"
340 PRINT ". . . . . IN THIS CHAMBER":GT=1:GOSUB 134
341 TD=INT(RND(0)*9+1)
342 IF TD>=7 THEN 347
343 PRINT
344 PRINT "BUT YOU'RE LUCKY . . . . ."
345 PRINT ". . . IT DIDN'T ACTIVATE"
346 RETURN
347 TT=1:PRINT "AND IT ACTIVATED . . . . .":GT=2:GOSUB 134
348 FOR A=1 TO 250
349 PRINT "*        %";
350 NEXT A
351 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1)
352 PRINT
353 PRINT :G=100
354 PRINT "YOU HAVE BEEN TELEPORTED TO . . . ."
355 PRINT ". . . . AN UNKNOWN LOCATION . . . ."
356 PRINT
357 PRINT "AND YOU LOST MOST OF YOUR GOLD"
358 PRINT
359 PRINT "YOU HAVE . . . ";G;" GOLD PIECES LEFT"
360 GT=6:GOSUB 134
361 RETURN
362 PRINT "YOU ARE AT AN EXIT PORTAL"
363 PRINT
364 PRINT "(A KEY IS REQUIRED)"
365 PRINT
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
366 RETURN
367 H=1:O=9:W=8
368 B=0:E=5:R=14
369 C=0:PR=0
370 GOTO 216
371 PRINT :GT=2:GOSUB 134
372 PRINT "BUT BEFORE YOU PROCEED . ."
373 PRINT "YOU LOOK TO THE GROUND AND . . ."
374 PRINT " . . . FIND THE CRYSTAL KEY . .":K=1
375 GT=3:GOSUB 134
376 GOTO 212
377 PRINT "YOU ANSWERED ";CA;" QUESTION(S) CORRECTLY"
378 PRINT " . . . . . IN ";M1;" TURNS,"
379 GOTO 409
380 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GT=1:GOSUB 134
381 RETURN
382 REM TIME DISPLAY
383 POSITION 5,12:PRINT "PORTAL YEAR . . . ";Y3;"  "
385 GOSUB 134
386 RETURN
387 PRINT CHR$(125):REM EXIT PORTAL
388 PRINT "YOU ENTER THE EXIT PORTAL AND"
389 PRINT "INSERT THE CRYSTAL KEY INTO THE SLOT"
390 PRINT :GT=4:GOSUB 134
391 PRINT "THE MACHINE BEGINS TO HUM . . . ."
392 PRINT :GT=2:GOSUB 134
393 YY=Y2:GOSUB 171
394 PRINT
395 PRINT "YOU FOUND YOUR WAY . . . . ."
396 PRINT ". . . . BACK TO THE PRESENT"
397 PRINT
398 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
399 PRINT
400 GOSUB 402
401 GOTO 274
402 GG=G+100
403 R=INT((GG*CA-7000+1)/M1)
404 PRINT
405 PRINT "GAME RATING IS ";R
406 PRINT :IF G<=0 OR KL=0 THEN 377
407 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT"
408 PRINT "AND ANSWERED ";CA;" QUESTION(S) CORRECTLY,"
409 PRINT "OUT OF ";TR;" QUESTIONS ASKED.":RETURN
410 PRINT CHR$(125):Y3=YY
411 GOSUB 444
412 Q3=Q3+1
413 IF Q3>50 THEN Q3=0:GOTO 415
414 GOTO 416
415 GOSUB 451
416 Q=INT(RND(0)*50+1)
417 IF B(Q)=1 THEN 416
418 B(Q)=1
419 PRINT
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
420 FOR AB=1 TO Q
421 READ YY,QD$,ID,AD$,I1$,I2$,I3$
422 NEXT AB
423 RESTORE
424 GOSUB 171
425 PRINT CHR$(125):TR=TR+1
426 PRINT "YOU HAVE ARRIVED AT THE YEAR ";YY
427 PRINT ". . . . . IN ";BZ$:PRINT
428 PRINT "YOU MUST ANSWER THIS QUESTION"
429 PRINT " . . TO CONTINUE YOUR JOURNEY"
430 PRINT "-------------------------------------";
431 PRINT "THE YEAR IS: ";YY:PRINT :IF ID=4 THEN 164
432 PRINT QD$
433 PRINT "-------------------------------------";
434 PRINT "QUESTION TYPE: "
435 ON ID GOSUB 455,456,457,458
436 GOSUB 459
437 IF E$=AD$ THEN 441
438 PRINT "INCORRECT"
439 GOSUB 471
440 RETURN
441 PRINT "CORRECT"
442 GOSUB 463
443 RETURN
444 PRINT "YOU ENTER INTO A BLUE HAZY . . ."
445 PRINT ". . . . . TIME PORTAL . . . "
446 PRINT :GT=1:GOSUB 134
447 PRINT "A PULSATING GLOW . . . . . ."
448 PRINT ". . . . INDICATES ACTIVATION":PRINT
449 PRINT "PRESENT YEAR . . .  ";Y3:GT=3:GOSUB 134
450 RETURN
451 FOR I=1 TO 50
452 B(I)=0
453 NEXT I
454 RETURN
455 PRINT "PEOPLE, PLACES, OR     THINGS ?":RETURN
456 PRINT "*** (T)RUE OR (F)ALSE  ?":RETURN
457 PRINT "*** WHO AM I (LAST NAME) ?":RETURN
458 PRINT "*** MULTIPLE CHOICE ?":RETURN
459 PRINT "ENTER CORRECT ANSWER?"
460 INPUT E$
461 G4=INT(RND(0)*500+1)+125
462 RETURN
463 G=G+G4
464 PRINT "YOU WIN ";G4;" GOLD PIECES"
465 A(C,D)=INT(RND(0)*2+1)
466 CA=CA+1:IF K=1 THEN RETURN
467 IF CA=K4 THEN 469
468 RETURN
469 GOSUB 325
470 RETURN
471 PRINT :G4=INT(RND(0)*400+1)+25
472 PRINT "THE CORRECT ANSWER IS '";AD$;"'"
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
473 PRINT :IF (G-G4)<0 THEN G4=G
474 G=G-G4
475 GT=1:GOSUB 134
476 PRINT "YOU LOSE ";G4;" GOLD PIECES"
477 RETURN
478 ZT=5
479 X=INT(RND(0)*8+1):Y=INT(RND(0)*8+1)
480 IF A(X,Y)<=2 THEN A(X,Y)=5:RETURN
481 ZT=ZT-1:IF ZT=0 THEN RETURN
482 GOTO 479
483 DATA -4000,THE  SITE  OF BABYLON WAS SETTLED BY   THE SUMERIANS
,2,T,0,0,0
484 DATA -3700,1ST USE OF WRITING WAS IN ....-A      SUMERIAN CITY
,4,URUK,ERECH,KISH,AGADE
485 DATA -3500,THE .... SETTLED ALONG THE EUPHRATES,1,SUMERIANS,0,
0,0
486 DATA -3000,.... WAS THE LEADING SUMERIAN CITY    UNDER KING ET
ANA,4,KISH,URUK,ERECH,AGADE
487 DATA -2800,MESKIAGGASHER FOUNDED DYNASTY IN .... -CITY,4,ERECH
,URUK,GIZEH,SUMER
488 DATA -2686,BEGINNING OF THE .... KINGDOM OF EGYPT,4,OLD,2ND,MI
DDLE,NEW
489 DATA -2600,THE GREAT .... FOR PHARAOH KHUFU WAS  COMPLETED,4,P
YRAMID,BATHS,FOUNTAIN,FORTRESS
490 DATA -2600,GREAT PYRAMID FOR PHARAOH KHUFU WAS   BUILT AT GIZE
H,2,T,0,0,0
491 DATA -2650,.... REIGNED AS KING OF ERECH-SUMERIAN,1,GILGAMESH,
0,0,0
492 DATA -2325,.... THE GREAT RULED OVER MESOPOTAMIA,4,SARGON,URUK
,ETANA,KHUFU
493 DATA -2200,GUTIANS CONQUERED SUMERIA AND         DESTROYED ...
.,4,AGADE,GIZEH,URUK,KISH
494 DATA -2133,BEGINNING OF THE .... KINGDOM OF EGYPT,4,MIDDLE,2ND
,OLD,NEW
495 DATA -2100,UR-NAMMAU FOUNDED THE LAST SUMERIAN   DYNASTY,2,T,0
,0,0
496 DATA -3200,UPPER AND .... EGYPT UNITED BY PHARAOH MENES,4,LOWE
R,NEW,MIDDLE,OLD
497 DATA -3200,.... WAS THE 1ST PHARAOH-BUILT MEMPHIS,4,MENES,SARG
ON,PILSER,ABRAHAM
498 DATA -2000,THE .... DESTROYED UR IN MESOPOTAMIA,4,ELAMITES,HIT
TITES,HEBREWS,EGYPTIANS
499 DATA -2000,I WAS THE FOUNDER OF JUDAISM,3,ABRAHAM,0,0,0
500 DATA -2000,THE .... LIVED AS NOMADIC SHEPHERDS IN CANAAN,4,HEB
REWS,TURKS,EGYPTIANS,SUMERIANS
501 DATA -1786,EGYPT RULED BY .... KINGS,4,HYKSOS,HEBREW,ELAMITE,H
ITTITE
502 DATA -1750,HAMMURABI RULED BABYLONIA-HAD CODE OF LAWS,2,T,0,0,
0
503 DATA -1600,BABYLONIAN DYNASTY DESTROYED BY THE   ....,4,HITTIT
ES,HEBREWS,SUMERIANS,EGYPTIANS
504 DATA -1567,BEGINNING OF THE .... KINGDOM IN EGYPT,4,NEW,OLD,MI
DDLE,UPPER
```

```
505 DATA -1468,EGYPTIANS CONQUERED SYRIA-BATTLE OF    ....,1,MEGIDD
O,0,0,0
506 DATA -1250,I LED THE HEBREWS OUT OF BONDAGE IN    EGYPT,3,MOSES
,0,0,0
507 DATA -1250,PHOENICIANS ESTABLISHED THE CITY-      STATES OF TYR
E & ....,4,SIDON,URUK,BABYLON,CANAAN
508 DATA -1250,THE HEBREWS ENTERED ....,4,CANAAN,EGYPT,BABYLON,URU
K
509 DATA -1020,.... BECAME KING OF THE HEBREWS,4,SAUL,MOSES,ABRAHA
M,DAVID
510 DATA -910,BEGINNING OF THE .... EMPIRE,4,ASSYRIAN,EGYPTIAN,TUR
KISH,HEBREW
511 DATA -747,TIGLATH-.... III RULED ASSYRIA,1,PILSER,0,0,0
512 DATA -705,SENNACHERIB OF ASSYRIA DESTROYED ....,4,BABYLON,EGYP
T,PERSIA,SUMERIA
513 DATA -705,SENNACHERIB OF ASSYRIA BUILT A PALACE AT ....,1,NINE
VEH,0,0,0
514 DATA -705,SARGON II OF ASSYRIA COMPLETED         CONQUEST OF ..
..,4,ISRAEL,EGYPT,TURKEY,BABYLON
515 DATA -625,BEGINNING OF THE .... EMPIRE OF        MESOPOTAMIA,1,
CHALDEAN,0,0,0
516 DATA -606,BATTLE OF .... ENDED THE ASSYRIAN      EMPIRE,1,CARCH
EMISH,0,0,0
517 DATA -605,BEGINS THE REIGN OF KING               NEBUCHADNEZZAR
-II OF BABYLONIA,2,T,0,0,0
518 DATA -550,BEGINNING OF THE PERSIAN EMPIRE,2,T,0,0,0
519 DATA -550,PERSIAN EMPIRE FOUNDED BY .... THE     GREAT,4,CYRUS,
HAMMURABI,PILSER,DARIUS
520 DATA -538,CYRUS THE GREAT CONQUERED ....,4,BABYLON,EGYPT,TURKE
Y,ISRAEL
521 DATA -538,PERSIANS CONQUERED BABYLON & RETURNED HEBREWS TO ...
.,1,JERUSALEM,0,0,0
522 DATA -525,PERSIANS CONQUERED AND RULED ....,4,EGYPT,IRAN,JORDA
N,SYRIA
523 DATA -490,1ST PERSIAN EXPEDITION TO GREECE UNDER DARIUS I,2,T,
0,0,0
524 DATA -480,2ND PERSIAN EXPEDITION TO GREECE UNDER ....-I,1,XERX
ES,0,0,0
525 DATA -334,.... THE GREAT FOUNDED THE CITY        ALEXANDRIA,1,A
LEXANDER,0,0,0
526 DATA -300,ALEXANDRIA ....-BECAME AN INTELLECTUAL CENTER,4,EGYP
T,ISRAEL,TURKEY,PERSIA
527 DATA -250,THE .... EMPIRE SUCCEEDED THE PERSIAN EMPIRE,1,PARTH
IAN,0,0,0
528 DATA -280,....-II BUILT A LIGHTHOUSE ON PHAROS- ALEXANDRIA,1,P
TOLEMY,0,0,0
529 DATA -192,BEGINS .... WAR BETWEEN ROME AND       SELEUCIDS,4,SY
RIAN,MACCABEES,SELEUCID,PERSIAN
530 DATA -167,HEBREW .... REVOLTED AGAINST ANTIOCHUS-IV OF SYRIA,1
,MACCABEES,0,0,0
531 DATA -48,AIDED BY CAESAR-I BECAME THE QUEEN OF EGYPT,3,CLEOPAT
RA,0,0,0
532 DATA -6,.... CHRIST WAS BORN IN BETHLEHEM,1,JESUS,0,0,0
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
533 PRINT CHR$(125);"THE TIME DUNGEON * * * MAP"
534 PRINT
535 FOR Q=1 TO 8
536 FOR N=1 TO 8
537 IF C=N AND D=Q THEN PRINT "=P= ";:GOTO 540
538 S1=A(N,Q)
539 ON S1 GOSUB 137,137,138,138,139,140,141,139,142
540 NEXT N
541 PRINT
542 NEXT Q
543 GT=INT(RND(0)*8+1)+INT(RND(0)*(CA+5)+1):GOSUB 134
544 PRINT CHR$(125):RETURN
545 PRINT :PRINT "ON THE WALL IS A GLOWING SCREEN"
546 PRINT "BELOW THE SCREEN IS A RED BUTTON":PRINT
547 KT=INT(RND(0)*9+1):KL=INT(RND(0)*15+1)+2
548 GOSUB 565
549 INPUT K$
550 IF K$="Y" THEN 552
551 RETURN
552 IF KT>=6 THEN 533
553 IF KT<=4 THEN 562
554 PRINT :G4=INT(RND(0)*100+1)+25:G=G+G4
555 PRINT "YOU RECEIVE ";G4;" GOLD PIECES . . ."
556 PRINT "BUT . . . . . THE CORRIDOR NARROWS":GT=3:GOSUB 134
557 KL=KL-1:IF KL=0 THEN RETURN
558 GOSUB 565
559 INPUT K$
560 IF K$="Y" THEN 554
561 RETURN
562 PRINT :PRINT "NOTHING HAPPENS"
563 GT=1:GOSUB 134
564 RETURN
565 PRINT :PRINT "DO YOU WISH TO PUSH THE BUTTON?"
566 PRINT "ENTER  (Y)ES  OR  (N)O":RETURN
567 PRINT CHR$(125);"YOU ARE STUCK IN THE NARROW CORRIDOR"
568 PRINT ". . . . . AND . . .":PRINT :GT=3:GOSUB 134
569 GOTO 264
570 PRINT :PRINT "YOU NOTICE A DOOR TO YOUR RIGHT"
571 PRINT
572 KT=INT(RND(0)*9+1)
573 PRINT "DO YOU WISH TO OPEN THE DOOR?"
574 PRINT "ENTER  (Y)ES  OR  (N)O"
575 INPUT K$
576 IF K$="Y" THEN 578
577 RETURN
578 PRINT :PRINT "YOU TRY THE DOOR . . . . .":GT=1:GOSUB 134
579 IF KT>=7 THEN 589
580 IF KT<=4 THEN 587
581 PRINT :G4=INT(RND(0)*100+1)+25
582 PRINT "THE DOOR OPENS . . . . . ."
583 PRINT "REVEALING A CLOSET . . . ."
584 PRINT :G=G+G4
585 PRINT "WHERE YOU FIND ";G4;" GOLD PIECES"
```

Program 1-6-cont. The Time Dungeon: Ancient History, Middle East, 4000 B.C. to 6 B.C., Program Listing

```
586 PRINT :RETURN
587 PRINT "BUT THE DOOR WON'T OPEN . . . ."
588 PRINT ". . . . IT MUST BE LOCKED":RETURN
589 PRINT :PRINT "THE DOOR OPENS . . . AND SUDDENLY"
590 PRINT "THE CHAMBER BEGINS TO . . . SPIN"
591 G7=INT(G/2):G4=INT(RND(0)*G7+1):MM=INT(RND(0)*20+1)
592 GT=4:GOSUB 134:G=G-G4
593 FOR K9=1 TO 250
594 PRINT "+    =    +";
595 NEXT K9
596 PRINT CHR$(125);"YOU WERE TELEPORTED INTO . . . ."
597 PRINT ". . . . ANOTHER DIMENSION . . . ."
598 PRINT ". . AND RETURNED IN AN INSTANT . ."
599 PRINT :PRINT "BUT YOU DROPPED ";G4;" GOLD PIECES"
600 PRINT ". . . AND WASTED ";MM;" MOVES . . ."
601 M1=M1+MM
602 GT=4:GOSUB 134
603 RETURN
```

CHAPTER 2

Relativistic Mass Simulation

Here's a scientific program using Einstein's theory of relativity. It takes the formula for the mass of a body in motion as it relates to the speed of light, and allows an interesting simulation. The program will display the change in mass for an object traveling at a given velocity, having a rest mass of m_o. It is written in BASIC for your microcomputer. See Program 2-1 for the program listing.

THE PROGRAM

The program creates the relativistic mass simulation using Einstein's equation:

$$m = \frac{m_o}{\sqrt{1 - v^2/c^2}}$$

where

m is the mass of the moving object,
m_o is the mass of the object at rest,
v is the velocity of the object,
c is the speed of light (2.997925×10^8 meters/second).

It allows the entry of the rest mass, m_o, of a given object, and its velocity, v. Enter the mass of the object in kilograms, and its velocity in meters per second. The program displays the mass of the object at rest, the mass at the velocity entered, the change in mass, and the percent change in mass.

Entering a small velocity will display no apparent change in mass. But as you increase the velocity, the change will become noticeable. When your test velocity approaches the speed of light, the mass change will become more apparent. The program will accept entry of any initial mass value, but it will limit the velocity entry to less than the speed of light, following Einstein's Special Theory of Relativity.

After the simulation is complete, enter a 1 to continue with the same mass and different velocity, enter a 2 to continue the simulation with a different mass, enter a 3 for a new simulation, or enter a 4 to end the program.

See Fig. 2-1 for a sample run.

```
RELATIVISTIC MASS SIMULATION
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THIS PROGRAM  WILL DISPLAY THE
CHANGE IN MASS FOR AN OBJECT
TRAVELING AT A GIVEN VELOCITY,
HAVING A REST MASS OF M0.
IT USES EINSTEIN'S RELATIONSHIP
THAT THE MASS OF AN OBJECT
INCREASES AS ITS VELOCITY INCREASES

ENTER THE NAME OF THE OBJECT
IN THE SIMULATION
? SPACE CAPSULE


ENTER THE MASS AT REST (KG)
FOR THE OBJECT 'SPACE CAPSULE'
? 2724

ENTER SIMULATED VELOCITY (M/S)
FOR THE OBJECT 'SPACE CAPSULE'
? 20000

GIVEN THE OBJECT: SPACE CAPSULE
WITH A REST MASS OF  2724  KG

THE MASS OF THE OBJECT:
SPACE CAPSULE-AT  20000  M/S IS
 2724  KG

THE INCREASE IN MASS IS
 0  KG, OR  0  %

ENTER 1-CONT. SIMULATION-SAME MASS
      2-CONT. SIMULATION-DIFF. MASS
      3-NEW SIMULATION
      4-END PROGRAM
? 1

ENTER THE SIMULATED VELOCITY (M/S)
FOR THE OBJECT 'SPACE CAPSULE'
? 2200000

GIVEN THE OBJECT: SPACE CAPSULE
WITH A REST MASS OF  2724  KG

THE MASS OF THE OBJECT:
SPACE CAPSULE-AT  2.2E+06  M/S IS
 2724.07  KG

THE INCREASE IN MASS IS
 .0732422  KG, OR  2.68877E-03  %

ENTER 1-CONT. SIMULATION-SAME MASS
      2-CONT. SIMULATION-DIFF. MASS
      3-NEW SIMULATION
      4-END PROGRAM
? 1


ENTER THE SIMULATED VELOCITY (M/S)
FOR THE OBJECT 'SPACE CAPSULE'
? 2.24E+08


GIVEN THE OBJECT: SPACE CAPSULE
WITH A REST MASS OF  2724  KG

THE MASS OF THE OBJECT:
SPACE CAPSULE-AT  2.24E+08  M/S IS
 4098.6  KG

THE INCREASE IN MASS IS
 1374.6  KG, OR  50.4624  %

ENTER 1-CONT. SIMULATION-SAME MASS
      2-CONT. SIMULATION-DIFF. MASS
      3-NEW SIMULATION
      4-END PROGRAM
? 4
```

Fig. 2-1. Relativistic Mass Simulation sample run.

Program 2-1. Relativistic Mass Simulation Program Listing

```
100 PRINT CHR$(125)
110 PRINT "RELATIVISTIC MASS SIMULATION"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT "ATARI":DIM A$(30)
140 PRINT :C=299792500
150 PRINT "THIS PROGRAM  WILL DISPLAY THE"
160 PRINT "CHANGE IN MASS FOR AN OBJECT"
170 PRINT "TRAVELING AT A GIVEN VELOCITY,"
180 PRINT "HAVING A REST MASS OF M0."
190 PRINT "IT USES EINSTEIN'S RELATIONSHIP"
200 PRINT "THAT THE MASS OF AN OBJECT"
210 PRINT "INCREASES AS ITS VELOCITY INCREASES"
220 PRINT
230 PRINT "ENTER THE NAME OF THE OBJECT"
240 PRINT "IN THE SIMULATION"
250 INPUT A$
260 PRINT
270 PRINT "ENTER THE MASS AT REST (KG)"
280 PRINT "FOR THE OBJECT '";A$;"'"
290 INPUT M
300 PRINT
310 PRINT "ENTER THE SIMULATED VELOCITY (M/S)"
320 PRINT "FOR THE OBJECT '";A$;"'"
330 INPUT V
340 IF V>=C THEN 570
350 V2=V*V
360 PRINT CHR$(125):C2=C*C
370 PRINT "GIVEN THE OBJECT: ";A$
380 PRINT "WITH A REST MASS OF ";M;" KG"
390 Q=SQR(1-(V2/C2))
400 MR=M/Q:T=MR-M
410 PRINT
420 PRINT "THE MASS OF THE OBJECT:"
430 PRINT A$;"-AT ";V;" M/S IS"
440 PRINT MR;" KG"
450 PRINT
460 PRINT "THE INCREASE IN MASS IS"
470 PRINT T;" KG";:GOSUB 650
480 PRINT
490 PRINT "ENTER 1-CONT. SIMULATION-SAME MASS"
500 PRINT "      2-CONT. SIMULATION-DIFF. MASS"
510 PRINT "      3-NEW SIMULATION"
520 PRINT "      4-END PROGRAM"
530 INPUT T
540 ON T GOTO 300,260,110,560
550 GOTO 480
560 END
570 PRINT
580 PRINT "EINSTEIN SAID THAT NO OBJECT CAN"
590 PRINT "TRAVEL EQUAL TO OR GREATER THAN"
600 PRINT "THE SPEED OF LIGHT."
610 PRINT
620 PRINT "ENTER A VELOCITY LESS THAN THE"
```

Program 2-1-cont. Relativistic Mass Simulation Program Listing

```
630 PRINT "SPEED OF LIGHT."
640 GOTO 300
650 P=(T/M)*100
660 PRINT ", OR ";P;" %"
670 RETURN
```

CHAPTER 3

Perception Testing: Eidetic Imagery

Here's a program that may be used in perception testing. It will test for the ability to form eidetic images. Eidetic imagery is the ability of the mind to form an almost photographic image of an object. A recalled eidetic image is a visual sensation and should be perfect. (A very accurate description is not necessarily eidetic.) The program is written in BASIC for your microcomputer. See Program 3-1 for the program listing.

THE PROGRAM

The program will generate two pictures, each made up of asterisks (*). When one is superimposed on the other, a recognizable pattern will result.

Enter a 1 to display the first picture. Study the picture and try to remember it. When you think you have memorized it, enter a 1 to display the second picture. This will erase the first picture and display the second. Now, try to recall the first picture and superimpose its pattern on the second. If you think you can identify what you have seen, then enter the answer at the keyboard. Otherwise enter NO. See Fig. 3-1 for a sample run.

A person that has the ability to form eidetic images will immediately recognize what he or she sees, and the answer will become apparent.

```
PERCEPTION TESTING
EIDETIC IMAGERY
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS PROGRAM WILL TEST YOU FOR
THE ABILITY TO FORM EIDETIC IMAGES.
IT WILL GENERATE TWO PICTURES, WHICH
YOU MUST TRY TO MEMORIZE. IF YOU
CAN IDENTIFY THE IMAGE FORMED BY
SUPERIMPOSING THE 1ST ON THE 2ND
THEN ENTER THE ANSWER.

ENTER '1' TO DISPLAY 1ST
PICTURE
? 1


 ****
*
*
*
*  **
*

*
*    *
 ** *

TRY TO MEMORIZE THIS PICTURE

ENTER '1' TO DISPLAY 2ND
PICTURE
? 1


*
     *
     *
     *
 **
     *
*    *
     *

*  *

NOW TRY TO RECALL THE 1ST PICTURE AND
SUPERIMPOSE ITS PATTERN ON THE 2ND.

ENTER '1' TO CONTINUE
? 1


IF YOU CAN IDENTIFY WHAT YOU
HAVE SEEN, THEN ENTER YOUR
ANSWER AT THE KEYBOARD.

OTHERWISE ENTER 'NO'.
?
```

Fig. 3-1. Perception Testing: Eidetic Imagery sample run.

Program 3-1. Perception Testing: Eidetic Imagery Program Listing

```
100 PRINT CHR$(125);"PERCEPTION TESTING"
110 PRINT "EIDETIC IMAGERY"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT "ATARI"
140 PRINT :DIM A$(1)
150 PRINT "THIS PROGRAM WILL TEST YOU FOR"
160 PRINT "THE ABILITY TO FORM EIDETIC IMAGES."
170 PRINT "IT WILL GENERATE TWO PICTURES, WHICH"
180 PRINT "YOU MUST TRY TO MEMORIZE. IF YOU"
190 PRINT "CAN IDENTIFY THE IMAGE FORMED BY"
200 PRINT "SUPERIMPOSING THE 1ST ON THE 2ND"
210 PRINT "THEN ENTER THE ANSWER."
220 PRINT
230 PRINT "ENTER '1' TO DISPLAY 1ST"
240 PRINT "PICTURE"
250 INPUT A:PRINT CHR$(125)
260 GOSUB 760
270 PRINT
280 PRINT "TRY TO MEMORIZE THIS PICTURE"
290 PRINT
300 PRINT "ENTER '1' TO DISPLAY 2ND"
310 PRINT "PICTURE"
320 INPUT A:PRINT CHR$(125)
330 GOSUB 870
340 PRINT
350 PRINT "NOW TRY TO RECALL THE 1ST PICTURE AND"
360 PRINT "SUPERIMPOSE ITS PATTERN ON THE 2ND."
370 PRINT
380 PRINT "ENTER '1' TO CONTINUE"
390 INPUT A:PRINT CHR$(125)
400 PRINT
410 PRINT "IF YOU CAN IDENTIFY WHAT YOU"
420 PRINT "HAVE SEEN, THEN ENTER YOUR"
430 PRINT "ANSWER AT THE KEYBOARD."
440 PRINT
450 PRINT "OTHERWISE ENTER 'NO'."
460 INPUT A$
470 IF A$="B" THEN 640
480 IF A$="NO" THEN 520
490 PRINT
500 PRINT CHR$(125);"YOUR ENTRY IS INCORRECT . ."
510 PRINT
520 PRINT "FROM THE ABOVE TEST, THERE IS"
530 PRINT "NO INDICATION THAT YOU HAVE THE"
540 PRINT "ABILITY TO FORM EIDETIC IMAGES."
550 GOSUB 570
560 GOTO 630
570 PRINT
580 PRINT "THE PATTERN SEEN WHEN THE TWO"
590 PRINT "PICTURES ARE SUPERIMPOSED"
600 PRINT "FORMS THE LETTER 'B'."
610 PRINT
620 RETURN
```

Program 3-1-cont. Perception Testing: Eidetic Imagery Program Listing

```
630 END
640 PRINT
650 PRINT CHR$(125);"CORRECT"
660 GOSUB 570
670 PRINT
680 PRINT "THERE IS AN INDICATION"
690 PRINT "THAT YOU HAVE THE ABILITY"
700 PRINT "TO FORM EIDETIC IMAGES."
710 PRINT
720 PRINT "FURTHER TESTING IS RECOMMENDED,"
730 PRINT "TO VERIFY THIS CONCLUSION."
740 PRINT
750 GOTO 630
760 PRINT " ****"
770 PRINT "*"
780 PRINT "*"
790 PRINT "*"
800 PRINT "*  **"
810 PRINT "*"
820 PRINT
830 PRINT "*"
840 PRINT "*    *"
850 PRINT " ** *"
860 RETURN
870 PRINT "*"
880 PRINT "     *"
890 PRINT "     *"
900 PRINT "     *"
910 PRINT " **"
920 PRINT "     *"
930 PRINT "*    *"
940 PRINT "     *"
950 PRINT
960 PRINT "*  *"
970 RETURN
```

CHAPTER 4

Memory Challenger II: Random Letters

The Memory Challenger II is a game used to test your memory and concentration. It generates and displays random letters (A–Z) of different lengths. You must enter the letters that are flashed on the screen. The program is written in BASIC for your microcomputer. See Program 4-1 for the program listing.

THE PROGRAM

The program begins by accepting entry of the difficulty level. Enter a 1 for easy, 2 for medium difficulty, or 3 for most difficult. Letters will be displayed from slow to fast, depending on the difficulty level; 1 is the slowest and 3 is the quickest.

After entering a 1 to begin, GET READY will be printed at the top center of the display. Then a set of random letters will be displayed at a random location on the screen, for a short period. Enter the letters that were displayed. The correct answer is displayed, and CORRECT or INCORRECT is printed. Then the number of correct answers out of the number of tries is displayed. Finally, TRY AGAIN will be displayed; and you have a choice of playing again at the same difficulty level, playing again at another difficulty level, or ending the test. When you decide to end the test, your final percent score will be displayed. See Fig. 4-1 for a sample run.

```
MEMORY CHALLENGER II: RANDOM LETTERS
COPYRIGHT (C) 1981 BY HOWARD BERENSON

THIS PROGRAM GENERATES & DISPLAYS RANDOM
LETTERS OF DIFFERENT LENGTHS. ENTER
THE LETTERS THAT ARE FLASHED AT RANDOM
LOCATIONS ON THE SCREEN.

ENTER DIFFICULTY LEVEL:
1=EASY
2=MEDIUM DIFFICULTY
3=MOST DIFFICULT
? 2


ENTER '1' TO BEGIN
? 1




                    GET READY




                PFOZ

                   DIFFICULTY LEVEL  2
ENTER LETTERS
? PFOZ
THE ANSWER IS 'PFOZ'


CORRECT
YOU HAVE  1  CORRECT OUT OF  1  TRIES

TRY AGAIN?
1 = YES & SAME DIFFICULTY-**GET READY**
2 = YES & CHANGE DIFFICULTY
0 = NO
? 1


                    GET READY




                                        PCDH

                   DIFFICULTY LEVEL  2
ENTER LETTERS
? PCDH
THE ANSWER IS 'PCDH'

CORRECT
YOU HAVE  2  CORRECT OUT OF  2  TRIES

TRY AGAIN?
1 = YES & SAME DIFFICULTY-**GET READY**
2 = YES & CHANGE DIFFICULTY
0 = NO
? 0


YOUR FINAL SCORE IS  100  PERCENT
```

Fig. 4-1. Memory Challenger II: Random Letters sample run.

Program 4-1. Memory Challenger II: Random Letters Program Listing

```
100 PRINT CHR$(125);"MEMORY CHALLENGER II: RANDOM LETTERS"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
130 PRINT :DIM L1$(5),L2$(5),L3$(5),L4$(5),L5$(5),L6$(5)
140 PRINT "THE PROGRAM GENERATES & DISPLAYS      RANDOM"
150 PRINT "LETTERS OF DIFFERENT LENGTHS. ENTER"
160 PRINT "THE LETTERS THAT ARE FLASHED AT RANDOM";
170 PRINT "LOCATIONS ON THE SCREEN."
180 PRINT
190 Z=0
200 W=0
210 PRINT "ENTER DIFFICULTY LEVEL:"
220 PRINT "1=EASY"
230 PRINT "2=MEDIUM DIFFICULTY"
240 PRINT "3=MOST DIFFICULT"
250 INPUT A
260 PRINT CHR$(125)
270 IF A=1 THEN 600
280 IF A=2 THEN 640
290 IF A=3 THEN 680
300 GOTO 210
310 PRINT CHR$(125)
320 IF D=1 THEN 340
330 PRINT "ENTER '1' TO BEGIN":INPUT B
340 GRAPHICS 0:GRAPHICS 1+16
350 POSITION 6,4
360 PRINT #6;"GET READY"
370 FOR D=1 TO 264
380 NEXT D
390 GRAPHICS 0:GRAPHICS 1+16
400 Y1=INT(RND(0)*20+1)
410 X=INT(RND(0)*15+1)
420 GOSUB 880
430 POSITION X,Y1
440 PRINT #6;L1$
450 GOSUB 720
460 GRAPHICS 0:POSITION 21,1
470 PRINT "DIFFICULTY LEVEL ";A
480 PRINT "ENTER LETTERS"
490 Z=Z+1
500 INPUT L6$
510 PRINT "THE ANSWER IS '";L1$;"'"
520 PRINT
530 IF L6$=L1$ THEN 570
540 PRINT "INCORRECT"
550 PRINT "YOU HAVE ";W;" CORRECT OUT OF ";Z;" TRIES"
560 GOTO 770
570 PRINT "CORRECT"
580 W=W+1
590 GOTO 550
600 G=35
610 F=2
620 N=INT(RND(0)*150+1)
```

Program 4-1-cont. Memory Challenger II: Random Letters Program Listing.

```
630 GOTO 320
640 N=INT(RND(0)*150+1)
650 G=45
660 F=4
670 GOTO 320
680 N=INT(RND(0)*100+1)
690 G=45
700 E=5
710 GOTO 320
720 FOR E=1 TO G+N
730 NEXT E
740 RETURN
750 PRINT "YOUR FINAL SCORE IS ";INT(W/Z*100);" PERCENT"
760 END
770 PRINT
780 PRINT "TRY AGAIN?"
790 PRINT "1 = YES & SAME DIFFICULTY**GET READY**";
800 PRINT "2 = YES & CHANGE DIFFICULTY"
810 PRINT "0 = NO"
820 INPUT D
830 IF D=1 THEN 260
840 IF D=2 THEN 210
850 IF D=0 THEN 750
860 GOTO 770
870 REM SELECT LETTERS
880 GOSUB 940:L1$=L6$
890 GOSUB 940:L2$=L6$:GOSUB 940:L3$=L6$
900 GOSUB 940:L4$=L6$:GOSUB 940:L5$=L6$
910 L1$(LEN(L1$)+1)=L2$:IF A=1 THEN RETURN
920 L1$(LEN(L1$)+1)=L3$:L1$(LEN(L1$)+1)=L4$:IF A=2 THEN RETURN
930 L1$(LEN(L1$)+1)=L5$:RETURN
940 LT=INT(RND(0)*26+1)
950 FOR T=1 TO LT:READ L6$
960 NEXT T:RESTORE :RETURN
970 DATA A,B,C,D,E,F,G,H,I,J,K,L,M
980 DATA N,O,P,Q,R,S,T,U,V,W,X,Y,Z
```

CHAPTER 5

Memory Challenger III: Random Words

The Memory Challenger III is another game used to test your memory and concentration. It's similar to the Memory Challenger II of Chapter 4, except that it displays random words taken from DATA statements beginning at line 1000. You must enter the word that is flashed at a random location on the screen. The program is written in BASIC for your microcomputer. See Program 5-1 for the program listing.

THE PROGRAM

The program begins by accepting entry of the difficulty level. Enter a 1 for easy, 2 for medium difficulty, or 3 for most difficult. Words will be displayed from slow to fast, depending on the difficulty level; 1 is the slowest and 3 is the quickest.

After entering a 1 to begin, GET READY will be printed at the top center of the display. Then a word is displayed at a random location on the screen for a short period. Enter the word that was displayed. The correct answer is displayed, and CORRECT or INCORRECT is printed. Then the number of correct answers out of the number of tries is displayed. Finally, TRY AGAIN will be displayed; and you have a choice of playing again at the same difficulty level, playing again at another difficulty level, or ending the test. When you decide to end the test, your final percent score will be displayed. See Fig. 5-1 for a sample run.

THE WORD LIST

The word list begins at program line 1000. Its content is arbitrary, with no specific purpose in mind. It may be changed, but the choice of words is up to you. They can be just random words with no apparent connection, or they can be words relating to a specific subject.

To enter a new word list, type in a set of 50 words, in DATA statements, beginning at line 1000. Limit the word length to no longer than six characters, otherwise the word may be too difficult to catch when displayed at difficulty levels 2 and 3. Alternately, you may enter longer words, but limit the difficulty level to level 1.

```
MEMORY CHALLENGER III: RANDOM WORDS
COPYRIGHT (C) 1981 BY HOWARD BERENBON

MEMORY CHALLENGER III IS USED TO TEST
YOUR MEMORY. IT DISPLAYS WORDS RANDOMLY
FROM A LIST OF 50 WORDS, LOCATED IN DATA
STATEMENTS BEGINNING AT 1000. EACH WORD
WILL APPEAR AT A RANDOM LOCATION ON THE
SCREEN. ENTER THE WORD THAT WAS FLASHED
ON THE SCREEN.

ENTER DIFFICULTY LEVEL:
1=EASY
2=MEDIUM DIFFICULTY
3=MOST DIFFICULT
? 2


ENTER '1' TO BEGIN
? 1



                        GET READY




      SALUTE



                    DIFFICULTY LEVEL  2
ENTER THE WORD
? SALUTE
THE ANSWER IS 'SALUTE'

CORRECT
YOU HAVE  1  CORRECT OUT OF  1  TRIES

TRY AGAIN?
1 = YES & SAME DIFFICULTY-**GET READY**
2 = YES & CHANGE DIFFICULTY
0 = NO
? 1



                        GET READY

                                                  KIND


                    DIFFICULTY LEVEL  2
ENTER THE WORD
? KIND
THE ANSWER IS 'KIND'

CORRECT
YOU HAVE  2  CORRECT OUT OF  2  TRIES

TRY AGAIN?
1 = YES & SAME DIFFICULTY-**GET READY**
2 = YES & CHANGE DIFFICULTY
0 = NO
? 0


YOUR FINAL SCORE IS  100  PERCENT
```

Fig. 5-1. Memory Challenger III: Random Words sample run.

Program 5-1. Memory Challenger III: Random Words Program Listing

```
100 PRRINT CHR$(125);"MEMORY CHALLENGER III: RANDOM WORDS"
105 PRINT "ATARI"
110 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
120 PRINT :DIM C$(30),G$(30)
125 PRINT "MEMORY CHALLENGER III IS USED TO TEST"
130 PRINT "YOUR MEMORY. IT DISPLAYS WORDS RANDOM-";
140 PRINT "LY FROM A LIST OF 50 WORDS, LOCATED IN";
145 PRINT "DATA STATEMENTS BEGINNING AT 1000."
150 PRINT "EACH WORD WILL APPEAR AT A RANDOM"
155 PRINT "LOCATION ON THE SCREEN. ENTER THE WORD";
160 PRINT "THAT IS FLASHED ON THE SCREEN.":PRINT
170 Z=0
180 W=0
190 PRINT "ENTER DIFFICULTY LEVEL:"
200 PRINT "1=EASY"
210 PRINT "2=MEDIUM DIFFICULTY"
220 PRINT "3=MOST DIFFICULT"
230 INPUT A
240 PRINT CHR$(125)
250 IF A=1 THEN 550
260 IF A=2 THEN 590
270 IF A=3 THEN 630
280 GOTO 190
290 PRINT CHR$(125)
300 IF D=1 THEN 320
310 PRINT "ENTER '1' TO BEGIN":INPUT B
320 GRAPHICS 0:GRAPHICS 1+16
330 POSITION 6,4
340 PRINT #6;"GET READY"
350 FOR D=1 TO 264
360 NEXT D:GRAPHICS 0:GRAPHICS 1+16
370 Y1=INT(RND(0)*20+1):X1=INT(RND(0)*15+1)
380 GOSUB 820:POSITION X,Y1
390 PRINT #6;G$
400 GOSUB 670
410 GRAPHICS 0:POSITION 21,1
420 PRINT "DIFFICULTY LEVEL ";A
430 PRINT "ENTER THE WORD"
440 Z=Z+1
450 INPUT C$
460 PRINT "THE ANSWER IS '";G$;"'"
470 PRINT
480 IF G$=C$ THEN 520
490 PRINT "INCORRECT"
500 PRINT "YOU HAVE ";W;" CORRECT OUT OF ";Z;" TRIES"
510 GOTO 720
520 PRINT "CORRECT"
530 W=W+1
540 GOTO 500
550 REM DIFFICULTY LEVELS
560 G=55
570 N=INT(RND(0)*170+1)
580 GOTO 300
```

Program 5-1-cont. Memory Challenger III: Random Words Program Listing

```
590 N=INT(RND(0)*100+1)
600 G=35
620 GOTO 300
630 N=INT(RND(0)*50+1)
640 G=30
660 GOTO 300
670 FOR E=1 TO G+N
680 NEXT E
690 RETURN
700 PRINT "YOUR FINAL SCORE IS ";INT(W/Z*100);" PERCENT"
710 END
720 PRINT
730 PRINT "TRY AGAIN?"
740 PRINT "1 = YES & SAME DIFFICULTY**GET READY**";
750 PRINT "2 = YES & CHANGE DIFFICULTY"
760 PRINT "0 = NO"
770 INPUT D
780 IF D=1 THEN 240
790 IF D=2 THEN 190
800 IF D=0 THEN 700
810 GOTO 720
820 X2=INT(RND(0)*50+1)
830 FOR T=1 TO X2
840 READ G$:NEXT T
850 RESTORE
860 RETURN
1000 DATA ABOVE,ACID,ADMIT,BARGE,BEAR
1010 DATA CAKE,CAR,COW,DODGE,DUST
1020 DATA EDIT,EGG,EVICT,FIRE,FLASH
1030 DATA GAME,GATE,GOLD,HEAT,HEAVY
1040 DATA INCISE,INFANT,INTO,JUST,JUDGE
1050 DATA KNOW,KIND,LADY,LAUGH,LEAVE
1060 DATA MAGIC,MARK,NICE,NEW,PANE
1070 DATA QUART,QUICK,RAFT,RADIO,SALUTE
1080 DATA TREE,THRUST,ULTRA,UNTIL,VEST
1090 DATA WELL,WHITE,YOUNG,ZOOM,ZINC
```

CHAPTER 6

Word Association

The Word Association program is an educational exercise for children. It gives a twenty-question test, with each question displaying four words. The word that is "not like the others" must be chosen. The program is written in BASIC for your microcomputer. See Program 6-1 for the program listing.

THE PROGRAM

The program begins by accepting the student's name, then requesting the entry of a 1 to begin the test. Each question displays four words, three of which are on a related subject, and the fourth is not related. The student must enter the word that is not related to the others. CORRECT is displayed for a correct response, and INCORRECT is displayed for an incorrect entry. This is repeated for all twenty questions, then the student's score is calculated. Finally, the number of correct out of twenty is displayed, along with the percent score. See Fig. 6-1 for a sample run.

THE QUESTIONS

The words are stored in DATA statements beginning at line 690. The first three words in each statement are related, and the fourth is not related. Each time a question is displayed, the unrelated word will appear in one of four positions on the display. The word list may be changed for a different set of questions.

```
WORD ASSOCIATION
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM IS A TEACHING AID FOR
CHILDREN. IT GIVES A 20 QUESTION
WORD ASSOCIATION TEST. FOUR WORDS
ARE DISPLAYED FOR EACH QUESTION,
AND THE STUDENT MUST ENTER THE ONE
THAT IS UNRELATED TO THE REST. THE
WORD LIST IS ENTERED IN DATA STATE-
MENTS BEGINNING WITH LINE 690. IT
MAY BE CHANGED FOR DIFFERENT TESTS.

