

Mostly BASIC: Applications for Your Atari® Book 1

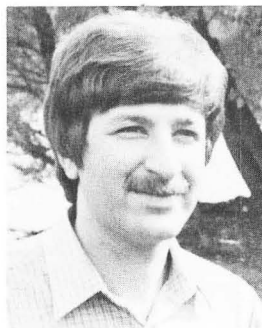
By Howard Berenbon



Atari®

Mostly BASIC:
Applications for Your Atari®
Book 1

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Mostly BASIC:
Applications for Your Atari®
Book 1

by
Howard Berenbon

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Preface

The microcomputer has come a long way since the 1975 introduction of the Altair 8800, which required program entry, in binary, through "front panel" switches. But now there are several different microcomputer systems to choose from. Most systems include a typewriter style keyboard, some sort of video graphics display, and a BASIC language resident in ROM.

This book is written for the hobbyist who owns an Atari 400/800/1200XL personal computer. It's composed of 38 chapters filled with useful BASIC programs for the home and office. The programs can help the hobbyist save money on energy usage, keep a record of medical expenses, bar chart business sales, teach foreign languages, and dial the telephone.

As an added feature, an educational Dungeons and Dragons* game program, called the Dungeon of Htam, is included. It's a two level dungeon where the player must answer math questions as he wanders through the maze. He receives gold for a correct response, and will lose gold for an incorrect response. His goal is to find the way out of the dungeon, with as much gold as possible.

Also included is the Tarot Card Reader, a program based on the ancient deck of 78 cards used in fortune-telling.

The last section in the book includes six chapters on graphics and sound. The programs include several color graphics routines, Display List manipulation, a message writer that uses the joystick for typing instead of the keyboard (may be used to aid the handicapped), a joystick test program with sound, and a moving stars simulation.

The programs are written in Atari BASIC for the Atari personal computer. Many of the programs utilize the expanded text mode with color. Some will run without modifications in other microcomputer BASICs, and may contain additional program lines to ensure some compatibility with the many dialects of BASIC.

The programs listed are only a fraction of the useful and practical programs that will be available to the computer hobbyist.

The application of the home computer is only limited by the imagination.

HOWARD BERENBON

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

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

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SECTION I

Real Time Applications

This book begins with 4 “real time” applications for your microcomputer. They are a telephone dialer, a timer, a combination lock, and a digital stopwatch. Most require a simple hardware interface, for connection to the “outside world.”

The Atari* 400/800/1200XL† personal computer has four game controller jacks for interfacing the system to the “outside world.” The interface circuit, as shown in Fig. I-1, consists of 2 resistors, one transistor, one diode, a miniature relay, and a 9 volt battery.

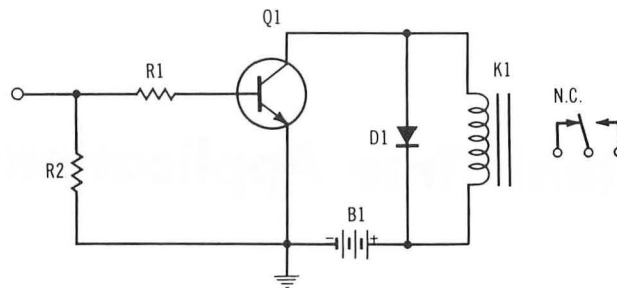


Fig. I-1. Interface circuit.

*Atari is a registered trademark of Atari, Inc.

†The Atari 1200XL has only two game controller jacks.

CHAPTER 1

BASIC Telephone Dialer

Here's an excellent application for your home computer. It's a telephone dialer program, written in BASIC, for your microcomputer. The program listing is given in Program 1-1.

THE PROGRAM

The program accesses phone numbers by comparing your string input (any string of characters) to the phone number list, stored in DATA statements beginning at program line 1000. If the entry is not found, then the program will display ENTRY NOT FOUND. When the entry is found, the number is dialed and displayed, one digit at a time. Pulses are output to the interface circuit through the i/o port of the computer, simulating the action of a rotary dial.

ENTERING PHONE NUMBERS

The phone numbers are entered in the following format:

1010 DATA NAME,5,5,5,1,2,1,2,55

Separate each digit with a comma. The last entry must be 55. This is used to stop the dialing process. Also, the last data statement in the list must be DATA END. The number of phone numbers in your list is limited by your RAM memory size.

HARDWARE

A simple interface circuit is required to operate the dialer. It's connected in series with L1 of the phone, using the normally closed (N.C.) contacts of relay K1; it works with both dial and pushbutton phones (see Note 1-1).

NOTE 1-1

This device may be added to a privately owned home or company internal phone system. It is not intended to be connected directly to a subscriber's telephone set without compliance to local telephone company regulations. It is intended for demonstrating a practical application for the home computer.

INTERFACE

The interface circuit is shown in Fig. 1-1 and the parts list is given in Table 1-1. It consists of two 5.6 k Ω resistors, one 2N2222A NPN transistor, one 1N914 silicon diode, and a 5- or 6-V dc miniature relay, and a 9-volt battery.

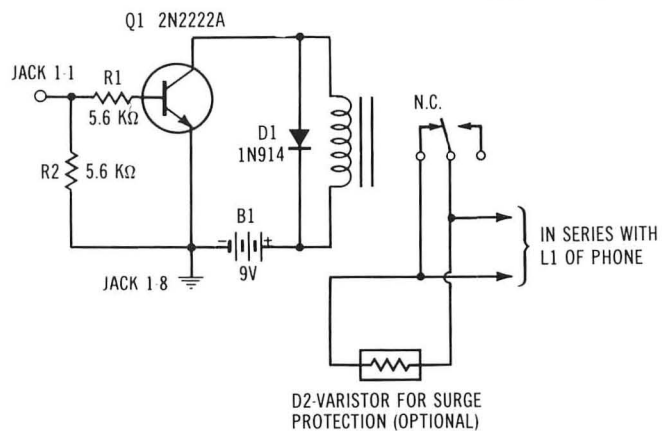


Fig. 1-1. Interface circuit.

The interface is connected to the Atari game controller jack 1. The connector is located on the left-front of the cabinet, labeled 1.* The interface is connected to jack 1, pins 1 and 8. Pin 1 is the output and pin 8 is the ground. The statements POKE 54018,48 , POKE 54016,255 and POKE 54018,52 are used to program the game controller for output. The statement POKE 54016,1 activates the circuit, and POKE 54016,0 deactivates it. The normally closed contacts (N.C.) of relay K1 are connected in series with L1 of the phone (see Note 1-1).

Table 1-1. Parts List for Interface Circuit

Item	Description
B1	Battery, 9-V transistor
D1	Diode, silicon, 1N914 or equiv
D2	Varistor, GE-V82ZA12 (Optional for surge protection)
K1	Relay, 5- or 6-V dc, 500-ohm, spdt (Radio Shack 275-004 or equiv)
Q1	Transistor, NPN, 2N2222A or equiv
R1,R2	Resistors, 5.6 k Ω , 1/2 W
Misc	Battery clip

OPERATION

After you run the program, you have 3 options:

1. Print the phone number list by entering an L.
2. Access a phone number for dialing by entering a D.
3. Repeat the last number dialed by entering an R.

To dial a number, enter a D for the dial mode, then lift the telephone receiver and wait for a dial tone. Finally, enter the string access code of the phone number that you want dialed. See Fig. 1-2 for a sample run.

*The Atari 1200XL game controller jacks are located on the left side of the cabinet.

PHONE DIALER PROGRAM

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INSTRUCTIONS?

ENTER 'L' TO PRINT PHONE # LIST
 ENTER 'D' TO DIAL A NUMBER
 ENTER 'R' TO REPEAT LAST NUMBER
 ? L

PHONE NUMBER LIST

TIME	4	7	2	1	2	1	2				
WEATHER	9	3	2	1	2	1	2				
HARRY	5	5	5	1	2	8	2				
FIRE	9	1	1								
POLICE	9	1	1								
LONG DISTANCE	1	2	1	3	5	5	5	1	2	1	2
RICK	5	5	5	5	2	1	9				
DAVE	5	5	5	1	9	6	3				
BRUCE	5	5	5	2	8	9	7				
COMPUTER CENTER	5	5	5	2	1	5	1				

INSTRUCTIONS?

ENTER 'L' TO PRINT PHONE # LIST
 ENTER 'D' TO DIAL A NUMBER
 ENTER 'R' TO REPEAT LAST NUMBER
 ? D

LIFT TELEPHONE RECEIVER BEFORE DIALING
 WAIT FOR A DIAL TONE

ENTER ACCESS CODE (ANY STRING OF CHARACTERS)
 ? DAVE

SEARCHING LIST FOR DAVE

DIALING DAVE
 5 5 5 1 9 6 3
 DIALING COMPLETE

INSTRUCTIONS?

ENTER 'L' TO PRINT PHONE # LIST
 ENTER 'D' TO DIAL A NUMBER
 ENTER 'R' TO REPEAT LAST NUMBER
 ?

Fig. 1-2. BASIC telephone dialer sample run.

Program 1-1. BASIC Telephone Dialer Program Listing

```
100 PRINT CHR$(125):DIM A$(50),C$(50),R$(1):GOSUB 930
110 PRINT "ATARI PHONE DIALER PROGRAM"
120 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
130 PRINT
140 GOTO 770
150 PRINT "LIFT RECEIVER BEFORE DIALING"
160 PRINT "WAIT FOR A DIAL TONE"
170 PRINT
180 PRINT "ENTER ACCESS CODE (ANY STRING)"
190 INPUT A$
200 PRINT CHR$(125)
210 PRINT "SEARCHING FOR ";A$
220 READ C$
230 IF C$="END" THEN 440
240 IF C$<>A$ THEN 410
250 REM DIALING NUMBER FROM DATA
260 PRINT
270 PRINT "DIALING ";A$
280 READ C
290 IF C=55 THEN 730
300 PRINT C;" ";
310 IF C=0 THEN 870
320 REM DIAL PHONE NUMBER 1 DIGIT AT A TIME
330 GOSUB 480
340 POKE 54016,1
350 GOSUB 510
360 POKE 54016,0
370 GOSUB 540
380 C=C-1
390 IF C=0 THEN 280
400 GOTO 340
410 READ C
420 IF C=55 THEN 220
430 GOTO 410
440 PRINT "ENTRY NOT FOUND"
450 RESTORE
460 PRINT
470 GOTO 140
480 FOR A=1 TO 95
490 NEXT A
500 RETURN
510 FOR A=1 TO 18
520 NEXT A
530 RETURN
540 FOR A=1 TO 11
550 NEXT A
560 RETURN
570 GOSUB 590
580 GOTO 770
590 PRINT "," PHONE NUMBER LIST"
600 PRINT
610 READ A$
620 PRINT A$,
```

Program 1-1-cont. BASIC Telephone Dialer Program Listing

```
630 IF A$="END" THEN 700
640 READ A
650 IF A=55 THEN 680
660 PRINT A;" ";
670 GOTO 640
680 GOSUB 890
690 GOTO 610
700 PRINT
710 RESTORE
720 RETURN
730 PRINT
740 PRINT "DIALING COMPLETE"
750 PRINT
760 RESTORE
770 PRINT "INSTRUCTIONS?"
780 PRINT
790 PRINT "ENTER 'L' TO PRINT PHONE # LIST"
800 PRINT "ENTER 'D' TO DIAL A PHONE NUMBER"
810 PRINT "ENTER 'R' TO REPEAT LAST #"
820 INPUT R$
830 IF R$="R" THEN 200
840 IF R$="D" THEN 150
850 IF R$="L" THEN 570
860 GOTO 770
870 C=10
880 GOTO 320
890 PRINT
900 FOR X=1 TO 387
910 NEXT X
920 RETURN
930 POKE 54018,48
940 POKE 54016,255
950 POKE 54018,52
960 RETURN
980 REM DATA STORAGE BEGINS AT LINE 1000
990 REM ENTER LAST DATA STATEMENT AS-DATA END
1000 DATA TIME,4,7,2,1,2,1,2,55
1010 DATA WEATHER,9,3,2,1,2,1,2,55
1020 DATA HARRY,5,5,5,1,2,8,2,55
1030 DATA FIRE,9,1,1,55
1040 DATA POLICE,9,1,1,55
1050 DATA LONG DISTANCE,1,2,1,3,5,5,5,1,2,1,2,55
1060 DATA RICK,5,5,5,5,2,1,9,55
1070 DATA DAVE,5,5,5,1,9,6,3,55
1080 DATA BRUCE,5,5,5,2,8,9,7,55
1090 DATA COMPUTER CENTER,5,5,5,2,1,5,1,55
1100 DATA END
```

CHAPTER 2

The Time Machine

Here's a program that allows your computer to operate as a 24-hour digital clock and timer, for controlling lights or appliances plugged into a power control circuit. It's written in BASIC for your microcomputer. A simple interface circuit is required for interfacing your computer to the "outside world." See Program 2-1 for the program listing.

THE PROGRAM

The program accepts entry of the 24-hour time, the time for circuit activation, and the time for circuit deactivation. After entering a 1 to begin, the program displays the 24-hour time, the activation time, and the deactivation time in hours and minutes. After each minute has passed, the display is updated. When the timer reaches the activation time, the circuit is activated, and CIRCUIT ACTIVATED is displayed. When it reaches the deactivation time, the circuit is deactivated, and CIRCUIT DEACTIVATED is displayed. See Fig. 2-1 for a sample run.

Table 2-1. Parts List for Interface and Control Circuits

Item	Description
B1	Battery, 9-volt transistor
B2	Battery, 6-volt lantern
D1, D2	Diode, silicon 1N914 or equiv
K1	Relay 5- or 6-V dc, 500-ohm, spdt (Radio Shack 275-004 or equiv)
K2	Relay 6-V dc, 350-ohm, spdt, contacts rated at 3.5A, 117 V ac (Allied Electronics 802-1880, series 1345 or equiv)
Q1	Transistor, NPN, 2N2222A or equiv
R1, R2	Resistor, 5.6 k Ω , 1/2 W
Misc	Ac outlet box; 117 V ac line cord with plug; battery clips

INTERFACE

The interface circuit and control circuit are shown in Fig. 2-2. The parts list is given in Table 2-1. It connects to the Atari game controller, jack 1.* The

*The Atari 1200XL game controller jacks are located on the left side of the cabinet.

```
THE TIME MACHINE
COPYRIGHT (C) 1980 BY HOWARD BERENSON
```

```
THE TIME MACHINE WILL TURN YOUR
SYSTEM INTO A TIMER, FOR CONTROLLING
LIGHTS OR APPLIANCES.
```

```
ENTER THE CURRENT 24 HOUR TIME IN HRS
AND MINUTES (HRS,MIN)
? 15,20
```

```
ENTER THE ACTIVATION TIME (24 HR)
IN HRS AND MINUTES (HRS,MIN)
? 21,00
```

```
ENTER THE DEACTIVATION TIME (24 HR)
IN HRS AND MINUTES (HRS,MIN)
? 25,15
```

```
ENTER A '1' TO START THE TIMER
? 1
```

```
THE TIME MACHINE
24 HR TIME
HRS 15 : MIN 20
```

```
ACTIVATION TIME
HRS 21 : MIN 0
```

```
DEACTIVATION TIME
HRS 25 : MIN 15
```

Fig. 2-1. Time machine sample run.

connector is located on the left-front of the cabinet, labeled 1. The interface is connected to jack 1, pins 1 and 8. Pin 1 is the output and pin 8 is the ground. The statements POKE 54018,48 , POKE 54016,255 and POKE 54018,52 are used to program the game

controller for output. The statement POKE 54016,1 activates the circuit, and POKE 54016,0 deactivates it. The normally open contacts (N.O.) of relay K1 operate the power control circuit, for controlling lights or appliances.

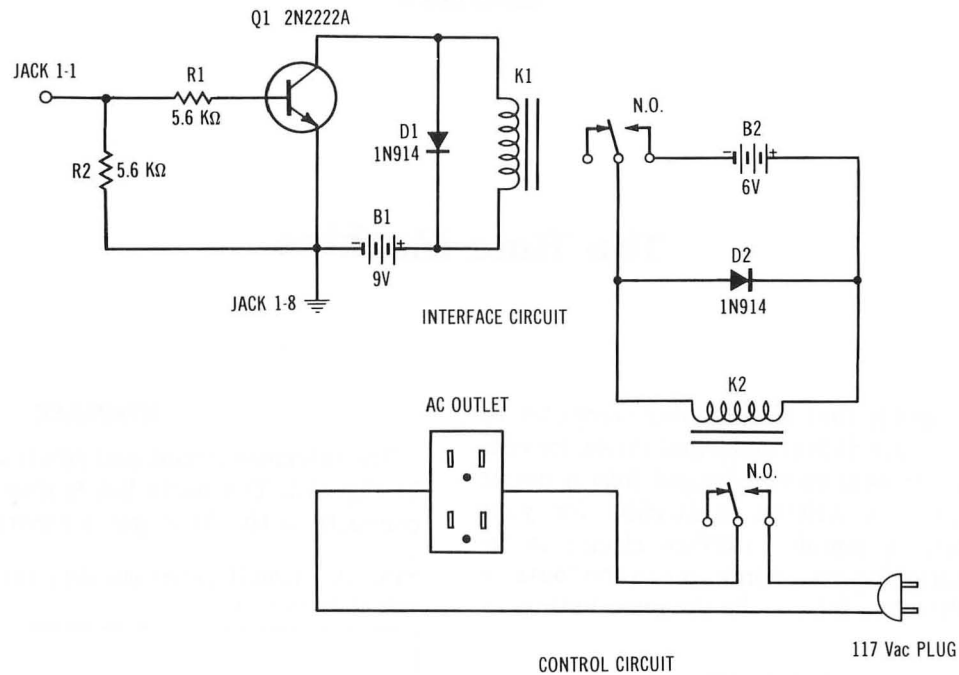


Fig. 2-2. Interface and control circuits.

Program 2-1. Time Machine Program Listing

```
100 POKE 54018,48:POKE 54016,255:POKE 54018,52
110 PRINT CHR$(125);"THE TIME MACHINE: ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON":PRINT
130 PRINT "THE TIME MACHINE WILL TURN YOUR"
140 PRINT "SYSTEM INTO A TIMER, FOR CONTROLLING"
150 PRINT "LIGHTS OR APPLIANCES.":PRINT
160 PRINT "ENTER THE CURRENT 24 HOUR TIME IN HRS"
170 PRINT "AND MINUTES (HRS,MIN) "
180 INPUT H,M:PRINT
190 PRINT "ENTER THE ACTIVATION TIME (24 HR) "
200 PRINT "IN HRS AND MINUTES (HRS,MIN) "
210 INPUT I,N:PRINT
220 PRINT "ENTER THE DEACTIVATION TIME (24 HR) "
230 PRINT "IN HRS AND MINUTES (HRS,MIN) "
240 INPUT J,K:PRINT :PRINT
250 PRINT "ENTER A '1' TO START THE TIMER"
260 INPUT C
270 PRINT CHR$(125)
280 PRINT "THE TIME MACHINE"
290 PRINT
300 REM DISPLAY TIMER
310 PRINT "24 HR TIME"
320 PRINT "HRS ";H;" : MIN ";M
330 PRINT
340 PRINT "ACTIVATION TIME"
350 PRINT "HRS ";I;" : MIN ";N
360 PRINT
370 PRINT "DEACTIVATION TIME"
380 PRINT "HRS ";J;" : MIN ";K
390 GOSUB 410
400 GOTO 270
410 FOR A=1 TO 226*60
420 NEXT A
430 M=M+1
440 IF H=I AND M=N THEN 540
450 IF H=J AND M=K THEN 590
460 IF M>=60 THEN 480
470 RETURN
480 M=0
490 H=H+1
500 IF H=25 THEN H=1
510 IF H=I AND M=N THEN 540
520 IF H=J AND M=K THEN 590
530 RETURN
540 POKE 54016,1
550 PRINT CHR$(125);"CIRCUIT ACTIVATED"
560 FOR A=1 TO 195*60
570 NEXT A:M=M+1
580 GOTO 460
590 POKE 54016,0
600 PRINT CHR$(125);"CIRCUIT DEACTIVATED"
610 GOTO 560
```

CHAPTER 3

Combination Lock

The Combination Lock program will allow your computer to accept input of a combination, to activate a control circuit. It can be used to open a safe, turn on a light, switch on your tv, or unlock a door. The program is written in BASIC for your microcomputer. An interface circuit is required for operation. See Program 3-1 for the program listing.