ENTER STUDENT'S NAME
? DAVID


ENTER '1' TO BEGIN TEST
? 1


WORD ASSOCIATION TEST
QUESTION #  1

CAR             ONE             TWO             THREE

ENTER THE WORD THAT IS NOT RELATED
TO THE OTHER THREE WORDS

? CAR

CORRECT




QUESTION #  3

BOAT            SAIL            LAKE            TRUMPET

ENTER THE WORD THAT IS NOT RELATED
TO THE OTHER THREE WORDS

? TRUMPET

CORRECT


QUESTION #  19

AIRPLANE        BOAT            GRASS           TRAIN

ENTER THE WORD THAT IS NOT RELATED
TO THE OTHER THREE WORDS

? GRASS

CORRECT


QUESTION #  20

DINNER          SCHOOL          READING         WRITING

ENTER THE WORD THAT IS NOT RELATED
TO THE OTHER THREE WORDS

? DINNER

CORRECT



TEST SCORING FOR STUDENT
DAVID

TOTAL CORRECT OUT OF 20 =  20
PERCENT SCORE IS =  100
```

Fig. 6-1. Word Association sample run.

Program 6-1. Word Association Program Listing

```
100 PRINT CHR$(125);"WORD ASSOCIATION"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI"
130 PRINT :DIM A$(50),B$(20),C$(20),D$(20),E$(20),F$(20)
140 PRINT "THIS PROGRAM IS A TEACHING AID FOR"
150 PRINT "CHILDREN. IT GIVES A 20 QUESTION"
160 PRINT "WORD ASSOCIATION TEST. FOUR WORDS"
170 PRINT "ARE DISPLAYED FOR EACH QUESTION,"
180 PRINT "AND THE STUDENT MUST ENTER THE ONE"
190 PRINT "THAT IS UNRELATED TO THE REST. THE"
200 PRINT "WORD LIST IS ENTERED IN DATA STATE-"
210 PRINT "MENTS BEGINNING WITH LINE 690. IT"
220 PRINT "MAY BE CHANGED FOR DIFFERENT TESTS."
230 PRINT
240 PRINT "ENTER STUDENT'S NAME"
250 INPUT A$:S=0
260 PRINT
270 PRINT "ENTER '1' TO BEGIN TEST"
280 INPUT A:PRINT CHR$(125)
290 PRINT "WORD ASSOCIATION TEST"
300 FOR T=1 TO 20:PRINT "QUESTION # ";T
310 PRINT :READ B$,C$,D$,E$
320 R=INT(RND(0)*4+1)
330 ON R GOSUB 450,470,490,510
340 GOSUB 420
350 INPUT F$
360 IF F$=E$ THEN 530
370 PRINT :PRINT "INCORRECT"
380 PRINT
390 PRINT "THE CORRECT WORD IS ";E$
400 GOSUB 660:PRINT CHR$(125):NEXT T
410 GOTO 580
420 PRINT :PRINT "ENTER THE WORD THAT IS NOT RELATED"
430 PRINT "TO THE OTHER THREE WORDS"
440 PRINT :RETURN
450 PRINT B$;"  ";C$;"  ";D$;"  ";E$
460 RETURN
470 PRINT C$;"  ";D$;"  ";E$;"  ";B$
480 RETURN
490 PRINT D$;"  ";E$;"  ";B$;"  ";C$
500 RETURN
510 PRINT E$;"  ";B$;"  ";C$;"  ";D$
520 RETURN
530 S=S+5
540 PRINT
550 PRINT "CORRECT"
560 PRINT
570 GOTO 400
580 PRINT CHR$(125)
590 PRINT "TEST SCORING FOR STUDENT"
600 PRINT A$
610 PRINT
620 PRINT "TOTAL CORRECT OUT OF 20 = ";S/5
```

Program 6-1-cont. Word Association Program Listing

```
630 PRINT "PERCENT SCORE IS = ";S
640 PRINT
650 END
660 FOR A=1 TO 900
670 NEXT A
680 RETURN
690 DATA ONE,TWO,THREE,CAR
700 DATA TIRE,CAR,FENDER,SAIL
710 DATA BOAT,SAIL,LAKE,TRUMPET
720 DATA GUITAR,TRUMPET,VIOLIN,SISTER
730 DATA BROTHER,SISTER,FATHER,BOOK
740 DATA BINDING,BOOK,PAGES,DRILL
750 DATA SAW,CUT,DRILL,GYM
760 DATA FOOTBALL,BASKETBALL,BASEBALL,TRUCK
770 DATA ARM,HAND,EYES,TIME
780 DATA HOURS,MINUTES,SECONDS,PEOPLE
790 DATA PENCIL,PAPER,PEN,AIRPLANE
800 DATA FLYING,AIRPORT,AIRPLANE,SING
810 DATA TALK,SING,WHISPER,JUMP
820 DATA WALK,STAND,RUN,EAT
830 DATA SALT,PEPPER,GARLIC,GLUE
840 DATA LAKE,RIVER,STREAM,TRAIN
850 DATA COOKIES,CAKE,BROWNIES,STEAM
860 DATA ICE,WATER,STEAM,MOUNTAIN
870 DATA TRAIN,AIRPLANE,BOAT,GRASS
880 DATA SCHOOL,READING,WRITING,DINNER
```

CHAPTER 7

The Student Grader

The Student Grader is a program designed to aid the teacher. It will accept entry of each student's individual grades, and it will display each set of grades with their average. It will also display the class average for any number of students in the list. The program is written in BASIC for your microcomputer. See Program 7-1 for the program listing.

THE PROGRAM

The program accepts entry of the student's grades, in DATA statements, beginning at line 500. Enter each student's name, each grade in percent (separated by commas), and the number 999, which is used to detect the end of each student's grades. After the whole list of students' grades is entered, DATA "END" must be entered as the last DATA statement in the list. The following are examples of DATA statement entries:

```
550 DATA TOM SMITH,86,78,79,88,80,999
560 DATA MIKE ROSS,78,88,90,90,85,83,999
```

Each of the students' grade lists may have a different number of percent scores. The program calculates the average score on the number of grades in each student's DATA statement.

After you run the program, enter a 1 to begin. The program will display each of the student's grades, and the average grade, for all of the students in the list. The program will also display the class average, calculated by adding each average grade of each student and dividing by the total number of students.

See Fig. 7-1 for a sample run.

```
THE STUDENT GRADER
COPYRIGHT (C) 1980 BY HOWARD BERENSON



THIS PROGRAM WILL AID THE TEACHER
IN RECORDING AND GRADING TEST SCORES.

ENTER EACH STUDENT'S NAME AND GRADES
IN DATA STATEMENTS BEGINNING AT LINE
500. ENTER AS FOLLOWS:
DATA NAME,60,70,80,78,79,67,999
999 MUST BE THE LAST NUMBER, WHICH
DETECTS THE END OF THE GRADES. ALSO,
DATA 'END' MUST BE THE LAST DATA
STATEMENT IN THE DATA LIST.

ENTER A '1' TO BEGIN
? 1


THE STUDENT GRADER

NAME       GRADE(%)

RICK  86   78   85   79   88   80   AVE= 83
BRUCE  78   80   78   90   91   78   AVE= 83
DAVE  89   88   87   67   68   90   AVE= 82
MIKE  56   60   67   56   80   70   AVE= 65

CLASS AVERAGE WITH  4  STUDENTS
IS  78  PERCENT
```

Fig. 7-1. The Student Grader sample run.

Program 7-1. The Student Grader Program Listing

```
100 PRINT CHR$(125);"THE STUDENT GRADER"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":DIM A$(30)
130 PRINT :PRINT :GOSUB 480
140 PRINT "THIS PROGRAM WILL AID THE TEACHER"
150 PRINT "IN RECORDING AND GRADING TEST SCORES."
160 PRINT
170 PRINT "ENTER EACH STUDENT'S NAME AND GRADES"
180 PRINT "IN DATA STATEMENTS BEGINNING AT LINE"
190 PRINT "500. ENTER AS FOLLOWS:"
200 PRINT "DATA NAME,60,70,80,78,79,67,999"
210 PRINT "999 MUST BE THE LAST NUMBER, WHICH"
220 PRINT "DETECTS THE END OF THE GRADES. ALSO,"
230 PRINT "DATA END MUST BE THE LAST DATA"
240 PRINT "STATEMENT IN THE DATA LIST."
250 PRINT
260 PRINT "ENTER A '1' TO BEGIN"
270 INPUT S
280 PRINT CHR$(125):N=0:C=0
290 N1=0:C1=0
300 PRINT "THE STUDENT GRADER"
310 PRINT
320 PRINT "NAME          GRADE(%)"
330 PRINT
340 READ A$:IF A$="END" THEN 440
350 PRINT A$;" ";
360 READ B:IF B=999 THEN 410
370 PRINT B;" ";
380 N=N+1
390 C=B+C
400 GOTO 360
410 S1=INT((C/N)+0.5):PRINT "AVE=";S1:GOSUB 480
420 C1=S1+C1:N=0:C=0:N1=N1+1
430 GOTO 340
440 RESTORE :PRINT
450 A1=INT((C1/N1)+0.5):PRINT "CLASS AVERAGE WITH ";N1;" STUDENTS"
460 PRINT "IS ";A1;" PERCENT"
470 END
480 FOR T=1 TO 1500
490 NEXT T:RETURN
500 DATA RICK,86,78,85,79,88,80,999
510 DATA BRUCE,78,80,78,90,91,78,999
520 DATA DAVE,89,88,87,67,68,90,999
530 DATA MIKE,56,60,67,56,80,70,999
540 DATA END
```

CHAPTER 8

Advanced Math: Algebra

Here's a program that gives a ten-question algebra test. Each question is randomly generated from six different algebra equations. The program is written in BASIC for your microcomputer. See Program 8-1 for the program listing.

THE PROGRAM

After you run the program, enter the difficulty level: 1 for moderate or 2 for difficult. Then the test will begin. An equation will be displayed, where you must solve the value of X. You have two tries to enter the correct answer. CORRECT will be displayed for a correct response, and the program will go on to the next question; INCORRECT will be displayed for a wrong answer. After two incorrect entries, the correct answer will be displayed, and the program will advance to the next question. After all ten questions are answered, your score will be displayed, with the number correct out of ten and the percent score. Finally, another test may be taken, or you can end the program. See Fig. 8-1 for a sample run.

THE PROBLEMS

The problems are generated randomly using program lines 530 through 1020. A random-number generator subroutine is used to generate the X, Y, P, and Q components of the problems. The following equations are used to generate the problems. In all cases, X must be solved for:

$$Y = PX \qquad Y = PX - Q \qquad Y = PX + Q$$
$$X = PY \qquad X = PY - Q \qquad X = PY + Q$$

In any case where division is required to solve for X, the division will result in an integer.

```
ADVANCED MATH: ALGEBRA
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS IS AN ALGEBRA TEST PROGRAM WHICH
RANDOMLY GENERATES A 10-QUESTION TEST.
YOU HAVE 2-TRIES PER QUESTION.

ENTER DIFFICULTY LEVEL

1) MODERATE
2) DIFFICULT
? 1


                ALGEBRA TEST
PROBLEM  1
TRIAL  1

X =  15 Y +  24

IF Y =  17  THEN SOLVE FOR X

? 279

CORRECT



                ALGEBRA TEST
PROBLEM  2
TRIAL  1

Y =  4 X +  19

IF Y =  115  THEN SOLVE FOR X

? 24

CORRECT

                ALGEBRA TEST
PROBLEM  9
TRIAL  1

Y =  6 X -  4

IF Y =  134  THEN SOLVE FOR X

? 23

CORRECT



                ALGEBRA TEST
PROBLEM  10
TRIAL  1

Y =  19 X -  23

IF Y =  376  THEN SOLVE FOR X

? 21

CORRECT



YOU HAVE  10  CORRECT OUT OF 10
THAT'S A SCORE OF  100  %

ANOTHER TEST? 1-YES  0-NO
? 1
```

Fig. 8-1. Advanced math: Algebra sample run.

Program 8-1. Advanced Math: Algebra Program Listing

```
100 PRINT CHR$(125);"ADVANCED MATH: ALGEBRA"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON":PRINT
130 PRINT "THIS IS AN ALGEBRA TEST PROGRAM WHICH"
140 PRINT "RANDOMLY GENERATES A 10-QUESTION TEST."
150 PRINT "YOU HAVE 2-TRIES PER QUESTION."
160 PRINT :GOSUB 380
170 S=0
180 FOR A=1 TO 10
190 R=INT(RND(0)*6+1)
200 T=1
210 GOSUB 470
220 PRINT CHR$(125):POSITION 18,1:PRINT "ALGEBRA TEST"
230 GOSUB 340
240 ON R GOTO 530,610,690,770,950,990
250 NEXT A
260 PRINT
270 PRINT "YOU HAVE ";S;" CORRECT OUT OF 10"
280 PRINT "THAT'S A SCORE OF ";S*10;" %"
290 PRINT
300 PRINT "ANOTHER TEST? 1-YES  0-NO"
310 INPUT Z
320 PRINT CHR$(125):IF Z=1 THEN 160
330 END
340 PRINT "PROBLEM ";A
350 PRINT "TRIAL ";T
360 PRINT
370 RETURN
380 PRINT "ENTER DIFFICULTY LEVEL"
390 PRINT
400 PRINT "1) MODERATE"
410 PRINT "2) DIFFICULT"
420 INPUT E
430 ON E GOTO 450,460
440 GOTO 380
450 D=25:RETURN
460 D=50:RETURN
470 X=INT(RND(0)*D+1):P=INT(RND(0)*D+1)
480 Y=INT(RND(0)*D+1):Q=INT(RND(0)*D+1)
490 RETURN
500 FOR Z=1 TO 600
510 NEXT Z
520 RETURN
530 REM Y=PX
540 Y=P*X
550 PRINT "Y = ";P;"X"
560 PRINT :PRINT "IF Y = ";Y;" THEN SOLVE FOR X"
570 PRINT :INPUT A1
580 IF A1=X THEN 600
590 GOTO 880
600 GOTO 850
610 REM Y=PX-Q
620 Y=P*X
```

Program 8-1-cont. Advanced Math: Algebra Program Listing

```
630 PRINT "Y = ";P;"X - ";Q
640 PRINT :PRINT "IF Y = ";Y-Q;" THEN SOLVE FOR X"
650 PRINT :INPUT A1
660 IF A1=X THEN 680
670 GOTO 880
680 GOTO 850
690 REM Y=PX+Q
700 Y=P*X
710 PRINT "Y = ";P;"X + ";Q
720 PRINT :PRINT "IF Y = ";Y+Q;" THEN SOLVE FOR X"
730 PRINT :INPUT A1
740 IF A1=X THEN 760
750 GOTO 880
760 GOTO 850
770 REM X=PY+Q
780 X=P*Y+Q
790 PRINT "X = ";P;"Y + ";Q
800 PRINT :PRINT "IF Y = ";Y;" THEN SOLVE FOR X"
810 PRINT :INPUT A1
820 IF A1=X THEN 840
830 GOTO 880
840 REM CORRECT
850 PRINT "CORRECT":GOSUB 500
860 S=S+1
870 GOTO 250
880 PRINT
890 PRINT "INCORRECT":GOSUB 500
900 T=T+1:IF T=3 THEN 920
910 GOTO 220
920 PRINT "THE CORRECT ANSWER IS ";X
930 GOSUB 500
940 GOTO 250
950 REM X=PY
960 X=P*Y
970 PRINT "X = ";P;"Y"
980 GOTO 800
990 REM X=PY-Q
1000 X=P*Y-Q
1010 PRINT "X = ";P;"Y - ";Q
1020 GOTO 800
```

CHAPTER 9

The Algebra Dungeon

The Algebra Dungeon is an educational fantasy game where the player must solve algebraic equations as he or she wanders through the chambers and corridors of the dungeon. It's a two-level dungeon, based on the fantasy role playing game Dungeons and Dragons.* It's written in BASIC for your microcomputer. See Program 9-1 for the program listing.

THE PROGRAM

You are given 1000 gold pieces and are then teleported to a random location in the lower level of this 128-chamber, two-level dungeon (64 chambers per level). Your goal is to find your way out, with as much gold as possible. Gold pieces are acquired by solving algebraic equations given by monsters that occupy the dungeon. Each time an equation is solved correctly, a random amount of gold is given as a reward. If your answer is incorrect, then a random amount of gold is taken away. The level of math is beginning algebra. See Fig. 9-1 for a sample run.

The Algebra Problems

The problems are generated randomly using program lines 3240 through 3480 and 4360 through 4470. A random number generator subroutine at line 3840 is used to generate the X, Y, P, and Q components of the problems. The following equations are used to generate random problems. In all cases, X must be solved for:

$Y = PX$	$Y = PX - Q$	$Y = PX + Q$
$X = PY$	$X = PY - Q$	$X = PY + Q$

In any case where division is required to solve for X, the division will result in an integer.

In the lower level of the dungeon, level two, the problems are generally less difficult than those at level one. The maximum value generated for X, Y, P, and Q is 50 for level one, and 25 for level two. The values in the random-number generator subroutine may be changed for different difficulty levels.

ACTIONS OR MOVES

In your trip into the dungeon, you will encounter algebra monsters, thieves, empty chambers, trap doors, secret doors leading to north-south or east-west corridors, maps, and Enchanted Keys.

Enter the letter in parentheses for the following actions or moves in the dungeon:

(N)ORTH movement (up)
(E)AST movement (right)
(S)OUTH movement (down)
(W)EST movement (left)
(U)P movement (when at a stairway, and have the Enchanted Key)
(M)AP display (if found—when encountering thieves)
(G)OLD pieces left

North Movement

Entering an N allows you to move north through the dungeon. You may not move north under the following conditions:

1. If you reach the North Wall, you cannot pass through it.
2. If you enter an east-west corridor (through a secret door), movement north is not allowed.

*Dungeons and Dragons is a registered trademark of TSR Hobbies, Inc.

```
YOU WILL BE TELEPORTED TO . . .

THE ALGEBRA DUNGEON

ENTER YOUR CHARACTER'S NAME?
? ERIC THE BOLD

YOU CARRY 1000 GOLD PIECES WITH YOU

ERIC THE BOLD . . . YOU ARE ON YOUR WAY


YOU HAVE ARRIVED AT . . . .

THE ALGEBRA DUNGEON . . . LEVEL 2

YOU WILL ENCOUNTER MONSTERS AND
THIEVES, AND GOLD . . . BUT WATCH
YOUR STEP . . . . . .
TRAP DOORS CAN BE COSTLY . . . .



YOU ARE IN A COLD AND DARK
 . . . . . EMPTY CHAMBER


ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? N


YOU DISTURBED A MONSTER IN THIS CHAMBER
AND HE SPEAKS . . . . . .

HALT . . . I AM THE KEEPER
OF . . . . . ALGEBRA

YOU MAY NOT PASS THRU UNTIL
YOU SOLVE THIS EQUATION FOR X

Y =  19 X

IF Y =  133  THEN SOLVE FOR X

? 7


CORRECT
YOU WIN  59  GOLD PIECES


ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? N


YOU ARE IN A DAMP AND MISTY
. . . . . EMPTY CHAMBER


ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? E


YOU DISTURBED A MONSTER IN THIS CHAMBER
AND HE SPEAKS . . . . . .

HALT . . . I AM THE KEEPER
OF . . . . . ALGEBRA

YOU MAY NOT PASS THRU UNTIL
YOU SOLVE THIS EQUATION FOR X

Y =  13 X -  7

IF Y =  149  THEN SOLVE FOR X

? 12


12
CORRECT
YOU WIN  70  GOLD PIECES

YOU HAVE FOUND THE ENCHANTED KEY . . .


ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? S


YOU DISTURBED A MONSTER IN THIS CHAMBER
AND HE SPEAKS . . . . . .

HALT . . . I AM THE KEEPER
OF . . . . . ALGEBRA

YOU MAY NOT PASS THRU UNTIL
YOU SOLVE THIS EQUATION FOR X

X =  10 Y +  4

IF Y =  16  THEN SOLVE FOR X

? 164


CORRECT
YOU WIN  312  GOLD PIECES


ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? E


YOU ACTIVATED A . . . TRAP DOOR

BUT . . . YOU CAUGHT YOURSELF
FROM FALLING

ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? E


YOU DISTURBED A MONSTER IN THIS CHAMBER
AND HE SPEAKS . . . . . .

HALT . . . I AM THE KEEPER
OF . . . . . ALGEBRA

YOU MAY NOT PASS THRU UNTIL
YOU SOLVE THIS EQUATION FOR X

X =  15 Y

IF Y =  40  THEN SOLVE FOR X

? 600


600
CORRECT
YOU WIN  382  GOLD PIECES


ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? E


YOU ARE AT A STAIRWAY
 . . . . . GOING UP


ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? U


YOU WALK UP THE STAIRWAY
THE ENCHANTED KEY . . . OPENS THE LOCK
YOU FOUND YOUR WAY . . .
 . . . OUT OF THE ALGEBRA DUNGEON

YOU HAVE ACQUIRED  4289  GOLD PIECES

GAME RATING IS  521

YOU TOOK  155  TURNS TO FIND THE WAY OUT,
AND ANSWERED  20  QUESTIONS CORRECTLY
OUT OF  20  QUESTIONS ASKED.

ANOTHER GAME?
ENTER '1'-YES  '0'-NO
? 1
```

Fig. 9-1. The Algebra Dungeon sample run.

East Movement

Entering an E allows you to move east. You may not move east under the following conditions:

1. If you reach the East Wall, you cannot pass through it.
2. If you enter a north-south corridor (through a secret door), movement east is not allowed.

South Movement

Entering an S allows you to move south. You may not move south under the following conditions:

1. If you reach the South Wall, you cannot pass through it.
2. If you enter an east-west corridor (through a secret door), movement south is not allowed.

West Movement

Entering a W allows you to move west. You may not move west under the following conditions:

1. If you reach the West Wall, you cannot pass through it.
2. If you enter a north-south corridor (through a secret door), movement west is not allowed.

Up Movement

Entering a U, when you are at a stairway and have found the Enchanted Key, allows you to go up to the next level. If you haven't found the key or you are not at a stairway, you cannot go up the stairway. To find the Enchanted Key, you must solve a random number of algebraic equations correctly, for each level. There is a different key for each level.

Map Display

Entering an M when you have found a map will display the map for that level. Each level has a different map, and the maps may be found when you are encountering thieves. The 64-chamber dungeon is displayed using the following symbols:

M = algebra monster
0 = empty chamber
? = unknown contents (either a thief or a trap door)
UP = stairway up
NS = north-south corridor (entered through secret doors)
EW = east-west corridor (entered through secret doors)
P1 = your location in the dungeon

See Fig. 9-2 for a sample map.

A question mark (?) indicates either a thief or a trap door. There is no way of knowing which it is unless you enter the chamber. If you encounter a thief, either you surprise him and he drops some of his gold pieces or he surprises you and steals some of your gold pieces. This is randomly determined, but it's in favor of the thief.

If you activate a trap door, you *can either* fall through or catch yourself from falling. If you fall through, you will lose most of your gold pieces. There is a 50-percent chance that you will fall through. If you are at level two, you will fall into a deep pit. If you are at level one, you will fall through to level two.

Gold Pieces Left

Entering a G will display the number of gold pieces you have with you. You will start out with 1000 and can gain or lose gold during your trip. But if you lose all your gold pieces, you will lose the game.

GAME RATING

After you complete the game, a game rating is displayed, along with the number of gold pieces acquired, the number of algebraic equations solved correctly out of the number of questions asked, and the number of turns taken. The rating is a number from approximately −600 to +2000, depending on the above statistics. The higher the rating number, the better is the game rating. A negative number indicates a poor rating.

```
THE ALGEBRA DUNGEON  *** MAP LEVEL  1 ***

EW  ?   UP  0   ?   0   NS  0
0   0   EW  M   0   0   EW  0
0   0   0   0   UP  UP  0   EW
EW  M   0   NS  EW  UP  NS  0
?   M   P1  M   M   0   UP  0
0   NS  0   0   M   0   0   0
M   M   M   EW  EW  0   0   0
M   UP  NS  NS  ?   0   NS  NS

ERIC THE BOLD,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD
? E
```

Fig. 9-2. The Algebra Dungeon sample map.

Program 9-1. The Algebra Dungeon Program Listing

```
100 PRINT CHR$(125)
110 PRINT "THE ALGEBRA DUNGEON"
120 PRINT "ATARI"
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 PRINT
150 PRINT "AN EDUCATIONAL FANTASY GAME"
160 GOSUB 440
170 GOSUB 440
180 PRINT CHR$(125):DIM A$(50),A(9,9),B(9,9),M1$(1)
190 PRINT "YOU WILL BE TELEPORTED TO . . . "
200 PRINT
210 PRINT "THE ALGEBRA DUNGEON"
220 PRINT
230 PRINT
240 MA=0:CA=0:G=1000:M1=1:K=0:TR=0
250 PRINT "ENTER YOUR CHARACTER'S NAME?"
260 INPUT A$
270 GOSUB 440
280 PRINT :PRINT "YOU CARRY 1000 GOLD PIECES WITH YOU"
290 PRINT :GOSUB 440:PRINT A$;" . . . YOU ARE ON YOUR WAY"
300 GOSUB 440
310 GOSUB 480
320 PRINT CHR$(125)
330 PRINT "YOU HAVE ARRIVED AT . . . ."
340 PRINT
350 PRINT "THE ALGEBRA DUNGEON . . . LEVEL 2"
360 PRINT
370 PRINT "YOU WILL ENCOUNTER MONSTERS AND"
380 PRINT "THIEVES, AND GOLD . . . BUT WATCH"
390 PRINT "YOUR STEP  . . . . . ."
400 PRINT "TRAP DOORS CAN BE COSTLY . . . ."
410 FOR AB=1 TO 2000
420 NEXT AB
430 GOTO 1010
440 REM DELAY
450 FOR Z2=1 TO 400
460 NEXT Z2
470 RETURN
480 REM SET UP 2 LEVEL DUNGEON
490 FOR X=1 TO 8
500 FOR Y=1 TO 8
510 A(X,Y)=INT(RND(0)*7+1):B(X,Y)=INT(RND(0)*7+1)
520 NEXT Y
530 NEXT X
540 REM TRAP DOORS #8, MIN-1, MAX-3
550 H=INT(RND(0)*3+1)
560 FOR N=1 TO H
570 X=INT(RND(0)*8+1)
580 Y=INT(RND(0)*8+1)
590 P=INT(RND(0)*8+1)
600 W=INT(RND(0)*8+1)
610 A(X,Y)=8:B(P,W)=8
620 NEXT N
```

```
630 REM STAIRWAYS #9, MIN-3, MAX-6
640 S=INT(RND(0)*4+1)+2
650 FOR N=1 TO S
660 X=INT(RND(0)*8+1)
670 Y=INT(RND(0)*8+1)
680 P=INT(RND(0)*8+1)
690 W=INT(RND(0)*8+1)
700 A(X,Y)=9
710 B(P,Y)=9
720 NEXT N
730 REM SET UP COMPLETE
740 RETURN
750 REM STAIRWAY
760 L1=L1-1
770 PRINT "YOU WALK UP THE STAIRWAY"
780 GOSUB 440
790 PRINT "THE ENCHANTED KEY . . . OPENS THE LOCK";
800 GOSUB 440
810 IF L1=0 THEN 870
820 MA=0:K=0:K4=INT(RND(0)*4+1)+4
830 PRINT :CB=CA+K4
840 PRINT "YOU ARE AT . . . . . LEVEL 1"
850 GOSUB 440:GOSUB 440:GOSUB 440:GOSUB 440
860 GOTO 1070
870 PRINT "YOU FOUND YOUR WAY . . . "
880 PRINT " . . . OUT OF THE ALGEBRA DUNGEON"
890 PRINT
900 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
910 GOSUB 930
920 GOTO 1910
930 GG=G+100:REM RATING
940 R=INT((GG*CA-7000+1)/M1)
950 PRINT
960 PRINT "GAME RATING IS ";R
970 PRINT :IF G<=0 THEN 4280
980 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT,"
990 PRINT "AND ANSWERED ";CA;" QUESTIONS CORRECTLY"
1000 PRINT "OUT OF ";TR;" QUESTIONS ASKED.":RETURN
1010 REM SET UP 1ST MOVE
1020 C=INT(RND(0)*8+1)
1030 D=INT(RND(0)*8+1)
1040 A(C,D)=1
1050 L1=2
1060 K4=INT(RND(0)*4+1)+4
1070 REM PLAYER MOVE ROUTINE
1080 PRINT CHR$(125):IF L1=1 THEN A=B(C,D):GOTO 1100
1090 A=A(C,D)
1100 GOSUB 440
1110 ON A GOSUB 2220,2280,2340,2340,2390,2700,2750,2790,3070
1120 PRINT
1130 IF G<=0 THEN 1820
1140 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
1150 PRINT
```

```
1160 PRINT "(N)ORTH, (E)AST, (S)OUTH, (W)EST"
1170 PRINT "(U)P, (M)AP, (G)OLD"
1180 INPUT M1$
1190 M1=M1+1:IF K=0 AND M1>=140/L1 THEN 4190
1200 IF M1$="N" THEN 1290
1210 IF M1$="E" THEN 1340
1220 IF M1$="S" THEN 1390
1230 IF M1$="W" THEN 1440
1240 IF M1$="U" THEN 1490
1250 IF M1$="M" THEN 1610
1260 IF M1$="G" THEN 1670
1270 PRINT
1280 GOTO 1120
1290 REM NORTH MOVEMENT
1300 IF A=7 THEN 1710
1310 IF (D-1)=0 THEN 1980
1320 D=D-1
1330 GOTO 1070
1340 REM EAST MOVEMENT
1350 IF A=6 THEN 1770
1360 IF (C+1)=9 THEN 2030
1370 C=C+1
1380 GOTO 1070
1390 REM SOUTH MOVEMENT
1400 IF A=7 THEN 1710
1410 IF (D+1)=9 THEN 2050
1420 D=D+1
1430 GOTO 1070
1440 REM WEST MOVEMENT
1450 IF A=6 THEN 1770
1460 IF (C-1)=0 THEN 2070
1470 C=C-1
1480 GOTO 1070
1490 PRINT CHR$(125):REM STAIRWAY UP
1500 IF A<>9 THEN 1580
1510 IF K=1 THEN 750
1520 PRINT
1530 PRINT "YOU CANNOT GO UP THE STAIRWAY"
1540 PRINT "YOU DON'T HAVE THE KEY"
1550 GOSUB 440
1560 PRINT
1570 GOTO 1120
1580 PRINT "YOU ARE NOT AT A STAIRWAY"
1590 GOSUB 440
1600 GOTO 1120
1610 PRINT CHR$(125):REM MAP
1620 IF MA=1 THEN 2090
1630 PRINT "YOU DON'T HAVE THE MAP"
1640 PRINT
1650 GOSUB 440
1660 GOTO 1120
1670 REM GOLD PIECES
1680 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
```

Program 9-1-cont. The Algebra Dungeon Program Listing

```
1690 PRINT
1700 GOTO 1120
1710 REM EW CORRIDOR
1720 PRINT
1730 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
1740 PRINT "YOU CAN ONLY GO EAST OR WEST"
1750 PRINT
1760 GOTO 1120
1770 REM NS CORRIDOR
1780 PRINT
1790 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
1800 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
1810 GOTO 1750
1820 REM GOLD ZERO
1830 GOSUB 440:GOSUB 440
1840 PRINT
1850 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
1860 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
1870 PRINT " . . . THE ALGEBRA DUNGEON . . ."
1880 PRINT :PRINT
1890 PRINT "BETTER LUCK NEXT TIME"
1900 GOSUB 930
1910 PRINT
1920 PRINT "ANOTHER GAME?"
1930 PRINT "ENTER '1'-YES  '0'-NO"
1940 INPUT AA
1950 IF AA<>1 THEN 1970
1960 PRINT CHR$(125):GOTO 210
1970 END
1980 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
1990 PRINT "YOU CANNOT PASS THROUGH"
2000 PRINT
2010 PRINT "TRY ANOTHER DIRECTION?"
2020 GOTO 1120
2030 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
2040 GOTO 1990
2050 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
2060 GOTO 1990
2070 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
2080 GOTO 1990
2090 REM DISPLAY MAP
2100 PRINT CHR$(125)
2110 PRINT "THE ALGEBRA DUNGEON ***MAP LEVEL ";L1;" ***";
2120 PRINT
2130 FOR Q=1 TO 8
2140 FOR N=1 TO 8
2150 IF C=N AND D=Q THEN PRINT "P1  ";:GOTO 2180
2160 IF L1=1 THEN S1=B(N,Q):GOTO 2170
2165 S1=A(N,Q)
2170 ON S1 GOSUB 3110,3110,3130,3130,3150,3170,3190,3210,3220
2180 NEXT N
2190 PRINT
2200 NEXT Q
```

Program 9-1-cont. The Algebra Dungeon Program Listing

```
2210 GOTO 1120
2220 REM EMPTY ROOM
2230 PRINT
2240 PRINT "YOU ARE IN A COLD AND DARK"
2250 PRINT " . . . . . EMPTY CHAMBER"
2260 PRINT
2270 RETURN
2280 REM EMPTY ROOM 2
2290 PRINT
2300 PRINT "YOU ARE IN A DAMP AND MISTY"
2310 PRINT ". . . . . EMPTY CHAMBER"
2320 PRINT
2330 RETURN
2340 TR=TR+1:PRINT CHR$(125):GOSUB 4140
2350 M4=INT(RND(0)*6+1)
2360 ON M4 GOSUB 3240,3370,3540,3670,4360,4420
2370 PRINT
2380 RETURN
2390 PRINT CHR$(125);"THERE IS A THIEF IN THIS CHAMBER"
2400 IF L1=1 THEN B(C,D)=2:GOTO 2410
2405 A(C,D)=2
2410 GOSUB 440
2420 G4=INT(RND(0)*350/L1+1)
2430 Y=INT(RND(0)*8+1)
2440 IF Y<=3 THEN 2610
2450 PRINT
2460 PRINT ". . . . . HE SURPRISES YOU":PRINT
2470 GOSUB 440
2480 PRINT "AS HE QUICKLY PASSES BY YOU HE"
2490 PRINT "SNATCHES . . . ";G4;" GOLD PIECES":PRINT
2500 G=G-G4
2510 REM LOOK FOR MAP
2520 IF MA=1 THEN RETURN
2530 MA=INT(RND(0)*4+1):IF MA<=2 THEN MA=1
2540 IF MA=1 THEN 2570
2550 RETURN
2560 GOSUB 440
2570 PRINT "YOU SEARCH THE CHAMBER AND"
2580 GOSUB 440
2590 PRINT "YOU . . . . . FIND A MAP"
2600 RETURN
2610 PRINT "YOU SURPRISED THE THIEF . . . ."
2620 PRINT :GOSUB 440
2630 PRINT "AS HE RUNS OUT HE DROPS . . . ."
2640 PRINT " . . . ";G4;" GOLD PIECES."
2650 PRINT "YOU PICK UP THE GOLD PIECES":G=G+G4
2660 PRINT :IF MA=1 THEN RETURN
2670 MA=INT(RND(0)*4+1):IF MA<=2 THEN MA=1
2680 IF MA=1 THEN 2570
2690 RETURN
2700 PRINT CHR$(125):REM NORTH SOUTH CORRIDOR
2710 PRINT
2720 PRINT "YOU ENTER A NORTH-SOUTH CORRIDOR"
```

Program 9-1-cont. The Algebra Dungeon Program Listing

```
2730 PRINT "THRU A SECRET DOOR":PRINT :GOSUB 4310
2740 RETURN
2750 PRINT CHR$(125):REM EAST WEST CORRIDOR
2760 PRINT
2770 PRINT "YOU ENTER AN EAST-WEST CORRIDOR"
2780 GOTO 2730
2790 REM TRAP DOOR
2800 PRINT "YOU ACTIVATED A . . . TRAP DOOR"
2810 GOSUB 440
2820 TD=INT(RND(0)*4+1)
2830 IF TD>=3 THEN 2880
2840 PRINT
2850 PRINT "BUT . . . YOU CAUGHT YOURSELF"
2860 PRINT "FROM FALLING"
2870 RETURN
2880 IF L1=2 THEN 2990
2890 L1=L1+1:PRINT :K=1
2900 PRINT "YOU FELL THRU TO LEVEL 2 . . . AND"
2910 G=100
2920 GOSUB 440
2930 PRINT
2940 PRINT "YOU . . . . . LOST"
2950 PRINT "MOST OF YOUR GOLD PIECES":PRINT
2960 PRINT "YOU HAVE . . ";G;" GOLD PIECES LEFT"
2970 PRINT "BUT . . . YOU STILL HAVE YOUR KEY"
2980 RETURN
2990 PRINT "YOU FELL INTO A DEEP . . . PIT"
3000 GOSUB 440
3010 PRINT "YOU'RE LUCKY . . . . "
3020 PRINT "YOU DIDN'T GET HURT"
3030 PRINT
3040 GOSUB 440
3050 PRINT "BUT IN CLIMBING OUT . . ."
3060 GOTO 4230
3070 PRINT "YOU ARE AT A STAIRWAY"
3080 PRINT " . . . . . GOING UP"
3090 PRINT
3100 RETURN
3110 PRINT "0   ";
3120 RETURN
3130 PRINT "M   ";
3140 RETURN
3150 PRINT "?   ";
3160 RETURN
3170 PRINT "NS  ";
3180 RETURN
3190 PRINT "EW  ";
3200 RETURN
3210 GOTO 3150
3220 PRINT "UP  ";
3230 RETURN
3240 REM Y=PX
3250 GOSUB 4330
```

```
3260 GOSUB 3800
3270 GOSUB 3840:Y=P*X
3280 PRINT "Y = ";P;"X"
3290 PRINT :PRINT "IF Y = ";Y;" THEN SOLVE FOR X"
3300 PRINT :INPUT A1
3310 IF A1=X THEN 3350
3320 REM LOSE GOLD
3330 GOSUB 4000
3340 RETURN
3350 GOSUB 3900
3360 RETURN
3370 REM Y=PX-Q
3380 GOSUB 4330
3390 GOSUB 3800
3400 GOSUB 3840:Y=P*X
3410 PRINT "Y = ";P;"X - ";Q
3420 PRINT :PRINT "IF Y = ";Y-Q;" THEN SOLVE FOR X"
3430 PRINT :INPUT A1
3440 IF A1=X THEN 3470
3450 GOSUB 4000
3460 RETURN
3470 GOSUB 3900
3480 RETURN
3490 GOSUB 480
3500 H=1:O=9:W=8
3510 B=0:E=5:R=14
3520 C=0:PR=0
3530 GOTO 1010
3540 REM Y=PX+Q
3550 GOSUB 4330
3560 GOSUB 3800
3570 GOSUB 3840:Y=P*X
3580 PRINT "Y = ";P;"X + ";Q
3590 PRINT :PRINT "IF Y = ";Y+Q;" THEN SOLVE FOR X"
3600 PRINT :INPUT A1
3610 IF A1=X THEN 3650
3620 REM LOSE GOLD
3630 GOSUB 4000
3640 RETURN
3650 GOSUB 3900
3660 RETURN
3670 REM X=PY+Q
3680 GOSUB 4330
3690 GOSUB 3800
3700 GOSUB 3840:X=P*Y+Q
3710 PRINT "X = ";P;"Y + ";Q
3720 PRINT :PRINT "IF Y = ";Y;" THEN SOLVE FOR X"
3730 PRINT :INPUT A1
3740 IF A1=X THEN 3780
3750 REM LOSE GOLD
3760 GOSUB 4000
3770 RETURN
3780 GOSUB 3900
```

Program 9-1-cont. The Algebra Dungeon Program Listing

```
3790 RETURN
3800 PRINT "YOU MAY NOT PASS THRU UNTIL"
3810 PRINT "YOU SOLVE THIS EQUATION FOR X"
3820 PRINT
3830 RETURN
3840 REM RANDOM ROUTINE
3850 X=INT(RND(0)*50/L1+1):P=INT(RND(0)*50/L1+1)
3860 Y=INT(RND(0)*50/L1+1):Q=INT(RND(0)*50/L1+1)
3870 GOSUB 440
3880 GOSUB 440
3890 RETURN
3900 PRINT "CORRECT"
3910 G4=INT(RND(0)*400/L1+1)+25
3920 G=G+G4
3930 GOSUB 440
3940 PRINT "YOU WIN ";G4;" GOLD PIECES"
3950 IF L1=1 THEN B(C,D)=1:GOTO 3960
3955 A(C,D)=1
3960 CA=CA+1:IF K=1 THEN RETURN
3970 IF L1=1 THEN 4210
3980 IF CA=K4 THEN 4090
3990 RETURN
4000 PRINT
4010 PRINT "INCORRECT"
4020 PRINT "THE CORRECT ANSWER IS ";X
4030 PRINT
4040 G4=INT(RND(0)*350/L1+1)
4050 G=G-G4
4060 GOSUB 440
4070 PRINT "YOU LOSE ";G4;" GOLD PIECES"
4080 RETURN
4090 GOSUB 440
4100 K=1
4110 PRINT :PRINT "YOU HAVE FOUND THE ENCHANTED KEY . . ."
4120 GOSUB 440
4130 RETURN
4140 PRINT "YOU DISTURB A MONSTER IN THIS CHAMBER"
4150 GOSUB 440
4160 PRINT "AND HE SPEAKS . . . . . .":PRINT
4170 GOSUB 440
4180 RETURN
4190 GOSUB 4100
4200 GOTO 1200
4210 IF CA=CB THEN 4090
4220 RETURN
4230 G=100:GOSUB 440:PRINT
4240 PRINT "YOU . . . . . DROPPED"
4250 PRINT "MOST OF YOUR GOLD PIECES."
4260 PRINT "YOU HAVE . .";G;" GOLD PIECES LEFT"
4270 RETURN
4280 PRINT "YOU ANSWERED ";CA;" QUESTIONS CORRECTLY"
4290 PRINT "OUT OF ";TR;" QUESTIONS ASKED,"
4295 PRINT " . . . . . IN ";M1;" TURNS."
```

Program 9-1-cont. The Algebra Dungeon Program Listing

```
4300 RETURN
4310 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GOSUB 440
4320 RETURN
4330 PRINT "HALT . . . I AM THE KEEPER"
4340 PRINT "OF . . . . . ALGEBRA"
4350 PRINT :RETURN
4360 REM X=PY
4370 GOSUB 4330
4380 GOSUB 3800
4390 GOSUB 3840:X=P*Y
4400 PRINT "X = ";P;"Y"
4410 GOTO 3720
4420 REM X=PY-Q
4430 GOSUB 4330
4440 GOSUB 3800
4450 GOSUB 3840:X=P*Y-Q
4460 PRINT "X = ";P;"Y - ";Q
4470 GOTO 3720
```

CHAPTER 10

State Capitals

This program tests your knowledge of the state capitals of the United States. For a review it displays a list of all fifty states and their capitals. Then a ten-question test may be taken. The program is written in BASIC for your microcomputer. See Program 10-1 for the program listing.

THE PROGRAM

After you run the program, you may enter a 1 to review the state capitals, enter a 2 to take the ten-question test, or enter a 3 to end the program.

After you enter a 2 to take the test, enter a 1 to begin. You are required to enter the name of the state capital for the state that is displayed. CORrect will be displayed for a correct entry. If your answer is incorrect, then INCORRECT will be displayed, along with the correct answer. When all ten questions are answered, your final score will be displayed, with the number correct out of ten and the percent score. You may now review the states, take another test, or end the program. Five tests may be taken without any of the questions being repeated.

See Fig. 10-1 for a sample run.

```
STATE CAPITALS
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS PROGRAM TESTS YOUR KNOWLEDGE
OF STATE CAPITALS. IT GIVES A TEN
QUESTION QUIZ , RANDOMLY CHOOSING
THE QUESTIONS. THE LIST OF STATES AND
CAPITALS MAY BE REVIEWED BEFORE TAKING
THE TEST.

ENTER 1-REVIEW STATE CAPITALS
      2-FOR TEST
      3-END PROGRAM
? 2

10 QUESTION STATE CAPITAL TEST

ENTER '1' TO BEGIN
? 1


QUESTION # 1  STATE CAPITALS

THE STATE IS: MASSACHUSETTS

ENTER ITS CAPITAL
? BOSTON

CORRECT



QUESTION # 2  STATE CAPITALS

THE STATE IS: WASHINGTON

ENTER ITS CAPITAL
? OLYMPIA

CORRECT

QUESTION # 3  STATE CAPITALS

THE STATE IS: DELAWARE

ENTER ITS CAPITAL
? DOVER

CORRECT



QUESTION # 10  STATE CAPITALS

THE STATE IS: CONNECTICUT

ENTER ITS CAPITAL
? HARTFORD

CORRECT



FINAL SCORE:
 10  QUESTIONS CORRECT OUT OF 10
THAT'S  100  % CORRECT



ENTER 1-REVIEW STATE CAPITALS
      2-FOR TEST
      3-END PROGRAM
? 1
```

Fig. 10-1. State Capitals sample run.

Program 10-1. State Capitals Program Listing

```
100 PRINT CHR$(125);"STATE CAPITALS"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":Q3=0
130 PRINT :DIM B(50),C$(14),C1$(14),S$(14):GOSUB 1100
140 PRINT "THIS PROGRAM TESTS YOUR KNOWLEDGE"
150 PRINT "OF STATE CAPITALS. IT GIVES A TEN"
160 PRINT "QUESTION QUIZ, RANDOMLY CHOOSING"
170 PRINT "THE QUESTIONS. THE LIST OF STATES AND";
180 PRINT "CAPITALS MAY BE REVIEWED BEFORE TAKING"
190 PRINT "THE TEST."
200 PRINT
210 PRINT "ENTER 1-REVIEW STATE CAPITALS"
220 PRINT "      2-FOR TEST"
230 PRINT "      3-END PROGRAM"
240 INPUT A
250 ON A GOTO 270,420,800
260 GOTO 200
270 PRINT CHR$(125);"REVIEWING THE STATES"
280 GT=2:GOSUB 380
290 FOR A=1 TO 50
300 READ S$,C$
310 PRINT "STATE            CAPITAL"
320 PRINT
330 PRINT S$:POSITION 19,3:PRINT C$
340 GT=2:GOSUB 380
350 NEXT A
360 RESTORE
370 GOTO 200
380 FOR T=1 TO 400*GT
390 NEXT T
400 PRINT CHR$(125)
410 RETURN
420 PRINT CHR$(125);"10 QUESTION STATE CAPITAL TEST"
430 PRINT
440 PRINT "ENTER '1' TO BEGIN"
450 INPUT D
460 PRINT CHR$(125)
470 IF D=1 THEN 490
480 GOTO 430
490 CA=0
500 FOR Q=1 TO 10
510 PRINT CHR$(125);"QUESTION # ";Q;" STATE CAPITALS"
520 PRINT :GOSUB 810
530 R=INT(RND(0)*50+1)
540 IF B(R)=1 THEN 530
550 B(R)=1
560 FOR H=1 TO R
570 READ S$,C$
580 NEXT H
590 RESTORE
600 PRINT "THE STATE IS: ";S$
610 PRINT
620 PRINT "ENTER ITS CAPITAL"
```

Program 10-1-cont. State Capitals Program Listing

```
630 INPUT C1$
640 IF C1$=C$ THEN 710
650 PRINT
660 PRINT "INCORRECT"
670 PRINT "THE CAPITAL OF ";S$;" IS '";C$;"'"
680 GT=3:GOSUB 380
690 NEXT Q
700 GOTO 750
710 PRINT
720 PRINT "CORRECT"
730 CA=CA+1
740 GOTO 680
750 PRINT CHR$(125);"FINAL SCORE:"
760 PRINT CA;" QUESTIONS CORRECT OUT OF 10"
770 PRINT "THAT'S ";10*CA;" % CORRECT"
780 GT=3:GOSUB 380
790 GOTO 200
800 END
810 Q3=Q3+1
820 IF Q3>50 THEN Q3=0:GOTO 840
830 RETURN
840 GOSUB 1100:RETURN
850 DATA ALABAMA,MONTGOMERY,ALASKA,JUNEAU
860 DATA ARIZONA,PHOENIX,ARKANSAS,LITTLE ROCK
870 DATA CALIFORNIA,SACRAMENTO,COLORADO,DENVER
880 DATA CONNECTICUT,HARTFORD,DELAWARE,DOVER
890 DATA FLORIDA,TALLAHASSEE,GEORGIA,ATLANTA
900 DATA HAWAII,HONOLULU,IDAHO,BOISE
910 DATA ILLINOIS,SPRINGFIELD,INDIANA,INDIANAPOLIS
920 DATA IOWA,DES MOINES,KANSAS,TOPEKA
930 DATA KENTUCKY,FRANKFORT,LOUISIANA,BATON ROUGE
940 DATA MAINE,AUGUSTA,MARYLAND,ANNAPOLIS
950 DATA MASSACHUSETTS,BOSTON,MICHIGAN,LANSING
960 DATA MINNESOTA,ST. PAUL,MISSISSIPPI,JACKSON
970 DATA MISSOURI,JEFFERSON CITY,MONTANA,HELENA
980 DATA NEBRASKA,LINCOLN,NEVADA,CARSON CITY
990 DATA NEW HAMPSHIRE,CONCORD,NEW JERSEY,TRENTON
1000 DATA NEW MEXICO,SANTA FE,NEW YORK,ALBANY
1010 DATA NORTH CAROLINA,RALEIGH,NORTH DAKOTA,BISMARCK
1020 DATA OHIO,COLUMBUS,OKLAHOMA,OKLAHOMA CITY
1030 DATA OREGON,SALEM,PENNSYLVANIA,HARRISBURG
1040 DATA RHODE ISLAND,PROVIDENCE,SOUTH CAROLINA,COLUMBIA
1050 DATA SOUTH DAKOTA,PIERRE,TENNESSEE,NASHVILLE
1060 DATA TEXAS,AUSTIN,UTAH,SALT LAKE CITY
1070 DATA VERMONT,MONTPELIER,VIRGINIA,RICHMOND
1080 DATA WASHINGTON,OLYMPIA,WEST VIRGINIA,CHARLESTON
1090 DATA WISCONSIN,MADISON,WYOMING,CHEYENNE
1100 FOR I=1 TO 50
1110 B(I)=0
1120 NEXT I
1130 RETURN
```

CHAPTER 11

Presidents of the United States

This program tests your knowledge of the Presidents of the United States. It displays a list of Presidents giving their number, name, party, and first year of term. Then, a ten-question test may be taken. The problems are randomly generated from the list of forty Presidents. The program is written in BASIC for your microcomputer. See Program 11-1 for the program listing.

THE PROGRAM

You may review the list of Presidents by entering a 1. Entering a 2 will generate the ten-question test. Each question will display the President's number, his name, and his political party (abbreviated using initials). It requires entry of the first year of the term of office. CORRECT will be displayed if your entry is correct. If your entry is incorrect, then INCORRECT will be displayed along with the correct answer.

After all ten questions are answered, your final score will be displayed, with the number correct out of ten and your precent score. You may now review the list and take another test, or end the program. Four ten-question tests can be taken before any of the questions will be repeated. See Fig. 11-1 for a sample run.