INTERFACE

The interface and control circuit is shown in Fig. 3-1. The parts list is given in Table 3-1. It connects to the Atari game controller, jack 1.* The connector is located on the left-front of the cabinet, labeled 1. The interface is connected to jack 1, pins 1 and 8. Pin 1 is the output and pin 8 is the ground. The statements POKE 54018,48 , POKE 54016,255 and POKE 54018,52 are used to program the game controller for output. The statement POKE 54016,1 activates the circuit, and POKE 54016,0 deactivates it. The normally open contacts (N.O.) of relay K1 operate the control circuit. Relay K2 is a power relay for controlling lights or appliances.

PROGRAM

In the load mode, the Atari program allows entry of numbers and letters for the combination, limited to 79 characters. After entering the access mode, the program is locked into that mode. Entering the correct combination will activate the control circuit, and OPEN will be displayed. Entering a C will deactivate it. If there is an error in entry, it will display ERROR, RE-ENTER. After 3 unsuccessful tries, it

*The Atari 1200XL game controller jacks are located on the left side of the cabinet.

will display NO ENTRY. Depress BREAK to stop program.

USES

Computerized Lock

A solenoid may be used in place of K2, to design a computer activated lock. See Fig. 3-2 for the circuit changes. K1 and B1 are the same as in Fig. 3-1. The solenoid is a 6-volt, 2-oz at ¼" limit (Allied Electronics 802-1111, or equiv). The plunger of the solenoid is used to latch the lock on a door or safe.

A "foolproof" system would require an external keypad for entering the combination. This will eliminate direct access to the computer, to prevent tampering with the program.

Light or Appliance Lock

A light or appliance may be activated with the program. The appliance is plugged into the ac outlet box for activation.

See Fig. 3-3 for a sample run.

Table 3-1. Parts List for Interface and Control Circuits

Item	Description
B1	Battery, 9-volt transistor
B2	Battery, 6-volt lantern
D1,D2	Diode, silicon 1N914 or equiv
K1	Relay, 5- or 6-V dc, 500-ohm, spst (Radio Shack 275-004 or equiv)
K2	Relay, 6-V dc, 350-ohm, spdt, contacts rated at 3.5A, 117-V ac (Allied Electronics 802-1880, series 1345 or equiv)
Q1	Transistor, NPN, 2N2222A, or equiv.
R1,R2	Resistor, 5.6 kΩ, ½ W
Misc	AC outlet box; 117-V ac line cord with plug; battery clips

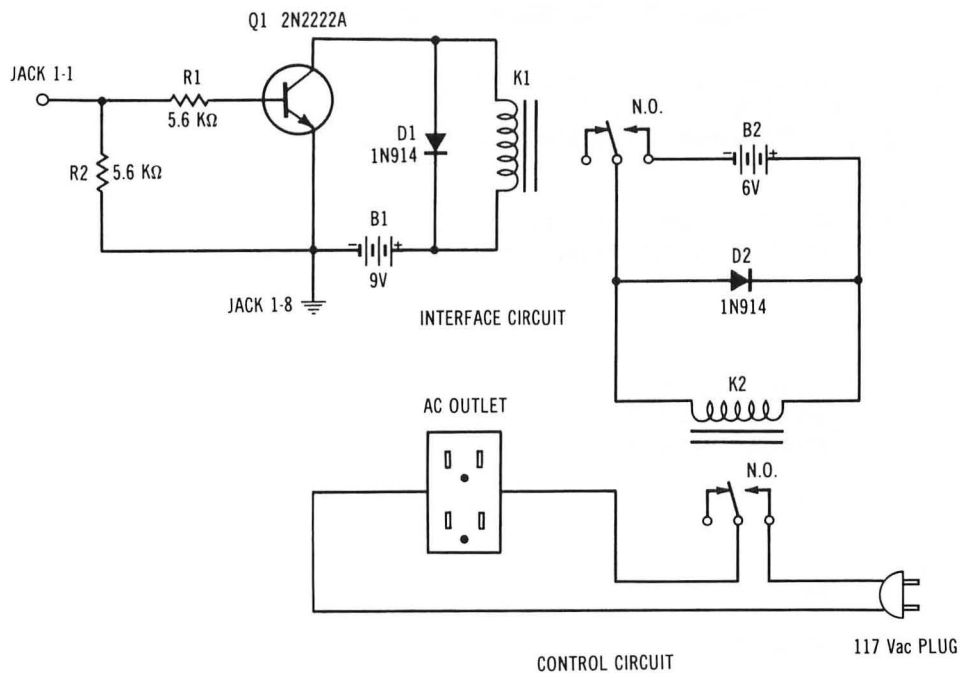


Fig. 3-1. Interface and control circuits.

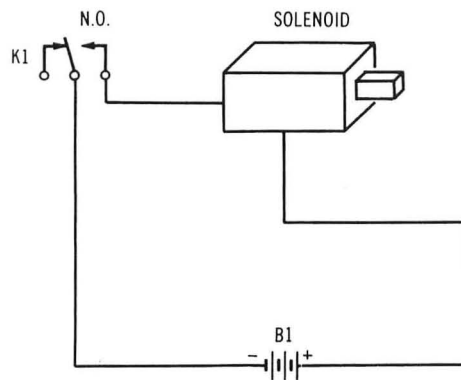


Fig. 3-2. Solenoid circuit for computerized lock.

COMBINATION LOCK
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ENTER MODE?
'1' TO LOAD NEW COMBINATION
'2' TO ACCESS COMBINATION LOCK
? 1
LOAD NEW COMBINATION
ENTER UP TO 79 CHARACTERS,
LETTERS AND/OR NUMBERS
? 2054ABCDEF GH

COMBINATION LOADED
ENTER MODE?
'1' TO LOAD NEW COMBINATION
'2' TO ACCESS COMBINATION LOCK
? 2

ACCESS MODE

ENTER COMBINATION
? 2054ABCDEF GH
OPEN
ENTER A 'C' TO CLOSE
? C
CLOSED

ACCESS MODE

ENTER COMBINATION
?

Fig. 3-3. Combination lock sample run.

Program 3-1. Combination Lock Program Listing

```
100 PRINT CHR$(125):DIM A$(79),B$(79),C$(1):GOSUB 520
110 PRINT "COMBINATION LOCK: ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
140 PRINT "ENTER MODE?"
150 PRINT "'1' TO LOAD NEW COMBINATION"
160 PRINT "'2' TO ACCESS COMBINATION LOCK"
170 INPUT A
180 IF A=1 THEN 210
190 IF A=2 THEN 270
200 GOTO 140
210 PRINT "LOAD NEW COMBINATION"
220 PRINT "ENTER UP TO 79 CHARACTERS,"
230 PRINT "LETTERS AND/OR NUMBERS"
240 INPUT A$
250 PRINT "COMBINATION LOADED"
260 GOTO 140
270 PRINT CHR$(125)
280 PRINT "ACCESS MODE"
290 PRINT
300 PRINT "ENTER COMBINATION"
310 N=3
320 N=N-1
330 INPUT B$
340 IF A$<>B$ THEN 470
350 GOSUB 500
360 POKE 54016,1
370 PRINT "ENTER A 'C' TO CLOSE"
380 INPUT C$
390 IF C$<>"C" THEN 370
400 POKE 54016,0
410 PRINT "CLOSED"
420 FOR A=1 TO 1329
430 NEXT A
440 GOTO 270
450 PRINT "NO ENTRY"
460 GOTO 460
470 IF N=0 THEN 450
480 PRINT "ERROR, RE-ENTER"
490 GOTO 320
500 PRINT "OPEN"
510 RETURN
520 POKE 54018,48
530 POKE 54016,255
540 POKE 54018,52
550 RETURN
```

CHAPTER 4

Digital Stopwatch

This program turns your system into a digital stopwatch. It's written in BASIC for your micro-computer. See Program 3-1 for the program listing.

THE PROGRAM

The program displays the HRS MIN SEC on the display beginning with 0 HRS 0 MIN 0 SEC. It will RUN to 1000 before it resets to zero. See Fig. 4-1 for a sample run. To stop the stopwatch press BREAK on the Atari. A suggested use would be as a long distance phone call timer.

```
DIGITAL STOPWATCH
COPYRIGHT (C) 1980 BY HOWARD BERENBON
PRESS 'BREAK' TO STOP TIMER
ENTER A '1' TO START
?

DIGITAL STOPWATCH

HRS 0 : MIN 1 : SEC 8
```

Fig. 4-1. Digital stopwatch sample run.

Program 4-1. Digital Stopwatch Program Listing

```
100 PRINT CHR$(125)
110 PRINT "DIGITAL STOPWATCH"
120 PRINT "ATARI"
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 PRINT
150 PRINT "PRESS 'BREAK' TO STOP TIMER"
160 PRINT
170 PRINT "ENTER A '1' TO START"
180 INPUT A
190 PRINT CHR$(125)
200 W=0
210 T=1000
220 X=0:Y=0:Z=0
230 POSITION 6,0
240 PRINT "DIGITAL STOPWATCH"
250 POSITION 2,11
270 PRINT "HRS ";Z;" : MIN ";Y;" : SEC ";X;" ";
280 GOSUB 360
290 X=X+1
300 IF X=60 THEN 320
310 GOTO 260
320 X=0
330 Y=Y+1
340 IF Y=60 THEN 390
350 GOTO 260
360 FOR A=1 TO 245
370 NEXT A
380 RETURN
390 Y=0
400 Z=Z+1
410 IF Z=T THEN 220
420 GOTO 260
```

SECTION II

Educational Programs

Educational software is needed to utilize the home computer for learning. This section contains programs to aid in learning.

In a classroom situation, where each student has his own terminal, the computer allows the teacher more time for individual instruction.

In the home, you can use your computer to supplement your children's education, and your own. The Dungeon of Htam is a math educational game. The Language Flash Card program and the Word Board will aid in learning French, Spanish, Italian, and German. Constellation 10 and The Sun will help out in astronomy. Also included is a memory test game, a visual perception game, a math test, a spelling test, and a reading pacer.

CHAPTER 5

Memory Challenger

The Memory Challenger is a game used to test your memory and concentration. It's written in BASIC for your microcomputer. See Program 5-1 for the program listing.

The program generates and displays random numbers of different lengths. There are three different levels of play. Enter a 1 for easy, 2 for medium difficulty, and 3 for most difficult.

THE PROGRAM

Enter a 1 to begin. The numbers are flashed at the

center of the screen. Enter the number that was flashed. Each time you enter an answer, the program checks the entry, and prints CORRECT or INCORRECT. Then it displays the correct answer, and the number of correct entries out of the number of tries so far. Now you may change the difficulty level and continue, continue at the same level, or end the game. If you decide to stop playing, then it displays your final percent score. See Fig. 5-1 for a sample run.

```

RUN
MEMORY CHALLENGER
COPYRIGHT (C) 1979 BY HOWARD BERENBON

THIS PROGRAM GENERATES AND DISPLAYS RANDOM NUMBERS
OF DIFFERENT LENGTHS. YOU MUST ENTER THE NUMBER THAT
IS FLASHED ON THE SCREEN.

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

ENTER '1' TO BEGIN
? 1

GET READY

40035

DIFFICULTY LEVEL 2

ENTER NUMBER
? 40035
THE ANSWER IS 40035

CORRECT
YOU HAVE 1 CORRECT OUT OF 3 TRIES

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

Fig. 5-1. Memory challenger sample run.

Program 5-1. Memory Challenger Program Listing

```
100 PRINT CHR$(125):PRINT "ATARI MEMORY CHALLENGER"
110 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
120 PRINT
130 PRINT "THIS PROGRAM GENERATES AND DISPLAYS  RANDOM NUMBERS"
140 PRINT "OF DIFFERENT LENGTHS. YOU MUST ENTER  THE NUMBER THAT"
150 PRINT "IS FLASHED ON THE SCREEN."
160 PRINT
170 Z=0
180 W=0
190 PRINT "ENTER DIFFICULTY LEVEL:"
200 PRINT "1=EASY"
210 PRINT "2=MEDIUM DIFFICULTY"
220 PRINT "3=MOST DIFFICULT"
230 INPUT A
240 PRINT CHR$(125)
250 IF A=1 THEN 560
260 IF A=2 THEN 600
270 IF A=3 THEN 640
280 GOTO 190
290 PRINT CHR$(125)
300 PRINT "ENTER '1' TO BEGIN"
310 INPUT B
320 Y=3986
330 GRAPHICS 1
340 POSITION 6,4
350 PRINT #6;"GET READY"
360 FOR D=1 TO 264
370 NEXT D:GRAPHICS 0
380 X=INT(RND(0)*Y+1)*F
390 GRAPHICS 1:POSITION 8,5
400 PRINT #6;X
410 GOSUB 680
420 GRAPHICS 0
430 POSITION 20,1:PRINT "DIFFICULTY ";A
440 PRINT "ENTER NUMBER"
450 Z=Z+1
460 INPUT C
470 PRINT "THE ANSWER IS ";X
480 PRINT
490 IF X=C THEN 530
500 PRINT "INCORRECT"
510 PRINT "YOU HAVE ";W;" CORRECT OUT OF ";Z;" TRIES"
520 GOTO 730
530 PRINT "CORRECT"
540 W=W+1
550 GOTO 510
560 G=40
570 F=1
580 N=INT(RND(0)*134+1)
590 GOTO 300
600 N=INT(RND(0)*90+1)
610 G=16
620 F=15
```


Program 5-1-cont. Memory Challenger Program Listing

```
630 GOTO 300
640 N=INT(RND(0)*45+1)
650 G=20
660 F=158
670 GOTO 300
680 FOR E=1 TO G+N
690 NEXT E
700 RETURN
710 PRINT "YOUR FINAL SCORE IS ";W/Z*(100);" PERCENT"
720 END
730 PRINT
740 PRINT "TRY AGAIN?"
750 PRINT "1 = YES & SAME DIFFICULTY-**GET READY"
760 PRINT "2 = YES & CHANGE DIFFICULTY"
770 PRINT "0 = NO"
780 INPUT D
790 IF D=1 THEN 330
800 IF D=2 THEN 190
810 IF D=0 THEN 710
820 GOTO 730
```

CHAPTER 6

Visual Perception Test

The Visual Perception Test is a game used to check your visual perception. It's written in BASIC for your microcomputer. See Program 6-1 for the program listing.

The program randomly displays 5 different symbols (= + < > *) at random locations, for a random period of time. You have 25 tries to enter the correct symbol, as it's flashed on the screen. This could be

```
RUN
VISUAL PERCEPTION TEST
COPYRIGHT (C) 1980 BY HOWARD BERENBON

IT RANDOMLY DISPLAYS 5 SYMBOLS FOR A RANDOM PERIOD
FROM .2 TO 3 SEC. YOU HAVE 25 TRIES, WITH THE COMPUTER
KEEPING TRACK OF YOUR SCORE.
THE SYMBOLS ARE: = + < > *

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

ENTER '1' TO BEGIN
GET READY
? 1

TRIAL 1 DIFFICULTY LEVEL 1
ENTER THE SYMBOL # FOR EACH TRIAL
1 FOR '=' 2 FOR '+' 3 FOR '<'
4 FOR '>' 5 FOR '*' 0 FOR DON'T KNOW
? 5

TRIAL 2 DIFFICULTY LEVEL 1
ENTER THE SYMBOL # FOR EACH TRIAL
1 FOR '=' 2 FOR '+' 3 FOR '<'
4 FOR '>' 5 FOR '*' 0 FOR DON'T KNOW
? 4

TRIAL 24 DIFFICULTY LEVEL 1
ENTER THE SYMBOL # FOR EACH TRIAL
1 FOR '=' 2 FOR '+' 3 FOR '<'
4 FOR '>' 5 FOR '*' 0 FOR DON'T KNOW
? 3

TRIAL 25 DIFFICULTY LEVEL 1
ENTER THE SYMBOL # FOR EACH TRIAL
1 FOR '=' 2 FOR '+' 3 FOR '<'
4 FOR '>' 5 FOR '*' 0 FOR DON'T KNOW
? 1

YOUR VISUAL PERCEPTION SCORE IS 25 OUT OF 25
THAT'S 100 % CORRECT

YOU HAVE COMPLETED 1 TEST(S)

% SCORE
TEST 1 100

DO YOU WISH ANOTHER TEST
ENTER '1' FOR YES, '0' FOR NO
? 0
```

Fig. 6-1. Visual perception test sample run.

from 0.2 second to 3 seconds. See Fig. 6-1 for a sample run.

THE TEST

Begin the program by entering the difficulty level. You have three to choose from. Enter 1 for easy, 2 for medium difficulty, and 3 for most difficult. Now you must pay attention, and enter a 1 to begin. A

symbol will be displayed on the screen, then you enter the number (1-5) that corresponds to the symbol: 1 for =; 2 for +; 3 for <; 4 for >; and 5 for *. Continue for 25 tries. When you're finished with the test, you may continue with another and change the difficulty level, or end the game.

When you end the game, your percent score for each test is displayed. Finally, an average score is given.

Program 6-1. Visual Perception Test Program Listing

```
100 PRINT CHR$(125);"ATARI VISUAL PERCEPTION TEST"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT
130 PRINT "IT RANDOMLY DISPLAYS 5 SYMBOLS FOR A  RANDOM PERIOD"
140 PRINT "FROM .2 TO 3 SEC. YOU HAVE 25 TRIES,  WITH THE COMPUTER
"
150 PRINT "KEEPING TRACK OF YOUR SCORE."
160 PRINT "THE SYMBOLS ARE:  =  +  <  >  *."
170 PRINT
180 DIM A(100)
190 W=0
200 G=1
210 GOSUB 890
220 PRINT CHR$(125)
230 PRINT "ENTER A '1' TO BEGIN"
240 W=0
250 PRINT "GET READY"
260 INPUT F
270 FOR B=1 TO 25
280 PRINT CHR$(125)
290 Y=15
300 REM GENERATE RANDOM NUMBERS
310 N=INT(RND(0)*R+1)
320 GOSUB 1040
330 GRAPHICS 1:GOSUB 560
340 FOR A=1 TO Y+N
350 NEXT A
360 GRAPHICS 0
370 PRINT "TRIAL ";B;"  DIFFICULTY LEVEL ";H
380 PRINT
390 GOSUB 690
400 NEXT B
410 PRINT "YOUR VISUAL PERCEPTION SCORE IS ";W;" OUT OF 25"
420 PRINT "THAT'S ";W*4;" % CORRECT"
430 GOSUB 780
440 PRINT "DO YOU WISH ANOTHER TEST"
450 PRINT "ENTER '1' FOR YES, '0' FOR NO"
460 INPUT C
470 IF C=1 THEN 210
480 PRINT "YOUR AVERAGE SCORE OUT OF ";G-1;" TEST(S) "
490 G=G-1
500 B=A(1)
510 FOR X=1 TO G
520 B=A(X+1)+B
530 NEXT X
540 PRINT "IS ";B/G;"%"
550 END
560 Z=INT(RND(0)*5+1):POSITION X,Y1
570 ON Z GOTO 590,610,630,650,670
580 GOTO 560
590 PRINT #6;"="
600 RETURN
610 PRINT #6;"+"

```

Program 6-1-cont. Visual Perception Test Program Listing

```
620 RETURN
630 PRINT #6;"<"
640 RETURN
650 PRINT #6;">"
660 RETURN
670 PRINT #6;"*"
680 RETURN
690 PRINT "ENTER THE SYMBOL # FOR EACH TRIAL"
700 PRINT "1 FOR '=' 2 FOR '+' 3 FOR '<'"
710 PRINT "4 FOR '>' 5 FOR '*' 0 FOR DON'T KNOW"
720 INPUT T
730 PRINT CHR$(125)
740 IF T=Z THEN 760
750 RETURN
760 W=W+1
770 RETURN
780 PRINT
790 A(G)=W*4
800 PRINT "YOU HAVE COMPLETED ";G;" TEST(S)"
810 PRINT
820 POSITION 11,6:PRINT "% SCORE"
830 FOR X=1 TO G
840 PRINT "TEST ";X,A(X)
850 NEXT X
860 G=G+1
870 PRINT
880 RETURN
890 PRINT "ENTER DIFFICULTY LEVEL"
900 PRINT "1=EASY"
910 PRINT "2=MEDIUM DIFFICULTY"
920 PRINT "3=MOST DIFFICULT"
930 INPUT H
940 IF H=1 THEN 980
950 IF H=2 THEN 1000
960 IF H=3 THEN 1020
970 GOTO 890
980 R=400
990 RETURN
1000 R=200
1010 RETURN
1020 R=100
1030 RETURN
1040 Y1=INT(RND(0)*16+1)
1050 X=INT(RND(0)*16+1)
1060 RETURN
```

CHAPTER 7

The Dungeon of Htam

The Dungeon of Htam is an educational fantasy game, where the player must answer math questions as he wanders through the chambers and corridors of the dungeon. It's a 2 level dungeon, based on the fantasy role playing game Dungeons and Dragons*. It's written in BASIC for your microcomputer. See Program 7-1 for the program listing.

THE PROGRAM

You are given 1000 gold pieces, and then teleported to a random location in the lower level of this 128 chamber, 2 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 answering math questions asked by monsters that occupy the dungeon. Each time a question is answered 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 simple addition, subtraction, multiplication, and division. The game is directed towards children, as an incentive for learning math. See Fig. 7-1 for a sample run.

The Math Problems

The problems are generated randomly using program lines 3250 through 4100. A random number generator subroutine at line 3860 is used to generate the X and Y components of the problems. Division is slightly different than the others. In order to have the answer as an integer, multiplication is used to create the problem, with $Z = X * Y$. It is generated using $X = Z/Y$, where X is the answer entered.

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

In the lower level of the dungeon, level 2, the problems are generally less difficult than those at level 1. The maximum value generated for X and Y is 30 at level 1, and 15 at level 2. 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 math 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:

1. (N)ORTH movement (up)
2. (E)AST movement (right)
3. (S)OUTH movement (down)
4. (W)EST movement (left)
5. (U)P movement
6. (M)AP display
7. (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.
2. If you enter an East-West corridor (through a secret door), North movement is not allowed.

East Movement

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

```

YOU WILL BE TELEPORTED TO . . .
THE DUNGEON OF HTAM
ENTER YOUR CHARACTERS NAME?
? RICK THE GREAT

YOU CARRY 1000 GOLD PIECES WITH YOU
RICK THE GREAT . . . YOU ARE ON YOUR WAY

YOU HAVE ARRIVED AT . . . .
THE DUNGEON OF HTAM . . . 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

RICK THE GREAT, 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 . . . . .