```
PRESIDENTS OF THE UNITED STATES
COPYRIGHT (C) 1980 BY HOWARD BERENBON

HERE'S AN EDUCATIONAL PROGRAM THAT TESTS
YOUR KNOWLEDGE OF THE PRESIDENTS. IT
DISPLAYS A LIST OF THE PRESIDENTS GIVING
THEIR #, NAME, PARTY, AND FIRST YEAR OF
TERM. THEN, A 10 QUESTION QUIZ  MAY BE
TAKEN. RANDOMLY, A NAME OF A PRESIDENT
IS DISPLAYED. YOU MUST ENTER THE FIRST
YEAR OF THAT TERM.

ENTER A  '1' TO REVIEW THE LIST
ENTER A  '2' TO TAKE THE TEST
? 2


10 QUESTION PRESIDENT QUIZ

ENTER '1' TO BEGIN THE TEST
? 1


QUESTION #  1   PRESIDENTS QUIZ

PRESIDENT OF THE UNITED STATES

PRESIDENT #  31
HERBERT C. HOOVER (R)

1ST YEAR OF TERM?
(ENTER YEAR)
? 1929
CORRECT


QUESTION #  2   PRESIDENTS QUIZ

PRESIDENT OF THE UNITED STATES

PRESIDENT #  32
FRANKLIN D. ROOSEVELT (D)

1ST YEAR OF TERM?
(ENTER YEAR)
? 1933
CORRECT


QUESTION #  3   PRESIDENTS QUIZ

PRESIDENT OF THE UNITED STATES

PRESIDENT #  4
JAMES MADISON (DR)

1ST YEAR OF TERM?
(ENTER YEAR)
? 1809
CORRECT



QUESTION #  10  PRESIDENTS QUIZ

PRESIDENT OF THE UNITED STATES

PRESIDENT #  39
JAMES E. CARTER, JR. (D)

1ST YEAR OF TERM?
(ENTER YEAR)
? 1977
CORRECT


FINAL SCORE
 10  QUESTIONS CORRECT OUT OF 10
THAT'S  100  % CORRECT

ANOTHER QUIZ  AND REVIEW THE LIST?
ENTER  1-YES  2-NO
? 1
```

Fig. 11-1. Presidents of The United States sample run.

Program 11-1. Presidents of The United States Program Listing

```
100 PRINT CHR$(125);"PRESIDENTS OF THE UNITED STATES"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT :DIM A$(25),B(50):GOSUB 1150
140 PRINT "HERE'S AN EDUCATIONAL PROGRAM THAT"
150 PRINT "TESTS YOUR KNOWLEDGE OF THE           PRESIDENTS."
160 PRINT "IT DISPLAYS A LIST OF THE PRESIDENTS"
170 PRINT "GIVING THEIR #, NAME, PARTY, AND FIRST";
180 PRINT "YEAR OF TERM. THEN, A 10 QUESTION QUIZ";
190 PRINT "MAY BE TAKEN. RANDOMLY, A NAME OF A"
200 PRINT "PRESIDENT IS DISPLAYED. YOU MUST ENTER";
210 PRINT "THE FIRST YEAR OF THAT TERM."
220 PRINT :Q3=0
230 PRINT "ENTER A  '1' TO REVIEW THE LIST"
240 PRINT "ENTER A  '2' TO TAKE THE TEST"
250 INPUT A
260 IF A=1 THEN 290
270 IF A=2 THEN 410
280 GOTO 230
290 PRINT CHR$(125):REM REVIEW THE LIST
300 FOR B=1 TO 40
310 PRINT CHR$(125)
320 PRINT "PRES #  NAME & PARTY       1ST YR-TERM";
330 PRINT
340 READ A$,E
350 PRINT B;"    ";A$;"     ";E
360 GOSUB 920
370 NEXT B
380 RESTORE
390 PRINT
400 GOTO 230
410 PRINT CHR$(125):REM 10 QUESTION QUIZ
420 PRINT "10 QUESTION PRESIDENT QUIZ"
430 PRINT
440 PRINT "ENTER '1' TO BEGIN THE TEST"
450 INPUT A
460 PRINT CHR$(125)
470 IF A=1 THEN 490
480 GOTO 440
490 REM DISPLAY NAME
500 CA=0
510 FOR A=1 TO 10
520 PRINT CHR$(125)
530 PRINT "QUESTION # ";A,"PRESIDENTS QUIZ"
540 PRINT :GOSUB 1190
550 Q=INT(RND(0)*40+1)
560 IF B(Q)=1 THEN 550
570 B(Q)=1
580 FOR A1=1 TO Q
590 READ A$,E
600 NEXT A1
610 RESTORE
620 PRINT "PRESIDENT OF THE UNITED STATES"
```

Program 11-1-cont. Presidents of The United States Program Listing

```
630 PRINT
640 PRINT "PRESIDENT # ";Q
650 PRINT A$
660 PRINT
670 PRINT "1ST YEAR OF TERM?"
680 PRINT "(ENTER YEAR)"
690 INPUT F
700 IF F=E THEN 760
710 GOSUB 900
720 PRINT "THE CORRECT YEAR IS ";E
730 GOSUB 920
740 NEXT A
750 GOTO 800
760 PRINT "CORRECT"
770 CA=CA+1
780 GOSUB 920
790 NEXT A
800 PRINT CHR$(125)
810 PRINT "FINAL SCORE"
820 PRINT CA;" QUESTIONS CORRECT OUT OF 10"
830 PRINT "THAT'S ";10*CA;" % CORRECT"
840 PRINT
850 PRINT "ANOTHER QUIZ AND REVIEW THE LIST?"
860 PRINT "ENTER  1-YES  2-NO"
870 INPUT Y
880 IF Y=1 THEN 230
890 END
900 PRINT "INCORRECT"
910 RETURN
920 FOR T=1 TO 600
930 NEXT T
940 RETURN
950 DATA GEORGE WASHINGTON (F),1789,JOHN ADAMS (F)      ,1797
960 DATA THOMAS JEFFERSON (DR),1801,JAMES MADISON (DR),1809
970 DATA JAMES MONROE (DR),1817,JOHN Q. ADAMS (DR),1825
980 DATA ANDREW JACKSON (D),1829,MARTIN VAN BUREN (D),1837
990 DATA WILLIAM H. HARRISON (W),1841,JOHN TYLER (W)      ,1841
1000 DATA JAMES KNOX POLK (D),1845,ZACHARY TAYLOR (W),1849
1010 DATA MILLARD FILLMORE (W),1850,FRANKLIN PIERCE (D),1853
1020 DATA JAMES BUCHANAN (D),1857,ABRAHAM LINCOLN (R),1861
1030 DATA ANDREW JOHNSON (R),1865,ULYSSES S. GRANT (R),1869
1040 DATA RUTHERFORD B. HAYES (R),1877,JAMES A. GARFIELD (R),1881
1050 DATA CHESTER A. ARTHUR (R),1881,GROVER CLEVELAND (D),1885
1060 DATA BENJAMIN HARRISON (R),1889,GROVER CLEVELAND (D),1893
1070 DATA WILLIAM MCKINLEY (R),1897,THEODORE ROOSEVELT (R),1901
1080 DATA WILLIAM H. TAFT (R),1909,WOODROW WILSON (D),1913
1090 DATA WARREN G. HARDING (R),1921,CALVIN COOLIDGE (R),1923
1100 DATA HERBERT C. HOOVER (R),1929
1105 DATA FRANKLIN D. ROOSEVELT (D),1933
1110 DATA HARRY S. TRUMAN (D),1945,DWIGHT D. EISENHOWER (R),1953
1120 DATA JOHN F. KENNEDY (D),1961,LYNDON B. JOHNSON (D),1963
1130 DATA RICHARD M. NIXON (R),1969,GERALD R. FORD (R),1974
1140 DATA JAMES E. CARTER  JR. (D),1977,RONALD REAGAN (R),1981
```

Program 11-1-cont. Presidents of The United States Program Listing

```
1150 FOR I=1 TO 40
1160 B(I)=0
1170 NEXT I
1180 RETURN
1190 Q3=Q3+1
1200 IF Q3>40 THEN Q3=0:GOSUB 1150
1210 RETURN
```

SECTION II

Home Applications

This section describes some useful home application programs including a weekly calendar, a special date calendar, a monthly budget program, a valuables inventory, a cost of food analysis, an electric appliance operating cost analysis, gas and water usage analysis, family dental expenses, a weekly jogging record, and, finally, a telephone number directory.

CHAPTER 12

Weekly Calendar

The Weekly Calendar program allows you to display a weekly calendar of events. It's useful in keeping track of your daily activities. The program is written in BASIC for your microcomputer. See Program 12-1 for the program listing.

THE PROGRAM

Enter your daily activity data in DATA statements beginning at line 670. Enter in the following format:

DATA DAY #,TIME,ACTIVITY

or

670 DATA 1,7-30AM,BREAKFAST

The first element is the day number, where 1 through 7 is Sunday through Saturday. The second element is the time, when a dash (−) is used in place of a colon (:); and the last element is the activity. Enter as many DATA statements, per day, as you have activities, and continue until all your weekly activities are entered. Finally, the statement DATA 99,0,0 must be the last DATA statement in your list.

After you run the program, enter the week date as MM/DD/YY, and the day number to be displayed. The program will display each activity for that day, and the time of the activity. After the data for that day is displayed, you may display another day or end the program. See Fig. 12-1 for a sample run.

```
WEEKLY CALENDAR
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM ALLOWS YOU TO
DISPLAY A WEEKLY CALENDAR.
DAILY DATA IS ENTERED INTO DATA
STATEMENTS BEGINNING AT LINE
670. ENTER DAILY ACTIVITIES
AS FOLLOWS:
DATA  DAY #,TIME,ACTIVITY
DATA 1,7-30 AM,BREAKFAST
THE LAST DATA STATEMENT IN
THE LIST MUST BE: DATA 99,0,0


ENTER WEEK DATE
(MM/DD/YY)
? 5/3/81


5/3/81

ENTER DAY # FOR DISPLAY
1-SUN  2-MON  3-TUES  4-WED
5-THUR 6-FRI  7-SAT
? 1



WEEKLY CALENDAR: WEEK DATE 5/3/81

SUNDAY

TIME            ACTIVITY

7-30            BREAKFAST
12              LUNCH
8-00            MOVIE

DISPLAY ANOTHER DAY?
1-YES  0-NO
? 0
```

Fig. 12-1. Weekly Calendar sample run.

Program 12-1. Weekly Calendar Program Listing

```
100 PRINT CHR$(125);"WEEKLY CALENDAR"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":DIM A$(30),T$(20),W$(8)
130 PRINT
140 PRINT "THIS PROGRAM ALLOWS YOU TO"
150 PRINT "DISPLAY A WEEKLY CALENDAR."
160 PRINT "DAILY DATA IS ENTERED INTO DATA"
170 PRINT "STATEMENTS BEGINNING AT LINE"
180 PRINT "670. ENTER DAILY ACTIVITIES"
190 PRINT "AS FOLLOWS:"
200 PRINT "DATA  DAY #,TIME,ACTIVITY"
210 PRINT "DATA 1,7-30 AM,BREAKFAST"
220 PRINT "THE LAST DATA STATEMENT IN"
230 PRINT "THE LIST MUST BE: DATA 99,0,0"
240 PRINT :PRINT :GOSUB 470
250 PRINT :PRINT "ENTER DAY # FOR DISPLAY"
260 PRINT "1-SUN  2-MON  3-TUES  4-WED"
270 PRINT "5-THUR 6-FRI  7-SAT"
280 INPUT D
290 IF D<1 THEN 250
300 IF D>7 THEN 250
310 PRINT CHR$(125);"WEEKLY CALENDAR: WEEK DATE ";W$
320 PRINT
330 READ D1,T$,A$
340 IF D1=D THEN 610
350 IF D1=99 THEN 370
360 GOTO 330
370 PRINT :PRINT "NO ACTIVITY DATA FOR DAY ";D;": ";
380 GOSUB 510
390 RESTORE :PRINT
400 PRINT "DISPLAY ANOTHER DAY?"
410 PRINT "1-YES  0-NO":INPUT AA
420 IF AA=1 THEN 250
430 END
440 FOR A=1 TO 500
450 NEXT A
460 RETURN
470 PRINT "ENTER WEEK DATE"
480 PRINT "(MM/DD/YY)"
490 INPUT W$
500 RETURN
510 IF D=1 THEN PRINT "SUNDAY"
520 IF D=2 THEN PRINT "MONDAY"
530 IF D=3 THEN PRINT "TUESDAY"
540 IF D=4 THEN PRINT "WEDNESDAY"
550 IF D=5 THEN PRINT "THURSDAY"
560 IF D=6 THEN PRINT "FRIDAY"
570 IF D=7 THEN PRINT "SATURDAY"
580 PRINT :RETURN
590 PRINT "TIME","ACTIVITY"
600 RETURN
610 GOSUB 510:GOSUB 590:PRINT
620 PRINT T$,A$
```

Program 12-1-cont. Weekly Calendar Program Listing

```
630 GOSUB 440
640 READ D1,T$,A$
650 IF D1=D THEN 620
660 GOTO 390
670 DATA 1,7-30,BREAKFAST
680 DATA 1,12,LUNCH
690 DATA 1,8-00,MOVIE
700 DATA 2,7-30,BREAKFAST
710 DATA 2,9-00,BUSINESS MEET
720 DATA 2,12,BUS. LUNCH
730 DATA 2,9-00,DINNER
740 DATA 99,0,0
```

CHAPTER 13

Special Date Calendar

The Special Date Calendar is a program that displays monthly dates and names, which are taken from DATA statements. It's useful in keeping track of your special dates and occasions. The program is written in BASIC for your microcomputer. See Program 13-1 for the program listing.

THE PROGRAM

Enter important dates and their occasion in DATA statements beginning at line 1000. Enter in the following format:

DATA MONTH,DAY,YEAR,OCCASION

or

1000 DATA 1,6,51,RICK'S BIRTHDAY

The statement DATA 999,0,0,0 must be the last DATA statement in the list.

After you run the program, enter the month number (1 – 12) to be displayed. The program will display each date and occasion in the month entered. After all the data for that month is displayed, you may display another month or end the program. See Fig. 13-1 for a sample run.

```
SPECIAL DATE CALENDAR
COPYRIGHT (C) 1986 BY HOWARD BERENSON

THIS PROGRAM WILL DISPLAY MONTHLY
DATES AND NAMES, SO YOU CAN KEEP
TRACK OF SPECIAL DATES AND OCCASIONS

ENTER IMPORTANT DATES IN DATA
STATEMENTS BEGINNING AT LINE
1000, AS IN THE FOLLOWING FORMAT:
DATA MO,DAY,YR,OCCASION
DATA 1,6,51,RICK'S BIRTHDAY
DATA 999,0,0,0 MUST BE THE LAST
DATA STATEMENT IN YOUR LIST


ENTER MONTH # (1-12)
TO BE DISPLAYED
? 1


SPECIAL DATE CALENDAR: MONTH  1

DATE            OCCASION

 1 / 6 / 51     RICK'S BIRTHDAY
 1 / 11 / 50    HARRY'S BIRTHDAY

ANOTHER MONTH FOR DISPLAY?
1-YES  0-NO
? 0
```

Fig. 13-1. Special Date Calendar sample run.

Program 13-1. Special Date Calendar Program Listing

```
100 PRINT CHR$(125)
110 PRINT "SPECIAL DATE CALENDAR"
120 PRINT "ATARI":DIM A$(50)
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 PRINT
150 PRINT "THIS PROGRAM WILL DISPLAY MONTHLY"
160 PRINT "DATES AND NAMES, SO YOU CAN KEEP"
170 PRINT "TRACK OF SPECIAL DATES AND OCCASIONS"
180 PRINT
190 PRINT "ENTER IMPORTANT DATES IN DATA"
200 PRINT "STATEMENTS BEGINNING AT LINE"
210 PRINT "1000, AS IN THE FOLLOWING FORMAT:"
220 PRINT "DATA MO,DAY,YR,OCCASION"
230 PRINT "DATA 1,6,51,RICK'S BIRTHDAY"
240 PRINT "DATA 999,0,0,0 MUST BE THE LAST"
250 PRINT "DATA STATEMENT IN YOUR LIST"
260 PRINT
270 PRINT
280 PRINT "ENTER MONTH # (1-12)"
290 PRINT "TO BE DISPLAYED"
300 INPUT M
310 IF M<1 THEN 270
320 IF M>12 THEN 270
330 M=INT(M):PRINT CHR$(125)
340 PRINT "SPECIAL DATE CALENDAR: MONTH ";M
350 PRINT
360 PRINT "DATE":POSITION 18,3:PRINT "OCCASION"
370 PRINT
380 READ A,B,C,A$
390 IF A=999 THEN 450
400 IF A=M THEN 420
410 GOTO 380
420 PRINT A;"/";B;"/";C;"          ";A$
430 GOSUB 520
440 GOTO 380
450 RESTORE :PRINT
460 PRINT "ANOTHER MONTH FOR DISPLAY?"
470 PRINT "1-YES  0-NO"
480 INPUT P
490 IF P=1 THEN 270
500 END
510 PRINT
520 REM DELAY
530 FOR T1=1 TO 500
540 NEXT T1
550 RETURN
1000 DATA 12,21,52,BRUCE'S BIRTHDAY
1010 DATA 8,31,49,DAVID'S BIRTHDAY
1020 DATA 1,6,51,RICK'S BIRTHDAY
1030 DATA 1,11,50,HARRY'S BIRTHDAY
1040 DATA 999,0,0,0
```

CHAPTER 14

Monthly Budget

Here's a program that will help you budget your household expenses. It accepts entry of your monthly net wage and individual expenses to calculate the amount available to save. The program is written in BASIC for your microcomputer. See Program 14-1 for the program listing.

THE PROGRAM

The program begins by requesting the month number (1 – 12) for analysis. Then it requests your monthly net wage. Next, you are required to enter all monthly expenses, under the following categories:

1. Rent, or house payment
2. Utility expenses
   a. Telephone bill
   b. Electric bill
   c. Gas or oil costs
   d. Water bill
3. Garbage pickup
4. Monthly food bills
5. Clothing, shoes, linen
6. Drugstore purchases
7. Medical expenses
8. Bank charges
9. House expenses
10. Automobile expenses
11. Entertainment expenses
12. Miscellaneous expenses

The monthly food bill category allows entry of individual food bills, for that month. Entering a 999 allows you to advance to the next category. All other categories accept only one expense entry per month.

After all your monthly expenses are entered, the program calculates the total expense for that month. It then displays the month number, monthly wage (allowed budget amount), and your total monthly expenses.

The difference between your total monthly expense and your monthly budget amount is calculated and displayed. If you spent less during the month than your budget allows, then it is recommended that the amount left over be saved. If you are over your monthly budget, then this will be noted.

See Fig. 14-1 for a sample run.

```
MONTHLY BUDGET
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THE MONTHLY BUDGET PROGRAM WILL
HELP YOU BUDGET YOUR HOUSEHOLD
EXPENSES. ENTER YOUR MONTHLY NET
WAGE, OR AMOUNT ALLOWED, AND TOTAL
MONTHLY EXPENSES. THE AMOUNT LEFT
OVER AFTER ALL BILLS ARE PAID WILL
BE THE AMOUNT AVAILABLE TO SAVE.

ENTER MONTH # (1-12)
? 4


ENTER MONTHLY NET WAGE (BUDGET AMT)
? 816


ENTER MONTHLY STATISTICS

RENT OR HOUSE PAYMENT
? 300

UTILITY EXPENSES

TELEPHONE
? 10
ELECTRIC
? 15
GAS OR OIL
? 15
WATER
? 4

GARBAGE PICKUP
? 10


MONTHLY FOOD BILLS
1 BILL PER ENTRY
(ENTER 999 TO STOP)
# 1
? 75

MONTHLY FOOD BILLS
1 BILL PER ENTRY
(ENTER 999 TO STOP)
# 2
? 999



ENTER MONTHLY STATISTICS

CLOTHING, SHOES, LINEN
? 24
DRUG STORE PURCHASES
? 15
MEDICAL EXPENSES
(DOCTOR, DENTIST, ETC.)
? 25
BANK CHARGES
? 0
HOUSE EXPENSES (INSURANCE, REPAIRS, ETC)
? 10


AUTOMOBILE EXPENSES
(REPAIRS, GAS, ETC.)
? 50
ENTERTAINMENT (MOVIES, PLAYS, DINNERS
BOOKS, MAGAZINES, ETC.)
? 85
MISCELLANEOUS EXPENSES
? 25



MONTHLY BUDGET STATISTICS FOR
MONTH # 4

MONTHLY WAGE OR ALLOWED AMT=$ 816

YOUR TOTAL MONTHLY EXPENSE
IS $ 663

YOU SPENT LESS IN MONTH # 4 , AND
HAVE $ 153  LEFT OVER TO SAVE.
```

Fig. 14-1. Monthly Budget sample run.

Program 14-1. Monthly Budget Program Listing

```
100 PRINT CHR$(125);"MONTHLY BUDGET"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI"
130 PRINT
140 PRINT "THE MONTHLY BUDGET PROGRAM WILL"
150 PRINT "HELP YOU BUDGET YOUR HOUSEHOLD"
160 PRINT "EXPENSES. ENTER YOUR MONTHLY NET"
170 PRINT "WAGE, OR AMOUNT ALLOWED, AND TOTAL"
180 PRINT "MONTHLY EXPENSES. THE AMOUNT LEFT"
190 PRINT "OVER AFTER ALL BILLS ARE PAID WILL"
200 PRINT "BE THE AMOUNT AVAILABLE TO SAVE."
210 PRINT
220 PRINT "ENTER MONTH # (1-12)"
230 INPUT N:IF N<1 OR N>12 THEN 210
240 PRINT
250 PRINT "ENTER MONTHLY NET WAGE (BUDGET AMT)"
260 INPUT W
270 GOSUB 890
280 PRINT "RENT OR HOUSE PAYMENT"
290 INPUT R:PRINT
300 PRINT "UTILITY EXPENSES"
310 PRINT
320 PRINT "TELEPHONE"
330 INPUT T
340 PRINT "ELECTRIC"
350 INPUT E
360 PRINT "GAS OR OIL"
370 INPUT G
380 PRINT "WATER"
390 INPUT WA
400 PRINT "GARBAGE PICKUP"
410 INPUT GA
420 PRINT CHR$(125):F=0:FC=1
430 PRINT "MONTHLY FOOD BILLS"
440 PRINT "1 BILL PER ENTRY"
450 PRINT "(ENTER 999 TO STOP)"
460 PRINT "#";FC
470 FC=FC+1
480 INPUT FD:IF FD=999 THEN 510
490 PRINT :F=FD+F
500 GOTO 430
510 GOSUB 890
520 PRINT "CLOTHING, SHOES, LINEN"
530 INPUT CL
540 PRINT "DRUG STORE PURCHASES"
550 INPUT DR
560 PRINT "MEDICAL EXPENSES"
570 PRINT "(DOCTOR, DENTIST, ETC.)"
580 INPUT M
590 PRINT "BANK CHARGES"
600 INPUT BC
610 PRINT "HOUSE EXPENSES (INSURANCE, REPAIRS,   ETC)"
620 INPUT HR
```

Program 14-1-cont. Monthly Budget Program Listing

```
630 PRINT "AUTOMOBILE EXPENSES"
640 PRINT "(REPAIRS, GAS, ETC.)"
650 INPUT AU
660 PRINT "ENTERTAINMENT (MOVIES, PLAYS, DINNERS"
670 PRINT "BOOKS, MAGAZINES, ETC.)"
680 INPUT EN
690 PRINT "MISCELLANEOUS EXPENSES"
700 INPUT MS
710 REM CALCULATE EXPENSES
720 TL=R+T+E+G+WA+GA+F+CL+DR+M+BC+HR+AU+EN+MS
730 PRINT CHR$(125)
740 BU=W-TL
750 PRINT "MONTHLY BUDGET STATISTICS FOR"
760 PRINT "MONTH #";N
770 PRINT
780 PRINT "MONTHLY WAGE OR ALLOWED AMT=$";W
790 PRINT
800 PRINT "YOUR TOTAL MONTHLY EXPENSE"
810 PRINT "IS $";TL
820 PRINT :IF TL>W THEN 860
830 PRINT "YOU SPENT LESS IN MONTH #";N;", AND"
840 PRINT "HAVE $";BU;" LEFT OVER TO SAVE."
850 GOTO 880
860 ET=TL-W
870 PRINT "YOU SPENT $";ET;" OVER YOUR BUDGET"
880 END
890 PRINT CHR$(125);"ENTER MONTHLY STATISTICS"
900 PRINT
910 RETURN
```

CHAPTER 15

Valuables Inventory

The Valuables Inventory program keeps a list of your valuables, including the name of each item and its price. It is useful for keeping a record of your valuables for insurance purposes. The program is written in BASIC for your microcomputer. See Program 15-1 for the program listing.

THE PROGRAM

The valuables data must be entered into DATA statements, beginning at line 850. Enter the items in the following format:

DATA CATEGORY #,NAME,PRICE

or

850 DATA 1,BRACELET,225

The category number is a number from 1 to 6. It represents the following types of items:

1 – Gold, silver, jewelry
2 – Appliances
3 – Furniture
4 – Clothing
5 – Collectables (art, antiques, etc.)
6 – Miscellaneous

Each item should have its own data statement with the category number, its name, and its value entered. After all items are entered, then DATA 9999,0,0 must be the last DATA statement in the list.

After running the program, enter a 1 to begin. The program calculates and displays the cumulative total worth of your valuables. Then you have the option of listing the items, prices, and cumulative total for each category separately (1 – 6), display the total list, or end the program. Enter a 7 to display the total list, or an 8 to end the program. See Fig. 15-1 for a sample run.

IDENTIFICATION NUMBER

Use the DATA statement line number as an identification number (ID) for each item in your valuables list. Engrave the statement number, if possible, to the corresponding item. In case of a fire or theft, you have a record of each item, with its separate ID number. Keep a cassette copy of the program, with the inventory data list, in a safety deposit box for insurance purposes.

```
VALUABLES INVENTORY
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS PROGRAM WILL KEEP A LIST
OF YOUR VALUABLES, AND ALLOW YOU
TO DISPLAY A PARTIAL OR FULL LIST
WITH EACH ITEM NAME, VALUE, AND
CUMULATIVE VALUE. ENTER THE ITEMS
IN DATA STATEMENTS BEGINNING AT
LINE 850, IN THE FOLLOWING FORMAT:
DATA CATEGORY,NAME,PRICE
DATA 1,BRACELET,225
DATA 9999,0,0 IS THE LAST STATEMENT
ENTER '1' TO BEGIN
? 1


ENTER CATEGORY #
1-GOLD, SILVER, JEWELRY
2-APPLIANCES
3-FURNITURE
4-CLOTHING
5-COLLECTABLES
6-MISCELLANEOUS
7-TOTAL LIST
8-END PROGRAM

? 5


5
COLLECTABLES

ITEM            PRICE           CUM. TOTAL
OIL PAINTING     1700            1700
WATER COLOR      190             1890



6
MISCELLANEOUS

ITEM            PRICE           CUM. TOTAL
BICYCLE          175             175
CHESS SET        200             375
```

Fig. 15-1. Valuables Inventory sample run.

Program 15-1. Valuables Inventory Program Listing

```
100 PRINT CHR$(125);"VALUABLES INVENTORY"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":DIM D$(30)
130 PRINT
140 PRINT "THIS PROGRAM WILL KEEP A LIST"
150 PRINT "OF YOUR VALUABLES, AND ALLOW YOU"
160 PRINT "TO DISPLAY A PARTIAL OR FULL LIST"
170 PRINT "WITH EACH ITEM NAME, VALUE, AND"
180 PRINT "CUMULATIVE VALUE. ENTER THE ITEMS"
190 PRINT "IN DATA STATEMENTS BEGINNING AT"
200 PRINT "LINE 850, IN THE FOLLOWING FORMAT:"
210 PRINT "DATA CATEGORY,NAME,PRICE"
220 PRINT "DATA 1,BRACELET,225"
230 PRINT "DATA 9999,0,0 IS THE LAST STATEMENT"
240 PRINT "ENTER '1' TO BEGIN"
250 INPUT A:PRINT CHR$(125)
260 RESTORE :IF B=7 THEN A=A+1:PRINT :GOTO 400
270 IF T>0 THEN PRINT "CUM. TOTAL =$";T
280 PRINT :PRINT "ENTER CATEGORY #"
290 T=0:C=0:E=0
300 PRINT "1-GOLD, SILVER, JEWELRY"
310 PRINT "2-APPLIANCES"
320 PRINT "3-FURNITURE"
330 PRINT "4-CLOTHING"
340 PRINT "5-COLLECTABLES"
350 PRINT "6-MISCELLANEOUS"
360 PRINT "7-TOTAL LIST"
370 PRINT "8-END PROGRAM"
380 PRINT
390 INPUT A:IF A=7 THEN B=7
400 IF B=7 THEN E=E+1:IF E=7 THEN 730
410 ON A GOTO 460,500,540,580,620,660,700,730
420 GOTO 280
430 FOR G=1 TO 600
440 NEXT G
450 RETURN
460 PRINT :PRINT "GOLD, SILVER, JEWELRY"
470 GOSUB 750
480 GOSUB 780
490 GOTO 260
500 PRINT "APPLIANCES"
510 GOSUB 750
520 GOSUB 780
530 GOTO 260
540 PRINT "FURNITURE"
550 GOSUB 750
560 GOSUB 780
570 GOTO 260
580 PRINT "CLOTHING"
590 GOSUB 750
600 GOSUB 780
610 GOTO 260
620 PRINT "COLLECTABLES"
```

Program 15-1-cont. Valuables Inventory Program Listing

```
630 GOSUB 750
640 GOSUB 780
650 GOTO 260
660 PRINT "MISCELLANEOUS"
670 GOSUB 750
680 GOSUB 780
690 GOTO 260
700 PRINT "TOTAL LIST"
710 A=1:E=1
720 GOTO 410
730 END
740 REM TABLE
750 PRINT
760 PRINT "ITEM                PRICE      CUM TOTAL";
770 RETURN
780 READ C,D$,P
790 IF C=9999 THEN RETURN
800 IF C<>A THEN 780
810 T=P+T
820 PRINT D$,P,T
830 GOSUB 430
840 GOTO 780
850 DATA 1,SILVERWARE,1500
860 DATA 1,GOLD BRACELET,500
870 DATA 5,OIL PAINTING,1700
880 DATA 4,MINK COAT,1200
890 DATA 2,COLOR TV ,540
900 DATA 3,COUCH    ,1195
910 DATA 3,CHAIR    ,875
920 DATA 3,DINING TABLE,880
930 DATA 2,STEREO   ,695
940 DATA 1,WATCH    ,295
950 DATA 6,BICYCLE  ,175
960 DATA 5,WATER COLOR,190
970 DATA 2,COMPUTER ,3500
980 DATA 2,WASHER/DRYER,700
990 DATA 2,BW TV    ,95
1000 DATA 6,CHESS SET,200
1010 DATA 4,COATS   ,450
1020 DATA 4,SHOES   ,275
1030 DATA 3,DESK    ,250
1040 DATA 9999,0,0
```

CHAPTER 16

Cost of Food Analysis

The cost of living has been on a constant increase over the years. Due to inflation, each year it takes more and more money to buy the same goods, compared with previous years' prices. This program is used to calculate the change in cost of food, by comparing the weekly price of six "basic" foods to previous weeks' price data. It will indicate the weekly changes in these prices, to help you budget your allotted food money more efficiently. The program is written in BASIC for your microcomputer. See Program 16-1 for the program listing.

THE PROGRAM

Enter the week's food price data in DATA statements beginning at line 850, as follows:

```
DATA P1,P2,P3,P4,P5,P6
```

where P1 through P6 are the prices of one gallon of milk, one pound of butter, one dozen eggs, one pound of hamburger, one loaf of bread (20 oz), and five pounds of sugar, respectively.

Enter any number of weeks of data, beginning with a "base" week's pricing. The "base" week's data should be taken from some weeks past. The final week in your data list should be the most recent week's food costs. The last DATA statement in your list must be DATA 0,0,0,0,0,0.

Example of Data List

```
BASE WEEK  DATA 1.95,.75,.85,1.79,.61,1.59
           DATA 2.00,.85,.95,1.85,.72,1.78
           DATA 2.09,.89,.95,1.85,.75,1.75
FINAL WEEK DATA 2.05,.79,.87,2.20,.65,1.79
           DATA 0,0,0,0,0,0
```

After you run the program, it will display the "base" week's total "basic" food cost. Then for each week, it prints the total "basic" food cost and the difference between the previous week's (N−1) total "basic" food cost and the current week's (N) total, and the precent change. Also displayed is the total change/increase from week No. 1 (the "base" week) to the previous week (N−1), and the percent change. Finally, a cost of food plot may be displayed, by entering a 1 for yes. The plot will display the total "basic" food cost for each week in your data list. It is a horizontal plot displaying a plus (+) sign on the horizontal line for each of the weekly food costs. Then the computer will display the total change/increase from week No. 1 (the "base" week) to the final (most recent) week in your data list, along with the percent change.

See Fig. 16-1 for a sample run.

```
COST OF FOOD ANALYSIS
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM IS USED TO CALCULATE THE
CHANGE IN COST OF FOOD, BY COMPARING
THE WEEKLY PRICE OF MILK, BUTTER, EGGS,
HAMBURGER, BREAD, AND SUGAR TO PREVIOUS
WEEKS DATA. IT ALSO PLOTS THE COMBINED
PRICE OF THESE ITEMS FROM WEEK TO WEEK,
TO SHOW THE RISE OR FALL OF PRICES FOR
A GIVEN NUMBER OF WEEKS.

ENTER A '1' TO CONTINUE
? 1


ENTER THE WEEKS FOOD PRICE DATA IN
DATA STATEMENTS BEGINNING AT LINE 850,
AS FOLLOWS:
DATA P1,P2,P3,P4,P5,P6   WHERE
P1 THRU P6 ARE THE PRICES OF 1 GALLON
OF MILK, 1 LB OF BUTTER, 1 DOZ EGGS,
1 LB HAMBURGER, 1 LOAF OF BREAD, AND
5 LBS OF SUGAR, RESPECTIVELY.
ENTER ANY # OF WEEKS OF DATA BEGINNING
WITH A BASE WEEK PRICING, TAKEN SOME
WEEKS PAST. THE LAST DATA STATEMENT IN
THE LIST MUST BE: DATA 0,0,0,0,0,0

ENTER A '1' TO CONTINUE
? 1

BASE WEEK  1  : FOOD PRICE=$ 7.54
WEEK #  2  : FOOD PRICE=$ 8.15

DIFFERENCE FROM WEEK #  1 TO
 2  IS $ .61
A CHANGE OF  7.48466  PERCENT

ENTER A '1' TO CONTINUE
? 1

WEEK #  3  : FOOD PRICE=$ 8.28

DIFFERENCE FROM WEEK #  2 TO
 3  IS $ .13
A CHANGE OF  1.57005  PERCENT

ENTER A '1' TO CONTINUE
? 1


WEEK #  4  : FOOD PRICE=$ 8.35

DIFFERENCE FROM WEEK #  3 TO
 4  IS $ .0700007
A CHANGE OF  .838331  PERCENT

ENTER A '1' TO CONTINUE
? 1

TOTAL CHANGE/INCREASE FROM WEEK
1 TO  4  IS $ .810001
A CHANGE OF  10.7427  PERCENT

DO YOU WISH A PLOT?
1-YES  0-NO
? 1


COST OF FOOD PLOT

FOOD COST
0.........5.........10........15........20
WEEK #  1       +
WEEK #  2        +
WEEK #  3        +
WEEK #  4        +

TOTAL CHANGE/INCREASE FROM WEEK
1 TO  4  IS $ .810001
A CHANGE OF  10.7427  PERCENT
```

Fig. 16-1. Cost of Food Analysis sample run.

Program 16-1. Cost of Food Analysis Program Listing

```
100 PRINT CHR$(125);"COST OF FOOD ANALYSIS"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI"
130 PRINT :Z=0
140 PRINT "THIS PROGRAM IS USED TO CALCULATE THE"
150 PRINT "CHANGE IN COST OF FOOD, BY COMPARING"
160 PRINT "THE WEEKLY PRICE OF MILK, BUTTER,EGGS,";
170 PRINT "HAMBURGER,BREAD, AND SUGAR TO PREVIOUS";
180 PRINT "WEEKS DATA. IT ALSO PLOTS THE COMBINED";
190 PRINT "PRICE OF THESE ITEMS FROM WEEK TO WEEK";
200 PRINT "TO SHOW THE RISE OR FALL OF PRICES FOR";
210 PRINT "A GIVEN NUMBER OF WEEKS."
220 PRINT
230 GOSUB 780
240 PRINT "ENTER THE WEEKS FOOD PRICE DATA IN"
250 PRINT "DATA STATEMENTS BEGINNING AT LINE 850,";
260 PRINT "AS FOLLOWS:"
270 PRINT "DATA P1,P2,P3,P4,P5,P6   WHERE"
280 PRINT "P1 THRU P6 ARE THE PRICES OF 1 GALLON"
290 PRINT "OF MILK, 1 LB OF BUTTER, 1 DOZ EGGS,"
300 PRINT "1 LB HAMBURGER, 1 LOAF OF BREAD, AND"
310 PRINT "5 LBS OF SUGAR, RESPECTIVELY."
320 PRINT "ENTER ANY # OF WEEKS OF DATA BEGINNING";
330 PRINT "WITH A BASE WEEK PRICING, TAKEN SOME"
340 PRINT "WEEKS PAST. THE LAST DATA STATEMENT IN";
350 PRINT "THE LIST MUST BE: DATA 0,0,0,0,0,0"
360 PRINT :N=1
370 GOSUB 780
380 GOSUB 710:FA=BA
390 PRINT "BASE WEEK ";N;" : FOOD PRICE=$";BA
400 N=N+1:GOSUB 710:IF B=0 THEN 440
410 PRINT "WEEK # ";N;" : FOOD PRICE=$";BA
420 GOSUB 660
430 GOSUB 780:GOTO 400
440 PRINT :GOSUB 580
450 PRINT "DO YOU WISH A PLOT?"
460 PRINT "1-YES  0-NO"
470 INPUT A
480 IF A=1 THEN 500
490 END
500 PL=3:PRINT CHR$(125);"COST OF FOOD PLOT":PRINT
510 PRINT "FOOD COST"
520 PRINT "0.........5.........10.......15.....18";
530 N=1:RESTORE
535 PL=PL+1:IF PL=20 THEN GOSUB 800
540 GOSUB 710
550 IF B=0 THEN 640
560 POSITION 2,PL:PRINT "WEEK # ";N:POSITION Z*2+2,PL:PRINT "+"
570 N=N+1:GOSUB 820:GOTO 535
580 PRINT :HA=Z-FA
590 PRINT "TOTAL CHANGE/INCREASE FROM WEEK"
600 PRINT "1 TO ";N-1;" IS $";HA
610 PRINT "A CHANGE OF ";HA/FA*100;" PERCENT"
620 PRINT
```

Program 16-1-cont. Cost of Food Analysis Program Listing

```
630 RETURN
640 GOSUB 580
650 GOTO 490
660 PRINT
670 PRINT "DIFFERENCE FROM WEEK # ";N-1;" TO"
680 PRINT N;" IS $";GA
690 PRINT "A CHANGE OF ";GA/Z*100;" PERCENT"
700 PRINT :RETURN
710 READ B,C,D,E,F,G
720 H=B+C+D+E+F+G
730 AV=H
740 BA=INT(AV*100+0.5)/100
750 GA=BA-Z:IF B=0 THEN 770
760 Z=INT(BA+0.5)
770 RETURN
780 PRINT "ENTER A '1' TO CONTINUE"
790 INPUT A:PRINT CHR$(125):RETURN
800 POSITION 2,4:FOR SC=1 TO 18
805 PRINT "                                        "
810 NEXT SC:PL=4:RETURN
820 FOR A=1 TO 600
830 NEXT A
840 RETURN
850 DATA 1.95,.75,.85,1.79,.61,1.59
860 DATA 2.00,.85,.95,1.85,.72,1.78
870 DATA 2.09,.89,.95,1.85,.75,1.75
880 DATA 2.05,.79,.87,2.20,.65,1.79
890 DATA 0,0,0,0,0,0
```

CHAPTER 17

Appliance Operating Cost Analysis

An interesting and useful application program for the home computer is the Appliance Operating Cost Analysis program. It's written in BASIC for your microcomputer. See Program 17-1 for the program listing.

THE PROGRAM

The program will calculate the cost of operating electrical appliances, given the number of watts they consume, the average number of hours of daily use, and the cost per kilowatt-hour, for each appliance under analysis.

After you run the program, enter the number of appliances for analysis. Then enter the cost of electrical use per kilowatt-hour, in dollars. (Example: typically $0.065. Call your local power company for the exact amount. This will vary for different areas of the country.) The program will display APPLIANCE #1. Enter the power consumed in watts and the average number of hours (or minutes) in daily use. The program is set to accept hours, but will accept minutes if 9999 is entered first. Then it will advance to accept data on the next appliance. After the last appliance data is entered, the analysis will begin.

The computer will display a table with the appliance number, the watts consumed, operating cost per day, estimated cost per month, and the estimated kilowatt-hour use per month for each appliance under analysis. Finally, the program will display the total kilowatt-hours used and the total monthly cost for operating the appliances.

See Fig. 17-1 for a sample run.

ANALYSIS

The program will show you what it costs to operate each appliance. This may help you decide to use less of one or more appliances that require a lot of power to run, to save on energy costs.

Probably the most expensive electrical appliance to operate is an air conditioner. Proper home insulation will allow it to operate more efficiently. Also, the wattage of some of the light bulbs you use could be higher than necessary. Changing these bulbs to a lower wattage will reduce energy costs.

```
APPLIANCE OPERATING COST ANALYSIS
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM WILL CALCULATE
THE COST OF OPERATING ELECTRICAL
APPLIANCES, GIVEN THE NUMBER OF
WATTS THEY CONSUME, THE AVERAGE
NUMBER OF HOURS OF DAILY USE,
AND THE COST PER KILOWATT HOUR
FOR EACH APPLIANCE UNDER ANALYSIS

ENTER THE # OF APPLIANCES
UNDER ANALYSIS
? 3


ENTER THE COST PER KILOWATT HOUR
(TYPICAL - $.065)
? .07¢


APPLIANCE # 1
ENTER TYPE (NAME)
LIMIT TO 8 CHARACTERS
? COLOR TV

ENTER POWER CONSUMED IN WATTS
? 110

ENTER AVERAGE # OF HOURS IN
DAILY USE (MAY ENTER FRACTIONS).
IF YOU DESIRE TO ENTER MINUTES
THEN ENTER 9999
? 5


APPLIANCE # 2
ENTER TYPE (NAME)
LIMIT TO 8 CHARACTERS
? STEREO

ENTER POWER CONSUMED IN WATTS
? 200

ENTER AVERAGE # OF HOURS IN
DAILY USE (MAY ENTER FRACTIONS).
IF YOU DESIRE TO ENTER MINUTES
THEN ENTER 9999
? 3


APPLIANCE # 3
ENTER TYPE (NAME)
LIMIT TO 8 CHARACTERS
? LIGHTS

ENTER POWER CONSUMED IN WATTS
? 500

ENTER AVERAGE # OF HOURS IN
DAILY USE (MAY ENTER FRACTIONS).
IF YOU DESIRE TO ENTER MINUTES
THEN ENTER 9999
? 8



APPLIANCE OPERATING COST ANALYSIS

APPL.       WATTS    COST/DAY    COST/MO    KWHS/MO
COLOR TV      110       .0385       1.155       16.5
STEREO        200        .042        1.26         18
LIGHTS        500         .28         8.4        120

TOTAL KILOWATT HOURS USED PER MONTH
FOR  3  APPLIANCES IS  154.5  KWHOURS

TOTAL MONTHLY COST FOR  3
APPLIANCE(S) IS $ 10.82
```

Fig. 17-1. Appliance Operating Cost Analysis sample run.

Program 17-1. Appliance Operating Cost Analysis Program Listing

```
100 PRINT CHR$(125)
110 PRINT "APPLIANCE OPERATING COST ANALYSIS"
120 PRINT "ATARI"
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 PRINT
150 PRINT "THIS PROGRAM WILL CALCULATE"
160 PRINT "THE COST OF OPERATING ELECTRICAL"
170 PRINT "APPLIANCES, GIVEN THE NUMBER OF"
180 PRINT "WATTS THEY CONSUME, THE AVERAGE"
190 PRINT "NUMBER OF HOURS OF DAILY USE,"
200 PRINT "AND THE COST PER KILOWATT HOUR"
210 PRINT "FOR EACH APPLIANCE UNDER ANALYSIS"
220 PRINT
230 PRINT "ENTER THE # OF APPLIANCES"
240 PRINT "UNDER ANALYSIS"
250 INPUT I
260 DIM W(I),U(I),R(I),S(I)
270 PRINT
280 PRINT "ENTER THE COST PER KILOWATT HOUR"
290 PRINT "(TYPICAL - $.065)"
300 INPUT K
310 FOR Q=1 TO I
320 PRINT CHR$(125)
330 PRINT "APPLIANCE #";Q
360 PRINT
370 PRINT
380 PRINT "ENTER POWER CONSUMED IN WATTS"
390 INPUT W:W(Q)=W
400 PRINT
410 PRINT "ENTER AVERAGE # OF HOURS IN"
420 PRINT "DAILY USE (MAY ENTER FRACTIONS)."
430 PRINT "IF YOU DESIRE TO ENTER MINUTES"
440 PRINT "THEN ENTER 9999"
450 INPUT H
460 IF H=9999 THEN 700
470 C=(W/1000)*H
480 U(Q)=INT(C*K*1000+0.5)/1000
490 R(Q)=INT(U(Q)*30*1000+0.5)/1000
500 S(Q)=INT(C*30*1000+0.5)/1000
510 NEXT Q
520 PRINT CHR$(125):S=0:V=0
530 PRINT "APPLIANCE OPERATING COST ANALYSIS"
540 PRINT
550 PRINT "# WATTS","COST/DY","CST/MO","KWH/MO"
560 FOR Q=1 TO I
570 PRINT Q;" ";W(Q),U(Q),R(Q),S(Q)
580 S=S+R(Q)
590 V=V+S(Q)
600 FOR A=1 TO 500
610 NEXT A
620 NEXT Q
```

Program 17-1-cont. Appliance Operating Cost Analysis Program Listing

```
630 PRINT
640 PRINT "TOTAL KILOWATT HOURS USED PER MONTH"
650 PRINT "FOR ";I;" APPLIANCES IS ";V;" KWHOURS"
660 PRINT :S=INT(100*S+0.5)/100
670 PRINT "TOTAL MONTHLY COST FOR ";I
680 PRINT "APPLIANCE(S) IS $";S
690 END
700 PRINT "ENTER AVERAGE # OF MINUTES"
710 PRINT "IN DAILY USE"
720 INPUT M
730 H=M/60
740 GOTO 470
```

CHAPTER 18

Gas Usage Analysis

Conservation is the key to reducing our energy consumption and costs, with the rising prices and pending shortages of all types of energy. You can help out by using the Gas Usage Analysis program. It will indicate differences in natural gas usage from one year to another, so that you can see possible imbalances in usage and correct them. The program is written in BASIC for your microcomputer. See Program 18-1 for the program listing.

THE PROGRAM

The program requires that your yearly natural gas usage data is stored in DATA statements at program lines 1000 and 1010. The first data element in line 1000 must be the comparison year (base year), followed by twelve months of gas usage units, beginning with January of that year. Program line 1010 holds the data for the "recent" year. Example:

```
1000 DATA 1977,310,268,225,110,76,60,25,28,29,
          100,260,290
1010 DATA 1981,296,282,207,141,58,63,29,27,51,
          123,233,270
```

The "base" year can be any past year, possibly the year that you moved into your house or apartment, or even the previous year. The "recent" year would be a full year's data for a recent energy consumption.

The program prints the "base" year data, including average units used per month, total units used, units used per month, and the percent of total units used per month. Then it prints the "recent" year's data, with a comparison with the "base" year. It gives the difference between the two years, with the monthly increase (+) or decrease (−) from the "base" year. See Fig. 18-1 for a sample run.

ANALYSIS

If there is a significant monthly increase in natural gas usage, pay close attention to those months. You may be using more energy than necessary. Check your insulation for possible air leaks. This leakage can cause your furnace to work overtime and use more gas than necessary. Other increases may be due to natural gas leaks. Have your natural gas appliances periodically checked for leaks; escaping gas can cause explosions and death.

```
GAS USAGE ANALYSIS
COPYRIGHT (C) 1981 BY HOWARD BERENSON

THIS PROGRAM WILL COMPARE AND DISPLAY
A 'BASE' YEAR AND 'RECENT' YEAR GAS
USAGE, IN UNITS.

ENTER THE 'BASE' YEAR DATA AT LINE 1000,
AND THE 'RECENT' YEAR DATA AT LINE 1010.

ENTER A '1' TO DISPLAY
THE 'BASE' YEAR DATA
? 1


BASE YEAR  1977                    AV/MO=  148.417
TOTAL UNITS=  1781
MONTH            UNITS             % TOTAL
 1                310               17.4
 2                268               15.04
 3                225               12.63
 4                110               6.17
 5                76                4.26
 6                60                3.36
 7                25                1.4
 8                28                1.57
 9                29                1.62
 10               100               5.61
 11               260               14.59
 12               290               16.28
ENTER '1' FOR COMPARISON? 1


RECENT YEAR  1981                  AV/MO=  148.333
TOTAL UNITS=  1780    RECENT-BASE= -1
MO.   UNITS   % TOTAL    + OR - FROM BASE
 1     296     16.62      -14
 2     282     15.84       14
 3     207     11.62      -18
 4     141     7.92        31
 5     58      3.25       -18
 6     63      3.53        3
 7     29      1.62        4
 8     27      1.51       -1
 9     51      2.86        22
 10    123     6.91        23
 11    233     13.08      -27
 12    270     15.16      -20
```

Fig. 18-1. Gas Usage Analysis sample run.

Program 18-1. Gas Usage Analysis Program Listing

```
100 PRINT CHR$(125):DIM A(50)
110 PRINT "GAS USAGE ANALYSIS: ATARI"
120 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM WILL COMPARE AND DISPLAY"
150 PRINT "A 'BASE' YEAR AND 'RECENT' YEAR GAS"
160 PRINT "USAGE, IN UNITS."
170 PRINT
180 PRINT "ENTER THE 'BASE' YEAR DATA AT LINE    1000,"
190 PRINT "AND THE 'RECENT' YEAR DATA AT LINE    1010."
200 PRINT
210 PRINT "ENTER A '1' TO DISPLAY"
220 PRINT "THE 'BASE' YEAR DATA"
230 INPUT A:PRINT CHR$(125)
240 B=0:R=0
250 READ P
260 FOR E=1 TO 12
270 READ C
280 A(E)=C
290 B=A(E)+B
300 NEXT E
310 READ T
320 FOR E=13 TO 24
330 READ C
340 A(E)=C
350 R=A(E)+R
360 NEXT E
370 PRINT "BASE YEAR ";P,"AV/MO= ";B/12
380 PRINT "TOTAL UNITS= ";B
390 PRINT "MONTH","UNITS","% TOTAL"
400 FOR A=1 TO 12
410 PRINT A,A(A),INT(A(A)/B*10000)/100
420 NEXT A:PRINT
430 PRINT "ENTER '1' FOR COMPARISON";
440 INPUT A:PRINT CHR$(125)
450 PRINT
460 PRINT
470 PRINT "RECENT YEAR ";T,"AV/MO= ";R/12
480 PRINT "TOTAL UNITS= ";R;"   RECENT-BASE= ";R-B
490 PRINT "MO.      UNITS    % TOTAL  + OR - BASE";
500 FOR A=13 TO 24
510 PRINT A-12,A(A),INT(A(A)/R*10000)/100,A(A)-A(A-12)
520 NEXT A
530 END
980 REM ENTER 'BASE' YEAR GAS DATA IN LINE 1000
990 REM ENTER 'RECENT' YEAR GAS DATA IN LINE 1010
1000 DATA 1977,310,268,225,110,76,60,25,28,29,100,260,290
1010 DATA 1981,296,282,207,141,58,63,29,27,51,123,233,270
```

CHAPTER 19

Water Usage Analysis

Here is a program that can help you reduce your water usage. (It's similar to the Gas Usage Analysis program in Chapter 18.) It will indicate differences in water usage from one year to another, so that you can see possible imbalances in usage and correct them. The program is written in BASIC for your microcomputer. See Program 19-1 for the program listing.

THE PROGRAM

The program requires that your yearly water usage data is stored in DATA statements at program lines 1000 and 1010. The first data element in line 1000 must be the comparison year (base year), followed by the four quarters of water usage units, beginning with January or February of that year. Program line 1010 holds the data for the "recent" year. Example:

```
1000 DATA 1977,15,19,19,18

1010 DATA 1981,14,17,14,17
```

The "base" year can be any past year, possibly the year that you moved into your house, or even the previous year. The "recent" year would be a full year's data for a recent water consumption.

The program prints the "base" year data, including average units used per quarter, total units used, units used per quarter, and the percent of total units used per quarter. Then it prints the "recent" year's data, with a comparison with the "base" year. It gives the difference between the two years, with the quarterly increase (+) or decrease (−) from the "base" year. See Fig. 19-1 for a sample run.

ANALYSIS

If there is a significant quarterly increase in water usage, pay close attention to those quarters. You may be using more water than necessary. Check your faucets and pipes for leaks. Replace worn washers or faucets and pipes if necessary.

```
WATER USAGE ANALYSIS
COPYRIGHT (C) 1981 BY HOWARD BERENBON

THIS PROGRAM WILL COMPARE AND DISPLAY
A 'BASE' YEAR AND 'RECENT' YEAR WATER
USAGE, IN UNITS.

ENTER THE 'BASE' YEAR DATA AT LINE 1000,
AND THE 'RECENT' YEAR DATA AT LINE 1010.

ENTER A '1' TO DISPLAY
THE 'BASE' YEAR DATA
? 1


BASE YEAR  1977                    AV/QU=  17.75
TOTAL UNITS=  71
QUART            UNITS             % TOTAL
 1                 15                21.12
 2                 19                26.76
 3                 19                26.76
 4                 18                25.35
ENTER '1' FOR COMPARISON? 1




RECENT YEAR  1981                  AV/QU=  15.5
TOTAL UNITS=  62    RECENT-BASE= -9
QU.   UNITS   % TOTAL    + OR - FROM BASE
 1     14      22.58      -1
 2     17      27.41      -2
 3     14      22.58      -5
 4     17      27.41      -1
```

Fig. 19-1. Water Usage Analysis sample run.

Program 19-1. Water Usage Analysis Program Listing

```
100 PRINT CHR$(125):DIM A(10)
110 PRINT "WATER USAGE ANALYSIS: ATARI"
120 PRINT "COPYRIGHT (C) 1981 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM WILL COMPARE AND DISPLAY"
150 PRINT "A 'BASE' YEAR AND 'RECENT' YEAR WATER"
160 PRINT "USAGE, IN UNITS."
170 PRINT
180 PRINT "ENTER THE 'BASE' YEAR DATA AT LINE    1000,"
190 PRINT "AND THE 'RECENT' YEAR DATA AT LINE    1010."
200 PRINT
210 PRINT "ENTER A '1' TO DISPLAY"
220 PRINT "THE 'BASE' YEAR DATA"
230 INPUT A:PRINT CHR$(125)
240 B=0:R=0
250 READ P
260 FOR E=1 TO 4
270 READ C
280 A(E)=C
290 B=A(E)+B
300 NEXT E
310 READ T
320 FOR E=5 TO 8
330 READ C
340 A(E)=C
350 R=A(E)+R
360 NEXT E
370 PRINT "BASE YEAR ";P,"AV/QU= ";B/4
380 PRINT "TOTAL UNITS= ";B
390 PRINT "QUART","UNITS","% TOTAL"
400 FOR A=1 TO 4
410 PRINT A,A(A),INT(A(A)/B*10000)/100
420 NEXT A:PRINT
430 PRINT "ENTER '1' FOR COMPARISON";
440 INPUT A
450 PRINT
460 PRINT
470 PRINT "RECENT YEAR ";T,"AV/QU= ";R/4
480 PRINT "TOTAL UNITS= ";R;"   RECENT-BASE= ";R-B
490 PRINT "QU.      UNITS    % TOTAL  + OR - BASE";
500 FOR A=5 TO 8
510 PRINT A-4,A(A),INT(A(A)/R*10000)/100,A(A)-A(A-4)
520 NEXT A
530 END
980 REM ENTER 'BASE' YEAR WATER USAGE DATA IN LINE 1000
990 REM ENTER 'RECENT' YEAR WATER USAGE DATA IN LINE 1010
1000 DATA 1977,15,19,19,18
1010 DATA 1981,14,17,14,17
```

CHAPTER 20

Family Dental Expenses

A useful way to keep track of your dental expenses is with the Family Dental Expense program. It's written in BASIC for your microcomputer. See Program 20-1 for the program listing.

THE PROGRAM

The program requires that you enter dental expenses in DATA statements beginning with program line 500. Limit the type of expense to a 14-character description. Enter each dental expense as follows:

DATA DATE,TYPE OF EXPENSE,COST

or

DATA 1/17/80,CLEANING,25

DATA END,0,0 must be the last DATA statement in the list.

After you run the program, enter the year of the report. Then enter a 1 to begin. The program will display each dental expense with the date, the type (description), the cost, and the cumulative total. After all the data is displayed, then the total yearly expense is given. See Fig. 20-1 for a sample run.

```
FAMILY DENTAL EXPENSES
COPYRIGHT (C) 1980 BY HOWARD BERENBON
ATARI


THIS PROGRAM WILL KEEP TRACK OF
YOUR FAMILY DENTAL EXPENSES.
ENTER EACH DENTAL EXPENSE RECEIPT
IN DATA STATEMENTS BEGINNING AT
LINE 500, AS FOLLOWS:
DATA DATE,TYPE,COST
DATA 1/17/80,CLEANING,25-LIMIT TYPE
TO A 14 CHARACTER DESCRIPTION.
DATA END,0,0 MUST BE THE LAST
STATEMENT IN YOUR LIST.

ENTER THE YEAR OF THE REPORT
? 1980

ENTER '1' TO BEGIN
? 1

FAMILY DENTAL EXPENSE REPORT
FOR THE YEAR: 1980

DATE      TYPE       COST      CUM. TOT
1/17/80   CLEANING   25        25
1/25/80   FILLING    35        60
2/20/80   FILLING    30        90
2/27/80   CROWN WK   75        165
3/10/80   CROWN WK   100       265
3/17/80   CROWN WK   15        280
3/25/80   CRN DONE   100       380
6/14/80   CLN-XRAY   35        415

FAMILY DENTAL EXPENSE REPORT
FOR THE YEAR: 1980

THE TOTAL YEARLY EXPENSE =$415
```

Fig. 20-1. Family Dental Expenses sample run.

Program 20-1. Family Dental Expenses Program Listing

```
100 PRINT CHR$(125);"FAMILY DENTAL EXPENSES"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":DIM A$(8),B$(8)
130 GOSUB 470:GOSUB 470
140 PRINT CHR$(125):PRINT :C=0
150 PRINT "THIS PROGRAM WILL KEEP TRACK OF"
160 PRINT "YOUR FAMILY DENTAL EXPENSES."
170 PRINT "ENTER EACH DENTAL EXPENSE RECEIPT"
180 PRINT "IN DATA STATEMENTS BEGINNING AT"
190 PRINT "LINE 500, AS FOLLOWS:"
200 PRINT "DATA DATE,TYPE,COST"
210 PRINT "DATA 1/17/80,CLEANING,25-LIMIT TYPE"
220 PRINT "TO A 14 CHARACTER DESCRIPTION."
230 PRINT "DATA END,0,0 MUST BE THE LAST"
240 PRINT "STATEMENT IN YOUR LIST."
250 PRINT
260 PRINT "ENTER THE YEAR OF THE REPORT"
270 INPUT Y
280 PRINT
290 PRINT "ENTER '1' TO BEGIN"
300 INPUT A
310 PRINT CHR$(125);"FAMILY DENTAL EXPENSE REPORT"
320 PRINT "FOR THE YEAR: ";Y
330 PRINT
340 PRINT "DATE","TYPE","COST","CUM. TOT";
350 PRINT
360 READ A$,B$,B
370 IF A$="END" THEN 420
380 C=C+B
390 PRINT A$,B$,B,C
400 GOSUB 470
410 GOTO 360
420 PRINT :PRINT "FAMILY DENTAL EXPENSE REPORT"
430 PRINT "FOR THE YEAR: ";Y
440 PRINT
450 PRINT "THE TOTAL YEARLY EXPENSE =$";C
460 END
470 FOR A=1 TO 500
480 NEXT A
490 RETURN
500 DATA 1/17/80,CLEANING,25
510 DATA 1/25/80,FILLING,35
520 DATA 2/20/80,FILLING,30
530 DATA 2/27/80,CROWN WK,75
540 DATA 3/10/80,CROWN WK,100
550 DATA 3/17/80,CROWN WK,15
560 DATA 3/25/80,CRN DONE,100
570 DATA 6/14/80,CLN-XRAY,35
580 DATA END,0,0
```

CHAPTER 21

Weekly Jogging Record

Jogging has been a popular pastime for many people. It's a good from of exercise that requires very little cost to do. If you're a jogger, then this program can help you. It keeps a record of your weekly jogging data and displays a graph of your performance. It's written in BASIC for your microcomputer. See Program 21-1 for the program listing.

THE PROGRAM

The program requires that you enter your weekly jogging distance data in DATA statements beginning at line 960. Enter the maximum distance you ran (in miles or fraction of miles) for each day of week 1 through week W. Only enter the data for the days that you ran. IF you ran three days out of seven, only enter three numbers, or all seven if you ran every day of that week. Also, 99 must be the last number in each DATA statement and DATA 555 must be the last DATA statement in your list. Enter the data as in the following example:

Week 1	**960**	**DATA 2,2,4,1,3,99**
Week 2	**970**	**DATA 2,2,2,3,4,2,99**
Week 3	**980**	**DATA 3,3,4,4,5,4,5,99**
Week 4	**990**	**DATA 4,3,4,5,99**
	1000	**DATA 555**

After you run the program, it calculates the number of weeks in your data list. It then calculates the number of miles you ran for each week and the average daily miles per week. Then a table is displayed with the week number, the average miles per day, the total miles per week, and the approximate calories expended per week.

ANALYSIS

The data is analyzed using your first week of data as the "base" week. The average jog during a "base" week day is displayed. Then the average jog during the last week day is displayed. Next, the (+) increase or (−) decrease in the average daily jogging distance, from a "base" week to the last (final) week W, is displayed. Finally, you can have a plot of your weekly progress. Enter a 1 for yes or 0 for no. The plot will display the average daily miles per week, for each week in your data list. It is a horizontal plot, using the TAB function to display a plus (+) sign on the horizontal line, for the average daily miles per week. The maximum distance that can be plotted is 40 miles per week.

See Fig. 21-1 for a sample run.

```
WEEKLY JOGGING RECORD
COPYRIGHT (C) 1980 BY HOWARD BERENSON

HERE'S A PROGRAM THAT KEEPS A RECORD
OF YOUR WEEKLY JOGGING DATA, AND
GIVES A PLOT OF YOUR PERFORMANCE.
ENTER THE MAXIMUM DISTANCE YOU RAN
(IN MILES OR FRACTIONS) FOR EACH DAY
OF WEEK 1 THRU WEEK W, IN DATA STATE-
MENTS BEGINNING AT LINE 960. ENTER
ONLY THE DATA FOR DAYS THAT YOU RAN.
IF YOU RAN 3 DAYS OUT OF 7, THEN ONLY
ENTER 3 NUMBERS; OR ALL 7 IF YOU RAN
EACH DAY. ENTER AS FOLLOWS:
ENTER '1' TO CONTINUE? 1


DATA DAY1,DAY2,DAY3,DAY4,DAY5,DAY6,DAY7,99
DATA 2.5,2,3.5,5,4.5,4,5,99-99 MUST BE
LAST ENTRY IN EACH DATA STATEMENT; DATA 555
MUST BE THE LAST STATEMENT IN THE LIST.
ENTER '1' TO CONTINUE? 1


WEEK#          AV-MIL/D        MILES/WK        CALORIES/WK

 1               2.375           9.5             902.5
 2               2.7             13.5            1282.5
 3               3.2             16              1520
 4               2.7             13.5            1282.5
 5               3.75            15              1425
 6               4               16              1520

AVERAGE JOGG DURING A BASE WEEK (#1)
DAY =  2.38  MILES

AVERAGE JOGG DURING A LAST (FINAL)
WEEK DAY =  4  MILES

ENTER '1' TO CONTINUE? 1
```

Fig. 21-1. Weekly Jogging Record sample run.

Program 21-1. Weekly Jogging Record Program Listing

```
100 PRINT CHR$(125);"WEEKLY JOGGING RECORD"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI"
130 GOSUB 900
140 PRINT "HERE'S A PROGRAM THAT KEEPS A RECORD"
150 PRINT "OF YOUR WEEKLY JOGGING DATA, AND"
160 PRINT "GIVES A PLOT OF YOUR PERFORMANCE."
170 PRINT "ENTER THE MAXIMUM DISTANCE YOU RAN"
180 PRINT "(IN MILES OR FRACTIONS) FOR EACH DAY"
190 PRINT "OF WEEK 1 THRU WEEK W, IN DATA STATE-"
200 PRINT "MENTS BEGINNING AT LINE 960. ENTER"
210 PRINT "ONLY THE DATA FOR DAYS THAT YOU RAN."
220 PRINT "IF YOU RAN 3 DAYS OUT OF 7, THEN ONLY"
230 PRINT "ENTER 3 NUMBERS; OR ALL 7 IF YOU RAN"
240 PRINT "EACH DAY. ENTER AS FOLLOWS:":GOSUB 930
250 PRINT "DATA DAY1,DAY2,DAY3,DAY4,DAY5,DAY6,DAY7,99"
260 PRINT "DATA 2.5,2,3.5,5,4.5,4,5,99-99 MUST BE";
270 PRINT "LAST ENTRY IN EACH DATA STATEMENT; DATA 555"
280 PRINT "MUST BE THE LAST STATEMENT IN THE LIST.";
290 GOSUB 930
300 PRINT CHR$(125):W=0:R1=0:Q=0
310 READ R
320 IF R=99 THEN W=W+1
330 IF R=555 THEN 350
340 GOTO 310
350 RESTORE
360 READ R
370 IF R=99 THEN 400
380 Q=Q+1:R1=R+R1
390 GOTO 360
400 R1=R1/Q:RESTORE
410 DIM A(W+1),B(W+1)
420 FOR G=1 TO W
430 Q=0:S=0
440 READ R
450 IF R=99 THEN 480
460 Q=Q+1:S=R+S:GOTO 440
470 NEXT G:GOTO 500
480 S1=S/Q:A(G)=S1
490 B(G)=S:GOTO 470
500 R1=INT(R1*100+0.5)/100
510 S1=INT(S1*100+0.5)/100
520 PRINT CHR$(125)
530 PRINT "WEEK#","AV-MIL/D","MILES/WK","CALS/WK"
540 PRINT
550 FOR G=1 TO W
560 PRINT G,A(G),B(G),95*B(G)
570 GOSUB 900
580 NEXT G
590 PRINT
600 PRINT "AVERAGE JOG DURING A BASE WEEK (#1)"
610 PRINT "DAY = ";R1;" MILES"
620 PRINT
```

Program 21-1-cont. Weekly Jogging Record Program Listing

```
630 PRINT "AVERAGE JOG DURING A LAST (FINAL)"
640 PRINT "WEEK DAY = ";S1;" MILES"
650 PRINT
660 GOSUB 930:GOSUB 820
670 PRINT
680 PRINT "DO YOU WISH A PLOT?"
690 PRINT "1-YES  0-NO"
700 INPUT A
710 IF A=1 THEN 730
720 END
730 PL=3:PRINT CHR$(125);"PLOT OF WEEKLY PROGRESS"
740 PRINT
750 PRINT "AVERAGE MILES/DAY (TOTAL DAYS)"
760 PRINT "0+++++++++5+++++++++10++++++++15++++18";
770 FOR G=1 TO W:Z=INT(A(G)+0.5):PL=PL+1:IF PL=21 THEN GOSUB 940
780 POSITION Z*2+2,PL:PRINT "+   WEEK #";G
790 GOSUB 900
800 NEXT G
810 GOTO 720
820 PRINT "THE (+)INCREASE OR (-) DECREASE IN THE";
830 PRINT "AVERAGE DAILY JOGGING DISTANCE,FROM"
840 PRINT "BASE (1ST) WEEK TO THE LAST-FINAL-WEEK";
850 D=S1-R1:PC=(D/R1)*100
860 PRINT W;", IS ";D;" MILES"
870 PRINT :PC=INT(PC*100)/100
880 PRINT "THAT'S A ";PC;" PERCENT CHANGE"
890 RETURN
900 FOR A=1 TO 400
910 NEXT A
920 RETURN
930 PRINT "ENTER '1' TO CONTINUE";:INPUT A:PRINT :RETURN
940 POSITION 2,4:FOR SC=1 TO 19
945 PRINT "                                        ";
950 NEXT SC:PL=4:RETURN
960 DATA 2,2.5,2,3,99
970 DATA 2.5,2.5,3,3.5,2,99
980 DATA 3,3,3.5,3,3.5,99
990 DATA 2.5,2,2.5,3,3.5,99
1000 DATA 3,4,4,4,99
1010 DATA 4,4,4.5,3.5,99
1020 DATA 555
```

CHAPTER 22

Telephone Number Directory

The Telephone Number Directory will list names and telephone numbers from your list of names and numbers in DATA statements. The program is written in BASIC for your microcomputer. See Program 22-1 for the program listing.

THE PROGRAM

The program requires that your name and phone number list is stored in DATA statements beginning at line 660. Enter as follows:

DATA NAME,PHONE #

or

660 DATA SMITH,555-1212

The statement DATA END,0 must be the last DATA statement in your list. The size of your phone number list is limited only by your computer's RAM size.

After you run the program, you may display individual numbers by entering an N, display your whole list by entering an L, or end the program by entering an E. If you wish to display individual names and numbers, the computer will request your desired name entry. Enter the name as it appears in the list. The computer will search the list, comparing the name entered with the names in your list. When the name is found, the computer will display that name with its corresponding telephone number. You may now access another number or discontinue this function. If the name entered is not in the list, the computer will display ENTRY NOT FOUND. Entering an N will return the program to the main input routine, allowing access to individual numbers or the whole list. See Fig. 22-1 for a sample run.

```
TELEPHONE NUMBER DIRECTORY
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS PROGRAM WILL LIST NAMES &
TELEPHONE NUMBERS FROM YOUR LIST
LOCATED IN DATA STATEMENTS
BEGINNING AT PROGRAM LINE 660.
ENTER THE DATA AS FOLLOWS:
DATA NAME,NUMBER
DATA SMITH,555-1212
THE LAST DATA STATEMENT IN THE
LIST MUST BE: DATA END,0



TELEPHONE # DIRECTORY


ENTER 'N' DISPLAY INDIVIDUAL #'S
      'L' DISPLAY FULL LIST
      'E' END PROGRAM
? N




TELEPHONE # DIRECTORY

ENTER NAME
? DAVE
SEARCHING LIST FOR 'DAVE'

NAME              PHONE NUMBER

DAVE              555-1963

ANOTHER ENTRY?
ENTER 'Y'-YES
      'N'-NO
?
```

Fig. 22-1. Telephone Number Directory sample run.

Program 22-1. Telephone Number Directory Program Listing

```
100 PRINT CHR$(125);"TELEPHONE NUMBER DIRECTORY"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":DIM A$(30),B$(1),C$(30),D$(30)
130 PRINT
140 PRINT "THIS PROGRAM WILL LIST NAMES &"
150 PRINT "TELEPHONE NUMBERS FROM YOUR LIST"
160 PRINT "LOCATED IN DATA STATEMENTS"
170 PRINT "BEGINNING AT PROGRAM LINE 660."
180 PRINT "ENTER THE DATA AS FOLLOWS:"
190 PRINT "DATA NAME,NUMBER"
200 PRINT "DATA SMITH,555-1212"
210 PRINT "THE LAST DATA STATEMENT IN THE"
220 PRINT "LIST MUST BE: DATA END,0"
230 FOR T=1 TO 3600
240 NEXT T:GOSUB 330
250 PRINT :RESTORE
260 PRINT "ENTER 'N' DISPLAY INDIVIDUAL #'S"
270 PRINT "      'L' DISPLAY FULL LIST"
280 PRINT "      'E' END PROGRAM"
290 INPUT B$
300 IF B$="N" THEN 370
310 IF B$="L" THEN 570
320 END
330 PRINT CHR$(125)
340 PRINT "TELEPHONE # DIRECTORY"
350 PRINT :RESTORE
360 RETURN
370 GOSUB 330
380 PRINT "ENTER NAME"
390 INPUT A$
400 PRINT "SEARCHING LIST FOR '";A$;"'":PRINT
410 READ C$,D$
420 IF C$="END" THEN 450
430 IF C$=A$ THEN 480
440 GOTO 410
450 PRINT "ENTRY NOT FOUND"
460 RESTORE
470 GOTO 500
480 PRINT "NAME            PHONE NUMBER":PRINT
490 PRINT C$:POSITION 18,9:PRINT D$
500 PRINT
510 PRINT "ANOTHER ENTRY?"
520 PRINT "ENTER 'Y'-YES"
530 PRINT "      'N'-NO"
540 INPUT B$
550 IF B$="Y" THEN 370
560 GOTO 250
570 GOSUB 330:PRINT "NAME",,"PHONE NUMBER":PRINT
580 READ C$,D$
590 IF C$="END" THEN 250
600 PRINT C$,D$
610 GOSUB 630
620 GOTO 580
```

Program 22-1-cont. Telephone Number Directory Program Listing

```
630 FOR T=1 TO 500
640 NEXT T
650 RETURN
660 DATA RICK,555-5219
670 DATA BRUCE,555-1694
680 DATA DAVE,555-1963
690 DATA HARRY,555-1282
700 DATA END,0
```

SECTION III

Money and Investment

This section describes some useful application programs dealing with money and investment. They include a stock buying guide, a stock record keeper, a stock plotter, a checkbook balancing program, a monthly savings plan, a compound interest table, a money market interest table, a KEOGH/SEP retirement program, and finally, a property tax assessment program.

CHAPTER 23

Stock Buying Guide

Here's an investment program for the small investor. It's a stock market buying guide questionnaire to help you determine if a particular stock is a right choice for investment. The program is written in BASIC for your microcomputer. See Program 23-1 for the program listing.

THE PROGRAM

The program consists of a fifteen-question questionnaire, requiring entry of different point values per question. A total score of 27 or better is a recommendation to invest in the stock. A preliminary question must be answered with a "no" response, to allow entry into the questionnaire.

After you run the program, the following preliminary question will be displayed:

IS THE COMPANY IN A DEFICIT?
1—Yes 0—No

The entry of a 1 indicates a "yes" and 0 indicates a "no." If the answer is "yes" (the company is in a deficit), then the program will display:

THE STOCK IS NOT ACCEPTABLE
IT IS NOT RECOMMENDED FOR PURCHASE

You will not be allowed entry into the questionnaire, since the stock is a bad risk.

Answering the question with a "no" (0 entry) allows entry into the questionnaire, and question No. 1 will be displayed. Enter the number of points that is indicated for your stock. If zero is indicated, then enter 0. The program will print the "point value so far" and advance to the next question. After all fifteen questions are answered, it displays the final point score and whether the stock is acceptable, and recommended, or not acceptable, and not recommended for purchase. See Fig. 23-1 for a sample run.

ANALYSIS

A total score of 27 or greater is an indication that your stock choice will be a safe investment. But before investing, since the market is so unpredictable, consult your stockbroker for recent information on the company, and use this program, along with your judgment, as a guide for investing.

```
STOCK BUYING GUIDE
COPYRIGHT (C) 1980 BY HOWARD BERENBON


USE THE FOLLOWING QUESTIONNAIRE TO
HELP DETERMINE IF A PARTICULAR STOCK
WILL BE A GOOD INVESTMENT. THERE ARE
15 QUESTIONS WITH DIFFERENT POINT
VALUES FOR EACH ANSWER. A TOTAL SCORE
OF 27 OR BETTER IS A RECOMMENDATION
TO INVEST IN THE STOCK. THE PRELIMINARY
QUESTION MUST BE ANSWERED WITH A 'NO'
TO ALLOW ENTRY INTO THE QUESTIONNAIRE.

PRELIMINARY QUESTION

IS THE COMPANY IN A DEFICIT?
1-YES  0-NO
? 0

STOCK BUYING GUIDE

#1-STOCK PRICE

$6 TO $30 = 4 POINTS
GREATER THAN $30 = 2 POINTS
LESS THAN $6 = 0

ENTER POINT VALUE
? 2


POINTS SO FAR =  2

#2-PRICE FLUCTUATION
(LAST 6 MONTHS)

UP=2 POINTS
DOWN = 0
NO CHANGE = 1

ENTER POINT VALUE
? 2


POINTS SO FAR =  4

#3-PE RATIO

4/1 TO 8/1 = 4 POINTS
9/1 TO 13/1 = 3
```

Fig. 23-1. Stock Buying Guide sample run.

```
14/1 TO 17/1 = 2
18/1 TO 24/1 = 1
25/1 AND ABOVE = 0

ENTER POINT VALUE
? 1


POINTS SO FAR =  5


#4-VOLUME SOLD, LAST (HUNDREDS)

0 TO 300 = 0 POINTS
301 TO 600 = 1
601 TO 1000 = 2
1001 AND GREATER = 3

ENTER POINT VALUE
? 3



POINTS SO FAR =  8


#5-DIVIDENDS

NONE = 0 POINTS
1 TO 2% = 1
2.1 TO 3% = 2
3.1 TO 6% = 3
6.1 TO 12% = 4
12.1% AND ABOVE =2

ENTER POINT VALUE
? 0



POINTS SO FAR =  8


#6-EARNINGS

UP = 2 POINTS
DOWN = 0
NO CHANGE = 1

ENTER POINT VALUE
? 2



POINTS SO FAR =  10


#7-RECENT NEWS ABOUT COMPANY

NO NEWS = 1
GOOD NEWS = 2
BAD NEWS = 0

ENTER POINT VALUE
? 2



POINTS SO FAR =  12


#8-INVESTMENT TYPE

SHORT TERM INVESTMENT = 2
LONG TERM INVESTMENT = 1

ENTER POINT VALUE
? 2



POINTS SO FAR =  14


#9-RECENT SPLITS

YES = 4
NO = 0

ENTER POINT VALUE
? 4



POINTS SO FAR =  18


#10-BROKER COMMISSION

3% OR LESS = 2 POINTS
3.1 TO 4% = 1
4.1% OR GREATER = 0

ENTER POINT VALUE
? 2



POINTS SO FAR =  20


#11-EXCHANGE TRADED ON

NEW YORK = 4 POINTS
AMERICAN = 2
OTHERS = 0

ENTER POINT VALUE
? 4



POINTS SO FAR =  24


#12-NUMBER OF YEARS IN BUSINESS

0 TO 6 = 0
7 TO 20 = 1
21 TO 30 = 2
31 TO 40 = 3
41 AND ABOVE = 4

ENTER POINT VALUE
? 2



POINTS SO FAR =  26


#13-SIZE OF BUSINESS

LARGE CORPORATION OR COMPANY = 4
MEDIUM SIZE = 2
SMALL = 0

ENTER POINT VALUE
? 4



POINTS SO FAR =  30


#14-EARNINGS AND DIVIDEND RANKING

A+ = 4 POINTS
A  = 3
A- = 3
B+ = 2
B  = 2
B- = 1
C  = 0
D  = 0


ENTER POINT VALUE
? 2



POINTS SO FAR =  32


#15-STOCK MARKET CONDITIONS

UP = 2 POINTS
DOWN OR NO CHANGE = 0

ENTER POINT VALUE
? 2



POINTS SO FAR =  34


FINAL POINT SCORE IS  34

THE STOCK IS ACCEPTABLE

IT IS RECOMMENDED FOR PURCHASE
```

Fig. 23-1-cont. Stock Buying Guide sample run.

Program 23-1. Stock Buying Guide Program Listing

```
100 PRINT CHR$(125);"STOCK BUYING GUIDE"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI"
130 GOSUB 1710:PRINT CHR$(125)
140 PRINT "USE THE FOLLOWING QUESTIONNAIRE TO"
150 PRINT "HELP DETERMINE IF A PARTICULAR STOCK"
160 PRINT "WILL BE A GOOD INVESTMENT. THERE ARE"
170 PRINT "15 QUESTIONS WITH DIFFERENT POINT"
180 PRINT "VALUES FOR EACH ANSWER. A TOTAL SCORE"
190 PRINT "OF 27 OR BETTER IS A RECOMMENDATION"
200 PRINT "TO INVEST IN THE STOCK.THE PRELIMINARY";
210 PRINT "QUESTION MUST BE ANSWERED WITH A 'NO'"
220 PRINT "TO ALLOW ENTRY INTO THE QUESTIONNAIRE.";
230 PRINT
240 PRINT "PRELIMINARY QUESTION"
250 PRINT
260 PRINT "IS THE COMPANY IN A DEFICIT?"
270 PRINT "1-YES  0-NO"
280 INPUT A
290 IF A=1 THEN 1740
300 IF A=0 THEN 320
310 GOTO 230
320 PRINT CHR$(125)
330 PRINT "STOCK BUYING GUIDE"
340 PRINT
350 S1=0
360 PRINT "#1-STOCK PRICE"
370 PRINT
380 PRINT "$6 TO $30 = 4 POINTS"
390 PRINT "GREATER THAN $30 = 2 POINTS"
400 PRINT "LESS THAN $6 = 0"
410 GOSUB 1610
420 GOSUB 1660
430 PRINT "#2-PRICE FLUCTUATION"
440 PRINT "(LAST 6 MONTHS)"
450 PRINT
460 PRINT "UP=2 POINTS"
470 PRINT "DOWN = 0"
480 PRINT "NO CHANGE = 1"
490 GOSUB 1610
500 GOSUB 1660
510 PRINT "#3-PE RATIO"
520 PRINT
530 PRINT "4/1 TO 8/1 = 4 POINTS"
540 PRINT "9/1 TO 13/1 = 3"
550 PRINT "14/1 TO 17/1 = 2"
560 PRINT "18/1 TO 24/1 = 1"
570 PRINT "25/1 AND ABOVE = 0"
580 GOSUB 1610
590 GOSUB 1660
600 PRINT "#4-VOLUME SOLD, LAST (HUNDREDS)"
610 PRINT
620 PRINT "0 TO 300 = 0 POINTS"
```

Program 23-1-cont. Stock Buying Guide Program Listing

```
630 PRINT "301 TO 600 = 1"
640 PRINT "601 TO 1000 = 2"
650 PRINT "1001 AND GREATER = 3"
660 GOSUB 1610
670 GOSUB 1660
680 PRINT "#5-DIVIDENDS"
690 PRINT
700 PRINT "NONE = 0 POINTS"
710 PRINT "1 TO 2% = 1"
720 PRINT "2.1 TO 3% = 2"
730 PRINT "3.1 TO 6% = 3"
740 PRINT "6.1 TO 12% = 4"
750 PRINT "12.1% AND ABOVE =2"
760 GOSUB 1610
770 GOSUB 1660
780 PRINT "#6-EARNINGS"
790 PRINT
800 PRINT "UP = 2 POINTS"
810 PRINT "DOWN = 0"
820 PRINT "NO CHANGE = 1"
830 GOSUB 1610
840 GOSUB 1660
850 PRINT "#7-RECENT NEWS ABOUT COMPANY"
860 PRINT
870 PRINT "NO NEWS = 1"
880 PRINT "GOOD NEWS = 2"
890 PRINT "BAD NEWS = 0"
900 GOSUB 1610
910 GOSUB 1660
920 PRINT "#8-INVESTMENT TYPE"
930 PRINT
940 PRINT "SHORT TERM INVESTMENT = 2"
950 PRINT "LONG TERM INVESTMENT = 1"
960 GOSUB 1610
970 GOSUB 1660
980 PRINT "#9-RECENT SPLITS"
990 PRINT
1000 PRINT "YES = 4"
1010 PRINT "NO = 0"
1020 GOSUB 1610
1030 GOSUB 1660
1040 PRINT "#10-BROKER COMMISSION"
1050 PRINT
1060 PRINT "3% OR LESS = 2 POINTS"
1070 PRINT "3.1 TO 4% = 1"
1080 PRINT "4.1% OR GREATER = 0"
1090 GOSUB 1610
1100 GOSUB 1660
1110 PRINT "#11-EXCHANGE TRADED ON"
1120 PRINT
1130 PRINT "NEW YORK = 4 POINTS"
1140 PRINT "AMERICAN = 2"
1150 PRINT "OTHERS = 0"
```

Program 23-1-cont. Stock Buying Guide Program Listing

```
1160 GOSUB 1610
1170 GOSUB 1660
1180 PRINT "#12-NUMBER OF YEARS IN BUSINESS"
1190 PRINT
1200 PRINT "0 TO 6 = 0"
1210 PRINT "7 TO 20 = 1"
1220 PRINT "21 TO 30 = 2"
1230 PRINT "31 TO 40 = 3"
1240 PRINT "41 AND ABOVE = 4"
1250 GOSUB 1610
1260 GOSUB 1660
1270 PRINT "#13-SIZE OF BUSINESS"
1280 PRINT
1290 PRINT "LARGE CORPORATION OR COMPANY = 4"
1300 PRINT "MEDIUM SIZE = 2"
1310 PRINT "SMALL = 0"
1320 GOSUB 1610
1330 GOSUB 1660
1340 PRINT "#14-EARNINGS AND DIVIDEND RANKING"
1350 PRINT
1360 PRINT "A+ = 4 POINTS"
1370 PRINT "A  = 3"
1380 PRINT "A- = 3"
1390 PRINT "B+ = 2"
1400 PRINT "B  = 2"
1410 PRINT "B- = 1"
1420 PRINT "C  = 0"
1430 PRINT "D  = 0"
1440 GOSUB 1610
1450 GOSUB 1660
1460 PRINT "#15-STOCK MARKET CONDITIONS"
1470 PRINT
1480 PRINT "UP = 2 POINTS"
1490 PRINT "DOWN OR NO CHANGE = 0"
1500 GOSUB 1610
1510 GOSUB 1660
1520 PRINT
1530 PRINT "FINAL POINT SCORE IS ";S1
1540 PRINT
1550 IF S1<27 THEN 1740
1560 PRINT
1570 PRINT "THE STOCK IS ACCEPTABLE"
1580 PRINT
1590 PRINT "IT IS RECOMMENDED FOR PURCHASE"
1600 END
1610 PRINT
1620 PRINT "ENTER POINT VALUE"
1630 INPUT S
1640 S1=S+S1:PRINT CHR$(125)
1650 RETURN
1660 PRINT
1670 PRINT "POINTS SO FAR = ";S1
1680 PRINT
```

Program 23-1-cont. Stock Buying Guide Program Listing

```
1690 PRINT
1700 RETURN
1710 FOR A=1 TO 600
1720 NEXT A
1730 RETURN
1740 PRINT
1750 PRINT "THE STOCK IS NOT ACCEPTABLE"
1760 PRINT
1770 PRINT "IT IS NOT RECOMMENDED FOR PURCHASE"
1780 GOTO 1600
```

CHAPTER 24

Stock Record Keeper

If you're an investor in the stock market then the Stock Record Keeper can help you. The program allows you to keep a record of each of the stocks in your portfolio, and it gives gain or loss information on your stocks. It's written in BASIC for your microcomputer. See Program 24-1 for the program listing.

THE PROGRAM

The program requires that you enter your stock data in DATA statements beginning at line 1000. Enter the data in the following format:

```
DATA COMPANY NAME,# OF SHARES,DATE OF
PURCHASE,PURCHASE PRICE,RECENT PRICE
```

or

```
DATA GM,100,2/1/80,54,55.5
```

The last DATA statement in your list must be DATA END,0,0,0,0.

The program allows you to list data on one or all of the stocks, including the company name, the number of shares held, the date of purchase (entered MM/DD/YY), the purchase price, and the recent price. It also displays the net worth, gain or loss, and the percent (%) gain or loss for your stocks. Finally, you can display the total gain or loss in your portfolio.

After you run the program, you have the following four options:

1. Enter a 1 to list one stock.
2. Enter a 2 to list all stocks.
3. Enter a 3 to list total gain or loss.
4. Enter a 4 to end the program.

List One Stock

Entering a 1 allows you to list the data on a single stock. The program requests entry of the stock name, and it searches the list for that name. If the name is found, the stock data is displayed. If the name is not found, the computer will display ENTRY NOT FOUND and then allow you to enter into one of the four previously listed options.

List All Stocks

Entering a 2 allows you to list the data on all the stocks in your portfolio. The program will list one stock at a time. After the data for a stock is displayed, enter a 1 to continue to the next stock in your list. When all the stock data has been displayed, the program will allow you to enter into one of the four options listed.

List Total Gain or Loss

Entering a 3 allows you to list the total gain or loss for the stocks in your portfolio. The program lists the total stock costs and their total worth. Then it displays the total (+) gain or (−) loss and the percent (+) gain or (−) loss, and then it allows you to enter into one of the four options listed.

See Fig. 24-1 for a sample run.

ONE LAST NOTE

This program does not take into account the brokerage fees associated with the buying and selling of your stocks. But these fees must be included when calculating your gains or losses for income tax purposes.

```
STOCK RECORD KEEPER
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM ALLOWS YOU TO KEEP
A RECORD OF YOUR STOCK PORTFOLIO.
YOU CAN LIST ONE OR ALL OF YOUR
STOCKS INCLUDING THE NAME, # OF
SHARES, THE DATE OF PURCHASE,
PURCHASE PRICE, AND RECENT PRICE.
IT ALSO DISPLAYS THE NET WORTH, GAIN
OR LOSS, % GAIN OR LOSS, AND THE
TOTAL GAIN OR LOSS IN YOUR PORTFOLIO.

ENTER '1' TO CONTINUE
? 1


ENTER YOUR STOCK DATA IN DATA
STATEMENTS BEGINNING AT LINE 1000,
IN THE FOLLOWING FORMAT:
DATA NAME,# SHARES,PUR DATE,PUR PRICE,REC PRICE
DATA GM,100,2/1/80,54,55.5
THE LAST STATEMENT IN THE LIST MUST BE:
DATA END,0,0,0,0

ENTER '1' TO CONTINUE
? 1




ENTER CHOICE

1-LIST ONE STOCK
2-LIST ALL STOCKS
3-GIVE TOTAL GAIN OR LOSS
4-END PROGRAM
? 1


LIST ONE STOCK

ENTER STOCK NAME
? AMPEX

STOCK DATA

STOCK NAME: AMPEX

# OF SHARES =  100     DATE OF PURCHASE IS 7/18/80
PURCHASE PRICE = $ 14.5     TOTAL COST = $ 1450

RECENT PRICE = $ 19.25     NET WORTH = $ 1925

(+) GAIN OR (-) LOSS IF SOLD = $ 475
PERCENT (+) GAIN OR (-) LOSS =  32.75


ENTER '1' TO CONTINUE
? 1


ENTER CHOICE

1-LIST ONE STOCK
2-LIST ALL STOCKS
3-GIVE TOTAL GAIN OR LOSS
4-END PROGRAM
? 3



TOTAL COST = $ 23125     NET WORTH =$ 25600

TOTAL (+) GAIN OR (-) LOSS FOR
ALL STOCKS IS $ 2475   OR  10.7  PERCENT

ENTER '1' TO CONTINUE
? 1
ENTER CHOICE

1-LIST ONE STOCK
2-LIST ALL STOCKS
3-GIVE TOTAL GAIN OR LOSS
4-END PROGRAM
? 4
```

Fig. 24-1. Stock Record Keeper sample run.

Program 24-1. Stock Record Keeper Program Listing

```
100 PRINT CHR$(125);"STOCK RECORD KEEPER"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":DIM A$(20),B$(20),C2$(20)
130 PRINT
140 PRINT "THIS PROGRAM ALLOWS YOU TO KEEP"
150 PRINT "A RECORD OF YOUR STOCK PORTFOLIO."
160 PRINT "YOU CAN LIST ONE OR ALL OF YOUR"
170 PRINT "STOCKS INCLUDING THE NAME, # OF"
180 PRINT "SHARES, THE DATE OF PURCHASE,"
190 PRINT "PURCHASE PRICE, AND RECENT PRICE."
200 PRINT "IT ALSO DISPLAYS THE NET WORTH, GAIN"
210 PRINT "OR LOSS, % GAIN OR LOSS, AND THE"
220 PRINT "TOTAL GAIN OR LOSS IN YOUR PORTFOLIO."
230 PRINT
240 GOSUB 710
250 PRINT "ENTER YOUR STOCK DATA IN DATA"
260 PRINT "STATEMENTS BEGINNING AT LINE 1000,"
270 PRINT "IN THE FOLLOWING FORMAT:"
280 PRINT "DATA NAME,# SHARES,PUR DATE,PUR PRICE,REC PRICE"
290 PRINT "DATA GM,100,2/1/80,54,55.5"
300 PRINT "THE LAST STATEMENT IN LIST MUST BE:"
310 PRINT "DATA END,0,0,0,0"
320 GOSUB 710
330 PRINT "ENTER CHOICE":RESTORE
340 PRINT :P=0:Q=0
350 PRINT "1-LIST ONE STOCK"
360 PRINT "2-LIST ALL STOCKS"
370 PRINT "3-GIVE TOTAL GAIN OR LOSS"
380 PRINT "4-END PROGRAM"
390 INPUT B:PRINT CHR$(125)
400 ON B GOTO 420,530,600,890
410 GOTO 320
420 PRINT "LIST ONE STOCK"
430 PRINT
440 PRINT "ENTER STOCK NAME"
450 INPUT A$
460 READ B$,C,C2$,D,E
470 IF B$="END" THEN 690
480 IF B$=A$ THEN 500
490 GOTO 460
500 GOSUB 740
510 PRINT
520 GOTO 320
530 PRINT "LIST ALL STOCKS"
540 PRINT
550 READ B$,C,C2$,D,E
560 IF B$="END" THEN 330
570 GOSUB 750
580 GOSUB 710
590 GOTO 540
600 PRINT :T2=0:T5=0
610 GOSUB 900
620 Q=INT((P*100+0.5))/100
```

Program 24-1-cont. Stock Record Keeper Program Listing

```
630 R=(Q/T2)*100:R=INT(R*100)/100
640 PRINT "TOTAL COST=$";T2;"  NET WORTH=$";T5
650 PRINT
660 PRINT "TOTAL (+) GAIN OR (-) LOSS FOR"
670 PRINT "ALL STOCKS IS $";Q;"  OR ";R;" PERCENT"
680 GOTO 320
690 PRINT "STOCK '";A$;"' NOT FOUND"
700 GOTO 320
710 PRINT :PRINT "ENTER '1' TO CONTINUE"
720 INPUT A:PRINT CHR$(125)
730 RETURN
740 PRINT CHR$(125);"STOCK DATA"
750 PRINT
760 PRINT "STOCK NAME: ";B$
770 PRINT
780 PRINT "# SHARES=";C;"  DATE OF PUR IS ";C2$
790 PRINT "PURCHASE PRICE=$";D;"  TOT COST=$";C*D
800 PRINT
810 PRINT "RECENT PRICE=$";E;"  NET WORTH=$";C*E
820 PRINT :GOSUB 960
830 PRINT "(+) GAIN PR (-) LOSS IF SOLD=$";T1
840 C2=C*D
850 R=(T1/C2)*100:R=INT(R*100)/100
860 PRINT "PERCENT (+) GAIN OR (-) LOSS = ";R
870 PRINT
880 RETURN
890 END
900 READ B$,C,C2$,D,E
910 IF B$="END" THEN 950
920 GOSUB 960
930 P=P+T1
940 GOTO 900
950 RETURN
960 N=C*E:M=C*D
970 T1=N-M:T2=T2+M:T5=T5+N
980 RETURN
1000 DATA GM,200,5/11/80,54,55.5
1010 DATA FORD,200,5/23/80,26.5,26
1020 DATA NVF,300,5/23/80,4.75,4.75
1030 DATA CHRYSLER,100,6/20/80,10.75,6.25
1040 DATA SONY,300,6/27/80,10.25,17.75
1050 DATA AMPEX,100,7/18/80,14.5,19.25
1060 DATA END,0,0,0,0
```

CHAPTER 25

Stock Plotter

A third program for the stock investor is the Stock Plotter. It will display a plot for any stock with a high price of up to $200, given a series of prices. These prices may be made of daily, weekly, or monthly data on a particular stock. The program is written in BASIC for your microcomputer. See Program 25-1 for the program listing.

THE PROGRAM

The stock price data must be entered into DATA statements beginning at line 810. Enter the data in the following format:

DATA PRICE1,PRICE2,PRICE3,PRICE4, . . . PRICEN

or

DATA 14.5,13.75,14.25,13.75

The last DATA statement in the list must be DATA 9999; this is used to test for the end of the data.

After you run the program, it requests your entry of the type of data plot. Enter a 1 for daily, 2 for weekly, or 3 for monthly. Then it requests an entry of the company name and the starting date of the plot (MM/DD/YY). Finally, enter a 1 to start the plot.

Now the computer will find the highest price of the stock. Then it uses this price for scaling the output of the plot. The computer will then display the company name, the date of the plot, and whether the plot is for daily, weekly, or monthly data. It then prints a horizontal scale from 0, at the left end, up to 200, at the right end. This scaling is dependent on the high price of the stock. Finally, the computer plots each stock price using a plus sign (+) for each point. After all the data points are plotted, the computer will display the average price of the stock over the given number of days, weeks, or months, and print the high price for that period.

See Fig. 25-1 for a sample run.