STOP *** I AM BUS

YOU MAY NOT PASS THRU UNTIL
YOU ANSWER THIS MATH QUESTION.

WHAT IS . . .
30 - 3 = ? 27

CORRECT
YOU WIN 352 GOLD PIECES

RICK THE GREAT, WHAT IS YOUR ACTION OR MOVE?

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

THERE IS A THIEF IN THIS CHAMBER
. . . . . HE SURPRISES YOU.
AS HE QUICKLY PASSES BY YOU HE
SNATCHES . . . 325 GOLD PIECES

RICK THE GREAT, WHAT IS YOUR ACTION OR MOVE?

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

THERE IS A THIEF IN THIS CHAMBER
YOU SURPRISED THE THIEF . . . .
AS HE RUNS OUT HE DROPS . . . .
. . . 103 GOLD PIECES.
YOU PICK UP THE GOLD PIECES

YOU SEARCH THE CHAMBER AND
YOU . . . . . FIND A MAP

RICK THE GREAT, 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 DDA

YOU MAY NOT PASS THRU UNTIL
YOU ANSWER THIS MATH QUESTION.

WHAT IS . . .
13 + 27 = ? 40

CORRECT
YOU WIN 160 GOLD PIECES

RICK THE GREAT, WHAT IS YOUR ACTION OR MOVE?

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

```

Fig. 7-1. The Dungeon of Htam sample run.

YOU DISTURBED A MONSTER IN THIS CHAMBER
AND HE SPEAKS

STOP *** I AM VID

YOU MAY NOT PASS THRU UNTIL
YOU ANSWER THIS MATH QUESTION.

WHAT IS . . .
399 / 21 = ? 194
19
CORRECT
YOU WIN 379 GOLD PIECES

RICK THE GREAT, WHAT IS YOUR ACTION OR MOVE?

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

YOU OPEN A SECRET DOOR AND
. . . ENTER AN EAST-WEST CORRIDOR

RICK THE GREAT, WHAT IS YOUR ACTION OR MOVE?

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

YOU ARE AT A STAIRWAY
. GOING UP

RICK THE GREAT, 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 DUNGEON OF HTAM

YOU HAVE ACQUIRED 5600 GOLD PIECES

GAME RATING IS 919

YOU TOOK 166 TURNS TO FIND THE WAY OUT,
AND ANSWERED 28 QUESTIONS CORRECTLY.

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

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.
2. If you enter an East-West corridor (through a secret door), South movement 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.
2. If you enter a North-South corridor (through a secret door), West movement 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 answer a random number of math questions 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 they may be found when encountering thieves. The 64 chamber dungeon is displayed using the following symbols:

1. M = Math monster
2. O = Empty chamber
3. ? = Unknown contents (either a thief or a trap door)
4. UP = Stairway up
5. NS = North-South corridor (entered through secret doors)
6. EW = East-West corridor (entered through secret doors)
7. P1 = Your location in the dungeon

See Fig. 7-2 for a sample Map.

A question mark (?) indicates either a Thief or a Trap Door. There is no way of knowing what the contents are, unless you enter the chamber. If you encounter a Thief, you either 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.

Fig. 7-1-cont. The Dungeon of Htam sample run.

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

THE DUNGEON OF HTAM *** MAP LEVEL 2 ***									
M	UP	0	EW	0	NS	M	0		
EW	M	0	?	M	M	?	?		
UP	0	EW	?	NS	EW	0	?		
M	0	NS	?	P1	?	NS	0		
UP	M	M	NS	M	?	?	0		
M	EW	0	M	NS	M	?	M		
0	0	NS	EW	0	M	M	M		
0	0	EW	EW	0	M	NS	M		
RICK THE GREAT, WHAT IS YOUR ACTION OR MOVE?									
(N)ORTH, (E)AST, (S)OUTH, (W)EST									
(U)P, (M)AP, (G)OLD									
? S									

Fig. 7-2. Sample map.

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 2, then you will fall into a deep pit. If you are at level 1, then you will fall through to level 2.

Gold Pieces Left

Entering a G will display the number of gold pieces you have with you. You will start out with 1000, and you 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 math questions answered correctly, and the number of turns taken. The rating is a number from approximately -500 to +1000, depending upon the above statistics. The higher the rating number, the better the rating. A negative number indicates a poor rating.

Program 7-1. The Dungeon of Htam Program Listing

```
100 PRINT CHR$(125)
110 PRINT "THE DUNGEON OF HTAM"
120 PRINT "ATARI"
130 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
140 PRINT
150 PRINT "AN EDUCATIONAL MATH DUNGEON"
160 GOSUB 440
170 GOSUB 440
180 PRINT CHR$(125)
190 DIM A$(100),A(9,9),B(9,9),M1$(1)
200 PRINT "YOU WILL BE TELEPORTED TO . . . ."
210 PRINT
220 PRINT "THE DUNGEON OF HTAM"
230 PRINT
240 MA=0:CA=0:G=1000:M1=1:K=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 GRAPHICS 0
330 PRINT "YOU HAVE ARRIVED AT . . . ."
340 PRINT
350 PRINT "THE DUNGEON OF HTAM . . . 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 2684
420 NEXT AB
430 GOTO 1010
440 REM DELAY
450 FOR Z2=1 TO 536
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
```

Program 7-1-cont. The Dungeon of Htam Program Listing

```
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,W)=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
860 GOTO 1070
870 PRINT "YOU FOUND YOUR WAY . . ."
880 PRINT " . . . OUT OF THE DUNGEON OF HTAM"
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 4300
980 PRINT "YOU TOOK ";M1;" TURNS TO FIND THE WAY OUT,"
990 PRINT "AND ANSWERED ";CA;" QUESTIONS CORRECTLY."
1000 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$(125):IF L1=1 THEN A=B(C,D):GOTO 1100
1090 A=A(C,D)
1100 GOSUB 440
1110 ON A GOSUB 2220,2280,2340,2340,2390,2700,2750,2800,3080
1120 PRINT
1130 IF G<0 THEN 1820
1140 PRINT A$;" , WHAT IS YOUR ACTION OR MOVE?"
```

Program 7-1-cont. The Dungeon of Htam Program Listing

```
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 4210
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$="G" THEN 1670
1270 PRINT
1280 GOTO 1120
1290 REM NORTH MOVEMENT
1300 IF A=7 THEN 1710
1310 IF (D-1)=0 THEN 1980
1320 D=D-1
1330 GOTO 1070
1340 REM EAST MOVEMENT
1350 IF A=6 THEN 1170
1360 IF (C+1)=9 THEN 2030
1370 C=C+1
1380 GOTO 1070
1390 REM SOUTH MOVEMENT
1400 IF A=7 THEN 1770
1410 IF (D+1)=9 THEN 2050
1420 D=D+1
1430 GOTO 1070
1440 REM WEST MOVEMENT
1450 IF A=6 THEN 1770
1460 IF (C-1)=0 THEN 2070
1470 C=C-1
1480 GOTO 1070
1490 PRINT CHR$(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
```

Program 7-1-cont. The Dungeon of Htam Program Listing

```
1680 PRINT CHR$(125):PRINT "YOU HAVE ";G;" GOLD PIECES WITH YOU"
1690 PRINT
1700 GOTO 1120
1710 REM EW CORRIDOR
1720 PRINT
1730 PRINT CHR$(125):PRINT "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$(125):PRINT "YOU ARE IN A NORTH-SOUTH CORRIDOR"
1800 PRINT "YOU CAN ONLY GO NORTH OR SOUTH"
1810 GOTO 1750
1820 REM GOLD ZERO
1830 GOSUB 440:GOSUB 440
1840 PRINT
1850 PRINT "YOU LOST ALL YOUR GOLD AND YOU WERE"
1860 PRINT " . . . UNABLE TO MEET THE DEMANDS OF"
1870 PRINT " . . . THE DUNGEON OF HTAM."
1880 PRINT :PRINT
1890 PRINT "BETTER LUCK NEXT TIME"
1900 GOSUB 930
1910 PRINT
1920 PRINT "ANOTHER GAME?"
1930 PRINT "ENTER '1'-YES '0'-NO"
1940 INPUT AA
1950 IF AA<>1 THEN 1970
1960 PRINT CHR$(125):GOTO 220
1970 END
1980 PRINT CHR$(125):PRINT "YOU ARE AT THE NORTH WALL"
1990 PRINT "YOU CANNOT PASS THROUGH"
2000 PRINT
2010 PRINT "TRY ANOTHER DIRECTION?"
2020 GOTO 1120
2030 PRINT CHR$(125):PRINT "YOU ARE AT THE EAST WALL"
2040 GOTO 1990
2050 PRINT CHR$(125):PRINT "YOU ARE AT THE SOUTH WALL"
2060 GOTO 1990
2070 PRINT CHR$(125):PRINT "YOU ARE AT THE WEST WALL"
2080 GOTO 1990
2090 REM DISPLAY MAP
2100 PRINT CHR$(125)
2110 PRINT "THE DUNGEON OF HTAM ** 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 3120,3120,3140,3140,3160,3180,3200,3220,3230
2180 NEXT N
2190 PRINT
```

Program 7-1-cont. The Dungeon of Htam Program Listing

```
2200 NEXT Q
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 PRINT CHR$(125):GOSUB 4160
2350 M4=INT(RND(0)*4+1)
2360 ON M4 GOSUB 3250,3380,3550,3680
2370 PRINT
2380 RETURN
2390 PRINT CHR$(125):PRINT "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."
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 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
```

Program 7-1-cont. The Dungeon of Htam Program Listing

```
2720 GOSUB 4350:PRINT ". . . ENTER A NORTH-SOUTH CORRIDOR"
2730 PRINT :GOSUB 4330
2740 RETURN
2750 PRINT CHR$(125):REM EAST WEST CORRIDOR
2760 PRINT
2770 PRINT ". . . ENTER AN EAST-WEST CORRIDOR"
2780 PRINT :GOSUB 4330
2790 RETURN
2800 REM TRAP DOOR
2810 PRINT "YOU ACTIVATED A . . . TRAP DOOR"
2820 GOSUB 440
2830 TD=INT(RND(0)*4+1)
2840 IF TD>=3 THEN 2890
2850 PRINT
2860 PRINT "BUT . . . YOU CAUGHT YOURSELF"
2870 PRINT "FROM FALLING"
2880 RETURN
2890 IF L1=2 THEN 3000
2900 L1=L1+1:PRINT :K=1
2910 PRINT "YOU FELL THRU TO LEVEL 2 . . . AND"
2920 G=100
2930 GOSUB 440
2940 PRINT
2950 PRINT "YOU . . . . . LOST"
2960 PRINT "MOST OF YOUR GOLD PIECES":PRINT
2970 PRINT "YOU HAVE . . ";G;" GOLD PIECES LEFT"
2980 PRINT "BUT . . . YOU STILL HAVE YOUR KEY"
2990 RETURN
3000 PRINT "YOU FELL INTO A DEEP . . . PIT"
3010 GOSUB 440
3020 PRINT "YOU'RE LUCKY . . . ."
3030 PRINT "YOU DIDN'T GET HURT"
3040 PRINT
3050 GOSUB 440
3060 PRINT "BUT IN CLIMBING OUT . . . ."
3070 GOTO 4250
3080 PRINT "YOU ARE AT A STAIRWAY"
3090 PRINT ". . . . . GOING UP"
3100 PRINT
3110 RETURN
3120 PRINT "0 ";
3130 RETURN
3140 PRINT "M ";
3150 RETURN
3160 PRINT "? ";
3170 RETURN
3180 PRINT "NS ";
3190 RETURN
3200 PRINT "EW ";
3210 RETURN
3220 GOTO 3160
3230 PRINT "UP ";
3240 RETURN
```

Program 7-1-cont. The Dungeon of Htam Program Listing

```
3250 REM ADD
3260 PRINT "HALT *** I AM DDA"
3270 GOSUB 3810
3280 GOSUB 3860
3290 PRINT X;" + ";Y;" = ";
3300 Z=X+Y
3310 INPUT A1
3320 IF A1=Z THEN 3360
3330 REM LOSE GOLD
3340 GOSUB 4020
3350 RETURN
3360 GOSUB 3920
3370 RETURN
3380 REM SUB
3390 PRINT "STOP *** I AM BUS"
3400 GOSUB 3810
3410 GOSUB 3860
3420 PRINT X;" - ";Y;" = ";
3430 Z=X-Y
3440 INPUT A1
3450 IF A1=Z THEN 3480
3460 GOSUB 4020
3470 RETURN
3480 GOSUB 3920
3490 RETURN
3500 GOSUB 480
3510 H=1:O=9:W=8
3520 B=0:E=5:R=14
3530 C=0:PR=0
3540 GOTO 1010
3550 REM MULT
3560 PRINT "HALT *** I AM LUM"
3570 GOSUB 3810
3580 GOSUB 3860
3590 PRINT X;" X ";Y;" = ";
3600 Z=X*Y
3610 INPUT A1
3620 IF A1=Z THEN 3660
3630 REM LOSE GOLD
3640 GOSUB 4020
3650 RETURN
3660 GOSUB 3920
3670 RETURN
3680 REM DIV
3690 PRINT "STOP *** I AM VID"
3700 GOSUB 3810
3710 GOSUB 3860
3720 PRINT X*Y;" / ";Y;" = ";
3730 Z=X
3740 INPUT A1
3750 IF A1=Z THEN 3790
3760 REM LOSE GOLD
3770 GOSUB 4020
```


Program 7-1-cont. The Dungeon of Htam Program Listing

```
3780 RETURN
3790 GOSUB 3920
3800 RETURN
3810 PRINT
3820 PRINT "YOU MAY NOT PASS THRU UNTIL"
3830 PRINT "YOU ANSWER THIS MATH QUESTION"
3840 PRINT
3850 RETURN
3860 REM RANDOM ROUTINE
3870 X=INT(RND(0)*30/L1+1)
3880 Y=INT(RND(0)*30/L1+1)
3890 PRINT "WHAT IS . . ."
3900 GOSUB 440
3910 RETURN
3920 PRINT "CORRECT"
3930 G4=INT(RND(0)*400/L1+1)+25
3940 G=G+G4
3950 GOSUB 440
3960 PRINT "YOU WIN ";G4;" GOLD PIECES"
3970 IF L1=1 THEN B(C,D)=1:GOTO 3980
3975 A(C,D)=1
3980 CA=CA+1:IF K=1 THEN RETURN
3990 IF CA=K4 THEN 4110
4000 IF L1=1 THEN 4230
4010 RETURN
4020 PRINT
4030 PRINT "INCORRECT"
4040 PRINT "THE CORRECT ANSWER IS ";Z
4050 PRINT
4060 G4=INT(RND(0)*350/L1+1)
4070 G=G-G4
4080 GOSUB 440
4090 PRINT "YOU LOSE ";G4;" GOLD PIECES"
4100 RETURN
4110 GOSUB 440
4120 K=1
4130 PRINT :PRINT "YOU HAVE FOUND THE ENCHANTED KEY . . ."
4140 GOSUB 440
4150 RETURN
4160 PRINT "YOU DISTURB A MONSTER IN THIS CHAMBER"
4170 GOSUB 440
4180 PRINT "AND HE SPEAKS . . . . .":PRINT
4190 GOSUB 440
4200 RETURN
4210 GOSUB 4120
4220 GOTO 1200
4230 IF CA=CB THEN 4110
4240 RETURN
4250 G=100:GOSUB 440:PRINT
4260 PRINT "YOU . . . . . DROPPED"
4270 PRINT "MOST OF YOUR GOLD PIECES"
4280 PRINT "YOU HAVE ";G;" GOLD PIECES LEFT"
4290 RETURN
```

Program 7-1-cont. The Dungeon of Htam Program Listing

```
4300 PRINT "YOU ANSWERED ";CA;" QUESTIONS CORRECTLY"  
4310 PRINT " . . . . . IN ";M1;" TURNS."  
4320 RETURN  
4330 PRINT "THE DOOR CLOSES AND LOCKS BEHIND YOU":GOSUB 440  
4340 RETURN  
4350 PRINT "YOU OPEN A SECRET DOOR AND . . . .":GOSUB 440  
4360 RETURN
```

CHAPTER 8

Language Flash Cards

Flash cards are an important educational tool for learning a variety of subjects. An excellent application of the home computer is its use as a language

flash card generator. This chapter describes 4 different language flash card programs, written in BASIC, for your microcomputer. They are French,

FRENCH-ENGLISH FLASH CARDS

COPYRIGHT (C) 1980 BY HOWARD BERENBON

BEGINNING AT LINE 2000, ENTER YOUR LIST OF FLASH CARDS IN THE FORM OF DATA STATEMENTS. ALTERNATE BETWEEN FRENCH AND ENGLISH; OR USE THE WORDS GIVEN.

THE PROGRAM WILL FLASH THE FRENCH OR ENGLISH WORD, AND EXPECT YOUR ENTRY OF ITS EQUIVALENT. BEFORE YOU TAKE THE TEST YOU MAY REVIEW THE WORD LIST. THE CARDS MAY BE IN FRENCH OR IN ENGLISH, AND YOU HAVE A CHOICE OF THREE SPEEDS: SLOW, MODERATE, FAST.

ENTER '1' FOR FRENCH CARDS, '2' FOR ENGLISH CARDS
? 1

ENTER SPEED: 1=SLOW 2=MODERATE 3=FAST
? 2

REVIEW THE WORD LIST? 1=YES 0=NO
? 0

ENTER A '1' TO BEGIN
? 1

```
CARD # 1
*****
*           *
*           *
*  PLUS    *
*           *
*           *
*****
```

CARD # 1
ENTER ANSWER, IN ENGLISH
? MORE
CORRECT

FRENCH 'PLUS' = ENGLISH 'MORE'

ENTER A '1' TO CONTINUE
? 1

```
CARD # 2
*****
*           *
*           *
*  REPOS   *
*           *
*           *
*****
```

CARD # 2
ENTER ANSWER, IN ENGLISH
? REST
CORRECT

FRENCH 'REPOS' = ENGLISH 'REST'

ENTER A '1' TO CONTINUE
? 1

```
CARD # 3
*****
*           *
*           *
*  RUE     *
*           *
*           *
*****
```

CARD # 3
ENTER ANSWER, IN ENGLISH
? STREET
CORRECT

FRENCH 'RUE' = ENGLISH 'STREET'

ENTER A '1' TO CONTINUE
? 1

Fig. 8-1. Language flash cards sample run.

Spanish, Italian, and German flash cards. See Programs 8-1 through 8-4 for the French, Spanish, Italian, and German flash card programs, respectively.

THE PROGRAM

Each program will flash 25 language cards, with a choice of three different speeds, and either foreign entry, or English entry.

The words are stored in DATA statements, beginning at line 2000. You can use the words given, or select your own list. Alternate between the foreign word and its English equivalent.

After you run the program, it requests entry of

the type of card to be flashed. Enter a 1 for foreign cards, or 2 for English cards. Then enter the speed; 1 for slow, 2 for moderate, or 3 for fast. Finally, you can review the word list before starting the test. Enter a 1 for YES or a 0 for NO.

THE TEST

Enter a 1 to begin the test. A card will be flashed on the screen. Now enter the correct word. The program will check your entry, and print CORRECT or INCORRECT, then print the correct answer. Enter a 1 to continue. After all 25 cards are displayed, it prints your point score, out of 25, and the percent correct. See Fig. 8-1 for a sample run.

Program 8-1. French Flash Cards Program Listing