```
STOCK PLOTTER
COPYRIGHT (C) 1980 BY HOWARD BERENSON


THIS PROGRAM WILL PLOT ANY STOCK,
GIVEN A SERIES OF PRICES FOR
DAILY, WEEKLY, OR MONTHLY DATA.

DATA IS STORED IN DATA STATEMENTS,
BEGINNING AT LINE 810. ENTER IN
THE FOLLOWING FORMAT:
DATA 14.5,13.75,14.25,13.75
THE LAST DATA STATEMENT SHOULD BE
DATA 9999. THIS IS USED TO TEST
FOR THE END OF THE DATA.

ENTER TYPE OF DATA?
1=DAILY  2=WEEKLY  3=MONTHLY
? 3


3

ENTER NAME OF THE COMPANY
? ABC

ENTER THE STARTING DATE OF PLOT
(MM/DD/YY)
? 06/15/80

ENTER A '1' FOR PLOT
? 1




COMPANY=ABC  DATE=06/15/80
MONTH                PRICE
0          12.5        25          37.5         50
++++++++++++++++++++++++++++++++++++++++++++++++++
 1        +
 2          +
 3        +
 4         +
 5           +
 6           +
 7           +
 8              +
 9           +
 10                +
 11               +
 12                      +



AVERAGE PRICE OF THE STOCK
ABC, OVER A PERIOD OF  12  MONTHS
IS $ 16.1
HIGH PRICE FOR THAT PERIOD IS $ 25.25
```

Fig. 25-1. Stock Plotter sample run.

Program 25-1. Stock Plotter Program Listing

```
100 PRINT CHR$(125)
110 PRINT "STOCK PLOTTER"
120 PRINT "ATARI":DIM A$(30),D$(8),P$(5)
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 GOSUB 690:PRINT CHR$(125)
150 PRINT "THIS PROGRAM WILL PLOT ANY STOCK,"
160 PRINT "GIVEN A SERIES OF PRICES FOR"
170 PRINT "DAILY, WEEKLY, OR MONTHLY DATA."
180 PRINT
190 PRINT "DATA IS STORED IN DATA STATEMENTS,"
200 PRINT "BEGINNING AT LINE 810. ENTER IN"
210 PRINT "THE FOLLOWING FORMAT:"
220 PRINT "DATA 14.5,13.75,14.25,13.75"
230 PRINT "THE LAST DATA STATEMENT SHOULD BE"
240 PRINT "DATA 9999. THIS IS USED TO TEST"
250 PRINT "FOR THE END OF THE DATA."
260 PRINT
270 REM BEGIN PLOT
280 PRINT "ENTER TYPE OF DATA?"
290 PRINT "1=DAILY  2=WEEKLY  3=MONTHLY"
300 INPUT T
310 PRINT
320 PRINT "ENTER NAME OF THE COMPANY"
330 INPUT A$
340 PRINT
350 PRINT "ENTER THE STARTING DATE OF PLOT"
360 PRINT "(MM/DD/YY)"
370 INPUT D$:S=0
380 GOSUB 620
390 GOSUB 410
400 GOTO 450
410 IF S<=10 THEN P=10:A=3.5:RETURN
420 IF S<=35 THEN P=35:A=1:RETURN
430 IF S<=100 THEN P=100:A=0.35:RETURN
440 IF S<=200 THEN P=200:A=0.175:RETURN
450 PRINT :PRINT "ENTER A '1' FOR PLOT"
460 INPUT J:PL=4
470 PRINT CHR$(125):C=1
480 PRINT "COMPANY=";A$;"  DATE=";D$
490 IF T=1 THEN P$="DAY"
500 IF T=2 THEN P$="WEEK"
510 IF T=3 THEN P$="MONTH"
520 PRINT P$:POSITION 20,2:PRINT "PRICE"
530 PRINT "0":POSITION 9,3:PRINT P/4:POSITION 18,3:PRINT P/2
535 POSITION 26,3:PRINT INT((P/1.3333)*100)/100
540 POSITION 35,3:PRINT P:R=0
545 PRINT "++++++++++++++++++++++++++++++++++++";
550 READ D:U=INT(D*A+0.5):PL=PL+1:IF PL=21 THEN GOSUB 700
560 IF D=9999 THEN 720
570 R=R+D
580 POSITION 2,PL:PRINT C:POSITION U,PL:PRINT "+":C=C+1
590 FOR B=1 TO 500
600 NEXT B
```

Program 25-1-cont. Stock Plotter Program Listing

```
610 GOTO 550
620 REM FIND HIGH PRICE
630 S=A
640 READ A:IF A=9999 THEN 670
650 IF S>A THEN 640
660 GOTO 630
670 RESTORE
680 RETURN
690 FOR G=1 TO 700:NEXT G:RETURN
700 POSITION 2,5:FOR SC=1 TO 19
705 PRINT "                                                  ";
710 NEXT SC:PL=5:RETURN
720 GOSUB 690
730 C=C-1:U=R/C
740 U=INT(100*U)/100
750 PRINT
760 PRINT "AVERAGE PRICE OF THE STOCK"
770 PRINT A$;", OVER A PERIOD OF ";C;" ";P$;"S"
780 PRINT "IS $";U
790 PRINT "HIGH PRICE FOR THAT PERIOD IS $";S
800 END
810 DATA 12.25,13.75,12,13,15.25,14.75
820 DATA 15.25,17.5,15.25,19.75,19.25,25.25
830 DATA 9999
```

CHAPTER 26

Double Check

Double Check is a program that will help you keep a record of your personal checks and keep your checking account in balance. It's written in BASIC for your microcomputer. See Program 26-1 for the program listing.

THE PROGRAM

The program accepts your check and deposit data in DATA statements beginning at line 570. Enter each check, bank charge, and deposit in the following format:

DATA CHECK #,DATE (MM/DD/YY),NAME PAYABLE TO,AMOUNT

or

DATA 702,12/10/80,EDISON,14.75

DATA CHARGE CODE,DATE (MM/DD/YY),CHARGE, AMOUNT

or

DATA C,12/19/80,BANK CHARGE,4.00

DATA DEPOSIT CODE,DATE (MM/DD/YY),DEPOSIT, AMOUNT

or

DATA D,12/22/80,DEPOSIT,350

The first entry into your data list must be a past balance or a deposit. Then enter the checks, bank charges, and deposits, as they appear in your checking account deposit record.

Enter the check number, the date (as MM/DD/YY—do not use commas), the name payable to, and the amount for each check written. Enter your bank charges with a C for the charge code, the date, the words BANK CHARGE, and the charge amount. Enter the deposit with a D for the deposit code, the date, the word DEPOSIT, and the deposit amount. Finally, the last statement in your data list must be DATA END,0,0,0.

After you run the program, it will list each check, bank charge, and deposit, as entered in the data list, plus the balance after each transaction. Then it will display the total number of transactions and the balance in your account. See Fig. 26-1 for a sample run.

SAVING THE PROGRAM AND DATA LIST

Each time there is a transaction in your checking account, enter it into the data list in the program. Then save the program on cassette or disk, to keep an ongoing record of your transactions.

```
DOUBLE CHECK
COPYRIGHT (C) 1980 BY HOWARD BERENSON


THIS PROGRAM WILL HELP YOU KEEP A
RECORD OF YOUR PERSONAL CHECKS, &
KEEP YOUR ACCOUNT IN BALANCE. IT'S
USED TO DOUBLE CHECK YOUR PERSONAL
CHECKING ACCOUNT RECORDS.
ENTER THE DATA IN DATA STATEMENTS
BEGINNING AT LINE 570, AS FOLLOWS:
DATA CHECK#,DATE,NAME PAYABLE TO,AMT.
YOUR DEPOST OR LAST BALANCE MUST BE
THE FIRST ENTRY IN YOUR DATA LIST.
THE LAST STATEMENT IN THE DATA LIST
MUST BE: DATA END,0,0,0



           DOUBLE CHECK

#     DATE      NAME          AMT        BAL

0     12/19/80  BALANCE       545.15     545.15
702   12/19/80  ELECTRIC      14.75      530.4
703   12/20/80  TELEPHONE     10.55      519.85
704   12/22/80  VISA          145.12     374.73
705   12/23/80  DR. SIMONS    5          369.73
706   12/23/80  RADIO SHACK   70         299.73
707   12/28/80  BOOK CLUB     9.95       289.78
0     12/28/80  DEPOSIT       200.35     490.13



THE TOTAL # OF TRANSACTIONS
IS  8 . YOUR BALANCE IS $ 490.13 .

CHECK THIS BALANCE WITH THE BALANCE
IN YOUR CHECKING ACCOUNT DEPOSIT
RECORD, AND COMPARE WITH YOUR BANK
STATEMENT FOR ACCURACY.
```

Fig. 26-1. Double Check sample run.

Program 26-1. Double Check Program Listing

```
100 PRINT CHR$(125);"DOUBLE CHECK"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT "ATARI":DIM N$(5),D$(8),NA$(15)
130 GT=2:GOSUB 560:PRINT CHR$(125)
140 B=0:N=0
150 PRINT "THIS PROGRAM WILL HELP YOU KEEP A"
160 PRINT "RECORD OF YOUR PERSONAL CHECKS, &"
170 PRINT "KEEP YOUR ACCOUNT IN BALANCE. IT'S"
180 PRINT "USED TO DOUBLE CHECK YOUR PERSONAL"
190 PRINT "CHECKING ACCOUNT RECORDS."
200 PRINT "ENTER THE DATA IN DATA STATEMENTS"
210 PRINT "BEGINNING AT LINE 570, AS FOLLOWS:"
220 PRINT "DATA CHECK#,DATE,NAME PAYABLE TO,AMT."
230 PRINT "YOUR DEPOSIT OR LAST BALANCE MUST BE"
240 PRINT "THE FIRST ENTRY IN YOUR DATA LIST."
250 PRINT "THE LAST STATEMENT IN THE DATA LIST"
260 PRINT "MUST BE: DATA END,0,0,0"
270 GT=8:GOSUB 560
280 PRINT CHR$(125):PL=4
290 POSITION 10,1:PRINT "DOUBLE CHECK"
300 PRINT
310 READ N$,D$,NA$,AM
320 IF N$="END" THEN 350
330 N=N+1
340 GOTO 310
350 RESTORE
360 PRINT "#   DATE     NAME          AMT     BAL";
370 PRINT
380 READ N$,D$,NA$,AM:PL=PL+1:IF PL=22 THEN GOSUB 540
390 IF N$="END" THEN 450
400 IF N$="D" THEN B=B+AM:GOTO 420
410 B=B-AM
420 POSITION 2,PL:PRINT N$:POSITION 6,PL:PRINT D$
425 POSITION 15,PL:PRINT NA$
430 POSITION 27,PL:PRINT AM:POSITION 34,PL:PRINT B:GT=2:GOSUB 560
440 GOTO 380
450 GT=2:GOSUB 560:PRINT
460 PRINT "THE TOTAL # OF TRANSACTIONS"
470 PRINT "IS ";N;". YOUR BALANCE IS $";B;"."
480 PRINT
490 PRINT "CHECK THIS BALANCE WITH THE BALANCE"
500 PRINT "IN YOUR CHECKING ACCOUNT DEPOSIT"
510 PRINT "RECORD, AND COMPARE WITH YOUR BANK"
520 PRINT "STATEMENT FOR ACCURACY."
530 END
540 POSITION 1,5:FOR C=1 TO 18
545 PRINT "                                        ";
550 NEXT C:PL=5:RETURN
560 FOR A=1 TO 300*GT:NEXT A:RETURN
570 DATA D,12/19/80,BALANCE,545.15
580 DATA 702,12/19/80,ELECTRIC,14.75
590 DATA 703,12/20/80,TELEPHONE,10.55
600 DATA 704,12/22/80,VISA,145.12
```

Program 26-1-cont. Double Check Program Listing.

```
610 DATA 705,12/23/80,DR. SIMONS,5.00
620 DATA 706,12/23/80,RADIO SHACK,70.00
630 DATA 707,12/28/80,BOOK CLUB,9.95
640 DATA D,12/28/80,DEPOSIT,200.35
650 DATA END,0,0,0
```

CHAPTER 27

Monthly Savings Plan

A savings plan is a good way to force yourself to save money for some future purchase. Here is a program that will calculate and display a monthly savings plan, given the initial amount, the monthly savings amount, the yearly interest rate, and the number of months to be displayed. The program is calculated on a monthly basis. The program is written in BASIC for your microcomputer. See Program 27-1 for the program listing.

THE PROGRAM

After you run the program, enter the initial amount of your savings plan, the monthly savings amount, the yearly interest rate (in percent), and the number of months to be displayed. The program will display the initial amount, the interest rate, and the starting amount (initial amount plus monthly savings amount). Then it will display a table including the month number, the balance, the interest, and the cumulative interest for each month in your savings plan. Finally, it will display the balance in your savings account and the total cumulative interest for the number of months in your plan.

You can use this program to project the number of months to a savings goal. By adjusting the amount entered into your account each month, or the number of months in your plan, you can reach your savings goal in a specific period.

See Fig. 27-1 for a sample run.

```
MONTHLY SAVINGS PLAN
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS PROGRAM CALCULATES AND DISPLAYS
A MONTHLY SAVINGS PLAN, GIVEN THE
INITIAL AMOUNT, MONTHLY SAVINGS
AMOUNT, THE YEARLY INTEREST RATE,
AND THE # OF MONTHS TO BE DISPLAYED.

ENTER THE INITIAL AMOUNT OF THE PLAN
? 200

ENTER THE MONTHLY SAVINGS AMOUNT
? 100

ENTER THE YEARLY INTEREST RATE (%)
? 5.25

ENTER THE # OF MONTHS TO BE DISPLAYED
? 12


MONTHLY SAVINGS PLAN
INITIAL AMOUNT = $ 200          INTEREST RATE =  5.25
MONTHLY SAVINGS AMT = $ 100     STARTING AMT = $ 300
MONTH          BALANCE          INTEREST         CUM. INT.
 1              301.31           1.31             1.31
 2              403.07           1.76             3.07
 3              505.27           2.2              5.27
 4              607.92           2.65             7.92
 5              711.02           3.1              11.02
 6              814.57           3.55             14.57
 7              918.57           4                18.57
 8              1023.03          4.46             23.03
 9              1127.94          4.91             27.94
 10             1233.31          5.37             33.31
 11             1339.14          5.83             39.14
 12             1445.44          6.3              45.44


BALANCE AFTER  12  MONTHS = $ 1445.44
TOTAL CUMULATIVE INTEREST = $ 45.44
ANOTHER DISPLAY?
1 = YES    0 = NO
? 0
```

Fig. 27-1. Monthly Savings Plan sample run.

Program 27-1. Monthly Savings Plan Program Listing

```
100 PRINT CHR$(125);"MONTHLY SAVINGS PLAN"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT :CI=0
140 PRINT "THIS PROGRAM CALCULATES AND DISPLAYS"
150 PRINT "A MONTHLY SAVINGS PLAN, GIVEN THE"
160 PRINT "INITIAL AMOUNT, MONTHLY SAVINGS"
170 PRINT "AMOUNT, THE YEARLY INTEREST RATE,"
180 PRINT "AND THE # OF MONTHS TO BE DISPLAYED."
190 PRINT
200 PRINT "ENTER THE INITIAL AMOUNT OF THE PLAN"
210 INPUT J
220 PRINT
230 PRINT "ENTER THE MONTHLY SAVINGS AMOUNT"
240 INPUT P
250 K=P
260 B=J
270 PRINT
280 PRINT "ENTER THE YEARLY INTEREST RATE (%)"
290 INPUT I
300 PRINT
310 PRINT "ENTER THE # OF MONTHS TO BE DISPLAYED"
320 INPUT M
330 MI=(I/12)/100
340 PRINT CHR$(125)
350 PRINT "MONTHLY SAVINGS PLAN"
360 PRINT "INITIAL AMT=$";J;"  INTEREST RATE=";I
370 PRINT "MONTHLY SAV AMT=$";K;"  START AMT=$";J+K
380 PRINT "MONTH","BALANCE","INTEREST","CUM. INT";
390 FOR A=1 TO M
400 GOSUB 520
410 PRINT A,B,IN,CI
420 FOR T=1 TO 400
430 NEXT T
440 NEXT A
450 PRINT "BALANCE AFTER ";M;" MONTHS = $";B
460 PRINT "TOTAL CUMULATIVE INTEREST = $";CI
470 PRINT "ANOTHER DISPLAY?"
480 PRINT "1 = YES   0 = NO"
490 INPUT A
500 IF A=1 THEN 100
510 END
520 REM CALCULATE MONTHLY DATA
530 B=B+P
540 IN=B*MI
550 IN=INT(IN*100+0.5)/100
560 B=B+IN
570 B=INT(B*100+0.5)
580 B=B/100
590 CI=CI+IN
600 RETURN
```

CHAPTER 28

Compound Interest Table

This program calculates and displays the compound interest for a savings account, given the type of compounding, the principal, and the yearly interest rate. It's written in BASIC for your microcomputer. See Program 28-1 for the program listing.

THE PROGRAM

After you run the program, it requests your entry of the type of compounding. Enter 1 for daily, 2 for monthly, or 3 for quarterly interest compounding. Then it requests entry of the principal amount of your account and the yearly interest rate of your savings and loan or bank. Now enter the number of days, months, or quarters to be displayed. A table will be printed for the type of compounding requested. It displays the principal, the yearly interest rate, the day, month, or quarter number, the balance, the interest, and the cumulative interest for the desired number of days, months, or quarters. Fianlly, the balance is displayed with the total cumulative interest. You may now enter a 1 for another display, or a 0 to end the program. See Fig. 28-1 for a sample run.

```
MONEY MARKET INTEREST TABLE
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS PROGRAM CALCULATES AND DISPLAYS
THE SIMPLE INTEREST FOR A MONEY MARKET
CERTIFICATE, GIVEN THE TYPE OF INTEREST
CALCULATION, THE PRINCIPAL, AND YEARLY
INTEREST RATE.

ENTER THE TYPE OF INTEREST
CALCULATION:
1 = DAILY
2 = MONTHLY
3 = QUARTERLY
? 1


ENTER THE PRINCIPAL AMOUNT
? 10000

ENTER THE YEARLY INTEREST RATE (%)
? 15.43


DAILY INTEREST TABLE

ENTER THE # OF DAYS TO BE DISPLAYED
? 12


DAILY INTEREST TABLE
INTEREST RATE =  15.43
DAY             PRINCIPAL       INTEREST        CUM. INT.
 1               10000           4.29            4.29
 2               10000           4.29            8.58
 3               10000           4.29            12.87
 4               10000           4.29            17.16
 5               10000           4.29            21.45
 6               10000           4.29            25.74
 7               10000           4.29            30.03
 8               10000           4.29            34.32
 9               10000           4.29            38.61
 10              10000           4.29            42.9
 11              10000           4.29            47.19
 12              10000           4.29            51.48

TOTAL CUM. INT. AFTER  12  DAYS
. . . IS $ 51.48
ANOTHER DISPLAY?
1 = YES   0 = NO
? 1


ENTER THE TYPE OF INTEREST
CALCULATION:
1 = DAILY
2 = MONTHLY
3 = QUARTERLY
? 2

ENTER THE PRINCIPAL AMOUNT
? 10000

ENTER THE YEARLY INTEREST RATE (%)
? 15.43

MONTHLY INTEREST TABLE

ENTER THE # OF MONTHS TO BE DISPLAYED
? 12

MONTHLY INTEREST TABLE
INTEREST RATE =  15.43
MONTH           PRINCIPAL       INTEREST        CUM. INT.
 1               10000           128.58          128.58
 2               10000           128.58          257.16
 3               10000           128.58          385.74
 4               10000           128.58          514.32
 5               10000           128.58          642.9
 6               10000           128.58          771.48
 7               10000           128.58          900.06
 8               10000           128.58          1028.64
 9               10000           128.58          1157.22
 10              10000           128.58          1285.8
 11              10000           128.58          1414.38
 12              10000           128.58          1542.96

TOTAL CUM. INT. AFTER  12  MONTHS
. . . IS $ 1542.96
ANOTHER DISPLAY?
1 = YES   0 = NO
? 0
```

Fig. 28-1. Compound Interest Table sample run.

Program 28-1. Compound Interest Table Program Listing

```
100 PRINT CHR$(125);"COMPOUND INTEREST TABLE"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT :CI=0
140 PRINT "THIS PROGRAM CALCULATES AND DISPLAYS"
150 PRINT "THE COMPOUND INTEREST FOR A SAVINGS"
160 PRINT "ACCOUNT,GIVEN THE TYPE OF COMPOUNDING,";
170 PRINT "THE PRINCIPAL, AND THE YEARLY INTEREST RATE."
180 PRINT
190 PRINT "ENTER THE TYPE OF COMPOUNDING:"
200 PRINT "1 = DAILY"
210 PRINT "2 = MONTHLY"
220 PRINT "3 = QUARTERLY"
230 INPUT CP
240 IF CP=1 THEN CM=360
250 IF CP=2 THEN CM=12
260 IF CP=3 THEN CM=4
270 IF CP<1 OR CP>3 THEN 190
280 PRINT
290 PRINT "ENTER THE PRINCIPAL AMOUNT"
300 INPUT P
310 PRINT
320 PRINT "ENTER THE YEARLY INTEREST RATE (%)"
330 INPUT I
340 PRINT
350 ON CP GOTO 390,620,800
360 FOR T=1 TO 400
370 NEXT T
380 RETURN
390 REM DAILY INTEREST
400 PRINT CHR$(125)
410 PRINT "DAILY INTEREST TABLE"
420 PRINT
430 PRINT "ENTER THE # OF DAYS TO BE DISPLAYED"
440 INPUT D
450 DI=(I/CM)/100
460 PRINT CHR$(125)
470 PRINT "DAILY COMPOUND INTEREST TABLE"
480 PRINT "PRINCIPAL=$";P;"  INTEREST RATE=";I
490 PRINT "DAY","BALANCE","INTEREST","CUM. INT";
500 FOR A=1 TO D
510 GOSUB 980
520 PRINT A,B,IN,CI
530 GOSUB 360
540 NEXT A
550 PRINT "BALANCE AFTER ";D;" DAYS = $";B
560 PRINT "TOTAL CUM. INTEREST = $";CI
570 PRINT "ANOTHER DISPLAY?"
580 PRINT "1 = YES   0 = NO"
590 INPUT G
600 IF G=1 THEN 100
610 END
620 REM MONTHLY INTEREST
```

Program 28-1-cont. Compound Interest Table Program Listing

```
630 PRINT CHR$(125)
640 PRINT "MONTHLY INTEREST TABLE"
650 PRINT
660 PRINT "ENTER THE # OF MONTHS TO BE DISPLAYED"
670 INPUT M
680 MI=(I/CM)/100
690 PRINT CHR$(125)
700 PRINT "MONTHLY COMPOUND INTEREST TABLE"
710 PRINT "PRINCIPAL=$";P;"  INTEREST RATE=";I
720 PRINT "MONTH","BALANCE","INTEREST","CUM. INT";
730 FOR A=1 TO M
740 GOSUB 1060
750 PRINT A,B,IN,CI
760 GOSUB 360
770 NEXT A
780 PRINT "BALANCE AFTER ";M;" MONTHS = $";B
790 GOTO 560
800 REM QUARTERLY INTEREST
810 PRINT CHR$(125)
820 PRINT "QUARTERLY INTEREST TABLE"
830 PRINT
840 PRINT "ENTER # OF QUARTERS TO BE DISPLAYED"
850 INPUT Q
860 QI=(I/CM)/100
870 PRINT CHR$(125)
880 PRINT "QUARTERLY COMPOUND INTEREST TABLE"
890 PRINT "PRINCIPAL=$";P;"  INTEREST RATE=";I
900 PRINT "QUARTER","BALANCE","INTEREST","CUM. INT";
910 FOR A=1 TO Q
920 GOSUB 1140
930 PRINT A,B,IN,CI
940 GOSUB 360
950 NEXT A
960 PRINT "BALANCE AFTER ";Q;" QUARTERS = $";B
970 GOTO 560
980 REM CALCULATE DAILY DATA
990 B=P
1000  IN=P*DI
1010  IN=INT(IN*100+0.5)/100
1020  B=P+IN:B=INT(B*100+0.5)
1030  B=B/100:P=B
1040  CI=CI+IN
1050  RETURN
1060  REM CALCULATE MONTHLY DATA
1070  B=P
1080  IN=P*MI
1090  IN=INT(IN*100+0.5)/100
1100  B=P+IN:B=INT(B*100+0.5)
1110  B=B/100:P=B
1120  CI=CI+IN
1130  RETURN
1140  REM CALCULATE QUARTERLY DATA
1150  B=P
```

Program 28-1-cont. Compound Interest Table Program Listing

```
1160 IN=P*QI
1170 IN=INT(IN*100+0.5)/100
1180 B=P+IN:B=INT(B*100+0.5)
1190 B=B/100:P=B
1200 CI=CI+IN
1210 RETURN
```

CHAPTER 29

Money Market Interest Table

Here's another program for calculating interest on your savings. It's a Money Market interest calculator that calculates the simple interest for Money Market type accounts. The program is written in BASIC for your microcomputer. See Program 29-1 for the program listing.

THE PROGRAM

The program will display a table, given the type of interest calculation (daily, monthly, or quarterly), the principal, the yearly interest rate, and the number of days, months, or quarters for display.

After you run the program, enter the type of interest calculation desired. Enter a 1 for daily, 2 for monthly, or 3 for quarterly interest. Then the program requests entry of the principal amount of your Money Market Certificate and the yearly interest rate. Now enter the number of days, months, or quarters to be displayed. A table will be printed for the type of interest calculation requested. It displays the yearly interest rate, the day, month, or quarter number, the principal, the interest, and the cumulative interest for the desired number of days, months, or quarters. Finally, the total cumulative interest is displayed for the requested number of days, months, or quarters. You may now enter a 1 for another display, or a 0 to end the program. See Fig. 29-1 for a sample run.

```
MONEY MARKET INTEREST TABLE
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM CALCULATES AND DISPLAYS
THE SIMPLE INTEREST FOR A MONEY MARKET
CERTIFICATE, GIVEN THE TYPE OF INTEREST
CALCULATION, THE PRINCIPAL, AND YEARLY
INTEREST RATE.

ENTER THE TYPE OF INTEREST
CALCULATION:
1 = DAILY
2 = MONTHLY
3 = QUARTERLY
? 1


ENTER THE PRINCIPAL AMOUNT
? 10000

ENTER THE YEARLY INTEREST RATE (%)
? 15.43



DAILY INTEREST TABLE

ENTER THE # OF DAYS TO BE DISPLAYED
? 12



DAILY INTEREST TABLE
INTEREST RATE =  15.43
DAY             PRINCIPAL       INTEREST        CUM. INT.
 1               10000           4.29            4.29
 2               10000           4.29            8.58
 3               10000           4.29            12.87
 4               10000           4.29            17.16
 5               10000           4.29            21.45
 6               10000           4.29            25.74
 7               10000           4.29            30.03
 8               10000           4.29            34.32
 9               10000           4.29            38.61
 10              10000           4.29            42.9
 11              10000           4.29            47.19
 12              10000           4.29            51.48

TOTAL CUM. INT. AFTER  12  DAYS
. . . IS $ 51.48
ANOTHER DISPLAY?
1 = YES   0 = NO
? 1


ENTER THE TYPE OF INTEREST
CALCULATION:
1 = DAILY
2 = MONTHLY
3 = QUARTERLY
? 2

ENTER THE PRINCIPAL AMOUNT
? 10000

ENTER THE YEARLY INTEREST RATE (%)
? 15.43


MONTHLY INTEREST TABLE

ENTER THE # OF MONTHS TO BE DISPLAYED
? 12



MONTHLY INTEREST TABLE
INTEREST RATE =  15.43
MONTH           PRINCIPAL       INTEREST        CUM. INT.
 1               10000           128.58          128.58
 2               10000           128.58          257.16
 3               10000           128.58          385.74
 4               10000           128.58          514.32
 5               10000           128.58          642.9
 6               10000           128.58          771.48
 7               10000           128.58          900.06
 8               10000           128.58          1028.64
 9               10000           128.58          1157.22
 10              10000           128.58          1285.8
 11              10000           128.58          1414.38
 12              10000           128.58          1542.96

TOTAL CUM. INT. AFTER  12  MONTHS
. . . IS $ 1542.96
ANOTHER DISPLAY?
1 = YES   0 = NO
? 0
```

Fig. 29-1. Money Market Interest Table sample run.

Program 29-1. Money Market Interest Table Program Listing

```
100 PRINT CHR$(125);"MONEY MARKET INTEREST TABLE"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT :CI=0
140 PRINT "THIS PROGRAM CALCULATES AND DISPLAYS"
150 PRINT "THE SIMPLE INTEREST FOR A MONEY MARKET";
160 PRINT "CERTIFICATE,GIVEN THE TYPE OF INTEREST";
170 PRINT "CALCULATION, THE PRINCIPAL, AND YEARLY";
180 PRINT "INTEREST RATE."
190 PRINT
200 PRINT "ENTER THE TYPE OF INTEREST"
210 PRINT "CALCULATION:"
220 PRINT "1 = DAILY"
230 PRINT "2 = MONTHLY"
240 PRINT "3 = QUARTERLY"
250 INPUT CP
260 IF CP=1 THEN CM=360
270 IF CP=2 THEN CM=12
280 IF CP=3 THEN CM=4
290 IF CP<1 OR CP>3 THEN 200
300 PRINT
310 PRINT "ENTER THE PRINCIPAL AMOUNT"
320 INPUT P
330 PRINT
340 PRINT "ENTER THE YEARLY INTEREST RATE (%)"
350 INPUT I
360 PRINT
370 ON CP GOTO 410,640,820
380 FOR T=1 TO 400
390 NEXT T
400 RETURN
410 REM DAILY INTEREST
420 PRINT CHR$(125)
430 PRINT "DAILY INTEREST TABLE"
440 PRINT
450 PRINT "ENTER THE # OF DAYS TO BE DISPLAYED"
460 INPUT D
470 DI=(I/CM)/100
480 PRINT CHR$(125)
490 PRINT "DAILY INTEREST TABLE"
500 PRINT "PRINCIPAL=$";P;"  INTEREST RATE=";I
510 PRINT "DAY","PRINCIP","INTEREST","CUM. INT";
520 FOR A=1 TO D
530 GOSUB 1000
540 PRINT A,P,IN,CI
550 GOSUB 380
560 NEXT A
570 PRINT "TOTAL CUM. INT. AFTER ";D;" DAYS"
580 PRINT ". . . IS $";CI
590 PRINT "ANOTHER DISPLAY?"
600 PRINT "1 = YES   0 = NO"
610 INPUT G
620 IF G=1 THEN 100
```

Program 29-1-cont. Money Market Interest Table Program Listing

```
630 END
640 REM MONTHLY INTEREST
650 PRINT CHR$(125)
660 PRINT "MONTHLY INTEREST TABLE"
670 PRINT
680 PRINT "ENTER THE # OF MONTHS TO BE DISPLAYED"
690 INPUT M
700 MI=(I/CM)/100
710 PRINT CHR$(125)
720 PRINT "MONTHLY INTEREST TABLE"
730 PRINT "PRINCIPAL=$";P;"  INTEREST RATE=";I
740 PRINT "MONTH","PRINCIP","INTEREST","CUM. INT";
750 FOR A=1 TO M
760 GOSUB 1060
770 PRINT A,P,IN,CI
780 GOSUB 380
790 NEXT A
800 PRINT "TOTAL CUM. INT. AFTER ";M;" MONTHS"
810 GOTO 580
820 REM QUARTERLY INTEREST
830 PRINT CHR$(125)
840 PRINT "QUARTERLY INTEREST TABLE"
850 PRINT
860 PRINT "ENTER # OF QUARTERS TO BE DISPLAYED"
870 INPUT Q
880 QI=(I/CM)/100
890 PRINT CHR$(125)
900 PRINT "QUARTERLY INTEREST TABLE"
910 PRINT "PRINCIPAL=$";P;"  INTEREST RATE=";I
920 PRINT "QUARTER","PRINCIP","INTEREST","CUM. INT";
930 FOR A=1 TO Q
940 GOSUB 1110
950 PRINT A,P,IN,CI
960 GOSUB 380
970 NEXT A
980 PRINT "TOTAL CUM. INT. AFTER ";Q;" QUARTERS"
990 GOTO 580
1000 REM CALCULATE DAILY DATA
1010 B=P
1020 IN=P*DI
1030 IN=INT(IN*100+0.5)/100
1040 CI=CI+IN
1050 RETURN
1060 REM CALCULATE MONTHLY DATA
1070 IN=P*MI
1080 IN=INT(IN*100+0.5)/100
1090 CI=CI+IN
1100 RETURN
1110 REM CALCULATE QUARTERLY DATA
1120 IN=P*QI
1130 IN=INT(IN*100+0.5)/100
1140 CI=CI+IN
1150 RETURN
```

CHAPTER 30

KEOGH/SEP Retirement Planning

Retirement plans are savings plans that allow you to set aside money for your retirement. The KEOGH and Simplified Employee Pension (SEP) are two types of retirement plans that allow the self-employed individual to save 15 percent of his or her annual self-employment income, up to a maximum of $15,000 (Note—the SEP may be used by an employer for contributing to his own and his employees' individual retirement accounts—IRA's). Your contributions to a KEOGH or SEP account are tax deductible, and the interest earned is not taxed until it is distributed to you at retirement. The amount deposited is deducted from your yearly income. This reduces your yearly income by that amount, therefore lowering your taxable income, and allowing you tax free interest on the amount contributed.

Here's a program that is useful in estimating the balance in your KEOGH or SEP account at retirement. It calculates and displays the approximate balance and cumulative interest after a given time period. The program is written in BASIC for your microcomputer. See Program 30-1 for the program listing.

THE PROGRAM

After you run the program, it requests your entry of the beginning year of the plan and your age at the start of the KEOGH or SEP plan. Now enter your estimated yearly deposit. Finally, enter your age at withdrawal. It is not recommended that you receive distributions before you are 59½, otherwise you will be charged a 10 percent additional tax on the premature distribution. Also, you must start receiving distributions before the end of the year in which you reach 70½, otherwise there is a 50 percent excise tax on the excess accumulation in your account in the year you reach 70½ and any year after that.

Now the computer will display NOW CALCULATING COMPOUND INTEREST and the year in which the calculation is being performed. Since there are 360 calculations for each year, it may take some time to complete the calculation. This is dependent upon the number of years you have until retirement. After the calculations are completed, the computer will display the beginning year of the plan, the yearly interest rate, the yearly KEOGH or SEP deposit, and the number of years compounding. Then it will display the principal, the compound interest, the retirement year, and the total balance in your KEOGH or SEP account at retirement.

See Fig. 30-1 for a sample run.

```
KEOGH/SEP RETIREMENT PLANNING

COPYRIGHT (C) 1983 BY HOWARD BERENBON

THIS PROGRAM CALCULATES AND DISPLAYS
THE APPROXIMATE BALANCE AND CUMULATIVE
INTEREST AFTER A GIVEN TIME PERIOD. IT
REQUIRES THE ENTRY OF YOUR AGE WHEN YOU
BEGAN YOUR KEOGH OR SEP, THE ESTIMATED
YEARLY DEPOSIT, THE APPROXIMATE YEARLY
INTEREST RATE (CURRENT RATE WILL BE
SUFFICIENT), AND THE AGE THAT YOU
EXPECT TO BEGIN WITHDRAWAL.

ENTER BEGINNING YEAR OF PLAN
? 1982

ENTER YOUR AGE AT START OF THE PLAN
? 28

ENTER YOUR ESTIMATED YEARLY DEPOSIT
? 2800

ENTER THE CURRENT YEARLY INTEREST RATE
? 12

ENTER YOUR AGE AT WITHDRAWAL
? 65
```

```
NOW CALCULATING COMPOUND INTEREST
FOR  37  YEARS

        CURRENTLY AT YEAR  1

KEOGH/SEP RETIREMENT PLANNING

BEGINNING YEAR OF PLAN:  1982
YEARLY INTEREST RATE (%):  12

YEARLY KEOGH/SEP DEPOSIT=    $2800.00

NUMBER OF YEARS COMPOUNDING:  37
PRINCIPAL=  $103600.00
COMPOUND INTEREST= $1969548.00

RETIREMENT YEAR:  2019

TOTAL BALANCE= $2073148.00
Ok
```

Fig. 30-1. KEOGH/SEP Retirement Planning sample run.

Program 30-1. KEOGH/SEP Retirement Planning Program Listing

```
100 PRINT CHR$(125);"KEOGH/SEP RETIREMENT PLANNING"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1983 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM CALCULATES AND DISPLAYS"
150 PRINT "THE APPROXIMATE BALANCE AND CUMULATIVE";
160 PRINT "INTEREST AFTER A GIVEN TIME PERIOD. IT";
170 PRINT "REQUIRES ENTRY OF YOUR AGE WHEN YOU"
180 PRINT "BEGAN YOUR KEOGH OR SEP,THE ESTIMATED"
190 PRINT "YEARLY DEPOSIT, THE APPROXIMATE YEARLY";
200 PRINT "INTEREST RATE (CURRENT RATE WILL BE"
210 PRINT "SUFFICIENT), AND THE AGE THAT YOU"
220 PRINT "EXPECT TO BEGIN WITHDRAWAL."
230 PRINT
240 PRINT "ENTER BEGINNING YEAR OF PLAN":INPUT Y:PRINT CHR$(125)
250 PRINT "ENTER YOUR AGE AT START OF THE PLAN"
260 INPUT A:PRINT :IF A>70.5 THEN 560
270 PRINT "ENTER YOUR ESTIMATED YEARLY DEPOSIT"
280 INPUT D:PRINT
290 PRINT "ENTER THE CURRENT YEARLY INTEREST RATE"
300 INPUT I:PRINT
310 PRINT "ENTER YOUR AGE AT WITHDRAWAL"
320 INPUT AW
330 IF AW<59.5 OR AW>70.5 THEN 610
340 PRINT CHR$(125):REM CALCULATE COMPOUND INTEREST AND BALANCE
350 CI=0:CM=360:REM DAILY INTEREST
360 YA=AW-A:PRINT "NOW CALCULATING COMPOUND INTEREST"
370 PRINT "FOR ";YA;" YEARS"
380 DI=(I/CM)/100:DZ=D
390 FOR Z=1 TO YA:POSITION 10,5:PRINT "CURRENTLY AT YEAR ";Z
400 FOR Z1=1 TO 360
410 IN=DZ*DI
420 IN=INT(IN*100+0.5)/100
430 B=DZ+IN:DZ=B
440 CI=CI+IN:NEXT Z1:DZ=D+DZ
450 NEXT Z:P=YA*D
460 PRINT CHR$(125);"KEOGH/SEP RETIREMENT PLANNING":PRINT
470 PRINT :PRINT "BEGINNING YEAR OF PLAN: ";Y
480 PRINT "YEARLY INTEREST RATE (%): ";I
490 PRINT :PRINT "YEARLY KEOGH/SEP DEPOSIT= ";D
500 PRINT :PRINT "NUMBER OF YEARS COMPOUNDING: ";YA
510 PRINT "PRINCIPAL= ";P:B=P+CI
520 PRINT "COMPOUND INTEREST= ";CI:PRINT
530 YY=YA+Y:PRINT :PRINT "RETIREMENT YEAR: ";YY:PRINT
540 PRINT :PRINT "TOTAL BALANCE= ";B
550 GOTO 600
560 PRINT "YOU CANNOT TAKE A TAX DEDUCTION FOR"
570 PRINT "ANY PAYMENT MADE AFTER THE AGE OF 70 1/2."
580 PRINT "THEREFORE, AT YOUR AGE OF ";A;" YOU ARE"
590 PRINT "NOT ELIGIBLE FOR A KEOGH OR SEP."
600 END
610 PRINT CHR$(125);"WITHDRAWAL REQUIRED BETWEEN THE AGES"
620 PRINT "OF 59 1/2 AND 70 1/2. RE-ENTER.":PRINT :GOTO 310
```

CHAPTER 31

Property Tax Assessment

Property tax is an expense incurred by property owners. It is a tax levied by the community (city, town, or village) in which the property is located, to raise money. It is based on the assessed value of your house, not on the current market value, or even the cost of construction. The tax is based on what value the community's tax assessor determines it to be, and is usually much less than the current market value, but greater than the cost of construction.

Here's a program that will help you determine what the assessed value of your house will be, and the yearly tax that you will have to pay to the community. It's written in BASIC for your microcomputer. See Program 31-1 for the program listing.

THE PROGRAM

After you run the program, enter the current market value of the house. Then enter the percent that your community uses for calculating the assessed value of property, and the tax rate per $100 (which will be a certain number of dollars per hundred). The program will then calculate and display the assessed value of your property, and the yearly property tax amount. See Fig. 31-1 for a sample run.

```
PROPERTY TAX ASSESSMENT
IBM PC
COPYRIGHT (C) 1983 BY HOWARD BERENBON

THIS PROGRAM CALCULATES YEARLY PROPERTY
TAX AMOUNT, GIVEN THE MARKET VALUE OF
THE PROPERTY, THE PERCENT USED TO
CALCULATE THE ASSESSED VALUE, AND THE
TAX RATE PER $100.

ENTER THE CURRENT MARKET VALUE OF THE
PROPERTY
? 100000

ENTER THE PERCENT FOR CALCULATING
THE ASSESSED VALUE
? 60

ENTER THE TAX RATE PER $100.
? 3.84



PROPERTY TAX ASSESSMENT

MARKET VALUE OF THE PROPERTY=$100000.00
PERCENT OF MARKET VALUE= 60
ASSESSED VALUE OF PROPERTY= $60000.00
TAX RATE PER $100= 3.84

YEARLY PROPERTY TAX AMOUNT=  $2304.00
Ok
```

Fig. 31-1. Property Tax Assessment sample run.

Program 31-1. Property Tax Assessment Program Listing

```
100 PRINT CHR$(125);"PROPERTY TAX ASSESSMENT"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1983 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THE PROGRAM CALCULATES YEARLY PROPERTY";
150 PRINT "TAX AMOUNT, GIVEN THE MARKET VALUE OF"
160 PRINT "THE PROPERTY, THE PERCENT USED TO"
170 PRINT "CALCULATE THE ASSESSED VALUE, AND THE"
180 PRINT "TAX RATE PER $100."
190 PRINT
200 PRINT "ENTER THE CURRENT MARKET VALUE OF THE"
210 PRINT "PROPERTY":INPUT M:PRINT
220 PRINT "ENTER THE PERCENT FOR CALCULATING"
230 PRINT "THE ASSESSED VALUE":INPUT P:PRINT
240 PRINT "ENTER THE TAX RATE PER $100."
250 INPUT R:PRINT CHR$(125):PR=P/100
260 A=M*PR:A=INT(A*100+0.5)/100:AS=INT((A/100*R)*100+0.5)/100
270 PRINT "PROPERTY TAX ASSESSMENT"
280 PRINT
290 PRINT "MARKET VALUE OF THE PROPERTY=$";M
300 PRINT "PERCENT OF MARKET VALUE=";P
310 PRINT "ASSESSED VALUE OF PROPERTY=$";A
320 PRINT "TAX RATE PER $100=";R
330 PRINT
340 PRINT "YEARLY PROPERTY TAX AMOUNT=$";AS
350 END
```

SECTION IV

ESP Testing

This section is directed to the study of extrasensory perception, also known as ESP or psi. It consists of two programs that test for ESP. The first program tests the subject for clairvoyance, and the second program tests for precognition.

CHAPTER 32

Parapsychology Test 1: Clairvoyance

Clairvoyance is defined as the ability to perceive things that are not in sight or that cannot be seen. This program tests for clairvoyance using five each of the symbols *, +, −, =, and 0 stored in the computer. The subject will try to guess the symbol card, from the shuffled deck of 25. After the test is completed, a score is given. A score of 6 or more, after at least five consecutive tests, may be an indication of clairvoyance. The program is written in BASIC for your microcomputer. See Program 32-1 for the program listing.

THE PROGRAM

After you run the program, enter your name, or the subject's name, and the date (MM/DD/YY). Then enter a 1 to shuffle the deck. The computer will randomly mix the symbols and store their numerical values in array C1(M). After the shuffling is done, the computer will print SHUFFLING COMPLETED. Then the clairvoyance test number is displayed along with the date, the subject's name, and CARD #1. You are then requested to enter the symbol guess.

Before entering your guess of the symbol, try to imagine yourself looking into the computer's memory and seeing the first symbol which appears in the shuffled deck. This first symbol will be stored in array C1(1) as a numerical representation of the string data for that symbol card. The rest of the shuffled deck will be in array C1(2) through C1(25). Enter the first symbol that appears in your mind. The program will advance to card No. 2. Continue entering the symbols in this manner until all 25 guesses are entered. You may now take another test by entering a Y, or end the test with an N.

Entering an N will cause the computer to display your test data, including your score out of 25, for each test, the average score out of G tests taken, and the percent score. Then an analysis is given. If your average score is 6 or above, the computer will indicate that there is a possibility that you are clairvoyant. If your average score is 5 or less, the computer will indicate that you have an average score and there is no indication of clairvoyance.

It is recommended that at least five tests be taken to ensure an accurate analysis of your test data. The program allows a maximum of 25 consecutive tests.

PLOT

After your test scoring is complete, you may see a plot of the test data. The total score for each test is plotted horizontally. A period (.) is displayed, along with the test number, on the horizontal line, for each test score as taken from the array T(A).

See Fig. 32-1 for a sample run.

```
PARAPSYCHOLOGY TEST 1
CLAIRVOYANCE
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS IS A TEST FOR CLAIRVOYANCE. USING
FIVE EACH OF THE SYMBOLS *, +, -, =,
AND 0, THE SUBJECT WILL TRY TO GUESS THE
SYMBOL CARD, FROM THE SHUFFLED DECK,
IN ORDER FROM 1 TO 25. AFTER THE TEST IS
COMPLETED, A SCORE IS GIVEN. A SCORE OF
5 OR LESS IS AVERAGE. A SCORE OF 6 OR
MORE, AFTER AT LEAST 5 TESTS, MAY BE AN
INDICATION OF CLAIRVOYANCE.

ENTER SUBJECT'S NAME
? BRUCE

BRUCE

ENTER DATE (MM/DD/YY)
? 05/07/80


ENTER A '1' TO SHUFFLE THE CARDS
? 1
NOW SHUFFLING


SHUFFLING COMPLETED



CLAIRVOYANCE TEST  1

DATE :  05/07/80
SUBJECT: BRUCE

CARD#  1        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? +


CARD#  2        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? 0


CARD#  3        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? 0



CARD#  4        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? 0


CARD#  5        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? +



CARD#  24       TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? =


CARD#  25       TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? +



ANOTHER TEST?
Y=YES  N=NO
? N



CLAIRVOYANCE TEST SCORING
DATE:  05/07/80
SUBJECT:  BRUCE

CORRECT SCORE OUT OF 25
TEST #  1
 5
AVERAGE SCORE OUT OF  1
TEST(S) IS  5

THAT'S  20  PERCENT CORRECT



YOU HAVE AN AVERAGE SCORE.
AT THIS TIME, THERE IS NO
INDICATION OF CLAIRVOYANCE.
WOULD YOU LIKE A PLOT
OF THE TEST SCORES
Y=YES  N=NO
? Y



PLOT OF CLAIRVOYANCE TEST DATA
SUBJECT:  BRUCE   DATE: 05/07/80

0    5    10   15        25
++++++++++++++++++++++++++
     .   TEST #  1
```

Fig. 32-1. Parapsychology Test 1: Clairvoyance sample run.

Program 32-1. Parapsychology Test 1: Clairvoyance Program Listing

```
100 PRINT CHR$(125);"PARAPSYCHOLOGY TEST 1"
110 PRINT "CLAIRVOYANCE"
120 PRINT "ATARI"
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 PRINT
160 DIM A(25),A$(1),B$(1),C$(1),C1(25),D$(8),N$(30),T(25)
170 PRINT "THIS IS A TEST FOR CLAIRVOYANCE. USING";
180 PRINT "FIVE EACH OF THE SYMBOLS *, +, -, =,"
190 PRINT "AND 0, THE SUBJECT WILL TRY TO GUESS"
200 PRINT "THE SYMBOL CARD, FROM THE SHUFFLED"
210 PRINT "DECK, IN ORDER FROM 1 TO 25. AFTER THE";
220 PRINT "TEST IS COMPLETED, A SCORE IS GIVEN. A";
230 PRINT "SCORE OF 5 OR LESS IS AVERAGE. A SCORE";
240 PRINT "OF 6 OR MORE, AFTER AT LEAST 5 TESTS,"
250 PRINT "MAY BE AN INDICATION OF CLAIRVOYANCE."
260 GOSUB 1260
270 GOSUB 1260
280 PRINT
290 PRINT "ENTER SUBJECT'S NAME"
300 INPUT N$:PRINT
310 PRINT "ENTER DATE (MM/DD/YY)"
320 INPUT D$
330 PRINT
340 PRINT CHR$(125):G=0:T=0
350 PRINT "ENTER A '1' TO SHUFFLE THE CARDS"
360 INPUT A
370 IF A<>1 THEN 340
380 PRINT "NOW SHUFFLING":GOSUB 840
390 PRINT :G=G+1:T=T+1
400 PRINT "SHUFFLING COMPLETED"
410 GOSUB 1260
420 GOSUB 1260
430 PRINT CHR$(125)
440 PRINT "CLAIRVOYANCE TEST ";T
450 PRINT :PRINT "DATE :  ";D$
460 PRINT "SUBJECT: ";N$
470 PRINT
480 FOR A=1 TO 25
490 PRINT "CARD# ";A,"TEST ";T
500 PRINT
510 PRINT "ENTER SYMBOL GUESS"
520 PRINT "(* + - = 0)"
530 INPUT C$:PRINT CHR$(125):CT=ASC(C$)
540 IF CT=C1(A) THEN T(G)=T(G)+1
550 NEXT A
560 PRINT
570 PRINT "ANOTHER TEST?"
580 PRINT "Y=YES  N=NO"
590 INPUT A$
600 IF A$="Y" THEN 350
610 PRINT CHR$(125)
620 PRINT "CLAIRVOYANCE TEST SCORING"
```

Program 32-1-cont. Parapsychology Test 1: Clairvoyance Program Listing

```
630 PRINT "DATE:  ";D$
640 PRINT "SUBJECT:  ";N$
650 PRINT
660 PRINT "CORRECT SCORE OUT OF 25"
670 J=0
680 FOR A=1 TO G
690 PRINT "TEST # ";A
700 PRINT T(A):J=T(A)+J
710 NEXT A
720 GOSUB 1260
730 PRINT "AVERAGE SCORE OUT OF ";G
740 PRINT "TEST(S) IS ";J/G
750 PRINT
760 PRINT "THAT'S ";J/G*4;" PERCENT CORRECT"
770 GOSUB 1260:GOSUB 1260:GOSUB 1140
780 PRINT "WOULD YOU LIKE A PLOT"
790 PRINT "OF THE TEST SCORES"
800 PRINT "Y=YES  N=NO"
810 INPUT A$
820 IF A$="Y" THEN 980
830 END
840 FOR N=1 TO 25
850 A(N)=0
860 NEXT N
870 FOR N=1 TO 25
880 REM GET SYMBOL
890 READ B$:B1=ASC(B$)
900 REM RANDOM
910 M=INT(RND(0)*25+1)
920 REM CHECK IF SELECTED
930 IF A(M)=1 THEN 910
940 A(M)=1
950 C1(M)=B1
960 NEXT N:RESTORE
970 RETURN
980 PL=4:PRINT CHR$(125);"PLOT OF CLAIRVOYANCE TEST DATA"
990 PRINT "SUBJECT:  ";N$;"   DATE: ";D$
1000 PRINT
1010 PRINT "0    5    10   15        25"
1020 PRINT "+++++++++++++++++++++++++"
1030 FOR A=1 TO G:PL=PL+1:IF PL=22 THEN GOSUB 1300
1040 GG=T(A)+2:POSITION GG,PL
1050 PRINT ".   TEST # ";A
1060 GOSUB 1260
1070 NEXT A
1080 END
1090 DATA *,*,*,*,*
1100 DATA +,+,+,+,+
1110 DATA -,-,-,-,-
1120 DATA =,=,=,=,=
1130 DATA 0,0,0,0,0
1140 PRINT
1150 IF J/G>=6 THEN 1210
```

Program 32-1-cont. Parapsychology Test 1: Clairvoyance Program Listing

```
1160 PRINT
1170 PRINT "YOU HAVE AN AVERAGE SCORE."
1180 PRINT "AT THIS TIME, THERE IS NO"
1190 PRINT "INDICATION OF CLAIRVOYANCE."
1200 RETURN
1210 PRINT
1220 PRINT "YOUR SCORE IS ABOVE AVERAGE."
1230 PRINT "THERE IS A POSSIBILITY THAT YOU"
1240 PRINT "ARE CLAIRVOYANT."
1250 RETURN
1260 REM DELAY
1270 FOR Z=1 TO 400
1280 NEXT Z
1290 RETURN
1300 POSITION 2,5:FOR C=1 TO 18
1310 PRINT "                                        ":NEXT C
1320 PL=5:RETURN
```

CHAPTER 33

Parapsychology Test 2: Precognition

Precognition is defined as the ability to perceive events before they occur. This program tests for precognition using five each of the symbols *, +, −, =, and 0 stored in the computer. The subject will try to guess the symbol card in order from 1 through 25. The deck is shuffled after all 25 guesses are entered. After the test is completed, a score is given. A score of 6 or more, after at least five consecutive tests, may be an indication of precognition. The program is written in BASIC for your microcomputer. See Program 33-1 for the program listing.

THE PROGRAM

After you run the program, enter your name, or the subject's name, and the date (MM/DD/YY). Then the precognition test number is displayed along with the date, the subject's name, and CARD #1. You are then requested to enter the symbol guess.

Before entering your guess of the symbol, try to imagine yourself looking into the computer's memory at some future time, after the cards have been shuffled (the cards will not be shuffled until all symbol guesses are entered). Imagine seeing the first symbol which will appear in the shuffled deck. This first symbol will be stored in array C1(1) as a numerical representation of the string data for that symbol card. The rest of the shuffled deck will be in array C1(2) through C1(25). Enter the first symbol that appears in your mind. The program will advance to card No. 2. Continue entering the symbols in this manner until all 25 guesses are entered. Then the cards will be shuffled. You may now take another test by entering a Y, or end the test with an N.

Entering an N will cause the computer to display your test data, including your score out of 25, for each test, the average score out of G tests taken, and the percent score. Then an analysis is given. If your average score is 6 or above, the computer will indicate that there is a possibility that you have precognition abilities. If your average score is 5 or less, the computer will indicate that you have an average score and there is no indication of precognition.

It is recommended that at least five tests are taken to ensure an accurate analysis of your test data. The program allows a maximum of 25 consecutive tests.

PLOT

After your test scoring is complete, you may see a plot of the test data. The total score for each test is plotted horizontally. A period (.) is displayed, along with the test number, on the horizontal line, for each test score as taken from the array T(A).

See Fig. 33-1 for a sample run.

```
PARAPSYCHOLOGY TEST 2: PRECOGNITION
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS IS A TEST FOR PRECOGNITION. USING
FIVE EACH OF THE SYMBOLS *, +, -, =,
AND 0, THE SUBJECT WILL TRY TO GUESS
THE SYMBOL CARD IN ORDER FROM 1 TO 25.
THE DECK IS SHUFFLED AFTER ALL 25
GUESSES ARE ENTERED. AFTER THE TEST IS
COMPLETED, A SCORE IS GIVEN. A SCORE OF
5 OR LESS IS AVERAGE. A SCORE OF 6 OR
MORE, AFTER AT LEAST 5 TESTS, MAY BE AN
INDICATION THAT THE SUBJECT CAN
PREDICT THE FUTURE.


ENTER SUBJECT'S NAME
? BRUCE

ENTER DATE (MM/DD/YY)
? 05/07/80



PRECOGNITION TEST  1

DATE :  05/07/80
SUBJECT: BRUCE

CARD#  1        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? =



CARD#  2        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? +



CARD#  3        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? *



CARD#  4        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? *



CARD#  5        TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? 0

CARD#  24       TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? =



CARD#  25       TEST  1

ENTER SYMBOL GUESS
(* + - = 0)
? -


ENTRY COMPLETED AND RECORDED

STAND BY . . .
THE CARDS ARE BEING SHUFFLED

SHUFFLING COMPLETED


NOW SCORING


TEST  1   SCORE RECORDED

ANOTHER TEST?
Y=YES  N=NO
? N


PRECOGNITION TEST SCORING
DATE:  05/07/80
SUBJECT:  BRUCE

CORRECT SCORE OUT OF 25
TEST #  1
 5
AVERAGE SCORE OUT OF  1
TEST(S) IS  5
THAT'S  20  PERCENT CORRECT


YOU HAVE AN AVERAGE SCORE.
AT THIS TIME, THERE IS NO
INDICATION OF PRECOGNITION
ABILITIES.

WOULD YOU LIKE A PLOT
OF THE TEST SCORES
Y=YES  N=NO
? Y


PLOT OF PRECOGNITION TEST DATA
SUBJECT:  BRUCE   DATE: 05/07/80

0    5    10   15        25
+++++++++++++++++++++++++++
         TEST #  1
```

Fig. 33-1. Parapsychology Test 2: Precognition sample run.

Program 33-1. Parapsychology Test 2: Precognition Program Listing

```
100 PRINT CHR$(125);"PARAPSYCHOLOGY TEST 2: PRECOGNITION"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
150 DIM A(25),A$(1),B$(1),C$(1),C1(25),D$(8),D1(25),N$(30),T(25)
160 PRINT "THIS IS A TEST FOR PRECOGNITION. USING";
170 PRINT "FIVE EACH OF THE SYMBOLS *, +, -, =,"
180 PRINT "AND 0, THE SUBJECT WILL TRY TO GUESS"
190 PRINT "THE SYMBOL CARD IN ORDER FROM 1 TO 25.";
200 PRINT "THE DECK IS SHUFFLED AFTER ALL 25"
210 PRINT "GUESSES ARE ENTERED. AFTER THE TEST IS";
220 PRINT "COMPLETED,A SCORE IS GIVEN. A SCORE OF";
230 PRINT "5 OR LESS IS AVERAGE. A SCORE OF 6 OR"
240 PRINT "MORE,AFTER AT LEAST 5 TESTS, MAY BE AN";
250 PRINT "INDICATION THAT THE SUBJECT CAN"
260 PRINT "PREDICT THE FUTURE."
270 GOSUB 1250
280 GOSUB 1250
290 PRINT
300 PRINT "ENTER SUBJECT'S NAME"
310 INPUT N$:PRINT
320 PRINT "ENTER DATE (MM/DD/YY)"
330 INPUT D$
340 PRINT
350 PRINT CHR$(125):G=0:T=0
360 T=T+1
370 PRINT CHR$(125)
380 PRINT "PRECOGNITION TEST ";T
390 PRINT :PRINT "DATE :  ";D$
400 PRINT "SUBJECT: ";N$
410 PRINT
420 FOR A=1 TO 25
430 PRINT "CARD# ";A,"TEST ";T
440 PRINT
450 PRINT "ENTER SYMBOL GUESS"
460 PRINT "(* + - = 0)"
470 INPUT C$:PRINT CHR$(125)
480 D1(A)=ASC(C$)
490 NEXT A
500 PRINT :PRINT "ENTRY COMPLETED AND RECORDED"
510 GOSUB 1250:GOSUB 1250
520 GOSUB 1320
530 PRINT "ANOTHER TEST?"
540 PRINT "Y=YES  N=NO"
550 INPUT A$
560 IF A$="Y" THEN 360
570 PRINT CHR$(125)
580 PRINT "PRECOGNITION TEST SCORING"
590 PRINT "DATE:  ";D$
600 PRINT "SUBJECT:  ";N$
610 PRINT
620 PRINT "CORRECT SCORE OUT OF 25"
```

Program 33-1-cont. Parapsychology Test 2: Precognition Sample Listing

```
630 J=0
640 FOR A=1 TO G
650 PRINT "TEST # ";A
660 PRINT T(A):J=T(A)+J
670 NEXT A
680 GOSUB 1250
690 PRINT "AVERAGE SCORE OUT OF ";G
700 PRINT "TEST(S) IS ";J/G
710 PRINT "THAT'S ";(J/G)*4;" PERCENT CORRECT"
720 GOSUB 1250:GOSUB 1250
730 GOSUB 1250:GOSUB 1250:GOSUB 1100:GOSUB 1250
740 PRINT "WOULD YOU LIKE A PLOT"
750 PRINT "OF THE TEST SCORES"
760 PRINT "Y=YES  N=NO"
770 INPUT A$
780 IF A$="Y" THEN 940
790 END
800 FOR N=1 TO 25
810 A(N)=0
820 NEXT N
830 FOR N=1 TO 25
840 REM GET SYMBOL
850 READ B$:B1=ASC(B$)
860 REM RANDOM
870 M=INT(RND(0)*25+1)
880 REM CHECK IF SELECTED
890 IF A(M)=1 THEN 870
900 A(M)=1
910 C1(M)=B1
920 NEXT N:RESTORE
930 RETURN
940 PL=4:PRINT CHR$(125);"PLOT OF PRECOGNITION TEST DATA"
950 PRINT "SUBJECT:  ";N$;"   DATE: ";D$
960 PRINT
970 PRINT "0    5    10   15        25"
980 PRINT "+++++++++++++++++++++++++"
990 FOR A=1 TO G:PL=PL+1:IF PL=22 THEN GOSUB 1490
1000 GG=T(A)+2:POSITION GG,PL
1010 PRINT ".   TEST # ";A
1020 GOSUB 1250
1030 NEXT A
1040 END
1050 DATA *,*,*,*,*
1060 DATA +,+,+,+,+
1070 DATA -,-,-,-,-
1080 DATA =,=,=,=,=
1090 DATA 0,0,0,0,0
1100 PRINT
1110 IF J/G>=6 THEN 1200
1120 IF J/G<4 THEN 1290
1130 PRINT
1140 PRINT "YOU HAVE AN AVERAGE SCORE."
1150 PRINT "AT THIS TIME, THERE IS NO"
```

Program 33-1-cont. Parapsychology Test 2: Precognition Sample Listing

```
1160 PRINT "INDICATION OF PRECOGNITION"
1170 PRINT "ABILITIES."
1180 PRINT
1190 RETURN
1200 PRINT "YOUR SCORE IS ABOVE AVERAGE."
1210 PRINT "THERE IS A POSSIBILITY THAT YOU"
1220 PRINT "HAVE PRECOGNITION ABILITIES"
1230 PRINT
1240 RETURN
1250 REM DELAY
1260 FOR Z=1 TO 400
1270 NEXT Z
1280 RETURN
1290 PRINT
1300 PRINT "YOUR SCORE IS LESS THAN AVERAGE."
1310 GOTO 1150
1320 PRINT
1330 PRINT "STAND BY . . ."
1340 PRINT "THE CARDS ARE BEING SHUFFLED"
1350 GOSUB 800
1360 PRINT :G=G+1
1370 PRINT "SHUFFLING COMPLETED"
1380 GOSUB 1250
1390 PRINT :GOSUB 1250:GOSUB 1250
1400 PRINT "NOW SCORING"
1410 GOSUB 1250:GOSUB 1250
1420 FOR A=1 TO 25
1430 IF C1(A)=D1(A) THEN T(G)=T(G)+1
1440 NEXT A
1450 PRINT CHR$(125);"TEST ";T;"  SCORE RECORDED"
1460 GOSUB 1250
1470 PRINT
1480 RETURN
1490 POSITION 2,5:FOR C=1 TO 18
1500 PRINT "                                          ":NEXT C
1510 PL=5:RETURN
```

SECTION V

A Fantasy Game

This section includes a complete fantasy game called The Dungeon of Danger. It is the longest program in the book, requiring almost 16K of RAM to run.

Here, you may choose your fantasy character's name and boldly roam the chambers and corridors of the dungeon, with your magic sword, seeking out monsters and gold. Your goal is to find your way out, unharmed, with as much gold as possible. Good luck.

CHAPTER 34

The Dungeon of Danger

The Dungeon of Danger is an adventure fantasy game in which the player must fight monsters as he or she wanders through the chambers and corridors of the dungeon. It's a two-level dungeon, based on the fantasy role-playing game Dungeons and Dragons.* It's written in BASIC for your microcomputer, and it requires 16K of RAM to run. See Program 34-1 for the program listing.

THE PROGRAM

You are given 500 gold pieces and are teleported to a random location in the lower level of this 128-chamber, two-level (64 chambers per level) dungeon. Your goal is to find your way out, with as much gold as possible. Gold pieces are required by finding and killing monsters that occupy the dungeon. Each time you kill a monster, you will find a random amount of gold in the chamber. But, monsters fight back, and if you're not careful you can be killed and lose the game. There are other places in the dungeon where gold may be found, but this will be discussed later.

ACTIONS OR MOVES

In your trip through the dungeon you will encounter monsters (up to 37 types), thieves, empty chambers, trap doors, secret doors leading to north-south or east-west corridors, caverns, vials (filled with liquids that can heal), teleportation traps, maps, enchanted keys, and stairways leading up.

See Fig. 34-1 for a sample run.

After you run the program, enter your name or your favorite fantasy character's name, for your trip into the Dungeon of Danger. Then enter the difficulty level; enter a 1 for moderate or a 2 for difficult. The computer will then generate your "hit-point" value for combat. A typical hit-point value for difficulty level 1 is about 26, and for difficulty level 2 is about 15. When fighting, if a monster scores a "hit" on you, then this number is subtracted from your current hit-point value. If your hit-point value is depleted to zero, then you will die and lose the game. Each monster has a different strength, and may be difficult to kill, depending on its hit-point number.

After your hit-point value is generated, you will be teleported to a random location in the lower level of the dungeon.

You now have a choice of eight actions. Enter the letter in parentheses for the following actions or moves in the dungeon:

(N)ORTH movememt	(up)
(E)AST movement	(right)
(S)OUTH movement	(down)
(W)EST movement	(left)
(U)P movement	(when at a stairway, and have the Enchanted Key)
(M)AP display	(if found-when encountering thieves)
(G)OLD pieces left	
(H)IT POINTS left	

North Movement (UP)

Entering an N allows you to move north through the dungeon. You may not move north under the following conditions:

1. If you reach the North Wall, you cannot pass through it.
2. If you enter an east-west corridor (through

*Dungeons and Dragons is a registered trademark of TSR Hobbies, Inc.

```
THE DUNGEON OF DANGER
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A FANTASY GAME



YOU WILL BE TELEPORTED TO . . .

THE DUNGEON OF DANGER

ENTER DIFFICULTY LEVEL?
1=MODERATE  2=DIFFICULT
? 1

ENTER YOUR CHARACTER'S NAME?
? FRODO



YOU CARRY A MAGIC SWORD
AND 500 GOLD PIECES WITH YOU.
YOUR 'HIT-POINT' VALUE IS  21
IF IT REACHES ZERO, YOU WILL DIE
. . . . . SO BE CAREFUL

FRODO . . . YOU ARE ON YOUR WAY



YOU HAVE ARRIVED AT . . . .

THE DUNGEON OF DANGER . . . LEVEL 2

YOU WILL ENCOUNTER MONSTERS AND
THIEVES, AND GOLD . . . GOOD LUCK



YOU ARE IN A DAMP AND MISTY
. . . . . EMPTY CHAMBER


FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? N



THERE IS SOMETHING LURKING . . .
. . . . IN THIS CHAMBER . . . .
. . . . . BEWARE

IT IS A . . . . . VAMPIRE BAT . .


WILL YOU (F)IGHT OR (R)UN ?
? F



YOU ATTACK THE . . . VAMPIRE BAT
WITH A SWING OF YOUR SWORD
YOU DO  2  HIT POINT(S) OF DAMAGE

IT HAS . .  9  'HIT-POINT(S)' LEFT


. . . . . IT ATTACKS YOU
AND IT DOES  2  'HIT-POINT(S)' OF DAMAGE

YOU HAVE . . .  19  'HIT-POINT(S)' LEFT


WILL YOU (F)IGHT OR (R)UN ?
? F
```

```
YOU ATTACK THE . . . VAMPIRE BAT
WITH A SWING OF YOUR SWORD

YOU HAVE KILLED THE VAMPIRE BAT

YOU SEARCH THE AREA . . . .
AND FIND . . .  229  GOLD PIECES

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? E



YOU ENTER AN . . . EAST-WEST CORRIDOR
THRU A . . . . . SECRET DOOR

THE DOOR CLOSES AND LOCKS BEHIND YOU

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? E



THERE IS A THIEF IN THIS CHAMBER

. . . . . HE SURPRISES YOU
AS HE QUICKLY PASSES BY YOU HE
SNATCHES . . .  65  GOLD PIECES


FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? N



YOU STUMBLED ONTO . . . . .
A HIDDEN CAVERN


YOU LOOK AROUND . . .
ON THE GROUND, AT YOUR FEET, IS A VIAL

YOU PICK UP THE VIAL . . AND SEE THAT
IT CONTAINS . . . A MILKY LIQUID

WOULD YOU LIKE A DRINK?
ENTER (Y)ES  OR  (N)O
? Y



YOU TAKE A DRINK . . .


IT WAS A WHITE MAGIC POTION . . .
WHICH INCREASED YOUR 'HIT-POINTS' BY  12

THE CAVERN SEEMS EMPTY . . .

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? W



YOU ARE IN A DAMP AND MISTY
. . . . . EMPTY CHAMBER


FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? W
```

Fig. 34-1. The Dungeon

```
THERE IS SOMETHING LURKING . . .
. . . . IN THIS CHAMBER . . . .
. . . . . BEWARE

IT IS A . . . . . BLACK CAT . .


. . . . . IT ATTACKS YOU
AND IT DOES  2  'HIT-POINT(S)' OF DAMAGE

YOU HAVE . . .  36  'HIT-POINT(S)' LEFT


WILL YOU (F)IGHT OR (R)UN ?
? F



YOU ATTACK THE . . . BLACK CAT
WITH A SWING OF YOUR SWORD

YOU HAVE KILLED THE BLACK CAT

YOU SEARCH THE AREA . . . .
AND FIND . . .  126  GOLD PIECES

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? S



THERE IS A THIEF IN THIS CHAMBER

. . . . . HE SURPRISES YOU
AS HE QUICKLY PASSES BY YOU HE
SNATCHES . . .  135  GOLD PIECES

YOU SEARCH THE CHAMBER AND
YOU . . . . . FIND A MAP

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? S



YOU ARE AT A STAIRWAY
 . . . . . GOING UP


FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? U



YOU WALK UP THE STAIRWAY
THE ENCHANTED KEY . . . OPENS THE LOCK

YOU ARE AT . . . . . LEVEL 1



THERE IS SOMETHING LURKING . . .
. . . . IN THIS CHAMBER . . . .
. . . . . BEWARE

IT IS A . . . . . DEADLY COBRA . .


WILL YOU (F)IGHT OR (R)UN ?
? F



YOU ATTACK THE . . . DEADLY COBRA
WITH A SWING OF YOUR SWORD

YOU HAVE KILLED THE DEADLY COBRA

YOU SEARCH THE AREA . . . .
AND FIND . . .  571  GOLD PIECES

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? E



YOU ACTIVATED A . . . TRAP DOOR

BUT . . . YOU CAUGHT YOURSELF
FROM FALLING

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? S



THERE IS SOMETHING LURKING . . .
. . . . IN THIS CHAMBER . . . .
. . . . . BEWARE

IT IS A . . . . . BERSERKER . .


. . . . . IT ATTACKS YOU
AND IT DOES  11  'HIT-POINT(S)' OF DAMAGE

YOU HAVE . . .  25  'HIT-POINT(S)' LEFT


WILL YOU (F)IGHT OR (R)UN ?
? F



YOU ATTACK THE . . . BERSERKER
WITH A SWING OF YOUR SWORD

YOU HAVE KILLED THE BERSERKER

YOU SEARCH THE AREA . . . .
AND FIND . . .  126  GOLD PIECES

FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? N



YOU ARE AT A STAIRWAY
 . . . . . GOING UP


FRODO,  WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? U



YOU WALK UP THE STAIRWAY
THE ENCHANTED KEY . . . OPENS THE LOCK
YOU FOUND YOUR WAY . . .
. . . OUT OF THE DUNGEON OF DANGER

YOU HAVE ACQUIRED  2708  GOLD PIECES

GAME RATING IS  556  = WARRIOR

YOU TOOK  48  TURNS TO FIND THE WAY OUT,
AND KILLED  12  MONSTERS.

ANOTHER GAME?
ENTER (Y)ES  OR  (N)O
? Y
```

of Danger sample run.

a secret door), movement north is not allowed.

East Movement (RIGHT)

Entering an E allows you to move east. You may not move east under the following conditions:

1. If you reach the East Wall, you cannot pass through it.
2. If you enter a north-south corridor (through a secret door), movement east is not allowed.

South Movement (DOWN)

Entering an S allows you to move south. You may not move south under the following conditions:

1. If you reach the South Wall, you cannot pass through it.
2. If you enter an east-west corridor (through a secret door), movement south is not allowed.

West Movement (LEFT)

Entering a W allows you to move west. You may not move west under the following conditions:

1. If you reach the West Wall, you cannot pass through it.
2. If you enter a north-south corridor (through a secret door), movement west is not allowed.

Up Movement

Entering a U, when you are at a stairway and have found the Enchanted Key, allows you to go up to the next level. If you haven't found the key or you are not at a stairway, you cannot go up the stairway. To find the Enchanted Key, you must kill a random number of monsters for each level. Also, there is a different key for each level.

Map Display

Entering an M, when you have found a map, will display the map for that level. Each level has a different map, and they may be found when encountering thieves. The 64-chamber dungeon is displayed using the following symbols:

M = monster
0 = empty chamber
? = unknown contents (either a thief or a trap door)
C = cavern
UP = stairway up
NS = north-south corridor (entered through secret doors)
EW = east-west corridor (entered through secret doors)
P1 = your location in the dungeon

See Fig. 34-2 for a sample map.

```
THE DUNGEON OF DANGER-MAP:  LEV   1

M   EW  NS  M   0   C   M   UP
EW  EW  EW  C   0   M   0   M
NS  EW  EW  ?   0   M   M   UP
M   C   UP  NS  0   NS  C   C
NS  ?   0   ?   0   M   0   NS
?   UP  ?   NS  0   P1  M   0
?   M   NS  NS  0   0   0   M
NS  EW  EW  0   C   0   EW  ?

FRODO, WHAT IS YOUR ACTION OR MOVE?

(N)ORTH, (E)AST, (S)OUTH, (W)EST
(U)P, (M)AP, (G)OLD, (H)IT POINTS
? N
```

Fig. 34-2. The Dungeon of Danger sample map.

A question mark (?) indicates either a thief or a trap door. There is no way of knowing which is there, unless you enter the chamber. If you encounter a thief, either you surprise him and he drops some of his gold, or he surprises you and steals some of your gold. This is randomly determined, but it's in favor of the thief. After you encounter a thief, the chamber becomes empty.

If you activate a trap door, you can either fall through or catch yourself from falling. If you fall through, you will lose most of your gold pieces, when playing at difficulty level 1 (moderate). But you can die if you are playing at difficulty level 2 (difficult). There is a 25-percent chance that you will fall through, when your difficulty level is 1, and a 50-percent chance when your difficulty is 2. If you are at level two of the dungeon, then you will fall into a deep pit. If you made it up to level one, then you will fall back down to level two. Avoid these traps, if possible.

When displaying the map, your location in the dungeon is identified with the symbol P1.

Gold Pieces Left

Entering a G will display the number of gold pieces you have with you. You will start out with 500 and can gain or lose gold during your trip. The more gold you acquire, the better your game rating will be.

Hit-Points Left

Entering an H will display the number of hit-points you have left. Also, each time you fight a monster, your number of hit-points left is displayed.

MONSTERS AND FIGHTING

When you are entering into a chamber occupied by a monster, the monster may or may not attack you. Then, you have the option of fighting, by entering an F, or running, by entering an R.

Fighting

If you choose to fight, then enter an F. Your character will swing at the monster with his magic sword, always making contact, and damaging it by depleting some of its hit-points. But then the monster will attack you and possibly score a hit, depleting some of your hit-points. There is a chance that the monster will miss you, if you are lucky. You may now continue fighting until the monster is killed, it kills you, or you run out.

Each monster has a different hit-point number, depending on its strength. A weak monster (easy to kill) will have a hit-point value of between 1 and 3. A monster with a hit-point value of 4 or greater is considered strong and more difficult to kill. The stronger the monster, the harder it can hit you. Each of the 37 monsters has two hit-point numbers. The first number is the maximum it can hit you with, at one time, and the second is the number of hit-points required to kill it. The DATA statements in program lines 3720 through 4050 hold the names and hit-points of most of the monsters in the dungeon. This data may be changed, or modified, for different monsters with different strengths. The last four monsters in the data list are the corridor monsters. They are the weakest and easiest to kill.

Each hit on a monster will deplete its hit-point value, until it reaches zero, then it is killed. Each time you kill a monster, you will find a random amount of gold in the chamber, and then the chamber becomes empty.

Running

When fighting a monster, you have the option of running away, by entering an R. This option should be used if your hit-point value is low and you may not survive the next attack. This choice depends on the strength of the monster. Use your own judgment. Entering an R will send you back to the chamber that you previously occupied, but the monster can attack you, with one or two hit-points, as you leave.

Your Strength at Different Levels

The number of hit-points that you deplete from a monster increases with the number of monsters you have killed. So, generally, the more monsters you kill, the easier it will be to kill the next monster that you encounter.

Generally, monsters are more difficult to kill at level one of the dungeon. But if you have killed a large number in finding your way up from level two to level one, then they should be easier to kill, due to your experience. Also, your reward for killing a monster at level one is generally higher than at level two.

CAVERNS

There are several things that can happen to you when you enter into a cavern. Often you will find vials filled with liquids. These liquids can heal wounds, two-thirds of the time, by increasing your hit-point value after you drink them. But sometimes the liquids have no effect, or even decrease your hit-point value slightly. It is recommended that you drink the liquid, if your hit-point value is low.

You may run into giant spiders or the Dark Wizards. They can hit hard and are difficult to kill, so be careful. But fortunately there are the Ancient Wizards that you may encounter. They will increase your hit-point value and give you gold.

Pools of Water

On the lower level of the dungeon (level two), there are pools of water that you may fall into. The following three things can happen when you fall into a pool:

1. You may be attacked by a Gill Monster; and he's not easy to kill.
2. The water will feel warm and soothing; and nothing happens.
3. The water will be steaming hot; and you will lose a random number of gold pieces in the pool.

NORTH-SOUTH AND EAST-WEST CORRIDORS

North-south and east-west corridors may be entered from any direction (through secret doors), but will limit your next move to the direction displayed.

Three things can happen when entering into a corridor:

1. You can activate a teleportation trap and be teleported to an unknown location (at your present level) in the dungeon.
2. You can encounter corridor monsters that may or may not attack you.

3. Or, the corridor can be empty.

There are four types of monsters that you may encounter in the corridors. They are among the weakest of the monsters in the dungeon and can be killed quite easily. They are as follows:

1. Gelatinous Cube
2. Giant Centipede
3. Giant Rat
4. Shadow

No other monsters can appear in the corridors.

WINNING

To win the game you must sucessfully make it up through the two levels and then exit the dungeon.

LOSING

You will lose the game if your hit-point value is depleted to 0. But in some cases (about 50 percent of the time) you will get a second chance. Your hit-points will be restored, and then you will be allowed a random number of moves (based on the number of monsters previously killed) to find your way out. If you die again, you won't get another chance.

GAME RATING

After you complete the game, a game rating is displayed along with the number of gold pieces acquired, the number of monsters killed, and the number of turns (moves) taken. The rating is a number from approximately −600 to +2000, depending on the statistics above. The higher the rating number, the better is the game rating.

Along with the number rating, there is a title rating. The following is a list of ten possible title ratings, and their scores:

−401 or less	Incompetent Serf
−101 to −400	Weakling
−100 to −1	Apprentice
0 to 99	Halfling
100 to 199	Foot Soldier
200 to 599	Warrior
600 to 899	Great Warrior
900 to 1499	Swordsman
1500 to 2499	Magic Swordsman
2500 and above	Dungeon Master

After the game is completed, you may play another game by entering a Y for yes, or end the game by entering an N for no.

THE MONSTER LIST

The following is a list of monsters that appear in the dungeon, with their hit-point values. The first number is used to generate its hit on you. The second number is its strength:

Gill Monster	8	14
Dark Wizard	8	14
Giant Spider	6	12
Large Dragon	6	12
Hideous Ghoul	5	10
Lizard Man	4	8
Manticore	6	12
Purple Worm	6	12
Deadly Cobra	5	10
Mad Elf	5	10
Clay Man	4	8
Hairy Beast	5	10
Mad Dwarf	4	8
Zombie	4	8
Berserker	5	10
Giant Scorpion	6	12
Giant Cockroach	4	8
Doppleganger	5	10
Giant Fire Beetle	1	2
Giant Ant	1	2
Giant Tick	2	4
Mummy	3	6
Nasty Orc	2	4
Skeleton	1	2
Troll	3	6
Goblin	3	6
Vampire Bat	3	6
Creeping Blob	3	6
Mad Dog	2	4
Large Spider	3	6
Black Cat	2	4
Man-Eating Plant	1	2
Hydra	3	6
Gelatinous Cube	2	4
Giant Centipede	1	2
Giant Rat	2	4
Shadow	2	4

Program 34-1. The Dungeon of Danger Program Listing

```
100 PRINT CHR$(125)
110 PRINT "THE DUNGEON OF DANGER"
120 PRINT "ATARI"
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 PRINT
150 PRINT "A FANTASY GAME"
160 BB=2
170 GOSUB 470
180 PRINT CHR$(125):DIM A$(50),A(9,9),B(9,9),D$(1),F$(1),M1$(1),MS
$(17)
190 PRINT "YOU WILL BE TELEPORTED TO . . . "
200 PRINT
210 PRINT "THE DUNGEON OF DANGER"
220 PRINT :DY=0:MD=1
230 GOSUB 5530
240 MA=0:CA=0:G=500:M1=1:K=0:HI=20+INT(RND(0)*15+1):HI=INT(HI/PL)
250 H1=HI:PRINT "ENTER YOUR CHARACTER'S NAME?"
260 INPUT A$
270 GOSUB 460
280 PRINT :PRINT "YOU CARRY A MAGIC SWORD"
290 PRINT "AND 500 GOLD PIECES WITH YOU."
300 PRINT "YOUR 'HIT-POINT' VALUE IS ";H1:GOSUB 460
310 PRINT "IF IT REACHES ZERO, YOU WILL DIE"
320 PRINT ". . . . . SO BE CAREFUL"
330 PRINT :GOSUB 460:PRINT A$;" . . . YOU ARE ON YOUR WAY"
340 BB=5:GOSUB 470
350 GOSUB 500
360 PRINT CHR$(125)
370 PRINT "YOU HAVE ARRIVED AT . . . ."
380 PRINT
390 PRINT "THE DUNGEON OF DANGER . . . LEVEL 2"
400 PRINT
410 PRINT "YOU WILL ENCOUNTER MONSTERS AND"
420 PRINT "THIEVES, AND GOLD . . . GOOD LUCK"
430 BB=6
440 GOSUB 470
450 GOTO 1030
460 BB=1
470 FOR ZZ=1 TO 300*BB
480 NEXT ZZ
490 RETURN
500 FOR X=1 TO 8
510 FOR Y=1 TO 8
520 A(X,Y)=INT(RND(0)*7+1)
530 B(X,Y)=INT(RND(0)*7+1)
540 NEXT Y
550 NEXT X
560 H=INT(RND(0)*3+1)
570 FOR N=1 TO H
580 X=INT(RND(0)*8+1)
590 Y=INT(RND(0)*8+1)
600 P=INT(RND(0)*8+1)
610 W=INT(RND(0)*8+1)
```

```
620 A(X,Y)=8:B(P,W)=8
630 NEXT N
640 S=INT(RND(0)*4+1)+2
650 FOR N=1 TO S
660 X=INT(RND(0)*8+1)
670 Y=INT(RND(0)*8+1)
680 P=INT(RND(0)*8+1)
690 W=INT(RND(0)*8+1)
700 A(X,Y)=9:B(P,W)=9
710 NEXT N
720 REM SET UP COMPLETE
730 RETURN
740 L1=L1-1
750 PRINT "YOU WALK UP THE STAIRWAY"
760 GOSUB 460
770 PRINT "THE ENCHANTED KEY . . . OPENS THE LOCK";
780 GOSUB 460
790 IF L1=0 THEN 890
800 MA=0:K=0:K4=INT(RND(0)*4+1)+1:IF H1<HI THEN 820
810 GOTO 850
820 H1=HI
830 PRINT "YOU FEEL STRONGER . . . . .":GOSUB 460
840 PRINT "YOUR 'HIT-POINTS' ARE RESTORED TO ";HI
850 PRINT :CB=CA+K4
860 PRINT "YOU ARE AT . . . . . LEVEL 1"
870 BB=4:GOSUB 470
880 GOTO 1070
890 PRINT "YOU FOUND YOUR WAY . . . "
900 PRINT ". . . OUT OF THE DUNGEON OF DANGER"
910 PRINT
920 PRINT "YOU HAVE ACQUIRED ";G;" GOLD PIECES"
930 GOSUB 950
940 GOTO 1810
950 GG=G+100
960 R=INT((GG*CA-7000+1)/M1)
970 PRINT
980 PRINT "GAME RATING IS ";R;" = ";:GOSUB 5620
990 PRINT :IF G<=0 THEN 3210
1000 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT"
1010 PRINT "AND KILLED ";CA;" MONSTERS."
1020 RETURN
1030 C=INT(RND(0)*8+1)
1040 D=INT(RND(0)*8+1)
1050 A(C,D)=1
1060 L1=2:K4=INT(RND(0)*4+1)+1
1070 F$=" ":PRINT CHR$(125)
1080 IF L1=1 THEN A=B(C,D):GOTO 1090
1085 A=A(C,D)
1090 GOSUB 460
1100 ON A GOSUB 2100,4060,3580,3580,2210,2510,2560,2610,2870
1110 IF TE=1 THEN TE=0:GOTO 1070
1120 PRINT :IF H1<=0 THEN 1700
1130 IF DY=1 THEN MD=MD-1
```

```
1140 IF DY=1 AND MD=0 THEN 1700
1150 IF F$="R" THEN 1070
1160 PRINT A$;",  WHAT IS YOUR ACTION OR MOVE?"
1170 PRINT
1180 PRINT "(N)ORTH, (E)AST, (S)OUTH, (W)EST"
1190 PRINT "(U)P, (M)AP, (G)OLD, (H)IT POINTS"
1200 INPUT M1$
1210 M1=M1+1:TL=0
1220 C1=C:D1=D
1230 IF M1$="N" THEN 1320
1240 IF M1$="E" THEN 1360
1250 IF M1$="S" THEN 1400
1260 IF M1$="W" THEN 1440
1270 IF M1$="U" THEN 1480
1280 IF M1$="M" THEN 1570
1290 IF M1$="G" THEN 1600
1300 IF M1$="H" THEN 3280
1310 PRINT :GOTO 1120
1320 IF A=7 THEN 1620
1330 IF (D-1)=0 THEN 1880
1340 D=D-1
1350 GOTO 1070
1360 IF A=6 THEN 1660
1370 IF (C+1)=9 THEN 1930
1380 C=C+1
1390 GOTO 1070
1400 IF A=7 THEN 1620
1410 IF (D+1)=9 THEN 1950
1420 D=D+1
1430 GOTO 1070
1440 IF A=6 THEN 1660
1450 IF (C-1)=0 THEN 1970
1460 C=C-1
1470 GOTO 1070
1480 PRINT CHR$(125):IF A<>9 THEN 1540
1490 IF K=1 THEN 740
1500 PRINT
1510 PRINT "YOU CANNOT GO UP THE STAIRWAY"
1520 PRINT "YOU DON'T HAVE THE KEY"
1530 GOSUB 460:PRINT :GOTO 1120
1540 PRINT "YOU ARE NOT AT A STAIRWAY"
1550 GOSUB 460:GOTO 1120
1560 GOTO 1120
1570 PRINT CHR$(125):IF MA=1 THEN 1990
1580 PRINT "YOU DON'T HAVE THE MAP"
1590 PRINT :GOSUB 460:GOTO 1120
1600 PRINT CHR$(125);"YOU HAVE ";G;" GOLD PIECES WITH YOU"
1610 PRINT :GOTO 1120
1620 PRINT
1630 PRINT CHR$(125);"YOU ARE IN AN EAST-WEST CORRIDOR"
1640 PRINT "YOU CAN ONLY GO EAST OR WEST"
1650 PRINT :GOTO 1120
1660 PRINT
```

```
1670 PRINT CHR$(125);"YOU ARE IN A NORTH-SOUTH CORRIDOR"
1680 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
1690 GOTO 1650
1700 BB=2:GOSUB 470:PRINT CHR$(125):IF DY=1 THEN 5510
1710 PRINT "YOUR 'HIT-POINTS' HAVE BEEN DEPLETED,"
1720 PRINT :G=0:PRINT "AND UNFORTUNATELY . . . YOU JUST DIED"
1730 BB=5:GOSUB 470
1740 PRINT :W=INT(RND(0)*6+1):IF DY=0 AND W>=3 THEN 5370
1750 PRINT CHR$(125);"YOU LOST ALL YOUR GOLD AND YOU WERE"
1760 PRINT ". . . UNABLE TO MEET THE DEMANDS OF"
1770 PRINT ". . . . . THE DUNGEON OF DANGER"
1780 PRINT :PRINT
1790 PRINT "BETTER LUCK NEXT TIME"
1800 GOSUB 950
1810 PRINT
1820 PRINT "ANOTHER GAME?"
1830 PRINT "ENTER (Y)ES  OR  (N)O"
1840 INPUT F$
1850 IF F$="Y" THEN 1870
1860 END
1870 PRINT CHR$(125):GOTO 210
1880 PRINT CHR$(125);"YOU ARE AT THE NORTH WALL"
1890 PRINT "YOU CANNOT PASS THROUGH"
1900 PRINT
1910 PRINT "TRY ANOTHER DIRECTION?"
1920 GOTO 1120
1930 PRINT CHR$(125);"YOU ARE AT THE EAST WALL"
1940 GOTO 1890
1950 PRINT CHR$(125);"YOU ARE AT THE SOUTH WALL"
1960 GOTO 1890
1970 PRINT CHR$(125);"YOU ARE AT THE WEST WALL"
1980 GOTO 1890
1990 PRINT CHR$(125);"THE DUNGEON OF DANGER-MAP:  LEV  ";L1
2000 PRINT
2010 FOR Q=1 TO 8
2020 FOR N=1 TO 8
2030 IF C=N AND D=Q THEN PRINT "P1  ";:GOTO 2060
2040 IF L1=1 THEN S1=B(N,Q):GOTO 2050
2045 S1=A(N,Q)
2050 ON S1 GOSUB 2910,2970,2930,2930,2950,2990,3010,3030,3040
2060 NEXT N
2070 PRINT
2080 NEXT Q
2090 GOTO 1120
2100 W=INT(RND(0)*2+1):IF W=2 THEN 2160
2110 PRINT
2120 PRINT "YOU ARE IN A COLD AND DARK"
2130 PRINT " . . . . . EMPTY CHAMBER"
2140 PRINT
2150 RETURN
2160 PRINT
2170 PRINT "YOU ARE IN A DAMP AND MISTY"
2180 PRINT ". . . . . EMPTY CHAMBER"
```

Program 34-1-cont. The Dungeon of Danger Program Listing