```
100 PRINT CHR$(125); "FRENCH-ENGLISH FLASH CARDS"
110 PRINT "ATARI": DIM A$(20), B$(20), C$(20), L$(10)
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
140 PRINT "BEGINNING AT LINE 2000, ENTER YOUR LIST OF"
150 PRINT "FLASH CARDS IN THE FORM OF DATA STATEMENTS. ALTERNATE"
160 PRINT "BETWEEN FRENCH AND ENGLISH; OR USE THE WORDS GIVEN."
170 PRINT
180 PRINT "THE PROGRAM WILL FLASH THE FRENCH OR ENGLISH WORD,"
190 PRINT "AND EXPECT YOUR ENTRY OF ITS EQUIVALENT. BEFORE YOU"
200 PRINT "TAKE THE TEST YOU MAY REVIEW THE WORD LIST. THE CARDS"
210 PRINT "MAY BE IN FRENCH OR IN ENGLISH, AND YOU HAVE A CHOICE"
220 PRINT "OF THREE SPEEDS: SLOW, MODERATE, FAST."
230 PRINT
240 PRINT "ENTER '1'-FRENCH OR '2'-ENGLISH CARDS"
250 INPUT J
260 GOSUB 970
270 PRINT "ENTER SPEED: 1=SLOW 2=MODERATE 3=FAST"
280 INPUT S
290 GOSUB 400
300 PRINT "REVIEW THE WORD LIST? 1=YES 0=NO"
310 INPUT A
320 IF A <> 1 THEN 340
330 GOSUB 490
340 PRINT CHR$(125)
350 PRINT "ENTER A '1' TO BEGIN"
360 INPUT A
370 GOSUB 600
380 GOSUB 820
390 END
400 IF S=1 THEN 430
410 IF S=2 THEN 450
420 IF S=3 THEN 470
430 X=368
440 RETURN
450 X=162
460 RETURN
470 X=68
480 RETURN
490 FOR C=1 TO 25
500 GRAPHICS 1+16:PRINT #6;"CARD #";C:PRINT #6
510 PRINT #6;"ENGLISH","FRENCH"
520 PRINT #6
530 READ A$,B$
540 PRINT #6;B$,A$
550 FOR T=1 TO 600
560 NEXT T
570 NEXT C
580 RESTORE
590 RETURN
600 IF J=2 THEN 1140
610 W=0
```

Program 8-1-cont. French Flash Cards Program Listing

```

620 PRINT CHR$(125)
630 FOR F=1 TO 25:GRAPHICS 2+16
640 READ A$:READ B$:N=INT(RND(0)*15+1)
650 SETCOLOR 0,N,8:COLOR 1
660 PRINT #6;"CARD #";F
670 PRINT #6;"*****"
680 PRINT #6;"*                *"
690 PRINT #6;"*                *":PRINT #6;"*";
700 PRINT #6;" ";A$:POSITION 13,4:PRINT #6;"*"
710 PRINT #6;"*                *"
720 PRINT #6;"*                *"
730 PRINT #6;"*****"
740 GOSUB 1040
750 INPUT C$
760 IF C$=B$ THEN 920
770 PRINT
780 PRINT "INCORRECT"
790 GOSUB 850
800 NEXT F
810 RETURN
820 PRINT "YOUR SCORE IS ";W;" CORRECT OF 25"
830 PRINT "THAT'S ";W*4;"% CORRECT"
840 RETURN
850 PRINT "FRENCH '";A$;"' = ENGLISH '";B$;"'"
860 IF F=25 THEN 1100
870 PRINT
880 PRINT "ENTER A '1' TO CONTINUE"
890 INPUT A
900 PRINT CHR$(125)
910 RETURN
920 W=W+1
930 PRINT "CORRECT"
940 PRINT
950 GOSUB 850
960 GOTO 800
970 REM SET UP TYPE OF CARD INPUT REQUEST
980 IF J=2 THEN 1020
990 J=1
1000 L$=" ENGLISH"
1010 RETURN
1020 L$=" FRENCH"
1030 RETURN
1040 FOR A=1 TO X
1050 NEXT A
1060 GRAPHICS 0
1070 PRINT "CARD #";F
1080 PRINT "ENTER ANSWER, IN";L$
1090 RETURN
1100 PRINT
1110 PRINT "ENTER A '1' TO DISPLAY SCORE"
1120 INPUT A
1130 RETURN
1140 W=0

```

Program 8-1-cont. French Flash Cards Program Listing

```
1150 PRINT CHR$(125)
1160 FOR F=1 TO 25:GRAPHICS 2+16
1170 READ A$:READ B$:N=INT(RND(0)*15+1)
1180 SETCOLOR 0,N,8:COLOR 1
1190 PRINT #6;"CARD #";F
1200 PRINT #6;"*****"
1210 PRINT #6;"*          *"
1220 PRINT #6;"*          *":PRINT #6;"*";
1230 PRINT #6;" ";B$:POSITION 13,4:PRINT #6;"*"
1240 PRINT #6;"*          *"
1250 PRINT #6;"*          *"
1260 PRINT #6;"*****"
1270 GOSUB 1040
1280 INPUT C$
1290 IF C$=A$ THEN 1350
1300 PRINT
1310 PRINT "INCORRECT"
1320 GOSUB 850
1330 NEXT F
1340 RETURN
1350 W=W+1
1360 PRINT "CORRECT"
1370 PRINT
1380 GOSUB 850
1390 GOTO 1330
1980 REM ENTER THE DATA, ALTERNATE BETWEEN FRENCH AND ENGLISH WORD
S
1990 REM 25 FRENCH AND 25 ENGLISH
2000 DATA PLUS,MORE,REPOS,REST,RUE,STREET,SALE,DIRTY
2010 DATA VIN,WINE,PLUTOT,RATHER,VERRE,GLASS,TOUT,ALL
2020 DATA SEL,SALT,TACHE,SPOT,VELO,BICYCLE,MONTRE,WATCH
2030 DATA ICI,HERE,FRANCAIS,FRENCH,HAUT,HIGH,ENFANT,CHILD
2040 DATA FAIM,HUNGER,AMI,FRIEND,CENT,HUNDRED,BRAS,ARM
2050 DATA CHAMBRE,ROOM,GARCON,BOY,LAIT,MILK
2060 DATA GRAND,BIG,FLEUR,FLOWER
```

Program 8-2. Spanish Flash Cards Program Listing

```
100 PRINT CHR$(125);"SPANISH-ENGLISH FLASH CARDS: ATARI"
110 DIM A$(20),B$(20),C$(20),L$(10)
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
140 PRINT "BEGINNING AT LINE 2000, ENTER YOUR LIST OF"
150 PRINT "FLASH CARDS IN THE FORM OF DATA STATEMENTS. ALTERNATE"
160 PRINT "BETWEEN SPANISH AND ENGLISH; OR USE THE WORDS GIVEN."
170 PRINT
180 PRINT "THE PROGRAM WILL FLASH THE SPANISH OR ENGLISH WORD,"
190 PRINT "AND EXPECT YOUR ENTRY OF ITS EQUIVALENT. BEFORE YOU"
200 PRINT "TAKE THE TEST YOU MAY REVIEW THE WORD LIST. THE CARDS"
210 PRINT "MAY BE IN SPANISH OR IN ENGLISH, AND YOU HAVE A CHOICE"
220 PRINT "OF THREE SPEEDS: SLOW, MODERATE, FAST."
230 PRINT
240 PRINT "ENTER '1'-SPANISH OR '2'-ENGLISH CARDS"
250 INPUT J
260 GOSUB 970
270 PRINT "ENTER SPEED: 1=SLOW 2=MODERATE 3=FAST"
280 INPUT S
290 GOSUB 400
300 PRINT "REVIEW THE WORD LIST? 1=YES 0=NO"
310 INPUT A
320 IF A<>1 THEN 340
330 GOSUB 490
340 PRINT CHR$(125)
350 PRINT "ENTER A '1' TO BEGIN"
360 INPUT A
370 GOSUB 600
380 GOSUB 820
390 END
400 IF S=1 THEN 430
410 IF S=2 THEN 450
420 IF S=3 THEN 470
430 X=368
440 RETURN
450 X=162
460 RETURN
470 X=68
480 RETURN
490 FOR C=1 TO 25
500 GRAPHICS 1+16:PRINT #6;"CARD #";C:PRINT #6
510 PRINT #6;"ENGLISH","SPANISH"
520 PRINT #6
530 READ A$,B$
540 PRINT #6;B$,A$
550 FOR T=1 TO 600
560 NEXT T
570 NEXT C
580 RESTORE
590 RETURN
600 IF J=2 THEN 1140
610 W=0
```


Program 8-2-cont. Spanish Flash Cards Program Listing

```
620 PRINT CHR$(125)
630 FOR F=1 TO 25:GRAPHICS 2+16
640 READ A$:READ B$:N=INT(RND(0)*15+1)
650 SETCOLOR 0,N,8:COLOR 1
660 PRINT #6;"CARD #";F
670 PRINT #6;"*****"
680 PRINT #6;"*                *"
690 PRINT #6;"*                *":PRINT #6;"*";
700 PRINT #6;"    ";A$:POSITION 13,4:PRINT #6;"*"
710 PRINT #6;"*                *"
720 PRINT #6;"*                *"
730 PRINT #6;"*****"
740 GOSUB 1040
750 INPUT C$
760 IF C$=B$ THEN 920
770 PRINT
780 PRINT "INCORRECT"
790 GOSUB 850
800 NEXT F
810 RETURN
820 PRINT "YOUR SCORE IS ";W;" CORRECT OF 25"
830 PRINT "THAT'S ";W*4;"% CORRECT"
840 RETURN
850 PRINT "SPANISH '";A$;"' = ENGLISH '";B$;"'"
860 IF F=25 THEN 1100
870 PRINT
880 PRINT "ENTER A '1' TO CONTINUE"
890 INPUT A
900 PRINT CHR$(125)
910 RETURN
920 W=W+1
930 PRINT "CORRECT"
940 PRINT
950 GOSUB 850
960 GOTO 800
970 REM SET UP TYPE OF CARD INPUT REQUEST
980 IF J=2 THEN 1020
990 J=1
1000 L$=" ENGLISH"
1010 RETURN
1020 L$=" SPANISH"
1030 RETURN
1040 FOR A=1 TO X
1050 NEXT A
1060 GRAPHICS 0
1070 PRINT "CARD #";F
1080 PRINT "ENTER ANSWER, IN";L$
1090 RETURN
1100 PRINT
1110 PRINT "ENTER A '1' TO DISPLAY SCORE"
1120 INPUT A
1130 RETURN
1140 W=0
```

Program 8-2-cont. Spanish Flash Cards Program Listing

```
1150 PRINT CHR$(125)
1160 FOR F=1 TO 25:GRAPHICS 2+16
1170 READ A$:READ B$:N=INT(RND(0)*15+1)
1180 SETCOLOR 0,N,8:COLOR 1
1190 PRINT #6;"CARD #";F
1200 PRINT #6;"*****"
1210 PRINT #6;"*          *"
1220 PRINT #6;"*          *":PRINT #6;"*";
1230 PRINT #6;" ";B$;:POSITION 13,4:PRINT #6;"*"
1240 PRINT #6;"*          *"
1250 PRINT #6;"*          *"
1260 PRINT #6;"*****"
1270 GOSUB 1040
1280 INPUT C$
1290 IF C$=A$ THEN 1350
1300 PRINT
1310 PRINT "INCORRECT"
1320 GOSUB 850
1330 NEXT F
1340 RETURN
1350 W=W+1
1360 PRINT "CORRECT"
1370 PRINT
1380 GOSUB 850
1390 GOTO 1330
1980 REM ENTER THE DATA, ALTERNATE BETWEEN SPANISH AND ENGLISH WORDS
1990 REM 25 SPANISH AND 25 ENGLISH
2000 DATA ENVOLVER,INVOLVE,CANTARO,JAR,QUIETO,QUIET
2010 DATA CIMA,TOP,SEMANA,WEEK,TIRO,THROW,ESTADO,STATE
2020 DATA EMBARAZO,PUZZLE,CERCANO,NEAR,CRUZ,CROSS
2030 DATA VIGILIA,FAST,COMPRAR,BUY,PROMEDIO,AVERAGE
2040 DATA MAL,HARM,VIDRIO,GLASS,RESULTADO,ISSUE
2050 DATA PRONTO,QUICK,MAR,SEA,ENTONCES,THEN,VIDA,LIFE
2060 DATA PERDIDA,LOSS,LECHE,MILK,RED,NET
2070 DATA ORIGEN,ORIGIN,PLUMA,PEN
```

Program 8-3. Italian Flash Cards Program Listing

```
100 PRINT CHR$(125);"ITALIAN-ENGLISH FLASH CARDS: ATARI"
110 DIM A$(20),B$(20),C$(20),L$(10)
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
140 PRINT "BEGINNING AT LINE 2000, ENTER YOUR LIST OF"
150 PRINT "FLASH CARDS IN THE FORM OF DATA STATEMENTS. ALTERNATE"
160 PRINT "BETWEEN ITALIAN AND ENGLISH; OR USE THE WORDS GIVEN."
170 PRINT
180 PRINT "THE PROGRAM WILL FLASH THE ITALIAN OR ENGLISH WORD,"
190 PRINT "AND EXPECT YOUR ENTRY OF ITS EQUIVALENT. BEFORE YOU"
200 PRINT "TAKE THE TEST YOU MAY REVIEW THE WORD LIST. THE CARDS"
210 PRINT "MAY BE IN ITALIAN OR IN ENGLISH, AND YOU HAVE A CHOICE"
220 PRINT "OF THREE SPEEDS: SLOW, MODERATE, FAST."
230 PRINT
240 PRINT "ENTER '1'-ITALIAN OR '2'-ENGLISH CARDS"
250 INPUT J
260 GOSUB 970
270 PRINT "ENTER SPEED: 1=SLOW 2=MODERATE 3=FAST"
280 INPUT S
290 GOSUB 400
300 PRINT "REVIEW THE WORD LIST? 1=YES 0=NO"
310 INPUT A
320 IF A<>1 THEN 340
330 GOSUB 490
340 PRINT CHR$(125)
350 PRINT "ENTER A '1' TO BEGIN"
360 INPUT A
370 GOSUB 600
380 GOSUB 820
390 END
400 IF S=1 THEN 430
410 IF S=2 THEN 450
420 IF S=3 THEN 470
430 X=368
440 RETURN
450 X=162
460 RETURN
470 X=68
480 RETURN
490 FOR C=1 TO 25
500 GRAPHICS 1+16:PRINT #6;"CARD #";C:PRINT #6
510 PRINT #6;"ENGLISH","ITALIAN"
520 PRINT #6
530 READ A$,B$
540 PRINT #6;B$,A$
550 FOR T=1 TO 600
560 NEXT T
570 NEXT C
580 RESTORE
590 RETURN
600 IF J=2 THEN 1140
610 W=0
```

Program 8-3-cont. Italian Flash Cards Program Listing

```
620 PRINT CHR$(125)
630 FOR F=1 TO 25:GRAPHICS 2+16
640 READ A$:READ B$:N=INT(RND(0)*15+1)
650 SETCOLOR 0,N,8:COLOR 1
660 PRINT #6;"CARD #";F
670 PRINT #6;"*****"
680 PRINT #6;"*                *"
690 PRINT #6;"*                *":PRINT #6;"*";
700 PRINT #6;" ";A$:POSITION 13,4:PRINT #6;"*"
710 PRINT #6;"*                *"
720 PRINT #6;"*                *"
730 PRINT #6;"*****"
740 GOSUB 1040
750 INPUT C$
760 IF C$=B$ THEN 920
770 PRINT
780 PRINT "INCORRECT"
790 GOSUB 850
800 NEXT F
810 RETURN
820 PRINT "YOUR SCORE IS ";W;" CORRECT OF 25"
830 PRINT "THAT'S ";W*4;"% CORRECT"
840 RETURN
850 PRINT "ITALIAN '";A$;"' = ENGLISH '";B$;"'"
860 IF F=25 THEN 1100
870 PRINT
880 PRINT "ENTER A '1' TO CONTINUE"
890 INPUT A
900 PRINT CHR$(125)
910 RETURN
920 W=W+1
930 PRINT "CORRECT"
940 PRINT
950 GOSUB 850
960 GOTO 800
970 REM SET UP TYPE OF CARD INPUT REQUEST
980 IF J=2 THEN 1020
990 J=1
1000 L$=" ENGLISH"
1010 RETURN
1020 L$=" ITALIAN"
1030 RETURN
1040 FOR A=1 TO X
1050 NEXT A
1060 GRAPHICS 0
1070 PRINT "CARD #";F
1080 PRINT "ENTER ANSWER, IN";L$
1090 RETURN
1100 PRINT
1110 PRINT "ENTER A '1' TO DISPLAY SCORE"
1120 INPUT A
1130 RETURN
1140 W=0
```

Program 8-3-cont. Italian Flash Cards Program Listing

```
1150 PRINT CHR$(125)
1160 FOR F=1 TO 25:GRAPHICS 2+16
1170 READ A$:READ B$:N=INT(RND(0)*15+1)
1180 SETCOLOR 0,N,8:COLOR 1
1190 PRINT #6;"CARD #";F
1200 PRINT #6;"*****"
1210 PRINT #6;"*                *"
1220 PRINT #6;"*                *":PRINT #6;"*";
1230 PRINT #6;" ";B$:POSITION 13,4:PRINT #6;"*"
1240 PRINT #6;"*                *"
1250 PRINT #6;"*                *"
1260 PRINT #6;"*****"
1270 GOSUB 1040
1280 INPUT C$
1290 IF C$=A$ THEN 1350
1300 PRINT
1310 PRINT "INCORRECT"
1320 GOSUB 850
1330 NEXT F
1340 RETURN
1350 W=W+1
1360 PRINT "CORRECT"
1370 PRINT
1380 GOSUB 850
1390 GOTO 1330
1980 REM ENTER THE DATA, ALTERNATE BETWEEN ITALIAN AND ENGLISH WORDS
1990 REM 25 ITALIAN AND 25 ENGLISH
2000 DATA SPARO,SHOT,ACQUA,WATER,DOLORE,PAIN,CAMERA,ROOM
2010 DATA GITA,TRIP,UNITA,UNIT,PIOGGIA,RAIN,MARE,SEA
2020 DATA PROVA,TEST,ANSIETA,CONCERN,ANCORA,AGAIN
2030 DATA ERBA,GRASS,INDICE,INDEX,GIACCA,COAT
2040 DATA PASTO,MEAL,AGO,NEEDLE,PAIO,PAIR,QUIETO,QUIET
2050 DATA SENSO,SENSE,DIRETTO,THROUGH,SOTTO,UNDER
2060 DATA PIEDE,FOOT,PORTA,DOOR,NUBE,CLOUD,RESPIRO,BREATH
```

Program 8-4. German Flash Cards Program Listing

```
100 PRINT CHR$(125);"GERMAN-ENGLISH FLASH CARDS"
110 PRINT "ATARI":DIM A$(20),B$(20),C$(20),L$(10)
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
140 PRINT "BEGINNING AT LINE 2000, ENTER YOUR LIST OF"
150 PRINT "FLASH CARDS IN THE FORM OF DATA STATEMENTS. ALTERNATE"
160 PRINT "BETWEEN GERMAN AND ENGLISH; OR USE THE WORDS GIVEN."
170 PRINT
180 PRINT "THE PROGRAM WILL FLASH THE GERMAN OR ENGLISH WORD,"
190 PRINT "AND EXPECT YOUR ENTRY OF ITS EQUIVALENT. BEFORE YOU"
200 PRINT "TAKE THE TEST YOU MAY REVIEW THE WORD LIST. THE CARDS"
210 PRINT "MAY BE IN GERMAN OR IN ENGLISH, AND YOU HAVE A CHOICE"
220 PRINT "OF THREE SPEEDS: SLOW, MODERATE, FAST."
230 PRINT
240 PRINT "ENTER '1'-GERMAN OR '2'-ENGLISH CARDS"
250 INPUT J
260 GOSUB 970
270 PRINT "ENTER SPEED: 1=SLOW 2=MODERATE 3=FAST"
280 INPUT S
290 GOSUB 400
300 PRINT "REVIEW THE WORD LIST? 1=YES 0=NO"
310 INPUT A
320 IF A<>1 THEN 340
330 GOSUB 490
340 PRINT CHR$(125)
350 PRINT "ENTER A '1' TO BEGIN"
360 INPUT A
370 GOSUB 600
380 GOSUB 820
390 END
400 IF S=1 THEN 430
410 IF S=2 THEN 450
420 IF S=3 THEN 470
430 X=368
440 RETURN
450 X=162
460 RETURN
470 X=68
480 RETURN
490 FOR C=1 TO 25
500 GRAPHICS 1+16:PRINT #6;"CARD #";C:PRINT #6
510 PRINT #6;"ENGLISH","GERMAN"
520 PRINT #6
530 READ A$,B$
540 PRINT #6;B$,A$
550 FOR T=1 TO 600
560 NEXT T
570 NEXT C
580 RESTORE
590 RETURN
600 IF J=2 THEN 1140
610 W=0
```

Program 8-4-cont. German Flash Cards Program Listing

```

620 PRINT CHR$(125)
630 FOR F=1 TO 25:GRAPHICS 2+16
640 READ A$:READ B$:N=INT(RND(0)*15+1)
650 SETCOLOR 0,N,8:COLOR 1
660 PRINT #6;"CARD #";F
670 PRINT #6;"*****"
680 PRINT #6;"*                *"
690 PRINT #6;"*                *":PRINT #6;"*";
700 PRINT #6;" ";A$:POSITION 13,4:PRINT #6;"*"
710 PRINT #6;"*                *"
720 PRINT #6;"*                *"
730 PRINT #6;"*****"
740 GOSUB 1040
750 INPUT C$
760 IF C$=B$ THEN 920
770 PRINT
780 PRINT "INCORRECT"
790 GOSUB 850
800 NEXT F
810 RETURN
820 PRINT "YOUR SCORE IS ";W;" CORRECT OF 25"
830 PRINT "THAT'S ";W*4;"% CORRECT"
840 RETURN
850 PRINT "GERMAN ";A$;"' = ENGLISH ";B$;"'"
860 IF F=25 THEN 1100
870 PRINT
880 PRINT "ENTER A '1' TO CONTINUE"
890 INPUT A
900 PRINT CHR$(125)
910 RETURN
920 W=W+1
930 PRINT "CORRECT"
940 PRINT
950 GOSUB 850
960 GOTO 800
970 REM SET UP TYPE OF CARD INPUT REQUEST
980 IF J=2 THEN 1020
990 J=1
1000 L$=" ENGLISH"
1010 RETURN
1020 L$=" GERMAN"
1030 RETURN
1040 FOR A=1 TO X
1050 NEXT A
1060 GRAPHICS 0
1070 PRINT "CARD #";F
1080 PRINT "ENTER ANSWER, IN";L$
1090 RETURN
1100 PRINT
1110 PRINT "ENTER A '1' TO DISPLAY SCORE"
1120 INPUT A
1130 RETURN
1140 W=0

```

Program 8-4-cont. German Flash Cards Program Listing

```
1150 PRINT CHR$(125)
1160 FOR F=1 TO 25:GRAPHICS 2+16
1170 READ A$:READ B$:N=INT(RND(0)*15+1)
1180 SETCOLOR 0,N,8:COLOR 1
1190 PRINT #6;"CARD #";F
1200 PRINT #6;"*****"
1210 PRINT #6;"*          *"
1220 PRINT #6;"*          *":PRINT #6;"*";
1230 PRINT #6;" ";B$:POSITION 13,4:PRINT #6;"*"
1240 PRINT #6;"*          *"
1250 PRINT #6;"*          *"
1260 PRINT #6;"*****"
1270 GOSUB 1040
1280 INPUT C$
1290 IF C$=A$ THEN 1350
1300 PRINT
1310 PRINT "INCORRECT"
1320 GOSUB 850
1330 NEXT F
1340 RETURN
1350 W=W+1
1360 PRINT "CORRECT"
1370 PRINT
1380 GOSUB 850
1390 GOTO 1330
1980 REM ENTER THE DATA, ALTERNATE BETWEEN GERMAN AND ENGLISH WORD
S
1990 REM 25 GERMAN AND 25 ENGLISH
2000 DATA MORGEN,TOMORROW,GLUECKLICH,HAPPY,KUNFTIG,FUTURE
2010 DATA NORD,NORTH,GENIESSION,ENJOY,SCHLAG,KNOCK,PARFUM,PERFUME
2020 DATA VERNUNFT,REASON,STILLE,STILL,TRAUBE,GRAPE
2030 DATA BEKOMMEN,OBTAIN,STAUB,DUST,SCHLOSS,CASTLE
2040 DATA HERZ,HEART,FEDER,PEN,SEGEL,SAIL,HANDEL,TRADE
2050 DATA AUF,UP,SCHRITT,WALK,ANLEGEN,INVEST,EINTRETEN,ENTER
2060 DATA DUNKEL,DARK,BRUCH,BREAK,ERSCHEINEN,APPEAR,FAHNE,FLAG
```


CHAPTER 9

The Word Board

Are you interested in educational applications, or in experimenting with new devices that can aid the handicapped? Then the Word Board is just the program for you. Using your microcomputer, you can turn your system into a language communicator.

WORD BOARD 1

The Word Board 1 accepts keyboard entry of individual letters, and displays single words assigned to each letter. See Program 9-1 for the program listing.

```
RUN
WORD BOARD 1
COPYRIGHT (C) 1980 BY HOWARD BERENBON

ACCEPTS CHARACTER INPUT (A TO Z, 0 TO 9)
AND PRINTS WORDS AND NUMBERS THAT
CORRESPOND TO THE ENTRY. ENTERING
AN '@' WILL SKIP 4 LINES.
```

```
ENTER CHARACTER?
? A
```

A	
ENGLISH	FRENCH
-----	-----
APPLE	POMME

```
ENTER CHARACTER?
? B
```

B	
ENGLISH	FRENCH
-----	-----
AIRPLANE	AVION

```
ENTER CHARACTER?
?
```

Fig. 9-1. Word board 1 sample run.

```
RUN
WORD BOARD 2
COPYRIGHT (C) 1980 BY HOWARD BERENBON

ACCEPTS CHARACTER INPUT (A TO Z, 0 TO 9)
AND PRINTS WORDS AND NUMBERS THAT
CORRESPOND TO THE ENTRY. ENTERING
AN '@' WILL SKIP 4 LINES.
```

```
MAY BE USED AS A HELP TO THE HANDICAPPED
? Q
```

Q	
	I
? F	WANT
? V	TO
? B	EAT
? @	

R	
	DO
? S	YOU
? T	GO
? V	TO
? B	EAT
? @	

L	
	OKAY
?	

Fig. 9-2. Word board 2 sample run.

The program may be used to aid in language instruction, by assigning English words to each of the 26 keys. For the English word covering a key, its French equivalent can be displayed. It allows the French word to be displayed, when the English word is depressed. See Fig. 9-1 for a sample run. The words are printed in large letters at the center of the screen, after the RETURN key is depressed. It's a handy aid for the language student, to help in memorizing foreign vocabulary words. A French vocabulary is given in Table 9-1. After the 26 words are learned, the student can test his memory by covering the keytops, and typing through the list for review.

Table 9.1 French Vocabulary Words

Key	French	English
A	pomme	apple
B	avion	airplane
C	tasse	cup
D	vache	cow
E	veston	coat
F	chien	dog
G	main	hand
H	soleil	sun
I	livre	book
J	lune	moon
K	oreille	ear
L	nuage	cloud
M	peigne	comb
N	yeux	eyes
O	glace	ice
P	etoile	star
Q	cuillere	spoon
R	chaise	chair
S	cheval	horse
T	crayon	pencil
U	lampe	lamp
V	oiseau	bird
W	poisson	fish
X	velo	bicycle
Y	chat	cat
Z	chapeau	hat
1	un	one
2	deux	two
3	trois	three
4	quatre	four
5	cinq	five
6	six	six
7	sept	seven
8	huit	eight
9	neuf	nine
0	zero	zero

Variations

A variation of Word Board 1 is to place small pictures on the keytops, and have their foreign meanings displayed when depressed. Program lines 600

through 1630 hold the French words in PRINT statements. An additional 10 keys, 0 through 9, are used to access their equivalent French numbers.

After the 26 words are mastered a different vocabulary set can be entered. Also, any language can be substituted in place of French used in the program.

You may also place the foreign meanings of the words on the keytops, and have their English equivalents displayed. Have the student read a word on the keytop, and recite the English meaning, then depress that key to find the correct answer.

The program can be used as a computer dictionary. The meaning of words, assigned to each key, can be displayed in sentence form.

WORD BOARD 2

Word Board 2 is used as a language communicator for the handicapped. See Program 9-2 for the program listing. A speech handicapped person may communicate with a limited vocabulary of 26 essential words, and numbers 0 through 9. Each key is assigned a different word. See Table 9-2 for the

Table 9-2. Keyboard Layout for Limited Vocabulary

Key	Word	Key	Word	Key	Word
A	he	N	time	Z	she
B	eat	O	yes	1	1
C	like	P	no	2	2
D	are	Q	I	3	3
E	is	R	do	4	4
F	want	S	you	5	5
G	drink	T	go	6	6
H	speak	U	here	7	7
I	please	V	to	8	8
J	happy	W	it	9	9
L	okay	X	am	0	0
M	not	Y	sleep	@	skip 4 lines

keyboard layout. Only two movements are required: typing a key covered by the word, and depressing RETURN. Sentences may be formed to call for a person's basic needs, as eating and sleeping. See Fig. 9-2 for a sample run. Alternately, sentences may be assigned certain keys to display one's needs. Example: "I am hungry, when do we eat?" Of course, this sentence won't fit on the keytop, so the handicapped person will have to choose from a list of special keys, with assigned sentences.

APPLICATIONS

Apply the Word Board at home. Expand on Word Board 1 for your educational needs. Develop a more detailed language study program, with several lists

of vocabulary. Use it to increase your English vocabulary, by accessing and learning the meanings of 10 new words a week.

You may or may not have an application for Word Board 2. But you can find organizations, in your area, that help the handicapped. Demonstrate the

program. This application may be useful to them. Considering that a home computer may be less expensive than other devices used to aid the handicapped, it may be within their budget to buy one or two.

Program 9-1. Word Board 1 Program Listing

```
100 PRINT CHR$(125);"WORD BOARD 1":DIM A$(1)
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT
130 PRINT "ACCEPTS CHARACTER INPUT (A TO Z, 0 TO 9)"
140 PRINT "AND PRINTS WORDS AND NUMBERS THAT"
150 PRINT "CORRESPOND TO THE ENTRY."
160 PRINT
170 FOR A=1 TO 2700
180 NEXT A:GRAPHICS 2
190 GOSUB 1710:POSITION 0,2
200 INPUT A$
210 IF A$="A" THEN 590
220 IF A$="B" THEN 620
230 IF A$="C" THEN 650
240 IF A$="D" THEN 680
250 IF A$="E" THEN 710
260 IF A$="F" THEN 740
270 IF A$="G" THEN 770
280 IF A$="H" THEN 800
290 IF A$="I" THEN 830
300 IF A$="J" THEN 860
310 IF A$="K" THEN 890
320 IF A$="L" THEN 920
330 IF A$="M" THEN 950
340 IF A$="N" THEN 980
350 IF A$="O" THEN 1010
360 IF A$="P" THEN 1040
370 IF A$="Q" THEN 1070
380 IF A$="R" THEN 1100
390 IF A$="S" THEN 1130
400 IF A$="T" THEN 1160
410 IF A$="U" THEN 1190
420 IF A$="V" THEN 1220
430 IF A$="W" THEN 1250
440 IF A$="X" THEN 1280
450 IF A$="Y" THEN 1310
460 IF A$="Z" THEN 1340
470 IF A$="1" THEN 1370
480 IF A$="2" THEN 1400
490 IF A$="3" THEN 1430
500 IF A$="4" THEN 1460
510 IF A$="5" THEN 1490
520 IF A$="6" THEN 1520
530 IF A$="7" THEN 1550
540 IF A$="8" THEN 1580
550 IF A$="9" THEN 1610
560 IF A$="0" THEN 1640
580 GOTO 190
590 GOSUB 1670
600 PRINT #6;"APPLE","POMME",
610 GOTO 190
620 GOSUB 1670
```

Program 9-1-cont. Word Board 1 Program Listing

```
630 PRINT #6;"AIRPLANE","AVION",
640 GOTO 190
650 GOSUB 1670
660 PRINT #6;"CUP","TASSE",
670 GOTO 190
680 GOSUB 1670
690 PRINT #6;"COW","VACHE",
700 GOTO 190
710 GOSUB 1670
720 PRINT #6;"COAT","VESTON",
730 GOTO 190
740 GOSUB 1670
750 PRINT #6;"DOG","CHIEN",
760 GOTO 190
770 GOSUB 1670
780 PRINT #6;"HAND","MAIN",
790 GOTO 190
800 GOSUB 1670
810 PRINT #6;"SUN","SOLEIL",
820 GOTO 190
830 GOSUB 1670
840 PRINT #6;"BOOK","LIVRE",
850 GOTO 190
860 GOSUB 1670
870 PRINT #6;"MOON","LUNE",
880 GOTO 190
890 GOSUB 1670
900 PRINT #6;"EAR","OREILLE",
910 GOTO 190
920 GOSUB 1670
930 PRINT #6;"CLOUD","NAUGE",
940 GOTO 190
950 GOSUB 1670
960 PRINT #6;"COMB","PEIGNE",
970 GOTO 190
980 GOSUB 1670
990 PRINT #6;"EYES","YEUX",
1000 GOTO 190
1010 GOSUB 1670
1020 PRINT #6;"ICE","GLACE",
1030 GOTO 190
1040 GOSUB 1670
1050 PRINT #6;"STAR","ETOILE",
1060 GOTO 190
1070 GOSUB 1670
1080 PRINT #6;"SPOON","CUILLERE",
1090 GOTO 190
1100 GOSUB 1670
1110 PRINT #6;"CHAIR","CHAISE",
1120 GOTO 190
1130 GOSUB 1670
1140 PRINT #6;"HORSE","CHEVAL",
1150 GOTO 190
```

Program 9-1-cont. Word Board 1 Program Listing

```
1160 GOSUB 1670
1170 PRINT #6;"PENCIL","CRAYON",
1180 GOTO 190
1190 GOSUB 1670
1200 PRINT #6;"LAMP","LAMPE",
1210 GOTO 190
1220 GOSUB 1670
1230 PRINT #6;"BIRD","OISEAU",
1240 GOTO 190
1250 GOSUB 1670
1260 PRINT #6;"FISH","POISSEN",
1270 GOTO 190
1280 GOSUB 1670
1290 PRINT #6;"BICYCLE","VELO",
1300 GOTO 190
1310 GOSUB 1670
1320 PRINT #6;"CAT","CHAT",
1330 GOTO 190
1340 GOSUB 1670
1350 PRINT #6;"HAT","CHAPEAU",
1360 GOTO 190
1370 GOSUB 1670
1380 PRINT #6;"ONE","UN",
1390 GOTO 190
1400 GOSUB 1670
1410 PRINT #6;"TWO","DEUX",
1420 GOTO 190
1430 GOSUB 1670
1440 PRINT #6;"THREE","TROIS",
1450 GOTO 190
1460 GOSUB 1670
1470 PRINT #6;"FOUR","QUATRE",
1480 GOTO 190
1490 GOSUB 1670
1500 PRINT #6;"FIVE","CINQ",
1510 GOTO 190
1520 GOSUB 1670
1530 PRINT #6;"SIX","SIX",
1540 GOTO 190
1550 GOSUB 1670
1560 PRINT #6;"SEVEN","SEPT",
1570 GOTO 190
1580 GOSUB 1670
1590 PRINT #6;"EIGHT","HUIT",
1600 GOTO 190
1610 GOSUB 1670
1620 PRINT #6;"NINE","NEUF",
1630 GOTO 190
1640 GOSUB 1670
1650 PRINT #6;"ZERO","ZERO",
1660 GOTO 190
1670 PRINT #6;"ENGLISH","FRENCH"
1680 PRINT #6;"-----","-----"
```

Program 9-1-cont. Word Board 1 Program Listing

```
1690 PRINT #6
1700 RETURN
1710 POSITION 0,8
1720 PRINT #6;"ENTER CHARACTER?"
1730 RETURN
```

Program 9-2. Word Board 2 Program Listing

```
100 PRINT CHR$(125);"WORD BOARD 2":DIM A$(1)
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT .
130 PRINT "ACCEPTS CHARACTER INPUT (A TO Z, 0 TO 9)"
140 PRINT "AND PRINTS WORDS AND NUMBERS THAT"
150 PRINT "CORRESPOND TO THE ENTRY."
160 PRINT "AN '@' WILL SKIP 4 LINES"
170 PRINT
180 PRINT "MAY BE USED AS A HELP TO THE HANDICAPPED"
190 INPUT A$
200 IF A$="A" THEN 580
210 IF A$="B" THEN 600
220 IF A$="C" THEN 620
230 IF A$="D" THEN 640
240 IF A$="E" THEN 660
250 IF A$="F" THEN 680
260 IF A$="G" THEN 700
270 IF A$="H" THEN 720
280 IF A$="I" THEN 740
290 IF A$="J" THEN 760
300 IF A$="K" THEN 780
310 IF A$="L" THEN 800
320 IF A$="M" THEN 820
330 IF A$="N" THEN 840
340 IF A$="O" THEN 860
350 IF A$="P" THEN 880
360 IF A$="Q" THEN 900
370 IF A$="R" THEN 920
380 IF A$="S" THEN 940
390 IF A$="T" THEN 960
400 IF A$="U" THEN 980
410 IF A$="V" THEN 1000
420 IF A$="W" THEN 1020
430 IF A$="X" THEN 1040
440 IF A$="Y" THEN 1060
450 IF A$="Z" THEN 1080
460 IF A$="1" THEN 1100
470 IF A$="2" THEN 1120
480 IF A$="3" THEN 1140
490 IF A$="4" THEN 1160
500 IF A$="5" THEN 1180
```

Program 9-2-cont. Word Board 2 Program Listing

```
510 IF A$="6" THEN 1200
520 IF A$="7" THEN 1220
530 IF A$="8" THEN 1240
540 IF A$="9" THEN 1260
550 IF A$="0" THEN 1280
560 IF A$="@" THEN 1300
570 GOTO 190
580 PRINT ,,"HE"
590 GOTO 190
600 PRINT ,,"EAT"
610 GOTO 190
620 PRINT ,,"LIKE"
630 GOTO 190
640 PRINT ,,"ARE"
650 GOTO 190
660 PRINT ,,"IS"
670 GOTO 190
680 PRINT ,,"WANT"
690 GOTO 190
700 PRINT ,,"DRINK"
710 GOTO 190
720 PRINT ,,"SPEAK"
730 GOTO 190
740 PRINT ,,"PLEASE"
750 GOTO 190
760 PRINT ,,"HAPPY"
770 GOTO 190
780 PRINT ,,"THANK YOU"
790 GOTO 190
800 PRINT ,,"OKAY"
810 GOTO 190
820 PRINT ,,"NOT"
830 GOTO 190
840 PRINT ,,"TIME"
850 GOTO 190
860 PRINT ,,"YES"
870 GOTO 190
880 PRINT ,,"NO"
890 GOTO 190
900 PRINT ,,"I"
910 GOTO 190
920 PRINT ,,"DO"
930 GOTO 190
940 PRINT ,,"YOU"
950 GOTO 190
960 PRINT ,,"GO"
970 GOTO 190
980 PRINT ,,"HERE"
990 GOTO 190
1000 PRINT ,,"TO"
1010 GOTO 190
1020 PRINT ,,"IT"
```


Program 9-2-cont. Word Board 2 Program Listing

```
1030 GOTO 190
1040 PRINT ,,"AM"
1050 GOTO 190
1060 PRINT ,,"SLEEP"
1070 GOTO 190
1080 PRINT ,,"SHE"
1090 GOTO 190
1100 PRINT ,,"1"
1110 GOTO 190
1120 PRINT ,,"2"
1130 GOTO 190
1140 PRINT ,,"3"
1150 GOTO 190
1160 PRINT ,,"4"
1170 GOTO 190
1180 PRINT ,,"5"
1190 GOTO 190
1200 PRINT ,,"6"
1210 GOTO 190
1220 PRINT ,,"7"
1230 GOTO 190
1240 PRINT ,,"8"
1250 GOTO 190
1260 PRINT ,,"9"
1270 GOTO 190
1280 PRINT ,,"0"
1290 GOTO 190
1300 FOR A=1 TO 4
1310 PRINT
1320 NEXT A
1330 GOTO 190
```

CHAPTER 10

Spelling Test

The Spelling Test is an educational program that tests for the correct spelling of 20 vocabulary words. It's written in BASIC for your microcomputer. See Program 10-1 for the program listing.

THE PROGRAM

The program accepts entry of the correctly spelled word, after the incorrect spelling is displayed. You have two tries to enter the correct answer, then it

advances to the next word. After each entry, it displays either CORRECT or INCORRECT. After all 20 words are displayed, it prints your total number correct and the percent score. See Fig. 10-1 for a sample run.

DATA STORAGE

The vocabulary words are stored in DATA statements beginning at program line 1000. You can use the words supplied or enter a new list. See Table 10-1 for the word list.

When entering new words, alternate between the correct spelling and incorrect spelling.