```
2190 PRINT
2200 RETURN
2210 PRINT CHR$(125);"THERE IS A THIEF IN THIS CHAMBER"
2220 IF L1=1 THEN B(C,D)=1:GOTO 2230
2225 A(C,D)=1
2230 GOSUB 460
2240 G4=INT(RND(0)*500/L1+1):IF (G-G4)<0 THEN G4=G
2250 Y=INT(RND(0)*8+1)
2260 IF Y<=3 THEN 2420
2270 PRINT
2280 PRINT ". . . . . HE SURPRISES YOU"
2290 GOSUB 460
2300 PRINT "AS HE QUICKLY PASSES BY YOU HE"
2310 PRINT "SNATCHES . . . ";G4;" GOLD PIECES":PRINT
2320 G=G-G4
2330 IF MA=1 THEN RETURN
2340 MA=INT(RND(0)*4+1):IF MA<=2 THEN MA=1
2350 IF MA=1 THEN 2380
2360 RETURN
2370 GOSUB 460
2380 PRINT "YOU SEARCH THE CHAMBER AND"
2390 GOSUB 460
2400 PRINT "YOU . . . . . FIND A MAP"
2410 RETURN
2420 PRINT :PRINT "YOU SURPRISED THE THIEF . . . ."
2430 GOSUB 460
2440 PRINT "AS HE RUNS OUT HE DROPS . . . ."
2450 G4=INT(RND(0)*400/L1+1):PRINT " . . . ";G4;" GOLD PIECES."
2460 PRINT "YOU PICK UP THE GOLD PIECES":G=G+G4
2470 PRINT :IF MA=1 THEN RETURN
2480 MA=INT(RND(0)*4+1):IF MA<=2 THEN MA=1
2490 IF MA=1 THEN 2380
2500 RETURN
2510 PRINT CHR$(125):PRINT
2520 PRINT "YOU ENTER A . . . NORTH-SOUTH CORRIDOR";
2530 PRINT "THRU A . . . . . SECRET DOOR"
2540 PRINT :GOSUB 3240
2550 RETURN
2560 PRINT CHR$(125):PRINT
2570 PRINT "YOU ENTER AN . . . EAST-WEST CORRIDOR"
2580 PRINT "THRU A . . . . . SECRET DOOR"
2590 PRINT :GOSUB 3240
2600 RETURN
2610 PRINT "YOU ACTIVATED A . . . TRAP DOOR"
2620 GOSUB 460
2630 TD=INT(RND(0)*4+1)*PL:IF TD>4 THEN PRINT "YOU FELL THRU . . .
":GOSUB 460:GOTO 1720
2640 IF TD=4 THEN 2690
2650 PRINT
2660 PRINT "BUT . . . YOU CAUGHT YOURSELF"
2670 PRINT "FROM FALLING"
2680 RETURN
2690 IF L1=2 THEN 2800
```

Program 34-1-cont. The Dungeon of Danger Program Listing

```
2700 L1=L1+1:PRINT :K=1
2710 PRINT "YOU FELL THRU TO LEVEL 2 . . . AND"
2720 G=0
2730 GOSUB 460
2740 PRINT
2750 PRINT "YOU . . . . . LOST"
2760 PRINT "ALL OF YOUR GOLD PIECES"
2770 PRINT :IF PT=1 THEN PT=0:RETURN
2780 PRINT "BUT . . . YOU STILL HAVE YOUR KEY"
2790 RETURN
2800 PRINT "YOU FELL INTO A DEEP . . . PIT":PT=1
2810 GOSUB 460
2820 PRINT "LUCKILY . . YOU DIDN'T GET HURT"
2830 PRINT
2840 GOSUB 460
2850 PRINT "BUT IN CLIMBING OUT . . ."
2860 GOTO 2720
2870 PRINT "YOU ARE AT A STAIRWAY"
2880 PRINT " . . . . . GOING UP"
2890 PRINT
2900 RETURN
2910 PRINT "0   ";
2920 RETURN
2930 PRINT "M   ";
2940 RETURN
2950 PRINT "?   ";
2960 RETURN
2970 PRINT "C   ";
2980 RETURN
2990 PRINT "NS  ";
3000 RETURN
3010 PRINT "EW  ";
3020 RETURN
3030 GOTO 2950
3040 PRINT "UP  ";
3050 RETURN
3060 H=1:O=9:W=8
3070 B=0:E=5:R=14
3080 C=0:PR=0
3090 GOTO 1030
3100 RETURN
3110 GOSUB 460
3120 K=1
3130 PRINT :PRINT "YOU LOOK TO THE GROUND . . . . . ."
3140 PRINT "AND FIND THE ENCHANTED KEY"
3150 GOSUB 460
3160 RETURN
3170 GOSUB 3120
3180 GOTO 1230
3190 IF CA=CB THEN 3110
3200 RETURN
3210 PRINT "YOU KILLED ";CA;" MONSTERS "
3220 PRINT ". . . . . IN ";M1;" TURNS."
```

```
3230 RETURN
3240 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GOSUB 460
3250 W=INT(RND(0)*8+1):IF W>=7 THEN 3300
3260 W=INT(RND(0)*8+1):IF W=8 THEN 3390
3270 RETURN
3280 PRINT CHR$(125);"YOU HAVE ";H1;" 'HIT-POINT(S)' LEFT"
3290 GOTO 1120
3300 W=INT(RND(0)*4+1)+30
3310 FOR AA=1 TO W
3320 READ MS$,HP,HM
3330 NEXT AA
3340 RESTORE
3350 PRINT
3360 PRINT "THERE IS SOMETHING LURKING"
3370 PRINT "IN THIS CORRIDOR . . .":GOSUB 460
3380 PRINT :GOTO 3680
3390 TE=1:TL=1
3400 IF K=1 THEN 3460
3410 K=1:PRINT :PRINT "YOU NOTICE A SHINY OBJECT . . . ."
3420 PRINT ". . . . AT YOUR FEET":GOSUB 460
3430 PRINT "YOU PICK IT UP AND FIND THAT . . ."
3440 PRINT "IT IS THE ENCHANTED KEY . . . . .":GOSUB 460
3450 PRINT :PRINT "BUT YOU WEREN'T CAREFUL . . . .":GOSUB 460
3460 PRINT "YOU ACTIVATED SOME SORT OF TRAP . . .":GOSUB 460
3470 C=INT(RND(0)*8+1):D=INT(RND(0)*8+1):BB=5:GOSUB 470:PRINT CHR$
(125)
3480 PRINT "SUDDENLY YOU FEEL DIZZY, AND PASS OUT"
3490 PRINT :BB=2:GOSUB 470:GOSUB 3540
3500 PRINT "WHEN YOU WAKE UP . . . YOU FIND"
3510 PRINT "THAT YOU WERE . . . . TELEPORTED"
3520 PRINT "TO AN UNKNOWN LOCATION . . . ."
3530 BB=5:GOSUB 470:RETURN
3540 FOR AA=1 TO 300
3550 PRINT "*        %";
3560 NEXT AA
3570 GOSUB 460:PRINT CHR$(125):RETURN
3580 IF A=4 THEN 3600
3590 W=INT(RND(0)*15+1):GOTO 3610
3600 W=INT(RND(0)*15+1)+15
3610 FOR AA=1 TO W
3620 READ MS$,HP,HM
3630 NEXT AA
3640 RESTORE
3650 PRINT
3660 PRINT "THERE IS SOMETHING LURKING . . . "
3670 PRINT ". . . . IN THIS CHAMBER . . . .":GOSUB 460
3680 PRINT ". . . . . BEWARE":GOSUB 460
3690 PRINT
3700 PRINT "IT IS A . . . . . ";MS$;" . . ":GOSUB 460
3710 GOTO 4510
3720 DATA LARGE DRAGON,6,12
3730 DATA HIDEOUS GHOUL,5,10
3740 DATA LIZARD MAN,4,8
```

```
3750 DATA MANTICORE,6,12
3760 DATA PURPLE WORM,6,12
3770 DATA DEADLY COBRA,5,10
3780 DATA MAD ELF,5,10
3790 DATA CLAY MAN,4,8
3800 DATA HAIRY BEAST,5,10
3810 DATA MAD DWARF,4,8
3820 DATA ZOMBIE,4,8
3830 DATA BERSERKER,5,10
3840 DATA GIANT SCORPION,6,12
3850 DATA GIANT COCKROACH,4,8
3860 DATA DOPPLEGANGER,5,10
3870 DATA GIANT FIRE BEETLE,1,2
3880 DATA GIANT ANT,1,2
3890 DATA GIANT TICK,2,4
3900 DATA MUMMY,3,6
3910 DATA NASTY ORC,2,4
3920 DATA SKELETON,1,2
3930 DATA TROLL,3,6
3940 DATA GOBLIN,3,6
3950 DATA VAMPIRE BAT,3,6
3960 DATA CREEPING BLOB,3,6
3970 DATA MAD DOG,2,4
3980 DATA LARGE SPIDER,3,6
3990 DATA BLACK CAT,2,4
4000 DATA MAN EATING PLANT,1,2
4010 DATA HYDRA,3,6
4020 DATA GELATINOUS CUBE,2,4
4030 DATA GIANT CENTIPEDE,1,2
4040 DATA GIANT RAT,2,4
4050 DATA SHADOW,2,4
4060 PRINT "YOU STUMBLED ONTO . . . . ."
4070 PRINT "A HIDDEN CAVERN":GOSUB 460
4080 PRINT :GOSUB 4210:IF H1<=0 THEN RETURN
4090 W=INT(RND(0)*9+1)
4100 GOSUB 460:IF W>3 THEN PRINT :PRINT "THE CAVERN SEEMS EMPTY .
. .":RETURN
4110 BB=2:GOSUB 470:GOSUB 4500
4120 GOSUB 460:PRINT "BUT WAIT . . BEFORE YOU PROCEED":GOSUB 460:P
RINT
4130 PRINT "YOU HEAR A NOISE OFF IN THE DISTANCE"
4140 BB=2:GOSUB 470
4150 PRINT "CAUTIOUSLY YOU WALK TOWARDS THE SOUND"
4160 BB=3:GOSUB 470:W=INT(RND(0)*4+1):IF HI<H1 THEN 4180
4170 IF W=1 THEN 5040
4180 IF W=2 THEN 5170
4190 IF W=4 AND L1=2 THEN 5720
4200 GOTO 5230
4210 PRINT :PRINT "YOU LOOK AROUND . . . ":GOSUB 460
4220 V=INT(RND(0)*7+1)
4230 IF V>=5 THEN 4250
4240 RETURN
4250 PRINT "ON THE GROUND, AT YOUR FEET, IS A VIAL";
```

```
4260 PRINT :BB=2:GOSUB 470
4270 PRINT "YOU PICK UP THE VIAL . . AND SEE THAT"
4280 PRINT "IT CONTAINS . . . A MILKY LIQUID"
4290 PRINT
4300 PRINT "WOULD YOU LIKE A DRINK?"
4310 PRINT "ENTER (Y)ES  OR  (N)O":DL=INT(RND(0)*6+1)
4320 INPUT D$
4330 IF D$="Y" THEN 4350
4340 RETURN
4350 PRINT :PRINT "YOU TAKE A DRINK . . .":BB=2:GOSUB 470:PRINT CH
R$(125)
4360 IF DL>=3 THEN 4440
4370 IF DL=2 THEN 4480
4380 H3=INT(RND(0)*6+1)*PL:H1=H1-H3
4390 PRINT "YOU FEEL A LITTLE FUNNY . . .":GOSUB 460:GOSUB 460
4400 IF H1<=0 THEN RETURN
4410 PRINT :PRINT "IT WAS A BLACK MAGIC POTION . . ."
4420 PRINT "WHICH DECREASED YOUR HIT-POINTS BY ";H3
4430 RETURN
4440 H3=INT(RND(0)*10/PL+1)+(6/PL):H1=H1+H3
4450 PRINT "IT WAS A WHITE MAGIC POTION . . ."
4460 PRINT "WHICH INCREASED YOUR HIT-POINTS BY ";H3
4470 RETURN
4480 PRINT "THE LIQUID HAD NO EFFECT ON YOU"
4490 RETURN
4500 GOSUB 460:PRINT :RETURN
4510 PRINT :W=INT(RND(0)*4+1)
4520 IF W<=2 THEN 4540
4530 GOSUB 460:GOSUB 4780
4540 IF H1<=0 THEN RETURN
4550 PRINT :PRINT "WILL YOU (F)IGHT OR (R)UN ?"
4560 INPUT F$:PRINT CHR$(125)
4570 IF F$="F" THEN 4600
4580 IF F$="R" THEN 4700
4590 GOTO 4540
4600 PRINT CHR$(125):PRINT :GOSUB 460
4610 PRINT "YOU ATTACK THE . . . ";MS$:GOSUB 460
4620 PRINT "WITH A SWING OF YOUR SWORD"
4630 N=INT(RND(0)*5+1)+INT(RND(0)*CA/2+1):HM=HM-N
4640 IF HM<=0 THEN 4890
4650 PRINT "YOU DO ";N;" HIT POINT(S) OF DAMAGE"
4660 PRINT :GOSUB 460
4670 PRINT "IT HAS . . ";HM;" 'HIT-POINT(S)' LEFT"
4680 PRINT :GOSUB 460
4690 GOTO 4530
4700 W=INT(RND(0)*4+1):C=C1:D=D1
4710 PRINT "YOU QUICKLY RUN OUT . . .":IF TL=1 THEN 5560
4720 N=INT(RND(0)*2+1):BB=2:GOSUB 470:IF W>=3 THEN 5330
4730 H1=H1-N
4740 PRINT "AS YOU LEAVE . . .":PRINT "THE ";MS$;" ATTACKS":GOSUB
460
4750 IF H1<=0 THEN RETURN
4760 PRINT "AND IT DOES ";N;" HIT-POINT(S) OF DAMAGE"
```

Program 34-1-cont. The Dungeon of Danger Program Listing

```
4770 BB=3:GOSUB 470:RETURN
4780 PRINT :W=INT(RND(0)*7+1)
4790 PRINT ". . . . . IT ATTACKS YOU":IF W<=2 THEN 5350
4800 W=INT(RND(0)*6+1):IF W>=3 THEN 4830
4810 N=INT(RND(0)*HP/L1+1)+INT(RND(0)*HP/L1+1)
4820 GOTO 4840
4830 N=INT(RND(0)*HP*PL+1)
4840 IF HM<=2 THEN N=1
4850 H1=H1-N:GOSUB 460:IF H1<=0 THEN RETURN
4860 PRINT "AND IT DOES ";N;" HIT-POINT(S) OF DAMAGE"
4870 PRINT :PRINT "YOU HAVE . . . ";H1;" 'HIT-POINT(S)' LEFT"
4880 PRINT :RETURN
4890 PRINT :GOSUB 460
4900 PRINT "YOU HAVE KILLED THE ";MS$
4910 PRINT
4920 IF A>=6 THEN 4950
4930 IF A=2 THEN 4950
4940 IF L1=1 THEN B(C,D)=1:GOTO 4950
4945 A(C,D)=1
4950 G8=500:IF A>=6 THEN G8=250
4960 G4=INT(RND(0)*G8/L1+1)+75:IF A=2 THEN G4=G4*2
4970 G=G+G4:GOSUB 460
4980 PRINT "YOU SEARCH THE AREA . . . ."
4990 GOSUB 460:PRINT "AND FIND . . . ";G4;" GOLD PIECES"
5000 CA=CA+1:IF K=1 THEN RETURN
5010 IF L1=1 THEN 3190
5020 IF CA=K4 THEN 3110
5030 RETURN
5040 GOSUB 460:GOSUB 460
5050 GOSUB 5290
5060 PRINT "HALT . . . I AM THE ANCIENT WIZARD"
5070 PRINT "I WILL NOT HARM YOU . . . . . .":GOSUB 460:GOSUB 460
5080 PRINT :G4=INT(RND(0)*300+1)+100:G=G+G4:PRINT
5090 PRINT "I GIVE YOU . . . ";G4;" GOLD PIECES"
5100 PRINT "OUT OF GOOD WILL AND FRIENDSHIP"
5110 PRINT
5120 H4=INT(RND(0)*10/PL+1)+(6/PL):H1=H1+H4
5130 PRINT "ALSO, I WILL INCREASE . . . "
5140 PRINT "YOUR 'HIT-POINTS' BY . . . ";H4
5150 GOSUB 460
5160 RETURN
5170 GOSUB 5290
5180 MS$="GIANT SPIDER":HP=6:HM=12
5190 PRINT "IT'S A HUGE MAN-SIZED CRAWLING"
5200 PRINT ". . . . . SPIDER . . .":GOSUB 460
5210 PRINT ". . . . . AND . . . . ."
5220 GOTO 4530
5230 GOSUB 5290
5240 MS$="DARK WIZARD":HP=8:HM=14:PRINT CHR$(125)
5250 PRINT "DO NOT PASS . . . I AM THE ";MS$;:GOSUB 460
5260 PRINT "AND I WILL HACK YOU TO PIECES . . ."
5270 BB=2:GOSUB 470
5280 GOTO 4530
```

Program 34-1-cont. The Dungeon of Danger Program Listing

```
5290 PRINT CHR$(125);"SUDDENLY . . . SOMETHING JUMPS . . ."
5300 PRINT "IN FRONT OF YOU . . . . . ."
5310 BB=3:GOSUB 470:PRINT CHR$(125)
5320 RETURN
5330 GOSUB 460:PRINT "AS YOU LEAVE . . . ";
5340 PRINT "THE ";MS$;" ATTACKS . .":GOSUB 460
5350 GOSUB 460:PRINT "BUT . . . . . IT MISSES":BB=2:GOSUB 47
0
5360 RETURN
5370 BB=2:GOSUB 470:GOSUB 3540:DY=1:H1=HI
5380 PRINT "YOU HAVE ENTERED . . A ZONE"
5390 PRINT "BETWEEN . . LIFE AND DEATH"
5400 PRINT :BB=3:GOSUB 470
5410 PRINT :PRINT "I . . . . THE ANCIENT WIZARD"
5420 PRINT "WILL RESTORE YOUR 'HIT-POINTS' TO ";HI
5430 PRINT "AND . . . . YOU HAVE ONE MORE"
5440 PRINT "CHANCE IN THE DUNGEON"
5450 PRINT :MD=INT(RND(0)*15+1)*CA+10:H1=HI
5460 PRINT "YOU SHALL HAVE ";MD;" MOVES"
5470 PRINT "LEFT TO FIND YOUR WAY OUT"
5480 PRINT "OF THE DUNGEON OF DANGER"
5490 BB=9:GOSUB 470
5500 GOSUB 3540:GOTO 1110
5510 PRINT A$;", YOU HAVE DEPLETED YOUR MOVES"
5520 GOTO 1720
5530 PRINT "ENTER DIFFICULTY LEVEL?"
5540 PRINT "1=MODERATE  2=DIFFICULT"
5550 INPUT PL:PRINT :RETURN
5560 TL=0:BB=2:GOSUB 470
5570 PRINT "YOU REACTIVATED THE TELEPORTATION TRAP"
5580 BB=2:GOSUB 470:GOSUB 3540
5590 PRINT "YOU END UP BACK IN THE AREA WHERE"
5600 PRINT ". . . YOU LAST TELEPORTED FROM":GOSUB 460
5610 BB=2:GOSUB 470:RETURN
5620 IF R<-400 THEN PRINT "INCOMPETENT SERF":RETURN
5630 IF R<-100 THEN PRINT "WEAKLING":RETURN
5640 IF R<0 THEN PRINT "APPRENTICE":RETURN
5650 IF R<100 THEN PRINT "HALFLING":RETURN
5660 IF R<200 THEN PRINT "FOOT SOLDIER":RETURN
5670 IF R<600 THEN PRINT "WARRIOR":RETURN
5680 IF R<900 THEN PRINT "GREAT WARRIOR":RETURN
5690 IF R<1500 THEN PRINT "SWORDSMAN":RETURN
5700 IF R<2500 THEN PRINT "MAGIC SWORDSMAN":RETURN
5710 IF R>=2500 THEN PRINT "DUNGEON MASTER":RETURN
5720 PRINT CHR$(125);"YOU FALL INTO A DEEP . . DARK":GOSUB 460
5730 PRINT ". . . POOL . . OF MURKY WATER":BB=4:GOSUB 470
5740 W=INT(RND(0)*6+1):PRINT :IF W>=5 THEN 5780
5750 IF W>=3 THEN 5860
5760 PRINT "IT IS WARM AND SOOTHING . .AND":BB=2:GOSUB 470
5770 PRINT "YOU CLIMB OUT . . FEELING RELAXED":PRINT :RETURN
5780 MS$="GILL MONSTER":HP=8:HM=14:PRINT CHR$(125)
5790 PRINT "THE WATER IS . . . ICY COLD":BB=5:GOSUB 470:PRINT
5800 PRINT "SUDDENLY . . YOU FEEL SOMETHING WARM"
```

Program 34-1-cont. The Dungeon of Danger Program Listing

```
5810 PRINT " . . . RUB AGAINST YOUR LEGS . . . .":BB=4:GOSUB 470:P
RINT
5820 PRINT "IT THEN SURFACES NEXT TO YOU . . ."
5830 PRINT " AND YOU SEE THAT IT IS A SLIMY . ."
5840 PRINT ". . . ";MS$;" . . READY TO ATTACK";:BB=2:GOSUB 470
5850 PRINT :PRINT "AS YOU CLIMB OUT . . .":GOSUB 460:GOTO 4530
5860 PRINT "THE WATER IS STEAMING . . . . HOT":BB=3:GOSUB 470
5870 PRINT :PRINT "AS YOU QUICKLY JUMP OUT . . . ."
5880 G4=INT(RND(0)*500+1)+100:IF (G-G4)<0 THEN G4=G
5890 G=G-G4:PRINT "YOU DROP . . . ";G4;" GOLD PIECES"
5900 PRINT "WHICH FALL INTO THE POOL . . LOST":BB=5:GOSUB 470:RETU
RN
```

SECTION VI

Graphics and Sound

This last section covers the subject of graphics and sound. Included are five programs that demonstrate graphics animation, and eight programs covering player-missile graphics animation. Chapter 37 details over eighty useful PEEK and POKE addresses used in programming graphics and sound. Finally, the last chapter gives thirty-two different sound effect routines using the SOUND statement.

CHAPTER 35

Redefining the Character Set

At first glance, the Atari keyboard looks like any ordinary typewriter style computer keyboard, except for a few additional keys for editing purposes. But within the computer's hardware and software, Atari has given the user the ability to actually change, or redefine, all or part of the standard character set into different shapes, for uses in graphics programming, or in creating different foreign language character sets. With this technique, you can create character graphics animation in the text mode, and you can design character graphics objects by combining several different redefined characters, using very little extra memory. You may also redefine the character set into graphics symbols for use in foreign languages, like Chinese and Japanese, that do not use the standard alphanumeric symbols available in the ROM character set.

Here are five BASIC programs for redefining the character set. They redefine six characters to demonstrate character graphics animation in the text mode. Each program first moves the ROM (read only memory) character set into RAM (random access memory), and then redefines the characters !, ", #, $, %, and & into the parts of an object used in animating a flying saucer on the screen. This may be used as a basis for developing game programs in BASIC.

PROGRAM 1

Program 1 displays the character set in RAM with the six redefined characters in graphics mode 0. See Program 35-1 for the program listing.

PROGRAM 2

Program 2 creates a star background in graphics mode 0 and moves the redefined character graphics object across the screen, simulating the movement of a flying saucer through space. See Program 35-2 for the program listing.

PROGRAM 3

Program 3 adds sound to program 2. See Program 35-3 for the program listing.

PROGRAM 4

Program 4 creates a star background in graphics mode 1 and moves the large redefined character graphics object across the screen, simulating the movement of a flying saucer through space. See Program 35-4 for the program listing.

PROGRAM 5

Program 5 adds sound to program 4. See Program 35-5 for the program listing.

CHARACTER ENCODING

Each character is made up of an array of small dots called pixels (picture elements), set up on an 8 $\times$ 8 grid. To redefine a character, you must draw the desired shape on graph paper, and then encode each of the eight horizontal lines of the grid into eight bit binary "words" made up of 1s and 0s. Beginning at the top left hand corner of the 8 $\times$ 8 grid, assign a 0 for any blank squares and a 1 for any darkened squares, as shown in Table 35-1. Then convert each eight bit binary encoded "word" into its hexadecimal and decimal equivalents. Each character will have eight of these data bytes to be stored consecutively into a preassigned area in RAM, where the new character set will reside. The decimal values are required for the DATA statements beginning at program line 1000. In the program examples given, each character has its own DATA statement.

See Table 35-1 for the encoding of six shapes used for character graphics animation.

REDEFINING PROCEDURES

A standard character set is permanently fixed in

the ROM. But if you follow these procedures, you may redefine all or part of the character set into graphics characters of your own design. Refer to Table 35-1 and the program examples, Program 1 through Program 5, for clarity.

1. On an 8 × 8 grid, draw and encode the graphics shapes required for your application.
2. Transfer each of the eight bytes, in decimal form, to DATA statements beginning at line 1000. Each character should have its own DATA statement for clarity.
3. Find the top of memory page number for your machine using TM=PEEK(106), and set the character set variable CM=TM−8. CS is the page number where the ROM character set will be transferred into RAM.
4. Then transfer the standard character set from the ROM address 57344 through 58367 into RAM, beginning at location CS*256 and ending at location CS*256+1023. This is performed by the statement POKE CS*256+A,PEEK(RA+A). The variable A is 0 through 1023 and the variable RA=57344.
5. Redefine the desired characters by reading the character encoded bytes from the DATA statements and POKing them into the RAM character set location using POKE CS*256+C+8,D. The variable D holds the encoded data byte.
6. Finally, you must tell the computer to use the new character set in RAM with the statement POKE 756,CS. This statement must be repeated each time a new graphics mode is entered.

For more information on redefining the character set, refer to the following Atari manual:

De Re Atari, A Guide to Effective Programming. Sunnyvale: Atari Program Exchange, APX-90008, 1981.

Table 35-1. Encoding of Six Shapes Used for Character Graphics Animation

	BINARY	HEX	DECIMAL
CHARACTER 1	0 0 0 0 1 0 0 0	08	08
	0 0 0 1 1 1 0 0	1C	28
	0 0 1 1 0 1 1 0	36	54
	0 1 0 0 0 0 0 1	41	65
	0 0 1 1 0 1 1 0	36	54
	0 0 0 1 1 1 0 0	1C	28
	0 0 0 0 1 0 0 0	08	08
CHARACTER 2	0 0 0 0 0 0 0 0	00	00
	0 0 0 0 1 0 0 0	08	08
	0 0 0 1 1 1 0 0	1C	28
	0 0 1 1 0 1 1 0	36	54
	0 1 1 0 0 0 0 1	61	97
	0 0 1 1 0 1 1 0	36	54
	0 0 0 1 1 1 0 0	1C	28
	0 0 0 0 1 0 0 0	08	08
CHARACTER 3	0 0 0 0 0 0 0 0	00	00
	0 0 0 0 1 0 0 0	08	08
	0 0 0 1 1 1 0 0	1C	28
	0 0 1 1 0 1 1 0	36	54
	0 1 0 1 0 0 0 1	51	81
	0 0 1 1 0 1 1 0	36	54
	0 0 0 1 1 1 0 0	1C	28
	0 0 0 0 1 0 0 0	08	08
CHARACTER 4	0 0 0 0 0 0 0 0	00	00
	0 0 0 0 1 0 0 0	08	08
	0 0 0 1 1 1 0 0	1C	28
	0 0 1 1 0 1 1 0	36	54
	0 1 0 0 1 0 0 1	49	73
	0 0 1 1 0 1 1 0	36	54
	0 0 0 1 1 1 0 0	1C	28
	0 0 0 0 1 0 0 0	08	08
CHARACTER 5	0 0 0 0 0 0 0 0	00	00
	0 0 0 0 1 0 0 0	08	08
	0 0 0 1 1 1 0 0	1C	28
	0 0 1 1 0 1 1 0	36	54
	0 1 0 0 0 1 0 1	45	64
	0 0 1 1 0 1 1 0	36	54
	0 0 0 1 1 1 0 0	1C	28
	0 0 0 0 1 0 0 0	08	08
CHARACTER 6	0 0 0 0 0 0 0 0	00	00
	0 0 0 0 1 0 0 0	08	08
	0 0 0 1 1 1 0 0	1C	28
	0 0 1 1 0 1 1 0	36	54
	0 1 0 0 0 0 1 1	43	67
	0 0 1 1 0 1 1 0	36	54
	0 0 0 1 1 1 0 0	1C	28
	0 0 0 0 1 0 0 0	08	08
	0 0 0 0 0 0 0 0	00	00

Program 35-1. Redefining the Character Set—Program 1 Listing

```
100 REM REDEFINING THE CHARACTER SET-PROGRAM 1
110 REM REDEFINE 6 CHARACTERS ENCODED IN DATA STATEMENTS
120 REM BEGINNING AT LINE 1000
130 REM FIND TOP OF MEMORY
140 TM=PEEK(106)
150 REM SUBTRACT 8 FROM TM TO CREATE NEW CHARACTER SET ADDRESS
160 CS=TM-8
170 REM ROM ADDRESS FOR CHARACTER SET  IS IN ADDRESS 57344
180 RA=57344
190 REM MOVE CHARACTER SET FROM ROM TO RAM
200 FOR A=0 TO 1023
210 POKE CS*256+A,PEEK(RA+A)
220 NEXT A
230 REM POKE COMPUTER TO READ THE CHARACTER SET IN RAM
240 POKE 756,CS
250 REM REDEFINE SIX CHARACTERS IN THE RAM CHARACTER SET
260 FOR C=1 TO 48:REM 8*NUMBER OF CHARACTERS TO REDEFINE
270 READ D:REM READ DATA SET BEGINNING AT LINE 1000
280 POKE CS*256+C+8,D:REM POKE NEW CHARACTERS IN RAM
290 NEXT C
300 RESTORE
310 REM DISPLAY NEWLY DEFINED CHARACTER SET
320 FOR A=0 TO 100
330 PRINT CHR$(A);" ";
340 NEXT A
350 END
1000 DATA 8,28,54,65,54,28,8,0
1010 DATA 8,28,54,97,54,28,8,0
1020 DATA 8,28,54,81,54,28,8,0
1030 DATA 8,28,54,73,54,28,8,0
1040 DATA 8,28,54,69,54,28,8,0
1050 DATA 8,28,54,67,54,28,8,0
```

Program 35-2. Redefining the Character Set—Program 2 Listing

```
100 REM REDEFINING THE CHARACTER SET-PROGRAM 2
110 REM REDEFINING 6 CHARACTERS ENCODED IN DATA STATEMENTS
120 REM BEGINNING AT LINE 1000
130 REM MOVING A FLYING SAUCER ACROSS THE SCREEN
140 REM IN GRAPHICS MODE 0
150 REM FIND TOP OF MEMORY
160 TM=PEEK(106)
170 REM SUBTRACT 8 FROM TM TO CREATE NEW CHARACTER SET ADDRESS
180 CS=TM-8
190 REM ROM ADDRESS FOR CHARACTER SET  IS IN ADDRESS 57344
200 RA=57344
210 REM MOVE CHARACTER SET FROM ROM TO RAM
220 FOR A=0 TO 1023
230 POKE CS*256+A,PEEK(RA+A)
240 NEXT A
250 REM POKE COMPUTER TO READ THE CHARACTER SET IN RAM
260 POKE 756,CS
270 REM REDEFINE SIX CHARACTERS IN THE RAM CHARACTER SET
280 FOR C=1 TO 48:REM 8*NUMBER OF CHARACTERS TO REDEFINE
290 READ D:REM READ DATA SET BEGINNING AT LINE 1000
300 POKE CS*256+C+8,D:REM POKE IN THE SIX NEW CHARACTERS
310 NEXT C
320 RESTORE
330 POKE 752,1:REM TURN CURSOR OFF
340 REM SET UP STAR BACKGROUND
350 PRINT CHR$(125):FOR A=1 TO 70
360 X=INT(RND(0)*35+1)
370 Y=INT(RND(0)*20+1)
380 POSITION X,Y:PRINT ".";
390 NEXT A
400 REM MOVE FLYING SAUCER ACROSS SCREEN
410 Y=10:X=0
420 FOR L=1 TO 10
430 POSITION X,Y
440 FOR C=33 TO 38:POSITION X,Y:PRINT CHR$(C)
450 T=2:GOSUB 500
460 NEXT C:POSITION X,Y:PRINT " "
470 X=X+1:IF X<38 THEN 430
480 X=0:NEXT L
490 END
500 REM DELAY FOR SPEED OF SAUCER
510 FOR D=1 TO 2*T
520 NEXT D
530 RETURN
1000 DATA 8,28,54,65,54,28,8,0
1010 DATA 8,28,54,97,54,28,8,0
1020 DATA 8,28,54,81,54,28,8,0
1030 DATA 8,28,54,73,54,28,8,0
1040 DATA 8,28,54,69,54,28,8,0
1050 DATA 8,28,54,67,54,28,8,0
```

Program 35-3. Redefining the Character Set—Program 3 Listing

```
100 REM REDEFINING THE CHARACTER SET-PROGRAM 3
110 REM REDEFINING 6 CHARACTERS ENCODED IN DATA STATEMENTS
120 REM BEGINNING AT LINE 1000
130 REM MOVING A FLYING SAUCER ACROSS THE SCREEN
140 REM IN GRAPHICS MODE 0-WITH SOUND
150 REM FIND TOP OF MEMORY
160 TM=PEEK(106)
170 REM SUBTRACT 8 FROM TM TO CREATE NEW CHARACTER SET ADDRESS
180 CS=TM-8
190 REM ROM ADDRESS FOR CHARACTER SET  IS IN ADDRESS 57344
200 RA=57344
210 REM MOVE CHARACTER SET FROM ROM TO RAM
220 FOR A=0 TO 1023
230 POKE CS*256+A,PEEK(RA+A)
240 NEXT A
250 REM POKE COMPUTER TO READ THE CHARACTER SET IN RAM
260 POKE 756,CS
270 REM REDEFINE SIX CHARACTERS IN THE RAM CHARACTER SET
280 FOR C=1 TO 48:REM 8*NUMBER OF CHARACTERS TO REDEFINE
290 READ D:REM READ DATA SET BEGINNING AT LINE 1000
300 POKE CS*256+C+8,D:REM POKE IN THE SIX NEW CHARACTERS
310 NEXT C
320 RESTORE
330 POKE 752,1:REM TURN CURSOR OFF
340 REM SET UP STAR BACKGROUND
350 PRINT CHR$(125):FOR A=1 TO 70
360 X=INT(RND(0)*35+1)
370 Y=INT(RND(0)*20+1)
380 POSITION X,Y:PRINT ".";
390 NEXT A
400 REM MOVE FLYING SAUCER ACROSS SCREEN
410 Y=10:X=0
420 FOR L=1 TO 10
430 POSITION X,Y
440 FOR C=33 TO 38:POSITION X,Y:PRINT CHR$(C)
450 T=2:GOSUB 500
460 NEXT C:POSITION X,Y:PRINT " "
470 X=X+1:IF X<38 THEN 430
480 X=0:NEXT L
490 END
500 SOUND 0,50,6,8:REM SAUCER SOUND
510 REM DELAY FOR SPEED OF SAUCER
520 FOR D=1 TO 2*T
530 NEXT D:SOUND 0,0,0,0
540 RETURN
1000 DATA 8,28,54,65,54,28,8,0
1010 DATA 8,28,54,97,54,28,8,0
1020 DATA 8,28,54,81,54,28,8,0
1030 DATA 8,28,54,73,54,28,8,0
1040 DATA 8,28,54,69,54,28,8,0
1050 DATA 8,28,54,67,54,28,8,0
```

Program 35-4. Redefining the Character Set—Program 4 Listing

```
100 REM REDEFINING THE CHARACTER SET-PROGRAM 4
110 REM REDEFINE 6 CHARACTERS ENCODED IN DATA STATEMENTS
120 REM BEGINNING AT LINE 1000
130 REM MOVING A FLYING SAUCER ACROSS THE SCREEN
140 REM IN GRAPHICS MODE 1
150 REM FIND TOP OF MEMORY
160 TM=PEEK(106)
170 REM SUBTRACT 8 FROM TM TO CREATE NEW CHARACTER SET ADDRESS
180 CS=TM-8
190 REM ROM ADDRESS FOR CHARACTER SET  IS IN ADDRESS 57344
200 RA=57344
210 REM MOVE CHARACTER SET FROM ROM TO RAM
220 FOR A=0 TO 1023
230 POKE CS*256+A,PEEK(RA+A)
240 NEXT A
250 REM POKE COMPUTER TO READ THE CHARACTER SET IN RAM
260 POKE 756,CS
270 REM REDEFINE SIX CHARACTERS IN THE RAM CHARACTER SET
280 FOR C=1 TO 48:REM 8*NUMBER OF CHARACTERS TO REDEFINE
290 READ D:REM READ DATA SET BEGINNING AT LINE 1000
300 POKE CS*256+C+8,D:REM POKE IN THE SIX NEW CHARACTERS
310 NEXT C
320 RESTORE
330 POKE 752,1:REM TURN CURSOR OFF
340 REM SET UP STAR BACKGROUND
350 GRAPHICS 1+16:POKE 756,CS
360 FOR A=1 TO 70
370 X=INT(RND(0)*19+1)
380 Y=INT(RND(0)*20+1)
390 POSITION X,Y:PRINT #6;".";
400 NEXT A
410 REM MOVE FLYING SAUCER ACROSS SCREEN
420 Y=10:X=0
430 FOR L=1 TO 10
440 POSITION X,Y
450 FOR C=33 TO 38:POSITION X,Y:PRINT #6;CHR$(C)
460 T=2:GOSUB 510
470 NEXT C:POSITION X,Y:PRINT #6;" "
480 X=X+1:IF X<20 THEN 440
490 X=0:NEXT L
500 END
510 REM DELAY TO SET SPEED OF SAUCER
520 FOR D=1 TO 4*T
530 NEXT D
540 RETURN
1000 DATA 8,28,54,65,54,28,8,0
1010 DATA 8,28,54,97,54,28,8,0
1020 DATA 8,28,54,81,54,28,8,0
1030 DATA 8,28,54,73,54,28,8,0
1040 DATA 8,28,54,69,54,28,8,0
1050 DATA 8,28,54,67,54,28,8,0
```

Program 35-5. Redefining the Character Set—Program 5 Listing

```
100 REM REDEFINING THE CHARACTER SET-PROGRAM 5
110 REM REDEFINE 6 CHARACTERS ENCODED IN DATA STATEMENTS
120 REM BEGINNING AT LINE 1000
130 REM MOVING A FLYING SAUCER ACROSS THE SCREEN
140 REM IN GRAPHICS MODE 1-WITH SOUND
150 REM FIND TOP OF MEMORY
160 TM=PEEK(106)
170 REM SUBTRACT 8 FROM TM TO CREATE NEW CHARACTER SET ADDRESS
180 CS=TM-8
190 REM ROM ADDRESS FOR CHARACTER SET  IS IN ADDRESS 57344
200 RA=57344
210 REM MOVE CHARACTER SET FROM ROM TO RAM
220 FOR A=0 TO 1023
230 POKE CS*256+A,PEEK(RA+A)
240 NEXT A
250 REM POKE COMPUTER TO READ THE CHARACTER SET IN RAM
260 POKE 756,CS
270 REM REDEFINE SIX CHARACTERS IN THE RAM CHARACTER SET
280 FOR C=1 TO 48:REM 8*NUMBER OF CHARACTERS TO REDEFINE
290 READ D:REM READ DATA SET BEGINNING AT LINE 1000
300 POKE CS*256+C+8,D:REM POKE IN THE SIX NEW CHARACTERS
310 NEXT C
320 RESTORE
330 POKE 752,1:REM TURN CURSOR OFF
340 REM SET UP STAR BACKGROUND
350 GRAPHICS 1+16:POKE 756,CS
360 FOR A=1 TO 70
370 X=INT(RND(0)*19+1)
380 Y=INT(RND(0)*20+1)
390 POSITION X,Y:PRINT #6;".";
400 NEXT A
410 REM MOVE FLYING SAUCER ACROSS SCREEN
420 Y=10:X=0
430 FOR L=1 TO 10
440 POSITION X,Y
450 FOR C=33 TO 38:POSITION X,Y:PRINT #6;CHR$(C)
460 T=2:GOSUB 510
470 NEXT C:POSITION X,Y:PRINT #6;" "
480 X=X+1:IF X<20 THEN 440
490 X=0:NEXT L
500 END
510 SOUND 0,50,6,8:REM SAUCER SOUND
520 REM DELAY TO SET SPEED OF SAUCER
530 FOR D=1 TO 4*T
540 NEXT D:SOUND 0,0,0,0
550 RETURN
1000 DATA 8,28,54,65,54,28,8,0
1010 DATA 8,28,54,97,54,28,8,0
1020 DATA 8,28,54,81,54,28,8,0
1030 DATA 8,28,54,73,54,28,8,0
1040 DATA 8,28,54,69,54,28,8,0
1050 DATA 8,28,54,67,54,28,8,0
```

CHAPTER 36

Animation Using Player-Missile Graphics

Player-Missile Graphics is a built-in feature of the Atari home computer, specifically designed for programming animation. It is very useful for programming games and simulations in BASIC. Here are eight BASIC programs demonstrating animation using player-missile graphics. Each of the programs follows a specific procedure required to create animation using BASIC. To aid in understanding the procedure, many of the important steps are commented on using the REM statement.

PROGRAM 1

Player-missile graphics program 1. Move player 0 from left to right. See Program 36-1 for the program listing.

PROGRAM 2

Player-missile graphics program 2. Move player 0 from left to right and from right to left. See Program 36-2 for the program listing.

PROGRAM 3

Player-missile graphics program 3. Move player 0 horizontally and vertically. See Program 36-3 for the program listing.

PROGRAM 4

Player-missile graphics program 4. Move player 0 horizontally and vertically, with a star background and sound. Player appears behind stars. See Program 36-4 for the program listing.

PROGRAM 5

Player-missile graphics program 5. Move player 0 horizontally and vertically, with a star background and sound. Player appears in front of stars. See Program 36-5 for the program listing.

PROGRAM 6

Player-missile graphics program 6. Move player 0 from left to right. Move player 1 from right to left. See Program 36-6 for the program listing.

PROGRAM 7

Player-missile graphics program 7. Move player 0 from left to right and fire missile. See Program 36-7 for the program listing.

PROGRAM 8

Player-missile graphics program 8. Move player 0 from left to right. Move player 1 from right to left. Change width of players as they move. See Program 36-8 for the program listing.

PLAYER ENCODING

Player-missile graphics allows you to have four players, players 0 through 3, with their corresponding missiles. Each player is made up of an array of small dots called pixels (picture elements). Players can have a maximum height of 256 lines and a width of 8 bits (one byte). Each of the four missiles is 2 bits wide, but is packed into one data byte, and uses the same RAM for movement. To move a single missile, it must be masked out from the other three, and then moved through the missile RAM.

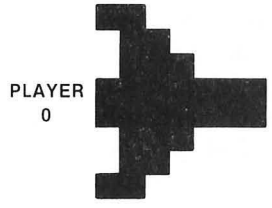
In this example, the player is set up on an 8 × 8 grid. To create a player, you must draw the desired shape on graph paper, and then encode each of the eight horizontal lines of the grid into eight bit binary "words" made up of 1s and 0s. Beginning at the top left hand corner of the 8 × 8 grid, assign a 0 for any blank squares and a 1 for any darkened

squares, as shown in Table 36-1. Then convert each eight bit binary encoded "word" into its hexadecimal and decimal equivalents. Each player will have eight of these data bytes defining its shape. They are to be stored consecutively into a preassigned player-missile area in RAM (usually 2K from the top of RAM).

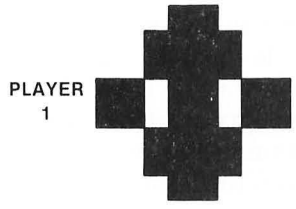
The player encoded data is read from DATA statements and stored into its corresponding player RAM.

See Table 36-1 for the encoding of two shapes used for player-missile graphics animation.

Table 36-1. Encoding of Two Shapes Used for Player-Missile Graphics Animation



BINARY	HEX	DECIMAL
1 1 0 0 0 0 0 0	C0	192
0 1 1 0 0 0 0 0	60	96
0 1 1 1 0 0 0 0	70	112
1 1 1 1 1 1 1 0	FE	254
1 1 1 1 1 1 1 0	FE	254
0 1 1 1 0 0 0 0	70	112
0 1 1 0 0 0 0 0	60	96
1 1 0 0 0 0 0 0	C0	192



0 0 0 1 1 0 0 0	18	24
0 0 1 1 1 1 0 0	3C	60
0 0 1 1 1 1 0 0	3C	60
1 1 0 1 1 0 1 1	DB	219
1 1 0 1 1 0 1 1	DB	219
0 0 1 1 1 1 0 0	3C	60
0 0 1 1 1 1 0 0	3C	60
0 0 0 1 1 0 0 0	18	24

PLAYER-MISSILE GRAPHICS PROCEDURES

The following procedures describe the steps involved in creating animation using player-missile graphics. It details Program 36-1. All other program examples start out similarly, but are changed enough to demonstrate some of the different features offered by player-missile graphics. Refer to Table 36-1 and program examples 1 through 8 for clarity.

1. On an 8 × 8 grid, draw and encode the graphics shapes required for your application. You are limited to four players with their corresponding missiles.
2. Transfer each of the eight bytes, in decimal form, to DATA statements beginning at line 1000. Each player should have its own DATA statement for clarity.
3. Find the page number for the top 2K of RAM used for player-missile graphics with BP=PEEK(106)−8.
4. Find the RAM address of player-missile base using PA=BP*256.
5. Tell the computer where the player-missile RAM is located with POKE 54279,BP.
6. Enable DMA with double-line resolution using POKE 559,46.
7. Enable player-missile display with POKE 53277,3.
8. Set up player's initial horizontal and vertical position with H=60 and V=50.
9. Clear player 0 RAM with

```
340 FOR A=PA+512 TO PA+640
350 POKE A,0
360 NEXT A
```

10. Read player 0 data from the DATA statement at line 1000, and store it into the player 0 RAM using

```
380 FOR P=PA+512+V TO PA+519+V
390 READ D
400 POKE P,D
410 NEXT P:RESTORE
```

11. Set up player 0 color as blue with POKE 704,130.

12. Move player 0 from left to right with