```
                                SPELLING TEST

WORD # 1
TRIAL 1

PROGRAMING
? PROGRAMMING
CORRECT

                                SPELLING TEST

WORD # 2
TRIAL 1

DICTIONERY
? DICTIONERY

INCORRECT
WORD # 2
TRIAL 2

DICTIONERY
?
```

Fig. 10-1. Spelling test sample run.

Table 10-1. Spelling Test Word List

Incorrect	Correct
programing	programming
dictionery	dictionary
performense	performance
investagate	investigate
satasfactory	satisfactory
inportant	important
signifacant	significant
simalar	similar
comand	command
necesary	necessary
constelation	constellation
busines	business
analise	analyze
difficult	difficult
challange	challenge
intellagant	intelligent
skillfull	skillful
imformation	information
obsurvation	observation
duplacait	duplicate

Program 10-1. Spelling Test Program Listing

```

100 PRINT CHR$(125);"SPELLING TEST: ATARI"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT :DIM A$(25),B$(25),C$(25)
130 PRINT "THIS IS A SPELLING TEST PROGRAM."
140 PRINT "GIVEN ARE 20 INCORRECTLY SPELLED"
150 PRINT "WORDS; YOU HAVE 3 TRIES TO"
160 PRINT "ENTER EACH CORRECT SPELLING."
170 PRINT
180 PRINT "THE WORDS ARE STORED IN DATA          STATEMENTS"
190 PRINT "BEGINNING AT LINE 1000. ALTERNATE      BETWEEN"
200 PRINT "THE CORRECT AND INCORRECT SPELLINGS."
210 PRINT
220 PRINT "ENTER A '1' TO BEGIN"
230 INPUT A
240 S=0:GRAPHICS 2
250 FOR A=1 TO 20
260 READ A$,B$
270 T=1
280 PRINT CHR$(125)
290 GOSUB 560
300 PRINT #6;"WORD # ";A
310 PRINT #6;"TRIAL ";T
320 PRINT #6
330 PRINT #6;B$
340 INPUT C$
350 IF C$=A$ THEN 480
360 T=T+1
370 IF T=3 THEN 410
380 PRINT #6
390 PRINT #6;"INCORRECT"
400 GOSUB 590:GOTO 280
410 PRINT CHR$(125):PRINT #6
420 PRINT #6;"INCORRECT":GOSUB 590:GRAPHICS 2
430 PRINT #6;"THE CORRECT SPELLING IS ";A$;" "
440 FOR H=1 TO 1250
450 NEXT H
460 NEXT A
470 GOTO 510
480 PRINT #6:PRINT #6;"CORRECT"
490 S=S+1
500 GOTO 440
510 PRINT #6
520 GOSUB 560:PRINT CHR$(125)
530 PRINT #6;"YOU HAVE ";S;" CORRECT OUT OF 20 WORDS."
540 PRINT #6;"THAT'S A SCORE OF ";S*5;" PERCENT."
550 END
560 GRAPHICS 2:POSITION 7,1:PRINT #6;"SPELLING TEST"
570 PRINT #6
580 RETURN
590 FOR H=1 TO 1250
600 NEXT H:RETURN
980 REM ENTER THE WORDS, ALTERNATING WITH THE CORRECT
990 REM AND INCORRECT WORD, AS SEEN BELOW.

```

Program 10-1-cont. Spelling Test Program Listing

1000 DATA PROGRAMMING ,PROGRAMING ,DICTIONARY ,DICTIANERY
1010 DATA PERFORMANCE ,PERFORMENCE ,INVESTIGATE ,INVESTAGATE
1020 DATA SATISFACTORY ,SATASFACERY ,IMPORTANT ,INPORTANT
1030 DATA SIGNIFICANT ,SIGNIFACANT ,SIMILAR ,SIMALAR
1040 DATA COMMAND ,COMAND ,NECESSARY ,NECESARY
1050 DATA CONSTELLATION ,CONSTELATION ,BUSINESS ,BUSINES
1060 DATA ANALYZE ,ANALISE ,DIFFICULT ,DIFICULT
1070 DATA CHALLENGE ,CHALLENGE ,INTELLIGENT ,INTELLAGANT
1080 DATA SKILLFUL ,SKILLFULL ,INFORMATION ,IMFORMATION
1090 DATA OBSERVATION ,OBSURVATION ,DUPLICATE ,DUPLACAIT

CHAPTER 11

The Reading Pacer

Here's a program that will help you increase your reading speed. It's called The Reading Pacer, and it's written in BASIC for your microcomputer. See Program 11-1 for the program listing.

THE PROGRAM

The program displays one line of text at a variable speed, from approximately 0.3 second to 3 seconds. It can display lines of text up to 1200 words per minute. Each line is printed at the center of the screen.

After you RUN the program, enter a speed value from 1 to 10. Your slowest speed is accessed with a 1, and the quickest with a 10. Then enter a 1 to begin. See Fig. 11-1 for a sample run.

DATA STORAGE

The lines of text are stored in DATA statements beginning with program line 1000. Any number of DATA statements may be used, just enter one line of text for each statement. The last line must be DATA END.

USE

Start the pacer at the slowest speed, then gradually increase the speed. Change the text, then start the pacer at about half your fastest speed. You should notice an increase in your reading speed and comprehension.

```
RUN
THE READING PACER

COPYRIGHT (C) 1979 BY HOWARD BERENSON

ENTER TEXT AS DATA STATEMENTS STARTING AT
LINE 1000.

THE READING PACER WILL DISPLAY LINES OF
TEXT UP TO 1200 WORDS PER MINUTE.

ENTER LINE SPEED-FROM 1 TO 10
ENTRY OF '10' IS THE QUICKEST,
'1' IS THE SLOWEST
? 4

ENTER '1' TO BEGIN
? 1

THE READING PACER CAN HELP INCREASE

END

DO YOU WISH TO TRY AGAIN?
ENTER '1'-YES, '0'-NO
? 1
```

Fig. 11-1. The reading pacer sample run.

Program 11-1. The Reading Pacer Program Listing

```
100 PRINT CHR$(125);"THE READING PACER"
110 PRINT "ATARI":DIM A$(100)
120 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
130 PRINT
140 PRINT "ENTER TEXT AS DATA STATEMENTS STARTING AT"
150 PRINT "LINE 1000."
160 PRINT
170 PRINT "THE READING PACER WILL DISPLAY LINES OF"
180 PRINT "TEXT UP TO 1200 WORDS PRE MINUTE."
190 PRINT
200 PRINT "ENTER LINE SPEED-FROM 1 TO 10"
210 PRINT "ENTRY OF '10' IS THE QUICKEST,"
220 PRINT "'1' IS THE SLOWEST"
230 INPUT A
240 GOSUB 430
250 PRINT CHR$(125)
260 PRINT "ENTER '1' TO BEGIN"
270 INPUT B
280 PRINT CHR$(125)
290 READ A$:POSITION 1,11
300 POSITION 0,11:PRINT A$
310 IF A$="END" THEN 360
320 FOR C=1 TO F
330 NEXT C
340 PRINT CHR$(125)
350 GOTO 290
360 RESTORE
370 PRINT
380 PRINT "DO YOU WISH TO TRY AGAIN?"
390 PRINT "ENTER '1'-YES, '0'-NO"
400 INPUT X
410 IF X=1 THEN 200
420 END
430 F=(5/A)*155
440 RETURN
1000 DATA THE READING PACER CAN HELP INCREASE
1010 DATA YOUR READING SPEED. START WITH THE
1020 DATA SLOWEST SPEED BY ENTERING A '1'
1030 DATA AND GRADUALLY INCREASE THE SPEED
1040 DATA UNTIL YOU NOTICE YOUR READING
1050 DATA COMPREHENSION INCREASING. CHANGE
1060 DATA THE TEXT THEN START THE PACER AT
1070 DATA ABOUT HALF YOUR FASTEST SPEED. YOU
1080 DATA SHOULD NOTICE AN INCREASE IN YOUR
1090 DATA READING SPEED AND COMPREHENSION
1100 DATA END
```

CHAPTER 12

Math 4

Math 4 is an educational program that gives 4 different 10-question math tests. It's written in BASIC for your microcomputer. See Program 12-1 for the program listing.

THE PROGRAM

The program begins by requesting entry of the difficulty level. Enter

1. Easy
2. Moderate
3. Most Difficult

Then enter your choice of the 4 subjects:

1. Addition
2. Subtraction
3. Multiplication
4. Division

Each test generates random problems, and no two tests will be alike. Enter the number (1-4) of the desired test. You have two tries to enter the correct answer, then the program advances to the next problem. Your answer is checked, then CORRECT or INCORRECT is displayed. After you complete all 10 questions, your score is displayed. You may then select another test, or end the program. See Fig. 12-1 for a sample run.

THE MATH PROBLEMS

The program generates random values for X and Y with program lines 280 and 290. The maximum

value is determined by the difficulty level. At the most difficult level, X and Y will not exceed 100.

```

RUN
MATH 4
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS IS A MATH TEST PROGRAM WITH
FOUR DIFFERENT 10-QUESTION TESTS.
YOU HAVE 2 TRIES PER QUESTION.

ENTER DIFFICULTY LEVEL

1) EASY
2) MODERATE
3) MOST DIFFICULT
? 1←

                                     MATH 4

ENTER THE DESIRED TEST NUMBER

1) ADDITION
2) SUBTRACTION
3) MULTIPLICATION
4) DIVISION
? 1←

                                     ADDITION TEST

PROBLEM 1
TRIAL 1

  1   +   7   =   ? 8
CORRECT

                                     ADDITION TEST

PROBLEM 2
TRIAL 1

  5   +   6   =   ? 11
CORRECT
```

Fig. 12-1. Math 4 sample run.

Program 12-1. Math 4 Program Listing

```
100 PRINT CHR$(125);"MATH 4: ATARI"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT
130 PRINT "THIS IS A MATH TEST PROGRAM WITH"
140 PRINT "FOUR DIFFERENT 10-QUESTION TESTS."
150 PRINT "YOU HAVE 2 TRIES PER QUESTION."
160 PRINT :GOSUB 1200
170 PRINT CHR$(125):POSITION 20,1:PRINT "MATH 4"
180 PRINT
190 PRINT "ENTER THE DESIRED TEST NUMBER"
200 PRINT
210 PRINT "1) ADDITION"
220 PRINT "2) SUBTRACTION"
230 PRINT "3) MULTIPLICATION"
240 PRINT "4) DIVISION"
250 INPUT A
260 ON A GOTO 400,690,850,1010
270 GOTO 190
280 X=INT(RND(0)*D+1)
290 Y=INT(RND(0)*D+1)
300 PRINT
310 RETURN
320 PRINT "PROBLEM ";A
330 PRINT "TRIAL ";T
340 PRINT
350 RETURN
360 PRINT "INCORRECT"
370 GOSUB 1170
380 PRINT
390 RETURN
400 S=0
410 FOR A=1 TO 10
420 T=1
430 GOSUB 280
440 PRINT CHR$(125):POSITION 16,1:PRINT "ADDITION TEST"
450 GOSUB 320
460 PRINT X;" + ";Y;" = ";
470 INPUT B
480 IF B=X+Y THEN 570
490 T=T+1
500 GOSUB 360
510 IF T=3 THEN 530
520 GOTO 440
530 PRINT "THE CORRECT ANSWER IS ";X+Y
540 GOSUB 1170
550 NEXT A
560 GOTO 610
570 PRINT "CORRECT"
580 GOSUB 1170
590 S=S+1
600 GOTO 550
610 PRINT
```


Program 12-1-cont. Math 4 Program Listing

```
620 PRINT "YOU HAVE ";S;" CORRECT OUT OF 10"
630 PRINT "THAT'S A SCORE OF ";S*10;" %"
640 PRINT
650 PRINT "ENTER A '1' TO CONTINUE TESTING"
660 INPUT A
670 IF A=1 THEN 160
680 END
690 S=0
700 FOR A=1 TO 10
710 T=1
720 GOSUB 280
730 PRINT CHR$(125):POSITION 16,1:PRINT "SUBTRACTION TEST"
740 GOSUB 320
750 PRINT X;" - ";Y;" = ";
760 INPUT B
770 IF B=X-Y THEN 570
780 T=T+1
790 GOSUB 360
800 IF T=3 THEN 820
810 GOTO 730
820 PRINT "THE CORRECT ANSWER IS ";X-Y
830 GOSUB 1170
840 GOTO 550
850 S=0
860 FOR A=1 TO 10
870 T=1
880 GOSUB 280
890 PRINT CHR$(125):POSITION 16,1:PRINT "MULTIPLICATION TEST"
900 GOSUB 320
910 PRINT X;" X ";Y;" = ";
920 INPUT B
930 IF B=X*Y THEN 570
940 T=T+1
950 GOSUB 360
960 IF T=3 THEN 980
970 GOTO 890
980 PRINT "THE CORRECT ANSWER IS ";X*Y
990 GOSUB 1170
1000 GOTO 550
1010 S=0
1020 FOR A=1 TO 10
1030 T=1
1040 GOSUB 280
1050 PRINT CHR$(125):POSITION 18,1:PRINT "DIVISION TEST"
1060 GOSUB 320
1070 PRINT X*Y;" / ";Y;" = ";
1080 INPUT B
1090 IF B=X THEN 570
1100 T=T+1
1110 GOSUB 360
1120 IF T=3 THEN 1140
1130 GOTO 1050
1140 PRINT "THE CORRECT ANSWER IS ";X
```

Program 12-1-cont. Math 4 Program Listing

```
1150 GOSUB 1170
1160 GOTO 550
1170 FOR P=1 TO 379
1180 NEXT P
1190 RETURN
1200 PRINT "ENTER DIFFICULTY LEVEL"
1210 PRINT
1220 PRINT "1) EASY"
1230 PRINT "2) MODERATE"
1240 PRINT "3) MOST DIFFICULT"
1250 INPUT E
1260 ON E GOTO 1280,1290,1300
1270 GOTO 1200
1280 D=10:RETURN
1290 D=20:RETURN
1300 D=100:RETURN
```

CHAPTER 13

The Sun

The Sun is an educational program describing the star at the center of our solar system. It lists important information about the sun, and gives a 10 question, TRUE/FALSE, test. It's written in BASIC for your microcomputer. See Program 13-1 for the program listing.

enter an answer, enter a 1 for TRUE or a 0 for FALSE. If your answer is correct, then CORRECT will be displayed. After all 10 questions are answered, the number of correct points per question, and your percent score, will be displayed. See Fig 13-1 for a sample run.

THE TEST

After reviewing the information, a TRUE/FALSE test may be taken. Enter a 1 to take the test. To

```
>RUN
THE SUN-ASTRONOMY LESSON II
COPYRIGHT (C) 1979 BY HOWARD BERENEON

THE SUN
      *
    *
  *
*
----- 864,400 MILES -----
*
  *
    *
      *
        *

ENTER '1' TO CONTINUE
?

THE SUN IS AN AVERAGE SIZE STAR IN OUR GALAXY. ITS MASS
IS 2.2 X 10 TO THE 27TH TONS. IT IS COMPLETELY GASEOUS.
SUNLIGHT ORIGINATES FROM THE PHOTOSPHERE, A BOUNDARY THAT
EXISTS BETWEEN THE SUN AND ITS ATMOSPHERE. THE REVERSING
LAYER, THE CHROMOSPHERE, AND THE CORONA ARE THE THREE LAYERS
OF THE SUNS ATMOSPHERE.
--*-----*-----*
CORONA
-----
CHROMOSPHERE
:::::::::::::-REVERSING LAYER-TOP, PHOTOSPHERE-BOTTOM
THE SUN

ENTER '1' TO CONTINUE
?
```

Fig. 13-1. The sun sample run.

THE DENSITY IS .25 THAT OF THE EARTH, AND SURFACE GRAVITY IS 28 TIMES THAT OF THE EARTH.
 THE PHOTOSPHERE IS A SHELL ABOUT 150 MILES THICK FROM WHICH LIGHT IS EMITTED. THE BRIGHTNESS IS NOT UNIFORM, BUT SPECKLED OR GRANULATED WITH DIAMETERS HUNDREDS OF MILES LONG, AND CONSTANTLY CHANGING.
 'SUNSPOTS' ARE GIGANTIC AREAS ON THE SUN THAT APPEAR DARK COMPARED TO OTHER AREAS. THEY CAN LAST FROM 4 DAYS (AVERAGE) TO MORE THAN 100 DAYS. THEY CAUSE AN INCREASE IN THE MAGNETIC FIELD, BY MANY THOUSANDS, IN THE AREA OF THE SUNSPOT.

ENTER '1' TO CONTINUE
 ?

'FACULAE' ARE SMALL TORCHES ABOVE THE SURFACE OF THE PHOTOSPHERE. THEY PRECEDE THE APPEARANCE OF SUNSPOTS AND LAST FROM 2 WEEKS TO MONTHS AFTER A SUNSPOT.
 THE TEMPERATURE AT THE 'REVERSING LAYER', AT THE BASE OF THE SUN, IS 7500 DEGREES A.
 'PROMINENCES' ARE ROSE-COLORED FEATHERY FLAMES FROM THE SUN. THEY FORM NEAR SUNSPOTS.
 'CHROMOSPHERIC FLARES' CAUSE RADIO FADEOUTS, FROM STRONG ULTRAVIOLET RADIATION EMITTED BY THESE FLARES.

ENTER '1' TO CONTINUE
 ?

THE 'CORONA' IS THE OUTER LAYER OF THE SUNS ATMOSPHERE. IT IS VISIBLE TO THE NAKED EYE DURING AN ECLIPSE. IT HAS HIGH TEMPERATURES OF 1,000,000 DEGREES A.

ENTER '1'-TEST, '2'-REVIEW
 ? 1

10 QUESTION 'TRUE' OR 'FALSE' TEST

1) THE DIAMETER OF THE SUN IS 864,400 MILES

ENTER '1'-TRUE, '0'-FALSE
 ? 1

CORRECT

2) SUNSPOTS ARE BRIGHT SPOTS ON THE SUN

ENTER '1'-TRUE, '0'-FALSE
 ? 0

CORRECT

POINTS PER QUESTION

1= 10	2= 10	3= 10	4= 10	5= 10
6= 10	7= 10	8= 10	9= 10	10= 10

YOUR SCORE IS 10 CORRECT OUT OF 10.
 THAT'S 100 PERCENT CORRECT

Fig. 13-1-cont. The sun sample run.

Program 13-1. The Sun Program Listing

```

100 DIM A(10)
110 FOR A=1 TO 10
120 A(A)=0
130 NEXT A
140 PRINT CHR$(125); "THE SUN-ASTRONOMY LESSON II: ATARI"
150 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
160 PRINT
170 PRINT "THE SUN"
180 POSITION 16,5:PRINT "*":POSITION 27,5:PRINT "*"
190 POSITION 10,6:PRINT "*":POSITION 32,6:PRINT "*":PRINT
200 POSITION 7,8:PRINT "*":POSITION 35,8:PRINT "*"
210 POSITION 6,9:PRINT "*":POSITION 37,9:PRINT "*"
220 PRINT "----- 864,400 MILES -----"
230 POSITION 6,11:PRINT "*":POSITION 38,11:PRINT "*"
240 POSITION 7,12:PRINT "*":POSITION 37,12:PRINT "*":PRINT
250 POSITION 9,14:PRINT "*":POSITION 35,14:PRINT "*"
260 POSITION 16,15:PRINT "*":POSITION 27,15:PRINT "*"
270 GOSUB 1320
280 INPUT A:IF A<>1 THEN 270
290 PRINT "THE SUN IS AN AVERAGE SIZE STAR IN OUR GALAXY. ITS MASS
"
300 PRINT "IS 2.2 X 10 TO THE 27TH TONS. IT IS COMPLETELY GASEOU
S."
310 PRINT "SUNLIGHT ORIGINATES FROM THE PHOTOSPHERE, A BOUNDARY THA
T"
320 PRINT "EXISTS BETWEEN THE SUN AND ITS ATMOSPHERE. THE REVERSIN
G"
330 PRINT "LAYER, THE CHROMOSPHERE, AND THE CORONA ARE THE THREE L
AYERS"
340 PRINT "OF THE SUNS ATMOSPHERE."
350 PRINT "-+-*+---+*+---+*-"
360 PRINT "CORONA"
370 PRINT "-----"
380 PRINT "CHROMOSPHERE"
390 PRINT ":::::::::::::-REVERSING LAYER-TOP, PHOTOSPHERE-BOT
TOM"
400 PRINT "THE SUN"
410 PRINT :GOSUB 1320
420 INPUT A:IF A<>1 THEN 410
430 PRINT "THE DENSITY IS .25 THAT OF THE EARTH, AND SURFACE GRAVI
TY"
440 PRINT "IS 28 TIMES THAT OF THE EARTH."
450 PRINT "THE PHOTOSPHERE IS A SHELL ABOUT 150 MILES THICK FROM
WHICH"
460 PRINT "LIGHT IS EMITTED. THE BRIGHTNESS IS NOT UNIFORM, BUT"
470 PRINT "SPECKLED OR GRANULATED WITH DIAMETERS HUNDREDS OF MILES
"
480 PRINT "LONG, AND CONSTANTLY CHANGING."
490 PRINT "'SUNSPOTS' ARE GIGANTIC AREAS ON THE SUN THAT APPEAR D
ARK"
500 PRINT "COMPARED TO OTHER AREAS. THEY CAN LAST FROM 4 DAYS (AVE
RAGE)"

```

Program 13-1-cont. The Sun Program Listing

```
510 PRINT "TO MORE THAN 100 DAYS. THEY CAUSE AN INCREASE IN THE"
520 PRINT "MAGNETIC FIELD, BY MANY THOUSANDS, IN THE AREA OF THE S
UNSPOT."
530 PRINT :GOSUB 1320
540 INPUT A:IF A<>1 THEN 530
550 PRINT "'FACULAE' ARE SMALL TORCHES ABOVE THE SURFACE OF THE PH
OTOSPHERE."
560 PRINT "THEY PRECEDE THE APPEARANCE OF SUNSPOTS AND LAST"
570 PRINT "FROM 2 WEEKS TO MONTHS AFTER A SUNSPOT."
580 PRINT "THE TEMPERATURE AT THE 'REVERSING LAYER', AT THE BASE O
F THE"
590 PRINT "SUN, IS 7500 DEGREES A."
600 PRINT "'PROMINENCES' ARE ROSE-COLORED FEATHERY FLAMES FROM THE
SUN."
610 PRINT "THEY FORM NEAR SUNSPOTS."
620 PRINT "'CHROMOSPHERIC FLARES' CAUSE RADIO FADEOUTS, FROM ST
RONG"
630 PRINT "ULTRAVIOLET RADIATION EMITTED BY THESE FLARES."
640 PRINT :GOSUB 1320
650 INPUT A:IF A<>1 THEN 640
660 PRINT "THE 'CORONA' IS THE LAYER OF THE SUNS ATMOSPHERE. IT"
670 PRINT "IS INVISIBLE TO THE NAKED EYE DURING AN ECLIPSE. IT HA
S HIGH"
680 PRINT "TEMPERATURES OF 1,000,000 DEGREES A."
690 PRINT
700 PRINT "ENTER '1'-TEST, '2'-REVIEW"
710 INPUT A:IF A=1 THEN 730
720 IF A<>1 THEN 110
730 PRINT CHR$(125);"10 QUESTION 'TRUE' OR 'FALSE' TEST"
740 P=0:PRINT
750 PRINT "1) THE DIAMETER OF THE SUN IS 864,400 MILES"
760 GOSUB 1240
770 IF C<>1 THEN 790
780 GOSUB 1270:A(1)=10
790 PRINT "2) SUNSPOTS ARE BRIGHT SPOTS ON THE SUN"
800 GOSUB 1240
810 IF C<>0 THEN 830
820 GOSUB 1270:A(2)=10
830 PRINT "3) THE SOLAR ATMOSPHERE CONSISTS OF 3 LAYERS:"
840 PRINT "REVERSING LAYER, CHROMOSPHERE, CORONA"
850 GOSUB 1240
860 IF C<>1 THEN 880
870 GOSUB 1270:A(3)=10
880 PRINT "4) THE SUN IS AN AVERAGE SIZE STAR IN OUR GALAXY"
890 GOSUB 1240
900 IF C<>1 THEN 920
910 GOSUB 1270:A(4)=10
920 PRINT "5) FACULAE ARE SMALL TORCHES ABOVE THE PHOTOSPHERE"
930 GOSUB 1240
940 IF C<>1 THEN 960
950 GOSUB 1270:A(5)=10
960 PRINT "6) PROMINENCES ARE BLUE COLORED FLAMES FROM THE SUN"
970 GOSUB 1240
```

Program 13-1-cont. The Sun Program Listing

```
980 IF C<>0 THEN 1000
990 GOSUB 1270:A(6)=10
1000 PRINT "7) THE SUN IS COMPLETELY GASEOUS"
1010 GOSUB 1240
1020 IF C<>1 THEN 1040
1030 GOSUB 1270:A(7)=10
1040 PRINT "8) AS SUNSPOTS GROW THEIR MAGNETIC      FIELDS DECREASE"
1050 GOSUB 1240
1060 IF C<>0 THEN 1080
1070 GOSUB 1270:A(8)=10
1080 PRINT "9) RADIO FADEOUTS ARE CAUSED BY INFRA-RED RADIATION"
1090 GOSUB 1240
1100 IF C<>0 THEN 1120
1110 GOSUB 1270:A(9)=10
1120 PRINT "10) CHROMOSPHERIC FLARES EMIT ULTRA-  VIOLET RADIATION
"
1130 GOSUB 1240
1140 IF C<>1 THEN 1160
1150 GOSUB 1270:A(10)=10
1160 PRINT
1170 PRINT "POINTS PER QUESTION":PRINT
1180 PRINT "1=";A(1);"  2=";A(2);"  3=";A(3);"  4=";A(4);"  5=";A(
5)
1190 PRINT "6=";A(6);"  7=";A(7);"  8=";A(8);"  9=";A(9);"  10=";A
(10)
1200 PRINT
1210 PRINT "YOUR SCORE IS ";P/10;" CORRECT OUT OF 10."
1220 PRINT "THAT'S ";P;" PERCENT CORRECT"
1230 END
1240 PRINT :PRINT "ENTER '1'-TRUE, '0'-FALSE"
1250 INPUT C:PRINT CHR$(125)
1260 RETURN
1270 P=P+10
1280 PRINT
1290 PRINT "CORRECT"
1300 PRINT
1310 RETURN
1320 PRINT "ENTER '1' TO CONTINUE"
1330 RETURN
```

CHAPTER 14

Constellation 10

Here's an educational program for teachers, students, and scientists, or for anyone interested in astronomy. It displays 10 common constellations, and gives a multiple choice exam on the constellations. See Program 14-1 for the program listings.

After you run the program, you may choose to review the constellations by entering a 1. To take the test, enter a 0. In the review mode, entering any number from 1 to 10 will display a constellation. They are displayed using asterisks (*), with their names printed at the top of the screen.

THE TEST

After reviewing the 10th constellation, enter a 0 to take the test. The test consists of 10 multiple choice questions. A constellation is displayed without identification, with 4 possible answers. Enter the number (1-4) that corresponds to the displayed constellation. If your answer is correct,

then CORRECT will be displayed. The program will advance to the next question. After the 10 questions are answered, a list of points per question is displayed, with your percent score below. See Fig. 14-1 for a sample run.

MODIFICATIONS

The program may be modified for other constellation configurations. Of course, the test part of the program must be changed to accommodate the new constellations.

ONE LAST NOTE

After reviewing the constellations, a few times, you'll be surprised how much you've learned. So the next time you look up into the night sky, you'll recognize Cassiopeia, easily.

RUN
 CONSTELLATION 10
 COPYRIGHT (C) 1980 BY HOWARD BERENBON
 THIS PROGRAM DISPLAYS 10 CONSTELLATIONS AND
 GIVES A MULTIPLE CHOICE TEST.

1-REVIEW, 0-TEST? 1

CASSIOPEIA

```

      *
    *
  *
*

```

ENTER #1-10
 ?

LYNX

```

  *
 *
    *

```

ENTER #1-10
 ?

CAMELOPARDALIS

```

      *
    *
  *
*

```

ENTER #1-10
 ?

LYRA

```

      *
    *
  *
*

```

ENTER #1-10
 ?

CYGNUS

```

      *
    *
  *
*

```

1-REVIEW, 0-TEST? 0

MULTIPLE CHOICE TEST
 ENTER CORRECT ANSWER (#1-4)

1)

```

      *
    *
  *
*

```

(1) LEO
 (2) BOOTES
 (3) CASSIOPEIA
 (4) LYNX
 (1-4)? 3

CORRECT
 2)

```

      *
    *
  *
*

```

(1) PROCYON
 (2) CAMELOPARDALIS
 (3) CEPHEUS
 (4) ORION
 (1-4)? 2

CORRECT

POINTS PER QUESTION

1= 10 2= 10 3= 10 4= 10 5= 10
 6= 10 7= 10 8= 10 9= 10 10= 10

YOUR SCORE IS 10 CORRECT OUT OF 10.
 THAT'S 100 PERCENT CORRECT

Fig. 14-1. Constellation 10 sample run.

Program 14-1. Constellation 10 Program Listing

```
100 PRINT CHR$(125);"CONSTELLATION 10: ATARI"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT
130 PRINT "THIS PROGRAM DISPLAYS 10 CONSTELLATIONS AND"
140 PRINT "GIVES A MULTIPLE CHOICE TEST."
150 DIM A(10):PRINT
160 FOR I=1 TO 10
170 A(I)=0
180 NEXT I
190 PRINT "1-REVIEW, 0-TEST";:INPUT A
200 IF A=0 THEN 1180
210 PRINT
220 PRINT "ENTER #1-10"
230 INPUT B
240 PRINT CHR$(125)
250 ON B GOTO 980,1000,1020,1040,1060,1080,1100,1120,1140,1160
260 PRINT "URSA MAJOR"
270 POSITION 32,2:PRINT "*":PRINT
280 PRINT
290 PRINT "      *      *      *      *":PRINT
300 PRINT "*****":POSITION 26,7:PRINT "*****"
310 RETURN
320 PRINT "CASSIOPEIA"
330 POSITION 12,3:PRINT "*****":PRINT
340 POSITION 26,5:PRINT "*****":PRINT
350 PRINT "      *":POSITION 20,6:PRINT "*****":PRINT
360 POSITION 33,9:PRINT "*****"
370 RETURN
380 PRINT "LYNX"
390 POSITION 7,2:PRINT "*****"
400 POSITION 7,3:PRINT "*****"
410 POSITION 19,4:PRINT "*****"
420 RETURN
430 PRINT "CAMELOPARDALIS"
440 POSITION 18,2:PRINT "*****"
450 PRINT
460 PRINT
470 POSITION 27,5:PRINT "*****"
480 POSITION 17,6:PRINT "*****":POSITION 23,6:PRINT "*****"
490 RETURN
500 PRINT "ANDROMEDA"
510 POSITION 19,2:PRINT "*****"
520 PRINT
530 POSITION 9,4:PRINT "*****"
540 POSITION 22,5:PRINT "*****"
550 POSITION 18,6:PRINT "*****":POSITION 26,6:PRINT "*****"
560 POSITION 26,7:PRINT "*****":POSITION 34,7:PRINT "*****"
570 RETURN
580 PRINT "GEMINI"
590 POSITION 10,2:PRINT "*****":POSITION 17,2:PRINT "*****"
600 PRINT
610 PRINT
```

Program 14-1-cont. Constellation 10 Program Listing

```
620 POSITION 9,5:PRINT "*"
620 POSITION 9,5:PRINT "*"
630 POSITION 10,6:PRINT "*":POSITION 17,6:PRINT "*"
640 PRINT
650 POSITION 9,8:PRINT "*":POSITION 18,8:PRINT "*"
660 POSITION 4,9:PRINT "*":POSITION 21,9:PRINT "*"
670 RETURN
680 PRINT "CANIS MINOR"
690 POSITION 25,2:PRINT "*"
700 PRINT
710 PRINT
720 POSITION 11,5:PRINT "*"
730 RETURN
740 PRINT "LYRA"
750 POSITION 25,2:PRINT "*"
760 POSITION 21,3:PRINT "*"
770 POSITION 16,4:PRINT "*"
780 PRINT
790 POSITION 19,6:PRINT "*"
800 POSITION 14,7:PRINT "*"
810 RETURN
820 PRINT "BOOTES"
830 POSITION 14,2:PRINT "*"
840 PRINT
850 POSITION 8,4:PRINT "*":POSITION 32,4:PRINT "*"
860 POSITION 24,5:PRINT "*"
870 POSITION 15,6:PRINT "*"
880 RETURN
890 PRINT "CYGNUS"
900 POSITION 20,2:PRINT "*"
910 POSITION 32,3:PRINT "*"
920 POSITION 24,4:PRINT "*"
930 POSITION 15,5:PRINT "*"
940 POSITION 29,6:PRINT "*"
950 POSITION 32,7:PRINT "*"
960 POSITION 35,8:PRINT "*"
970 RETURN
980 GOSUB 260
990 GOTO 210
1000 GOSUB 320
1010 GOTO 210
1020 GOSUB 380
1030 GOTO 210
1040 GOSUB 430
1050 GOTO 210
1060 GOSUB 500
1070 GOTO 210
1080 GOSUB 580
1090 GOTO 210
1100 GOSUB 680
1110 GOTO 210
1120 GOSUB 740
1130 GOTO 210
1140 GOSUB 820
```

Program 14-1-cont. Constellation 10 Program Listing

```
1150 GOTO 210
1160 GOSUB 890
1170 GOTO 190
1180 PRINT CHR$(125):P=0
1190 PRINT "MULTIPLE CHOICE TEST"
1200 PRINT "ENTER CORRECT ANSWER (#1-4)"
1210 PRINT
1220 PRINT "1)"
1230 GOSUB 330
1240 PRINT "(1) LEO"
1250 PRINT "(2) BOOTES"
1260 PRINT "(3) CASSIOPEIA"
1270 PRINT "(4) LYNX"
1280 GOSUB 2240
1290 IF C<>3 THEN 1310
1300 GOSUB 2210:A(1)=10
1310 PRINT "2)"
1320 GOSUB 440
1330 PRINT "(1) PROCYON"
1340 PRINT "(2) CAMELOPARDALIS"
1350 PRINT "(3) CEPHEUS"
1360 PRINT "(4) ORION"
1370 GOSUB 2240
1380 IF C<>2 THEN 1400
1390 GOSUB 2210:A(2)=10
1400 PRINT "3)"
1410 GOSUB 830
1420 PRINT "(1) BOOTES"
1430 PRINT "(2) AURIGA"
1440 PRINT "(3) GEMINI"
1450 PRINT "(4) HYDRA"
1460 GOSUB 2240
1470 IF C<>1 THEN 1490
1480 GOSUB 2210:A(3)=10
1490 PRINT "4)"
1500 GOSUB 510
1510 PRINT "(1) ANDROMEDA"
1520 PRINT "(2) CRUX"
1530 PRINT "(3) CANOPUS"
1540 PRINT "(4) DRACO"
1550 GOSUB 2240
1560 IF C<>1 THEN 1580
1570 GOSUB 2210:A(4)=10
1580 PRINT "5)"
1590 GOSUB 270
1600 PRINT "(1) AURIGA"
1610 PRINT "(2) LYNX"
1620 PRINT "(3) URSA MAJOR"
1630 PRINT "(4) LEPUS"
1640 GOSUB 2240
1650 IF C<>3 THEN 1670
1660 GOSUB 2210:A(5)=10
1670 PRINT "6)"
```

Program 14-1-cont. Constellation 10 Program Listing

```
1680 GOSUB 590
1690 PRINT "(1) LEO"
1700 PRINT "(2) CYGNUS"
1710 PRINT "(3) CORONA BOREALIS"
1720 PRINT "(4) GEMINI"
1730 GOSUB 2240
1740 IF C<>4 THEN 1760
1750 GOSUB 2210:A(6)=10
1760 PRINT "7)"
1770 GOSUB 750
1780 PRINT "(1) LYRA"
1790 PRINT "(2) LEO"
1800 PRINT "(3) ORION"
1810 PRINT "(4) CETUS"
1820 GOSUB 2240
1830 IF C<>1 THEN 1850
1840 GOSUB 2210:A(7)=10
1850 PRINT "8)"
1860 GOSUB 690
1870 PRINT "(1) CRUX"
1880 PRINT "(2) CETUS"
1890 PRINT "(3) DRACO"
1900 PRINT "(4) CANIS MINOR"
1910 GOSUB 2240
1920 IF C<>4 THEN 1940
1930 GOSUB 2210:A(8)=10
1940 PRINT "9)"
1950 GOSUB 390
1960 PRINT "(1) CRUX"
1970 PRINT "(2) Ursa MAJOR"
1980 PRINT "(3) LYNX"
1990 PRINT "(4) VIRGO"
2000 GOSUB 2240
2010 IF C<>3 THEN 2030
2020 GOSUB 2210:A(9)=10
2030 PRINT "10)"
2040 GOSUB 900
2050 PRINT "(1) PERSEUS"
2060 PRINT "(2) LEPUS"
2070 PRINT "(3) CYGNUS"
2080 PRINT "(4) ORION"
2090 GOSUB 2240
2100 IF C<>3 THEN 2120
2110 GOSUB 2210:A(10)=10
2120 PRINT
2130 PRINT "POINTS PER QUESTION"
2140 PRINT
2150 PRINT "1=";A(1);" 2=";A(2);" 3=";A(3);" 4=";A(4);" 5=";A(
5)
2160 PRINT "6=";A(6);" 7=";A(7);" 8=";A(8);" 9=";A(9);" 10=";A
(10)
2170 PRINT
2180 PRINT "YOUR SCORE IS ";P/10;" CORRECT OUT OF 10."
```

Program 14-1-cont. Constellation 10 Program Listing

```
2190 PRINT "THAT'S ";P;" PERCENT CORRECT"  
2200 END  
2210 P=P+10  
2220 PRINT "CORRECT"  
2230 RETURN  
2240 PRINT "(1-4) "  
2250 INPUT C  
2260 PRINT CHR$(125)  
2270 RETURN
```

SECTION III

Business and Investment

The business and investment use of the home computer is an important one. In the past, the small business could not afford the use of a computer. Now with the low price of the home computer, under \$200, it's easily affordable. A fully equipped business system can cost from \$2500 to \$5000 including a printer, dual disks, and enough RAM memory for inventory and pay roll, etc.

This section includes an IRA program for retirement planning; the house buying guide program and a bond analysis program for investors; a loan amortization program that prints a payment schedule for a given loan amount, interest rate, and monthly payment; two depreciation programs for business property depreciation; and a bar chart for business sales.

CHAPTER 15

IRA Planning

Individual Retirement Arrangements have become very popular in the past few years, because of the great tax advantages that they offer. The Individual Retirement Account (IRA) is one of three types of accounts offered for retirement planning. It is a savings plan that lets you set aside money for your retirement. Your contributions to the IRA are tax deductible, and the interest earned is not taxed until it is distributed to you at retirement.

You may deposit up to \$2000 per year into your IRA, and receive the amount deposited as a deduction from your yearly income. It 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 IRA 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 15-1 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 IRA. Now enter your estimated yearly deposit (maximum allowed is \$2000). 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 IRA 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 IRA at retirement.

See Fig. 15-1 for a sample run.

IRA PLANNING

NOW CALCULATING COMPOUND INTEREST
FOR 37 YEARS

COPYRIGHT (C) 1982 BY HOWARD BERENBON

CURRENTLY AT YEAR 23

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 THE IRA, 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 IRA
? 28

ENTER YOUR ESTIMATED YEARLY IRA DEPOSIT
? 2000

ENTER THE CURRENT YEARLY INTEREST RATE
? 10

ENTER YOUR AGE AT WITHDRAWAL
? 65

IRA PLANNING

BEGINNING YEAR OF PLAN: 1982
YEARLY INTEREST RATE (%): 10

YEARLY IRA DEPOSIT= \$2000.00

NUMBER OF YEARS COMPOUNDING: 37
PRINCIPAL= \$74000.00
COMPOUND INTEREST= \$754723.30

RETIREMENT YEAR: 2019

TOTAL BALANCE= \$828723.90
OK

NOW CALCULATING COMPOUND INTEREST
FOR 37 YEARS

CURRENTLY AT YEAR 2

Fig. 15-1. IRA planning sample run.

Program 15-1. IRA Planning Program Listing

```

100 PRINT CHR$(125);"IRA PLANNING"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1982 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM CALCULATES AND DISPLAYS"
150 PRINT "THE APPROXIMATE BALANCE & CUMULATIVE"
160 PRINT "INTEREST AFTER A GIVEN TIME PERIOD."
170 PRINT "IT REQUIRES THE ENTRY OF YOUR AGE"
180 PRINT "WHEN YOU BEGAN THE IRA, THE ESTIMATED"
190 PRINT "YEARLY DEPOSIT, THE APPROXIMATE"
200 PRINT "YEARLY INTEREST RATE (CURRENT RATE"
210 PRINT "WILL BE SUFFICIENT), AND THE AGE THAT"
220 PRINT "YOU EXPECT TO BEGIN WITHDRAWAL."
230 PRINT
240 PRINT "ENTER BEGINNING YEAR OF PLAN":INPUT Y:PRINT CHR$(125)
250 PRINT "ENTER YOUR AGE AT THE START OF THE IRA";
260 INPUT A:PRINT :IF A>70.5 THEN 560
270 PRINT "ENTER THE ESTIMATED YEARLY IRA DEPOSIT";
280 INPUT D:PRINT :IF D>2000 THEN PRINT "TOO LARGE":GOTO 270
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);"IRA PLANNING":PRINT
470 PRINT :PRINT "BEGINNING YEAR OF PLAN: ";Y
480 PRINT "YEARLY INTEREST RATE (%): ";I
490 PRINT :PRINT "YEARLY IRA DEPOSIT=$";D
500 PRINT :PRINT "NUMBER OF YEARS OF COMPOUNDING: ";YA
510 PRINT "PRINCIPAL=$";P
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"
580 PRINT "70 1/2. THEREFORE, AT YOUR AGE OF ";A
590 PRINT "YOU ARE NOT ELIGIBLE FOR AN IRA."
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 16

The House Buying Guide

Here's an interesting program for the potential home investor, or investment group. It's the house buying guide, used for screening houses that may be of interest to you. It's written in BASIC, and will run on your microcomputer.