```
450 FOR D=1 TO 5
460 FOR A=1 TO 130
470 POKE 53248,H+A
480 GOSUB 700:REM GOSUB DELAY
490 NEXT A
500 NEXT D
```

13. And finally, clear player 0 from the display using POKE 53248,0.

HORIZONTAL PLAYER-MISSILE MOVEMENT

To move a player or missile horizontally, you must use the horizontal position registers assigned to each player and missile. By Poking a value between 47 and 208 into their horizontal position registers, you can easily move a player or missile horizontally from BASIC. To move the player from left to right you simply POKE the player into its initial horizontal and vertical position in its player-missile RAM area. Then you increment the initial horizontal position value by one, and POKE the number back into the horizontal position register. This is continued until the player reaches the right edge of the screen. A value of 47 is the left visible edge of the display and 208 is the right visible edge. To clear the player from the display, set the horizontal position value to 0. This moves the player off the screen to the left; but the image is still present in the player RAM. The following is a list of player-missile horizontal position register addresses.

PLAYER-MISSILE	ADDRESS
Player 0	53248
Player 1	53249
Player 2	53250
Player 3	53251
Missile 0	53252
Missile 1	53253
Missile 2	53254
Missile 3	53255

PLAYER-MISSILE BASE REGISTER

The player-missile base register at location 54279 contains the page number of the player-missile RAM area. This area is assigned on either 1K or 2K boundaries and is usually located near the top of your system's RAM. The page number of the top of RAM is found in the register at location 106 using P=PEEK(106). By subtracting 8 from that number, you get the page number of the player-missile base address (a page is 256 bytes long). The statement BP=PEEK(106)−8 is used to set up the player-missile base address at 2K from the top of RAM. And POKE 54279,BP tells the computer the page number of the player-missile base. The address of the player-missile RAM area is then found with the statement PA=BP*256.

The player-missile base address is used to access the player-missile RAM for storage of the image data and for use in vertical player-missile movement. It is used, with an offset number, to store player image data into the player RAM.

VERTICAL PLAYER-MISSILE MOVEMENT

Vertical player-missile movement is more difficult to program than horizontal movement. This is because the player-missile image data must be moved through the respective RAMs, byte by byte. You cannot move players vertically by changing one value in a register, as with horizontal movement. To move a player vertically, you must first locate its current vertical position. Then rewrite the eight byte encoded image up or down in its player RAM. A missile is moved vertically in a similar manner, but only one single missile byte is moved through the missile RAM area. Missiles are more difficult to move, since all four are encoded into one byte. Thus, each missile must be masked out before moving it through the missile RAM. Missiles are encoded in 2 bits of the byte starting with missile 0, at bit 0 and 1. For example, to move missile 0 vertically, you must POKE the number 3 through the missile RAM area. To move missile 1, POKE the number 12 through the missile RAM. The following are the masked out numbers for moving missiles through their RAM area:

MISSILE	MASKED OUT NUMBER
Missile 0	3
Missile 1	12
Missile 2	48
Missile 3	192

To move a player or missile vertically, besides moving them through their RAM areas, you must remember to erase either part, or all, of the last image displayed; this is done by zeroing the previous image. Otherwise, you will see both vertical images on the screen (its new vertical position and its last vertical position). Vertical player-missile movement can be accomplished by Poking the player or missile image into its new position, but this tends to be a slow process. A better and faster way to move a player or missile vertically is with a machine-language routine called from BASIC with the USR function.

The following address offsets are used to access the player-missile RAM for double-line resolution player-missile graphics:

MISSILE RAM AREA
Player-Missile Base Address + 384

PLAYER 0 RAM AREA
Player-Missile Base Address + 512

PLAYER 1 RAM AREA
Player-Missile Base Address + 640

PLAYER 2 RAM AREA
Player-Missile Base Address + 768

PLAYER 3 RAM AREA
Player-Missile Base Address + 896

The following address offsets are used to access the player-missile RAM for single-line resolution player-missile graphics:

MISSILE RAM AREA
Player-Missile Base Address + 768

PLAYER 0 RAM AREA
Player-Missile Base Address + 1024

PLAYER 1 RAM AREA
Player-Missile Base Address + 1280

PLAYER 2 RAM AREA
Player-Missile Base Address + 1536

PLAYER 3 RAM AREA
Player-Missile Base Address + 1792

PLAYER-MISSILE COLOR REGISTERS

The following registers are used to set up the color of players and missiles. Each player may be assigned a single color, but that color will also be assigned to its corresponding missile. Thus, player 0 and missile 0 will be assigned the same color when you POKE a color number into the register 704.

PLAYER-MISSILE COLOR REGISTER	ADDRESS
Player-Missile Color Register 0	704
Player-Missile Color Register 1	705
Player-Missile Color Register 2	706
Player-Missile Color Register 3	707

The value Poked into the color register is used to create different colors and shadings. This must be an even number between 0 and 255. Here are several colors and their associated numerical values.

COLOR	VALUE
Gray	2
Yellow	20 or 42
Orange	36
Red	50 or 68
Purple	84 or 98
Blue	114 or 130
Green	178 or 196

Experiment with different values for varied colors and shadings.

PLAYER-MISSILE WIDTH REGISTERS

Each player may be displayed in one of three different widths. The width is determined by the number Poked into the player's width register. Poking a 0 in this register gives a player normal width, a 1 gives twice the normal width, and a 3 gives four times the normal width.

The missile width function is identical to the player width function, allowing three different widths, except that there is only one register for all four missiles. Therefore, all missiles must have the same width.

WIDTH REGISTER	ADDRESS
Player 0 Width	53256
Player 1 Width	53257
Player 2 Width	53258
Player 3 Width	53259
Missile Width	53260

POKE 53256,0 gives player 0 normal width
POKE 53256,1 gives player 0 double width
POKE 53256,3 gives player 0 quadruple width

GRAPHICS CONTROL REGISTER

The register at location 53277 is used to enable DMA (direct memory access) for player-missile graphics.

POKE 53277,1 enables player DMA only.
POKE 53277,2 enables missile DMA only.
POKE 53277,3 enables a combined player-missile DMA.

DMA CONTROL REGISTER

The register at location 559 is used to enable the DMA for player-missile graphics.

POKE 559,46 will enable player-missile graphics with double-line resolution.
POKE 559,62 will enable player-missile graphics with single-line resolution

For more information on player-missile graphics, refer to the following Atari manual:

De Re Atari, *A Guide to Effective Programming.* Sunnyvale: Atari Program Exchange, APX-90008, 1981.

Program 36-1 Player-Missile Graphics Program 1 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 1
110 REM MOVE PLAYER 0 FROM LEFT TO RIGHT
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50
330 REM CLEAR PLAYER 0 RAM
340 FOR A=PA+512 TO PA+640
350 POKE A,0
360 NEXT A
370 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
380 FOR P=PA+512+V TO PA+519+V
390 READ D
400 POKE P,D
410 NEXT P:RESTORE
420 REM SET UP PLAYER 0 COLOR AS BLUE
430 POKE 704,130
440 REM MOVE PLAYER 0 FROM LEFT TO RIGHT
450 FOR D=1 TO 5
460 FOR A=1 TO 130
470 POKE 53248,H+A
480 GOSUB 700:REM GOSUB DELAY
490 NEXT A
500 NEXT D
510 REM CLEAR PLAYER 0 FROM DISPLAY
520 POKE 53248,0
530 END
700 FOR T=1 TO 5
710 NEXT T
720 RETURN
990 REM ENCODED PLAYER 0 DATA
1000 DATA 192,96,112,254,254,112,96,192
```

Program 36-2. Player-Missile Graphics Program 2 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 2
110 REM MOVE PLAYER 0 FROM LEFT TO RIGHT
120 REM AND FROM RIGHT TO LEFT
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER-MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50
330 REM CLEAR PLAYER 0 RAM
340 FOR A=PA+512 TO PA+640
350 POKE A,0
360 NEXT A
370 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
380 FOR P=PA+512+V TO PA+519+V
390 READ D
400 POKE P,D
410 NEXT P:RESTORE
420 REM SET UP PLAYER 0 COLOR AS GREEN
430 POKE 704,194
440 REM MOVE PLAYER 0
450 FOR D=1 TO 5
460 REM MOVE LEFT TO RIGHT
470 FOR A=1 TO 130
480 POKE 53248,H+A
490 GOSUB 700:REM GOSUB DELAY
500 NEXT A
510 REM MOVE RIGHT TO LEFT
520 FOR A=130 TO 1 STEP -1
530 POKE 53248,H+A
540 GOSUB 700:REM GOSUB DELAY
550 NEXT A
560 NEXT D
570 REM CLEAR PLAYER 0 FROM DISPLAY
580 POKE 53248,0
590 END
700 FOR T=1 TO 5
710 NEXT T
720 RETURN
990 REM ENCODED PLAYER 0 DATA
1000 DATA 24,60,60,219,219,60,60,24
```

Program 36-3. Player-Missile Graphics Program 3 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 3
110 REM MOVE PLAYER 0 HORIZONTALLY AND VERTICALLY
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER-MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50
330 REM CLEAR PLAYER 0 RAM
340 FOR A=PA+512 TO PA+640
350 POKE A,0
360 NEXT A
370 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
380 FOR P=PA+512+V TO PA+519+V
390 READ D
400 POKE P,D
410 NEXT P:RESTORE
420 REM SET UP PLAYER 0 COLOR AS GREEN
430 POKE 704,194
440 REM MOVE PLAYER 0
450 FOR D=1 TO 5
460 REM MOVE LEFT TO RIGHT
470 FOR A=1 TO 130:IF A=65 THEN GOSUB 600
480 POKE 53248,H+A
490 GOSUB 700:REM GOSUB DELAY
500 NEXT A
510 REM MOVE RIGHT TO LEFT
520 FOR A=130 TO 1 STEP -1:IF A=65 THEN GOSUB 650
530 POKE 53248,H+A
540 GOSUB 700:REM GOSUB DELAY
550 NEXT A
560 NEXT D
570 REM CLEAR PLAYER 0 FROM DISPLAY
580 POKE 53248,0
590 END
600 REM MOVE PLAYER 0 VERTICALLY UPWARDS
610 FOR M=1 TO 20
620 FOR P=PA+512+V-M TO PA+519+V-M
630 POKE P,PEEK(P+1):POKE P+1,0
640 NEXT P:NEXT M:RETURN
650 REM MOVE PLAYER 0 VERTICALLY DOWNWARDS
660 FOR M=1 TO 20
670 FOR P=PA+519+V-20+M TO PA+512+V-20+M STEP -1
680 POKE P,PEEK(P-1):POKE P-1,0
690 NEXT P:NEXT M:RETURN
700 FOR T=1 TO 2
```

Program 36-3-cont. Player-Missile Graphics Program 3 Listing

```
710 NEXT T
720 RETURN
990 REM ENCODED PLAYER 0 DATA
1000 DATA 24,60,60,219,219,60,60,24
```

Program 36-4. Player-Missile Graphics Program 4 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 4
110 REM MOVE PLAYER 0 HORIZONTALLY AND VERTICALLY
120 REM WITH A STAR BACKGROUND AND SOUND
130 REM PLAYER APPEARS BEHIND STARS
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER-MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE.RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50
330 REM CLEAR PLAYER 0 RAM
340 FOR A=PA+512 TO PA+640
350 POKE A,0:NEXT A
360 GOSUB 730:REM ADD STAR BACKGROUND AND SOUND
370 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
380 FOR P=PA+512+V TO PA+519+V
390 READ D
400 POKE P,D
410 NEXT P:RESTORE
420 REM SET UP PLAYER 0 COLOR AS GREEN
430 POKE 704,194
440 REM MOVE PLAYER 0
450 FOR D=1 TO 5
460 REM MOVE LEFT TO RIGHT
470 FOR A=1 TO 130:IF A=65 THEN GOSUB 600
480 POKE 53248,H+A
490 GOSUB 700:REM GOSUB DELAY
500 NEXT A
510 REM MOVE RIGHT TO LEFT
520 FOR A=130 TO 1 STEP -1:IF A=65 THEN GOSUB 650
530 POKE 53248,H+A
540 GOSUB 700:REM GOSUB DELAY
550 NEXT A
560 NEXT D
570 REM CLEAR PLAYER 0 FROM DISPLAY
580 POKE 53248,0
590 SOUND 0,0,0,0:SOUND 1,0,0,0:END
600 REM MOVE PLAYER 0 VERTICALLY UPWARDS
610 FOR M=1 TO 20
620 FOR P=PA+512+V-M TO PA+519+V-M
630 POKE P,PEEK(P+1):POKE P+1,0
640 NEXT P:NEXT M:RETURN
650 REM MOVE PLAYER 0 VERTICALLY DOWNWARDS
660 FOR M=1 TO 20
670 FOR P=PA+519+V-20+M TO PA+512+V-20+M STEP -1
680 POKE P,PEEK(P-1):POKE P-1,0
```

Program 36-4-cont. Player-Missile Graphics Program 4 Listing

```
690 NEXT P:NEXT M:RETURN
700 FOR T=1 TO 2
710 NEXT T
720 RETURN
730 POKE 752,1:REM TURN OFF CURSOR
740 REM GENERATE STARS
750 FOR ST=1 TO 50:X1=INT(RND(0)*37+1)
760 Y1=INT(RND(0)*23+1):POSITION X1,Y1
770 PRINT ".";:NEXT ST
780 REM CREATE SOUND
790 SOUND 0,19,6,8:SOUND 1,59,6,8
800 RETURN
990 REM ENCODED PLAYER 0 DATA
1000 DATA 24,60,60,219,219,60,60,24
```

Program 36-5. Player-Missile Graphics Program 5 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 5
110 REM MOVE PLAYER 0 HORIZONTALLY AND VERTICALLY
120 REM WITH A STAR BACKGROUND AND SOUND
130 REM PLAYER APPEARS IN FRONT OF STARS
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER-MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50
330 REM CLEAR PLAYER 0 RAM
340 FOR A=PA+512 TO PA+640
350 POKE A,0:NEXT A
360 GOSUB 730:REM ADD STAR BACKGROUND AND SOUND
370 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
380 FOR P=PA+512+V TO PA+519+V
390 READ D
400 POKE P,D
410 NEXT P:RESTORE
420 REM SET UP PLAYER 0 COLOR AS GREEN
430 POKE 704,194
440 REM MOVE PLAYER 0
450 FOR D=1 TO 5
460 REM MOVE LEFT TO RIGHT
470 FOR A=1 TO 130:IF A=65 THEN GOSUB 600
480 POKE 53248,H+A
490 GOSUB 700:REM GOSUB DELAY
500 NEXT A
510 REM MOVE RIGHT TO LEFT
520 FOR A=130 TO 1 STEP -1:IF A=65 THEN GOSUB 650
530 POKE 53248,H+A
540 GOSUB 700:REM GOSUB DELAY
550 NEXT A
560 NEXT D
570 REM CLEAR PLAYER 0 FROM DISPLAY
580 POKE 53248,0
590 SOUND 0,0,0,0:SOUND 1,0,0,0:POKE 623,0:END
600 REM MOVE PLAYER 0 VERTICALLY UPWARDS
610 FOR M=1 TO 20
620 FOR P=PA+512+V-M TO PA+519+V-M
630 POKE P,PEEK(P+1):POKE P+1,0
640 NEXT P:NEXT M:RETURN
650 REM MOVE PLAYER 0 VERTICALLY DOWNWARDS
660 FOR M=1 TO 20
670 FOR P=PA+519+V-20+M TO PA+512+V-20+M STEP -1
680 POKE P,PEEK(P-1):POKE P-1,0
```

Program 36-5-cont. Player-Missile Graphics Program 5 Listing

```
690 NEXT P:NEXT M:RETURN
700 FOR T=1 TO 2
710 NEXT T
720 RETURN
730 POKE 752,1:REM TURN OFF CURSOR
740 POKE 623,64:REM SET UP PLAYER IN FRONT OF STARS
750 REM GENERATE STARS
760 FOR ST=1 TO 50:X1=INT(RND(0)*37+1)
770 Y1=INT(RND(0)*23+1):POSITION X1,Y1
780 PRINT ".";:NEXT ST
790 REM CREATE SOUND
800 SOUND 0,19,6,8:SOUND 1,59,6,8
810 RETURN
990 REM ENCODED PLAYER 0 DATA
1000 DATA 24,60,60,219,219,60,60,24
```

Program 36-6. Player-Missile Graphics Program 6 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 6
110 REM MOVE PLAYER 0 FROM LEFT TO RIGHT
120 REM MOVE PLAYER 1 FROM RIGHT TO LEFT
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER-MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50:H1=190:V1=60
330 REM CLEAR PLAYER 0 AND PLAYER 1 RAM
340 FOR A=PA+512 TO PA+768
350 POKE A,0
360 NEXT A
370 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
380 FOR P=PA+512+V TO PA+519+V
390 READ D:POKE P,D:NEXT P
400 REM READ PLAYER 1 DATA INTO RAM FROM DATA AT 1010
410 FOR P=PA+640+V1 TO PA+647+V1
420 READ D:POKE P,D:NEXT P:RESTORE
430 POKE 704,130:REM SET PLAYER 0 COLOR AS BLUE
440 POKE 705,194:REM SET PLAYER 1 COLOR AS GREEN
450 REM MOVE PLAYER 0 AND PLAYER 1
460 FOR D=1 TO 5:FOR A=1 TO 130
470 POKE 53248,H+A:REM MOVE PLAYER 0 FROM LEFT TO RIGHT
480 POKE 53249,H1-A:REM MOVE PLAYER 1 FROM RIGHT TO LEFT
490 GOSUB 700:REM GOSUB DELAY
500 NEXT A:NEXT D
510 REM CLEAR PLAYER 0 FROM DISPLAY
520 POKE 53248,0
530 REM CLEAR PLAYER 1 FROM DISPLAY
540 POKE 53249,0
550 END
700 FOR T=1 TO 2
710 NEXT T
720 RETURN
990 REM ENCODED PLAYER 0 AND PLAYER 1 DATA
1000 DATA 192,96,112,254,254,112,96,192
1010 DATA 24,60,60,219,219,60,60,24
```

Program 36-7. Player-Missile Graphics Program 7 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 7
110 REM MOVE PLAYER 0 FROM LEFT TO RIGHT
120 REM AND FIRE MISSILE
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER-MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50:MH=110:MV=54
330 REM CLEAR PLAYER 0 RAM
340 FOR A=PA+512 TO PA+640
350 POKE A,0:NEXT A
360 REM CLEAR MISSILE RAM
370 FOR A=PA+384 TO PA+512
380 POKE A,0:NEXT A
390 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
400 FOR P=PA+512+V TO PA+519+V
410 READ D:POKE P,D:NEXT P:RESTORE
420 REM POKE MISSILE 0 INTO MISSILE RAM
430 POKE PA+384+MV,3
440 REM SET UP PLAYER-MISSILE 0 COLOR AS BLUE
450 POKE 704,130
460 REM MOVE PLAYER 0 FROM LEFT TO RIGHT-FIRE MISSILE
470 FOR D=1 TO 5:FOR A=1 TO 130
480 POKE 53248,H+A:IF A=50 THEN GOSUB 730
490 GOSUB 700:REM GOSUB DELAY
500 NEXT A:NEXT D
510 REM CLEAR PLAYER-MISSILE 0 FROM DISPLAY
520 POKE 53248,0:POKE 53252,0
530 END
700 FOR T=1 TO 5
710 NEXT T
720 RETURN
730 REM STOP PLAYER 0 TO SHOOT MISSILE
740 FOR X=1 TO 3
750 FOR Z=1 TO 100:POKE 53252,MH+Z
760 FOR T=1 TO 4:NEXT T
770 NEXT Z:NEXT X
780 POKE 53252,0:RETURN
990 REM ENCODED PLAYER 0 DATA
1000 DATA 192,96,112,254,254,112,96,192
```

Program 36-8. Player-Missile Graphics Program 8 Listing

```
100 REM PLAYER-MISSILE GRAPHICS PROGRAM 8
110 REM MOVE PLAYER 0 FROM LEFT TO RIGHT
120 REM MOVE PLAYER 1 FROM RIGHT TO LEFT
130 REM CHANGE WIDTH OF PLAYERS AS THEY MOVE
200 GRAPHICS 0
210 SETCOLOR 2,0,0
220 REM FIND PAGE # OF TOP 2K OF RAM FOR PLAYER-MISSILE
230 BP=PEEK(106)-8
240 PA=BP*256:REM RAM ADDRESS OF PLAYER-MISSILE BASE
250 REM TELL COMPUTER WHERE PLAYER-MISSILE RAM IS LOCATED
260 POKE 54279,BP
270 REM ENABLE DMA WITH DOUBLE LINE RESOLUTION
280 POKE 559,46
290 REM ENABLE PLAYER-MISSILE DISPLAY
300 POKE 53277,3
310 REM SET UP INITIAL HORIZONTAL AND VERTICAL POSITION
320 H=60:V=50:H1=190:V1=60
330 REM CLEAR PLAYER 0 AND PLAYER 1 RAM
340 FOR A=PA+512 TO PA+768
350 POKE A,0
360 NEXT A
370 REM READ PLAYER 0 DATA INTO RAM FROM DATA AT 1000
380 FOR P=PA+512+V TO PA+519+V
390 READ D:POKE P,D:NEXT P
400 REM READ PLAYER 1 DATA INTO RAM FROM DATA AT 1010
410 FOR P=PA+640+V1 TO PA+647+V1
420 READ D:POKE P,D:NEXT P:RESTORE
430 POKE 704,130:REM SET PLAYER 0 COLOR AS BLUE
440 POKE 705,194:REM SET PLAYER 1 COLOR AS GREEN
450 REM MOVE PLAYER 0 AND PLAYER 1
460 FOR D=1 TO 5:FOR A=1 TO 130
470 POKE 53248,H+A:REM MOVE PLAYER 0 FROM LEFT TO RIGHT
480 POKE 53249,H1-A:REM MOVE PLAYER 1 FROM RIGHT TO LEFT
490 GOSUB 700:REM GOSUB DELAY
500 NEXT A:NEXT D
510 REM CLEAR PLAYER 0 FROM DISPLAY
520 POKE 53248,0
530 REM CLEAR PLAYER 1 FROM DISPLAY
540 POKE 53249,0
550 END
700 FOR T=1 TO 2
710 NEXT T
720 IF A=43 THEN GOSUB 800
730 IF A=86 THEN GOSUB 840
740 IF A=130 THEN GOSUB 880
750 RETURN
800 REM DOUBLE WIDTH
810 POKE 53256,1:REM PLAYER 0
820 POKE 53257,1:REM PLAYER 1
830 RETURN
840 REM QUADRUPLE WIDTH
850 POKE 53256,3:REM PLAYER 0
860 POKE 53257,3:REM PLAYER 1
```

Program 36-8-cont. Player-Missile Graphics Program 8 Listing

```
870 RETURN
880 REM NORMAL WIDTH
890 POKE 53256,0:REM PLAYER 0
900 POKE 53257,0:REM PLAYER 1
910 RETURN
990 REM ENCODED PLAYER 0 AND PLAYER 1 DATA
1000 DATA 192,96,112,254,254,112,96,192
1010 DATA 24,60,60,219,219,60,60,24
```

CHAPTER 37

Some Useful PEEKs and POKEs

Here are some useful PEEKS and POKES, and their functions, for use in programming graphics and sound with the Atari.

PEEK AND POKE APPLICATION EXAMPLE

To change the operating system top of memory pointer to reserve 4K (4096 bytes) of memory from the top of your system's RAM for special programs or data storage, use the following procedure:

1. Find the top of memory address for your system with the statements:

   A=PEEK(741)+PEEK(742)*256

2. Subtract 4K from the address in A with the statement:

   B=A−4*1024

   B now has the address for the new top of memory.
3. Break the address in B into the high and low bytes with the statements:

   HI=INT(B/256):LO=B−H*256

4. Set the new top of memory address in your system with the statements:

   POKE 741,LO:POKE 742,HI

DISABLE BEEPING DURING I/O

POKE 65,0 will disable the beeping sounds through your television set during tape or disk i/o operations.

DISABLE ATTRACT MODE

The Attract mode is a built-in feature to help protect your color tv screen from image burn in. If there is no keyboard entry after seven to nine minutes, then the computer will rotate the colors displayed at reduced luminance (intensity). But if you write programs that use only the joystick for input, as with most game programs, then you must disable the Attract mode. POKE 77,127 will disable this mode. Insert it into the joystick scan routine. POKE 77,128 will activate the Attract mode.

LEFT MARGIN

PEEK(82)

gives the left margin on your screen in graphics mode 0. The default value is 2. You may POKE values between 0 and 39 to change the margin setting.

RIGHT MARGIN

The statement

PEEK(83)

gives the right margin on your screen in graphics mode 0. The default value is 39. You may POKE values between 0 and 39 to change the margin setting.

CURRENT GRAPHICS CURSOR ROW

The statement

PEEK(84)

is used to find the current graphics cursor row. You may POKE into the address 84 to change cursor's position.

CURRENT GRAPHICS CURSOR COLUMN

To find the current graphics cursor column use the following statements:

CC=PEEK(85)+PEEK(86)*256:PRINT CC

LOWEST ADDRESS OF SCREEN MEMORY

To find the lowest address of your screen memory use the following statements:

```
LA=PEEK(88)+PEEK(89)*256:PRINT LA
```

PREVIOUS GRAPHICS CURSOR ROW

The statement

```
PEEK(90)
```

gives the previous graphics cursor row.

PREVIOUS GRAPHICS CURSOR COLUMN

To find the previous graphics cursor column use the following statements:

```
PC=PEEK(91)+PEEK(92)*256:PRINT PC
```

ACTUAL TOP OF RAM

To find the actual top of RAM memory, which is given as the number of pages (a page is 256 bytes of memory), use the following statements:

```
RP=PEEK(106):PRINT RP
```

BASIC LOW MEMORY POINTER

To find the BASIC low memory pointer use the following statements:

```
LM=PEEK(128)+PEEK(129)*256:PRINT LM
```

BASIC VARIABLE NAME TABLE

To find the BASIC variable name table address use the following statements:

```
VN=PEEK(130)+PEEK(131)*256:PRINT VN
```

BASIC VARIABLE NAME TABLE ENDING ADDRESS

To find the BASIC variable name table ending address use the following statements:

```
VE=PEEK(132)+PEEK(133)*256:PRINT VE
```

BASIC VARIABLE VALUE TABLE ADDRESS

To find the BASIC variable value table address use the following statements:

```
VV=PEEK(134)+PEEK(135)*256:PRINT VV
```

BASIC TOP OF MEMORY POINTER

To find the BASIC top of memory pointer, which gives you the end of the user program, use the following statements:

```
MT=PEEK(144)+PEEK(145)*256:PRINT MT
```

TURN ANTIC DISPLAY CHIP OFF

To turn the Antic display chip off, to increase your programming speed by about 30%, first find the number that is used to keep the display on with N=PEEK(559). Then POKE 559,0 to disable the Antic chip. To turn the display back on POKE 559,N.

PLAYER-MISSILE GRAPHICS DMA CONTROL REGISTER

The Statement

```
POKE 559,46
```

enables player-missile DMA with double-line resolution. The statement

```
POKE 559,62
```

enables player-missile DMA with single-line resolution.

DISPLAY LIST POINTER

The statements

```
DL=PEEK(560)+PEEK(561)*256:PRINT DL
```

give the starting address of the display list. Changing the contents of the display list can produce various screen effects.

LIGHT PEN HORIZONTAL VALUE

The statement

```
PEEK(564)
```

gives the light pen horizontal value.

LIGHT PEN VERTICAL VALUE

The statement

```
PEEK(565)
```

gives the light pen vertical value.

PLAYER-MISSILE GRAPHICS PRIORITY REGISTER

POKE into register 623 to select player-missile graphics priorities. Use this register to choose which objects will appear in front of other objects on the display.

PADDLE VALUES

PEEK(624) gives the value of paddle 0
PEEK(625) gives the value of paddle 1
PEEK(626) gives the value of paddle 2
PEEK(627) gives the value of paddle 3
PEEK(628) gives the value of paddle 4
PEEK(629) gives the value of paddle 5
PEEK(630) gives the value of paddle 6
PEEK(631) gives the value of paddle 7

The range is from 0 to 228.

JOYSTICK VALUES

PEEK(632) gives the value of joystick 0
PEEK(633) gives the value of joystick 1
PEEK(634) gives the value of joystick 2
PEEK(635) gives the value of joystick 3

The numbers read depend upon the position of the joystick. Refer to the Atari BASIC Reference Manual, page 60, for the positions and their corresponding values.

PADDLE TRIGGER BUTTONS

PEEK(636) gives paddle 0 trigger button value
PEEK(637) gives paddle 1 trigger button value
PEEK(638) gives paddle 2 trigger button value
PEEK(639) gives paddle 3 trigger button value
PEEK(640) gives paddle 4 trigger button value
PEEK(641) gives paddle 5 trigger button value
PEEK(642) gives paddle 6 trigger button value
PEEK(643) gives paddle 7 trigger button value

A value of 1 indicates that the trigger button has not been pressed, and a value of 0 indicates that it has been pressed.

JOYSTICK TRIGGER BUTTONS

PEEK(644) gives joystick 0 trigger button value
PEEK(645) gives joystick 1 trigger button value
PEEK(646) gives joystick 2 trigger button value
PEEK(647) gives joystick 3 trigger button value

A value of 1 indicates that the trigger button has not been pressed, and a value of 0 indicates that it has been pressed.

INVERSE VIDEO

POKE 694,128 for inverse video. **POKE 694,0** to return to normal video.

PLAYER-MISSILE GRAPHICS COLOR REGISTER ADDRESSES

704 = color of player 0 and missile 0
705 = color of player 1 and missile 1
706 = color of player 2 and missile 2
707 = color of player 3 and missile 3

MULTICOLORED GRAPHICS

To create multicolored graphics lines when programming in graphics mode 8, use **POKE 710,0** before you execute the DRAWTO or PLOT statements.

OPERATING SYSTEM TOP OF MEMORY POINTER

To find the operating system top of memory pointer use the following statements:

```
TP=PEEK(741)+PEEK(742)*256:PRINT TP
```

OPERATING SYSTEM LOW MEMORY POINTER

To find the operating system low memory pointer use the following statements:

```
LP=PEEK(743)+PEEK(744)*256:PRINT LP
```

CURSOR ON-OFF

POKE 752,1 turns cursor off. **POKE 752,0** turns cursor on.

UPSIDE DOWN CHARACTERS

POKE 755,4 displays characters upside down. **POKE 755,2** returns the characters to normal.

CHARACTER BASE ADDRESS

PEEK(756) gives the page number of the start of your character set. Used in redefining the character set.

KEYBOARD CHARACTER INPUT

PEEK(764) gives the value of the last key pressed, or a 255 if no key has been pressed. Use **POKE 764,255** to clear.

PLAYER-MISSILE GRAPHICS ADDRESSES

POKE values into these registers to control the horizontal position of players and missiles. To move a player or missile from left to right, POKE values between 47 and 208. Also PEEK these registers for the various player-missile collisions.

53248 = horizontal position of player 0; and missile 0 to playfield collision.
53249 = horizontal position of player 1; and missile 1 to playfield collision.
53250 = horizontal position of player 2; and missile 2 to playfield collision.
53251 = horizontal position of player 3; and missile 3 to playfield collision.
53252 = horizontal position of missile 0; and player 0 to playfield collision.
53253 = horizontal position of missile 1; and player 1 to playfield collision.
53254 = horizontal position of missile 2; and player 2 to playfield collision.
53255 = horizontal position of missile 3; and player 3 to playfield collision.

PLAYER-MISSILE GRAPHICS SIZES

To change the width of players or missiles, POKE 0 for normal, 1 for double, or 3 for quadruple size. Also, PEEK these registers for various player-missile collisions.

53256 = size of player 0; and missile 0 to player collisions
53257 = size of player 1; and missile 1 to player collisions
53258 = size of player 2; and missile 2 to player collisions
53259 = size of player 3; and missile 3 to player collisions
53260 = size for all missiles; and player 0 to player collisions

GRAPHICS CONTROL REGISTER

The register 53277 is used to enable player-missile graphics DMA.

POKE 53277,1 enables missile DMA only.
POKE 53277,2 enables player DMA only.
POKE 53277,3 enables combined player-missile DMA.

COLLISION CLEAR REGISTER

POKE register 53278 with any number to clear all collision registers.

AUDIO ADDRESSES TO CONTROL SOUND

POKE into these registers to control the sound functions.

53760 = audio frequency register 1
53761 = audio control register 1
53762 = audio frequency register 2
53763 = audio control register 2
53764 = audio frequency register 3
53765 = audio control register 3
53766 = audio frequency register 4
53767 = audio control register 4
53768 = audio control

PLAYER-MISSILE GRAPHICS BASE ADDRESS REGISTER

Set register 54279 with the page number of the player-missile graphics base address. First, find the top of your system's RAM minus 8 pages (1 page is 256 bytes long) with **BP=PEEK(106)−8.** Then **POKE 54279,BP** to set the player-missile graphics base address 2K from the top of your system's RAM.

ROM CHARACTER SET ADDRESS

The ROM character set uses 1K of memory (1024 bytes) beginning at the address 57344. You can relocate your character set into RAM with **POKE RM+A,PEEK(57344+A),** where RM is the address in RAM where you will transfer the character set to, and A is from 0 to 1023.

CHAPTER 38

Sound Effects

Here are several short programs using the SOUND statement to generate sound effects. The programs are written in BASIC for your microcomputer.

PROGRAM 1

Seashore. See Program 38-1 for the program listing.

PROGRAM 2

Seashore-with random boat horn. See Program 38-2 for the program listing.

PROGRAM 3

Single engine airplane. See Program 38-3 for the program listing.

PROGRAM 4

Machine gun fire. See Program 38-4 for the program listing.

PROGRAM 5

Footsteps in gravel. See Program 38-5 for the program listing.

PROGRAM 6

Bongo drums. See Program 38-6 for the program listing.

PROGRAM 7

Rotary dialing the number 555-1212. See Program 38-7 for the program listing.

PROGRAM 8

Rocket launching. See Program 38-8 for the program listing.

PROGRAM 9

Winter storm. See Program 38-9 for the program listing.

PROGRAM 10

Waterfall. See Program 38-10 for the program listing.

PROGRAM 11

Thunderstorm. See Program 38-11 for the program listing.

PROGRAM 12

Heartbeat. See Program 38-12 for the program listing.

PROGRAM 13

Geiger counter. See Program 38-13 for the program listing.

PROGRAM 14

Car engine idling. See Program 38-14 for the program listing.

PROGRAM 15

Helicopter. See Program 38-15 for the program listing.

PROGRAM 16

Bird chirping. See Program 38-16 for the program listing.

PROGRAM 17

Jet airplane in flight. See Program 38-17 for the program listing.

PROGRAM 18

Leaky faucet. See Program 38-18 for the program listing.

PROGRAM 19

Metronome. See Program 38-19 for the program listing.

PROGRAM 20

Bouncing ping-pong ball. See Program 38-20 for the program listing.

PROGRAM 21

Explosion. See Program 38-21 for the program listing.

PROGRAM 22

Thunder and lightning. See Program 38-22 for the program listing.

PROGRAM 23

Wind chimes. See Program 38-23 for the program listing.

PROGRAM 24

Gunshots. See Program 38-24 for the program listing.

PROGRAM 25

Falling bomb and explosion. See Program 38-25 for the program listing.

PROGRAM 26

Police siren. See Program 38-26 for the program listing.

PROGRAM 27

Jet airplane takeoff. See Program 38-27 for the program listing.

PROGRAM 28

Train. See Program 38-28 for the program listing.

PROGRAM 29

European police siren. See Program 38-29 for the program listing.

PROGRAM 30

Chiseling stone. See Program 38-30 for the program listing.

PROGRAM 31

Fireworks. See Program 38-31 for the program listing.

PROGRAM 32

Random pipe organ. See Program 38-32 for the program listing.

For more information on generating sound, refer to the following Atari manual:

De Re Atari, *A Guide to Effective Programming.* Sunnyvale: Atari Program Exchange, APX-90008, 1981.

Program 38-1. Seashore Program Listing

```
100 REM SEASHORE
110 FOR B=1 TO 8:SOUND 1,10,8,4
120 FOR A=10 TO 1 STEP -1:GOSUB 500
130 SOUND 0,10,8,A
140 NEXT A:SOUND 1,0,0,0:SOUND 2,10,8,8
150 FOR A=1 TO 10:GOSUB 500
160 SOUND 0,10,8,A
170 NEXT A:SOUND 2,0,0,0:NEXT B
180 END
500 FOR T=1 TO 200
510 NEXT T
520 RETURN
```

Program 38-2. Seashore With Random Boat Horn Program Listing

```
100 REM SEASHORE-WITH RANDOM BOAT HORN
110 FOR B=1 TO 8:X=INT(RND(0)*8+1):SOUND 1,10,8,X
120 FOR A=14 TO 1 STEP -1:GOSUB 500
130 SOUND 0,10,8,A
140 NEXT A:SOUND 1,0,0,0
150 X=INT(RND(0)*8+1)+4:SOUND 2,10,8,X
160 FOR A=1 TO 14:GOSUB 500
170 SOUND 0,10,8,A
180 NEXT A:SOUND 2,0,0,0
190 S=INT(RND(0)*10+1)
200 IF S>5 THEN GOSUB 530
210 NEXT B
220 END
500 FOR T=1 TO 200
510 NEXT T
520 RETURN
530 SOUND 3,250,10,15:GOSUB 580
540 SOUND 3,0,0,0:GOSUB 580
550 SOUND 3,250,10,15:GOSUB 580
560 SOUND 3,0,0,0
570 RETURN
580 FOR T=1 TO 1700
590 NEXT T
600 RETURN
```

Program 38-3. Single Engine Airplane Program Listing

```
100 REM SINGLE ENGINE AIRPLANE
110 SOUND 0,23,6,8
120 SOUND 1,36,6,5
130 GOSUB 500:GOSUB 500
140 SOUND 0,0,0,0:SOUND 1,0,0,0
150 END
500 FOR A=1 TO 4000
510 NEXT A
520 RETURN
```

Program 38-4. Machine Gun Fire Program Listing

```
100 REM MACHINE GUN FIRE
110 FOR A=1 TO 8
120 SOUND 0,170,6,14
130 X=INT(RND(0)*1400+1)+100
140 GOSUB 500
150 SOUND 0,0,0,0
160 X=INT(RND(0)*700+1)+100
170 GOSUB 500
180 NEXT A
190 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-5. Footsteps in Gravel Program Listing

```
100 REM FOOTSTEPS IN GRAVEL
110 FOR A=1 TO 8
120 SOUND 0,45,8,4:X=80
130 GOSUB 500
140 SOUND 0,0,0,0:X=200
150 GOSUB 500
160 NEXT A
170 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-6. Bongo Drums Program Listing

```
100 REM BONGO DRUMS
110 R=INT(RND(0)*15+1)
120 FOR B=1 TO 4:FOR A=1 TO R
130 SOUND 0,200,14,15:SOUND 1,200,14,15
140 SOUND 0,0,0,0:SOUND 1,0,0,0
141 X=INT(RND(0)*120+1)
142 GOSUB 500
145 SOUND 0,180,14,15:SOUND 1,180,14,15
146 SOUND 0,0,0,0:SOUND 1,0,0,0
150 X=INT(RND(0)*120+1)
160 GOSUB 500
170 SOUND 0,180,14,15:SOUND 1,180,14,15
180 SOUND 0,0,0,0:SOUND 1,0,0,0
190 X=INT(RND(0)*120+1)
200 GOSUB 500
219 NEXT A:X=INT(RND(0)*400+1)
220 GOSUB 500:NEXT B
230 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-7. Rotary Dialing Number 555-1212 Program Listing

```
100 REM ROTARY DIALING THE NUMBER 555-1212
110 FOR G=1 TO 7:READ N
120 FOR A=1 TO N
130 SOUND 0,245,8,62:X=15
140 GOSUB 500
150 SOUND 0,0,0,0:X=24
160 GOSUB 500
170 NEXT A
180 X=200:GOSUB 500
190 NEXT G
200 RESTORE
210 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
1000 DATA 5,5,5,1,2,1,2
```

Program 38-8. Rocket Launching Program Listing

```
100 REM ROCKET LAUNCHING
110 FOR A=15 TO 1 STEP -1
120 SOUND 0,200,8,A
130 SOUND 1,100,8,A
140 SOUND 2,50,8,A
150 X=1200:GOSUB 500
160 NEXT A:X=300:GOSUB 500
170 SOUND 0,0,0,0
180 SOUND 1,0,0,0
190 SOUND 2,0,0,0
200 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-9. Winter Storm Program Listing

```
100 REM WINTER STORM
110 FOR B=1 TO 15:X=INT(RND(0)*40+20)
120 FOR A=X TO 15 STEP -1
130 SOUND 0,A,8,5
140 GOSUB 500
150 NEXT A
160 FOR A=15 TO X
170 SOUND 0,A,8,5
180 GOSUB 500
190 NEXT A
200 NEXT B
210 END
500 FOR T=1 TO 15
510 NEXT T
520 RETURN
```

Program 38-10. Waterfall Program Listing

```
100 REM WATERFALL
110 SOUND 0,2,8,8
120 SOUND 1,10,0,6
130 X=10000
140 GOSUB 500
150 SOUND 0,0,0,0
160 SOUND 1,0,0,0
170 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-11. Thunderstorm Program Listing

```
100 REM THUNDERSTORM
110 SOUND 0,10,0,3
120 SOUND 1,12,8,3
130 FOR A=1 TO 20
140 S=INT(RND(0)*6+1)
150 FOR B=1 TO S
160 GOSUB 530:NEXT B
170 X=INT(RND(0)*20000+1)+4000
180 NEXT A
190 SOUND 0,0,0,0:SOUND 1,0,0,0
200 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
530 L=INT(RND(0)*15+1)
540 R=INT(RND(0)*300+1)+400
550 FOR N=L TO 1 STEP -1
560 SOUND 2,45,0,N
570 GOSUB 600
580 NEXT N:SOUND 2,0,0,0
590 RETURN
600 FOR T=1 TO INT(R/L)
610 NEXT T
620 RETURN
```

Program 38-12. Heartbeat Program Listing

```
100 REM HEARTBEAT
110 FOR B=1 TO 16
120 SOUND 0,250,2,8:X=40:GOSUB 500
130 X=70:GOSUB 500
140 SOUND 0,150,2,8:X=60:GOSUB 500
150 X=120:GOSUB 500
160 NEXT B
170 END
500 SOUND 0,0,0,0:FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-13. Geiger Counter Program Listing

```
100 REM GEIGER COUNTER
110 FOR G=150 TO 4 STEP -2
120 SOUND 0,245,8,62:X=G
130 GOSUB 500
140 SOUND 0,0,0,0:X=G
150 NEXT G
160 X=4:FOR A=1 TO 30
170 SOUND 0,245,8,62:GOSUB 500
180 SOUND 0,0,0,0:GOSUB 500
190 NEXT A
200 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-14. Car Engine Idling Program Listing

```
100 REM CAR ENGINE IDLING
110 FOR A=1 TO 2000
120 SOUND 0,65,4,8
130 NEXT A
140 SOUND 0,0,0,0
```

Program 38-15. Helicopter Program Listing

```
100 REM HELICOPTER
110 FOR A=1 TO 1500
120 SOUND 0,45,2,15:SOUND 0,10,2,0
130 SOUND 1,64,2,2
140 GOSUB 500
150 SOUND 0,0,0,0
160 SOUND 1,0,0,0
170 NEXT A
180 END
500 FOR T=1 TO 35
510 NEXT T
520 RETURN
```

Program 38-16. Bird Chirping Program Listing

```
100 REM BIRD CHIRPING
110 FOR S=1 TO 50
120 FOR A=1 TO INT(RND(0)*30+1)
130 SOUND 0,A,14,12
140 NEXT A:SOUND 0,0,0,0
150 R=INT(RND(0)*75+1):GOSUB 500
160 NEXT S
170 END
500 FOR T=1 TO R
510 NEXT T
520 RETURN
```

Program 38-17. Jet Airplane in Flight Program Listing

```
100 REM JET AIRPLANE IN FLIGHT
110 FOR A=1 TO 2000
120 SOUND 0,30,8,5
130 SOUND 1,10,8,8
140 NEXT A
150 SOUND 0,0,0,0
160 SOUND 1,0,0,0
170 END
```

Program 38-18. Leaky Faucet Program Listing

```
100 REM LEAKY FAUCET
110 FOR A=1 TO 20
120 SOUND 0,200,12,15
130 SOUND 0,0,0,0
140 X=500
150 GOSUB 500
160 NEXT A
170 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-19. Metronome Program Listing

```
100 REM METRONOME
110 FOR A=1 TO 40
120 SOUND 0,20,14,8
130 SOUND 0,0,0,0
140 X=200
150 GOSUB 500
160 NEXT A
170 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-20. Bouncing Ping-Pong Ball Program Listing

```
100 REM BOUNCING PING PONG BALL
110 X=150:FOR A=1 TO 30
120 SOUND 0,30,14,6:SOUND 1,30,14,8
130 SOUND 0,0,0,0:SOUND 1,0,0,0
140 X=X-5
150 GOSUB 500
160 NEXT A
170 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-21. Explosion Program Listing

```
100 REM EXPLOSION
110 FOR A=1 TO 300
120 SOUND 0,A,4,15
130 NEXT A
140 FOR A=250 TO 70 STEP -1
150 SOUND 0,A,4,15
160 NEXT A
170 FOR A=1 TO 250
180 SOUND 0,A,2,10
190 NEXT A
200 END
```

Program 38-22. Thunder and Lightning Program Listing

```
100 REM THUNDER AND LIGHTNING
110 FOR A=1 TO 500
120 SOUND 0,A,8,15
130 NEXT A
140 FOR A=1 TO 300
150 SOUND 0,A,8,15
160 NEXT A
170 FOR A=1 TO 300
180 SOUND 0,A,8,15
190 NEXT A
200 FOR A=1 TO 500
210 SOUND 0,A,8,15
220 NEXT A
```

Program 38-23. Wind Chimes Program Listing

```
100 REM WIND CHIMES
110 FOR A=1 TO 30:R=INT(RND(0)*200+1)
120 C=INT(RND(0)*6+1)
130 SOUND 0,C,14,6:GOSUB 500
140 D=INT(RND(0)*6*1)
150 SOUND 1,D,14,10:GOSUB 500
160 E=INT(RND(0)*6*1)
170 SOUND 2,E,14,15:GOSUB 500
180 NEXT A
190 END
500 FOR T=1 TO R
510 NEXT T
520 RETURN
```

Program 38-24. Gunshots Program Listing

```
100 REM GUN SHOTS
110 FOR S=1 TO 8
120 FOR A=1 TO 70
130 SOUND 0,A,4,15
140 NEXT A:NEXT S
150 END
```

Program 38-25. Falling Bomb and Explosion Program Listing

```
100 REM FALLING BOMB AND EXPLOSION
110 FOR A=1 TO 255:GOSUB 500
120 SOUND 0,A,14,10
130 NEXT A
140 FOR A=1 TO 350
150 SOUND 0,A,8,15
160 NEXT A
170 FOR A=1 TO 250
180 SOUND 0,A,8,15
190 NEXT A
200 END
500 FOR T=1 TO 10
520 NEXT T
530 RETURN
```

Program 38-26. Police Siren Program Listing

```
100 REM POLICE SIREN
110 FOR B=1 TO 15
120 FOR A=40 TO 100
130 SOUND 0,A,14,10:GOSUB 500
140 NEXT A
150 FOR A=100 TO 40 STEP -1
160 SOUND 0,A,14,10:GOSUB 500
170 NEXT A
180 NEXT B
190 SOUND 0,0,0,0
200 END
500 FOR T=1 TO 2
510 NEXT T
520 RETURN
```

Program 38-27. Jet Airplane Takeoff Program Listing

```
100 REM JET AIRPLANE TAKEOFF
110 SOUND 0,50,8,8
120 D=3000:GOSUB 500
130 FOR A=50 TO 4 STEP -1
140 SOUND 1,A,8,10
150 D=75:GOSUB 500
160 NEXT A
170 SOUND 1,4,8,6:SOUND 2,30,8,6
180 D=5000:GOSUB 500
190 SOUND 0,0,0,0:SOUND 1,0,0,0
200 END
500 FOR T=1 TO D
510 NEXT T
520 RETURN
```

Program 38-28. Train Program Listing

```
100 REM TRAIN
110 SOUND 0,10,0,3
120 FOR A=1 TO 200
130 GOSUB 500
140 NEXT A
150 SOUND 0,0,0,0
160 END
500 L=15
510 FOR N=L TO 1 STEP -1
520 SOUND 1,4,0,N
530 NEXT N
540 SOUND 1,0,0,0
550 RETURN
```

Program 38-29. European Police Siren Program Listing

```
100 REM EUROPEAN POLICE SIREN
110 FOR B=1 TO 15:FOR A=1 TO 18
120 SOUND 0,50,10,8
130 NEXT A:X=150:GOSUB 500
140 FOR A=1 TO 18
150 SOUND 0,70,10,8
160 NEXT A
170 X=130:GOSUB 500
180 NEXT B
190 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-30. Chiseling Stone Program Listing

```
100 REM CHISELING STONE
110 FOR B=1 TO 8:R=INT(RND(0)*15+1)
120 FOR A=1 TO R
130 SOUND 0,10,14,15:SOUND 1,10,14,15
140 SOUND 0,0,0,0:SOUND 1,0,0,0
150 X=150
160 GOSUB 500
170 NEXT A:X=INT(RND(0)*500+1)+200
180 GOSUB 500:NEXT B
190 END
500 FOR T=1 TO X
510 NEXT T
520 RETURN
```

Program 38-31. Fireworks Program Listing

```
100 REM FIREWORKS
110 FOR S=1 TO 30
120 FOR A=1 TO INT(RND(0)*50+6)
130 SOUND 0,A,4,15
140 NEXT A:NEXT S
150 END
```

Program 38-32. Random Pipe Organ Program Listing

```
100 REM RANDOM PIPE ORGAN
110 FOR A=1 TO 30:R=INT(RND(0)*200+1)
120 C=INT(RND(0)*40+1)
130 SOUND 0,C,12,6:GOSUB 500
140 D=INT(RND(0)*40*1)
150 SOUND 1,D,12,10:GOSUB 500
160 E=INT(RND(0)*40*1)
170 SOUND 2,E,12,15:GOSUB 500
180 NEXT A
190 END
500 FOR T=1 TO R
510 NEXT T
520 RETURN
```

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