The program is a 16 question, questionnaire, with each answer assigned a point value. See Program 16-1 for the program listing. Before beginning the questionnaire, the program requires a "yes" answer to the following preliminary questions:

1. Does the house have all utilities?
(gas, water, etc.)
2. Is there gas heat?
3. Are the roads paved?
4. Is the down payment and initial cost within your budget?

If any of the preliminary questions are answered "no," then the house is not acceptable. A house that passed the screening will go on to the questionnaire. See Fig. 16-1 for a sample run.

USE

The questionnaire was designed to assist the investor in finding a reliable house, for maximum profitability and resale value.

A point score of 36 points or more is a positive recommendation to invest in the house. The house will have all the qualifications for a profit making investment, either for renting and/or selling at some future date.

Questions 14 through 16 pertain to profitability of your investment. Question 14 requires entry of the monthly rent that you will charge. Question 15 requests a monthly cash flow value, calculated by the following formula:

$$\text{Monthly Cash Flow} = \frac{(\text{yr rent}) - (\text{yr insurance} + \text{yr tax} + \text{yr water})}{12}$$

Finally, question 16 requests the percent profit, calculated by the following formula:

$$\text{Percent Profit} = \frac{(\text{yr cash flow} + \text{yr principal})}{(\text{down payment} + \text{initial costs})}$$

If you intend to use the questionnaire for screening a house, without the intention of renting, then questions 14 through 16 must be answered with a set point value. To adjust the point count for an accurate recommendation, give these questions 4 points each.

RUN
THE HOUSE BUYING GUIDE

PRELIMINARY SCREENING

A
DOES THE HOUSE HAVE ALL UTILITIES?
ENTER '1'=YES, '0'=NO
? 1

B
IS THERE GAS HEAT?
ENTER '1'=YES, '0'=NO
? 1

C
ARE THE ROADS PAVED?
ENTER '1'=YES, '0'=NO
? 1

D
IS THE DOWN PAYMENT AND INITIAL
COST WITHIN YOUR BUDGET?
ENTER '1'=YES, '0'=NO
? 1

THE HOUSE HAS PASSED THE PRELIMINARY SCREENING

BEGIN QUESTIONNAIRE

#1
GENERAL CONDITION?
POOR =1
AVERAGE=2
GOOD =3
EXCELLENT=4
ENTER POINT VALUE
? 3

#2
STRUCTURE?
ALUMINUM=1
BRICK =2
ENTER POINT VALUE
? 2
POINTS SO FAR= 5

#3
FAMILY ROOM?
YES=1, NO=0
ENTER POINT VALUE
? 1

POINTS SO FAR= 10

#6
LOCATION? (RATING FROM 0 TO 5)
ZERO=0 THREE=6
ONE=2 FOUR=8
TWO=4 FIVE=10
ENTER POINT VALUE
? 8

8
POINTS SO FAR= 18

#7
IMMEDIATE NEIGHBORHOOD?
POOR =1
AVERAGE=2
GOOD =3
EXCELLENT=4
ENTER POINT VALUE
?

#9
BATHS?
1 1/2 BATHS=1 2 1/2 BATHS=3
2 BATHS =2 3 BATHS =4
ENTER POINT VALUE
? 2
POINTS SO FAR= 28

#10
BASEMENT?
YES=1, NO=0
ENTER POINT VALUE
? 1

POINTS SO FAR= 32

#13
AGE?
1 TO 5 YRS=3
6 TO 10 YRS=2
11 TO 15 YRS=1
16 OR GREATER=0
ENTER POINT VALUE
? 1

POINTS SO FAR= 45

THE HOUSE IS ACCEPTABLE

TOTAL POINTS= 45

Fig. 16-1. The house buying guide sample run.

Program 16-1. House Buying Guide Program Listing

```
100 PRINT CHR$(125); "THE HOUSE BUYING GUIDE"
110 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
120 PRINT
130 P=0
140 PRINT "PRELIMINARY SCREENING"
150 PRINT
160 PRINT "A"
170 PRINT "DOES THE HOUSE HAVE ALL UTILITIES?"
180 GOSUB 1480
190 PRINT "B"
200 PRINT "IS THERE GAS HEAT?"
210 GOSUB 1480
220 PRINT "C"
230 PRINT "ARE THE ROADS PAVED?"
240 GOSUB 1480
250 PRINT "D"
260 PRINT "IS THE DOWN PAYMENT AND INITIAL"
270 PRINT "COST WITHIN YOUR BUDGET?"
280 GOSUB 1480
290 PRINT CHR$(125):PRINT "THE HOUSE HAS PASSED THE PRELIMINARY S
CREENING"
300 PRINT
310 PRINT "BEGIN QUESTIONNAIRE"
320 PRINT
330 B=0
340 PRINT "#1"
350 PRINT "GENERAL CONDITION?"
360 PRINT "POOR      =1"
370 PRINT "AVERAGE=2"
380 PRINT "GOOD      =3"
390 PRINT "EXCELLENT=4"
400 GOSUB 1530
410 PRINT "#2"
420 PRINT "STRUCTURE?"
430 PRINT "ALUMINUM=1"
440 PRINT "BRICK      =2"
450 GOSUB 1530
460 PRINT "#3"
470 PRINT "FAMILY ROOM?"
480 PRINT "YES=1,  NO=0"
490 GOSUB 1530
500 PRINT "#4"
510 PRINT "GARAGE?"
520 PRINT "1 CAR      =1"
530 PRINT "1 1/2     =2"
540 PRINT "2 CAR      =3"
550 PRINT "2 1/2     =4"
560 GOSUB 1530
570 PRINT "#5"
580 PRINT "BEDROOM?"
590 PRINT "TWO=1", "FOUR=3"
600 PRINT "THREE=2", "FIVE=4"
```

Program 16-1-cont. House Buying Guide Program Listing

```

610 GOSUB 1530
620 PRINT "#6"
630 PRINT "LOCATION? (RATING FROM 0 TO 5)"
640 PRINT "ZERO=0","THREE=6"
650 PRINT "ONE=2","FOUR=8"
660 PRINT "TWO=4","FIVE=10"
670 GOSUB 1530
680 PRINT "#7"
690 PRINT "IMMEDIATE NEIGHBORHOOD?"
700 PRINT "POOR =1"
710 PRINT "AVERAGE=2"
720 PRINT "GOOD =3"
730 PRINT "EXCELLENT=4"
740 GOSUB 1530
750 PRINT "#8"
760 PRINT "SQUARE FOOTAGE?"
770 PRINT "1000=1","1400=5","1800=9"
780 PRINT "1100=2","1500=6","1900=10"
790 PRINT "1200=3","1600=7","2000=11"
800 PRINT "1300=4","1700=8","2100=12"
810 GOSUB 1530
820 PRINT "#9"
830 PRINT "BATHS?"
840 PRINT "1 1/2 BATHS=1","2 1/2 BATHS=3"
850 PRINT "2 BATHS =2","3 BATHS =4"
860 GOSUB 1530
870 PRINT "#10"
880 PRINT "BASEMENT?"
890 PRINT "YES=1, NO=0"
900 GOSUB 1530
910 PRINT "#11"
920 PRINT "LOAN %?"
930 PRINT "LESS THAN 8%=5"
940 PRINT "8 TO 9% =4"
950 PRINT "9 TO 10% =3"
960 PRINT "10 TO 11%=2"
970 PRINT "11 TO 12%=1"
980 GOSUB 1530
990 PRINT "#12"
1000 PRINT "LOAN TYPE?"
1010 PRINT "CONVENTIONAL=1"
1020 PRINT "LAND CONTRACT=2"
1030 PRINT "ASSUMPTION=3"
1040 GOSUB 1530
1050 PRINT "#13"
1060 PRINT "AGE?"
1070 PRINT "1 TO 5 YRS=3"
1080 PRINT "6 TO 10 YRS=2"
1090 PRINT "11 TO 15 YRS=1"
1100 PRINT "16 OR GREATER=0"
1110 GOSUB 1530
1120 PRINT "#14"
1130 PRINT "AVERAGE MONTHLY RENT (RENT PROPERTY)?"

```

Program 16-1-cont. House Buying Guide Program Listing

```
1140 PRINT "LESS THAN $251=1"
1150 PRINT "$300 TO 251=2"
1160 PRINT "$400 TO 301=3"
1170 PRINT "$401 TO 450=2"
1180 PRINT "GREATER THAN $450=1"
1190 GOSUB 1530
1200 PRINT "#15"
1210 PRINT "MONTHLY CASH FLOW="
1220 PRINT "((YR RENT)-(YR INSURANCE+YR TAX+YR WATER))/12"
1230 PRINT "$50 TO 100=1"
1240 PRINT "$101 TO 150=2"
1250 PRINT "$151 TO 200=3"
1260 PRINT "$201 TO 250=4"
1270 PRINT "$251 TO 300=5"
1280 PRINT "$301 TO 350=6"
1290 PRINT "$351 TO 400=7"
1300 PRINT "$401 TO 450=8"
1310 GOSUB 1530
1320 PRINT "#16"
1330 PRINT "PERCENT PROFIT="
1340 PRINT "(YR CASH FLOW+YR PRINCIPAL)/(DOWN PAYMENT+INITIAL COST
S)"
1350 PRINT "10%=2","13%=8"
1360 PRINT "11%=4","14%=10"
1370 PRINT "12%=6","15%=12"
1380 GOSUB 1530
1390 PRINT
1400 PRINT
1410 IF P>35 THEN 1440
1420 GOTO 1600
1430 END
1440 PRINT "THE HOUSE IS ACCEPTABLE"
1450 PRINT
1460 PRINT "TOTAL POINTS= ";P
1470 GOTO 1430
1480 PRINT "ENTER '1'=YES, '0'=NO"
1490 INPUT A
1500 IF A=0 THEN 1600
1510 PRINT
1520 RETURN
1530 PRINT "ENTER POINT VALUE"
1540 INPUT B:PRINT CHR$(125)
1550 P=B+P
1560 PRINT "POINTS SO FAR= ";P
1570 PRINT
1580 PRINT
1590 RETURN
1600 PRINT "THE HOUSE IS NOT ACCEPTABLE"
1610 PRINT "NO FURTHER SCREENING IS REQUIRED"
1620 GOTO 1430
```


CHAPTER 17

Bond Analysis

The purchase of bonds is a common type of investment called debt investing. A bond is a form of an IOU that usually has a face value of \$1000, but may also have values from \$25 up to \$10,000. Bonds are issued by companies or government agencies that promise to pay the owner the face value, or par value, after a definite time. Bonds also pay a specific interest rate, calculated on the par value, each year until maturity.

Here's a program that calculates the bond yield, the annual income, and the total income from bond investments. It is written in BASIC for your microcomputer. See Program 17-1 for the program listing.

THE PROGRAM

After you run the program, enter the actual cost of the bond and the face value, or par value. Then enter the yearly interest rate, in percent, and the number of years to maturity. Finally, enter the number of bonds invested in, and the cost of the transaction (if any). The program will calculate and display the percent yield, the annual income from one bond, the annual income from all bonds invested in, and the total income from your investment. The program will then display ANOTHER ANALYSIS 1-YES 0-NO. Enter a 1 to run the analysis again, or enter a 0 to end the program.

See Fig. 17-1 for a sample run.

BOND ANALYSIS

COPYRIGHT (C) 1982 BY HOWARD BERENBON

THIS PROGRAM WILL CALCULATE THE
BOND YIELD, THE ANNUAL INCOME,
AND THE TOTAL INCOME FROM
BOND INVESTMENTS.

ENTER ACTUAL COST OF ONE BOND
? 850
ENTER PAR VALUE OF BOND
? 1000
ENTER THE YEARLY INTEREST RATE (%)
? 6
ENTER THE NUMBER OF YEARS TO MATURITY
? 5
ENTER THE NUMBER OF BONDS INVESTED IN
? 4
ENTER THE COST OF THE TRANSACTION
? 25

BOND ANALYSIS

PERCENT YIELD= 7

ANNUAL INCOME FROM ONE 6 %, \$ 1000
BOND
IS \$60.00

ANNUAL INCOME FROM INVESTMENT OF
4 \$ 1000 BOND(S) IS \$240.00

TOTAL INCOME FROM INVESTMENT= \$815.00

ANOTHER ANALYSIS? 1-YES 0-NO
?

Fig. 17-1. Bond analysis sample run.

Program 17-1. Bond Analysis Program Listing

```
100 PRINT CHR$(125);"BOND ANALYSIS"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1982 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM WILL CALCULATE THE"
150 PRINT "BOND YIELD, THE ANNUAL INCOME,"
160 PRINT "AND THE TOTAL INCOME FROM"
170 PRINT "BOND INVESTMENTS."
180 PRINT
190 PRINT "ENTER ACTUAL COST OF ONE BOND"
200 INPUT P
210 PRINT "ENTER PAR VALUE OF BOND"
220 INPUT M
230 PRINT "ENTER THE YEARLY INTEREST RATE (%)"
240 INPUT I:IR=I:I=I/100
250 PRINT "ENTER THE NUMBER OF YEARS TO MATURITY"
260 INPUT Y
270 PRINT "ENTER THE NUMBER OF BONDS INVESTED IN"
280 INPUT N
290 PRINT "ENTER THE COST OF THE TRANSACTION"
300 INPUT C:PRINT CHR$(125)
310 PRINT "BOND ANALYSIS"
320 PRINT
330 IN=M*I
340 YR=IN*N:T=N*P+C
350 YI=YR/T:YP=YI*100:YL=INT(YI*10000)/10000:YL=YL*100
360 PRINT :PRINT "PERCENT YIELD=";YL
370 PRINT :PRINT "ANNUAL INCOME FROM ONE ";IR;"%, $";M;" BOND"
380 PRINT "IS $";IN
390 PRINT :PRINT "ANNUAL INCOME FROM INVESTMENT OF"
400 PRINT N;"-$";M;" BOND(S) IS $";N*IN
410 PRINT :B=M-P
420 BT=B*N+IN+N-C
430 PRINT "TOTAL INCOME FROM INVESTMENT=$";BT
440 PRINT :PRINT "ANOTHER ANALYSIS? 1-YES 0-NO":INPUT A
450 IF A=1 THEN 100
460 END
```

CHAPTER 18

Amortization Schedule

If you're in the market for a loan, then the amortization schedule can help you. The program generates a loan payment schedule given the principal, yearly interest rate, and monthly payment. It calculates and displays the balance, principal, interest, and cumulative interest for each month of the loan. It's written in BASIC for your microcomputer. See Program 18-1 for the program listing.

THE PROGRAM

After you run the program, enter the principal (the amount of the loan), the yearly interest (in percent), and the monthly payment. Then enter a 1 to display the schedule.

The program calculates the monthly interest from the principal, and subtracts that amount from the

```
RUN
AMORTIZATION SCHEDULE

COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM CALCULATES A MONTHLY LOAN PAYMENT
SCHEDULE. IT DISPLAYS THE PAYMENT, BALANCE, PRINCIPAL,
INTEREST, AND CUM. INTEREST FOR EACH MONTH OF THE LOAN.

ENTER THE PRINCIPAL (AMOUNT OF LOAN)
? 1000

ENTER THE YEARLY INTEREST RATE (%)
? 18

ENTER THE MONTHLY PAYMENT
? 140

ENTER '1' TO BEGIN
? 1

                        AMORTIZATION SCHEDULE

PRINCIPAL=$ 1000                INTEREST= 18 %

MONTHLY PAYMENT=$ 140

MONTH  PAYMENT    BALANCE    PRINCIPAL    INTEREST    CUM. INT
1      140        875        125         15          15
2      140        748.13     126.87      13.13       28.13
3      140        619.35     128.78      11.22       39.35
4      140        488.64     130.71      9.29        48.64
5      140        355.97     132.67      7.33        55.97
6      140        221.31     134.66      5.34        61.31
7      140        84.63      136.68      3.32        64.63
8      85.9        0          84.63      1.27        65.9

TOTAL INTEREST= 65.9
```

Fig. 18-1. Amortization schedule sample run.

monthly payment, to give the current balance. This continues until the balance is less than the monthly payment, then the final month's data is calculated.

A time delay is included to aid in viewing the data. Each time a month's data is displayed, a 1.5 second delay is called. See program lines 500 and 510. This FOR-NEXT loop may be changed for different delay

lengths, or eliminated altogether. See Fig. 18-1 for a sample run.

If an unrealistically low payment is entered, the program will not function properly, possibly giving negative or zero results. If this happens then stop the program, and run it again, entering a higher value for the monthly payment.

Program 18-1. Amortization Schedule Program Listing

```
100 PRINT CHR$(125); "AMORTIZATION SCHEDULE"
110 PRINT "ATARI VERSION"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM CALCULATES A MONTHLY LOAN PAYMENT"
150 PRINT "SCHEDULE. IT DISPLAYS THE PAYMENT,      BALANCE, PRINCIPA
L,"
160 PRINT "INTEREST, AND CUM. INTEREST FOR EACH  MONTH OF THE LOAN
."
170 PRINT
180 PRINT "ENTER THE PRINCIPAL (AMOUNT OF LOAN)"
190 INPUT A
200 PRINT
210 PRINT "ENTER THE YEARLY INTEREST RATE (%)"
220 INPUT I
230 PRINT
240 PRINT "ENTER THE MONTHLY PAYMENT"
250 INPUT P
260 PRINT
270 PRINT "ENTER '1' TO BEGIN"
280 INPUT L
290 PRINT CHR$(125)
300 B=A
310 REM PRINT SCHEDULE
320 POSITION 10,1:PRINT "AMORTIZATION SCHEDULE"
330 PRINT
340 PRINT "PRINCIPAL=$";B,"INTEREST=";I;" %"
350 PRINT "MONTHLY PAYMENT=$";P
360 PRINT
370 PRINT "MO PAYMT BALANCE PRINCIP INT. CUM. INT"
380 Y=1:Z=8
390 R=0
400 IF A<=P THEN 680
410 GOSUB 530
420 POSITION 2,Z:PRINT Y:POSITION 5,Z:PRINT P:POSITION 11,Z:PRINT
P2:POSITION 19,Z:PRINT P0
425 POSITION 27,Z:PRINT I2:POSITION 33,Z:PRINT R
430 GOSUB 500
440 Y=Y+1:Z=Z+2:IF Z=24 THEN Z=8:PRINT CHR$(125)
450 IF P2=0 THEN 470
460 GOTO 400
470 PRINT
480 PRINT "TOTAL INTEREST=";R
490 END
500 FOR T=1 TO 664
510 NEXT T
520 RETURN
530 REM CALCULATE BALANCE AND INTEREST
540 I2=A*(I/100)
550 I2=I2/12
560 GOSUB 630
570 P2=A-(P-I2)
580 P0=P-I2
```

Program 18-1-cont. Amortization Schedule Program Listing

```
590 P2=INT(P2*100+0.5)/100
600 A=P2
610 R=I2+R
620 RETURN
630 REM ROUND TO 2 DIGITS PASSED THE DECIMAL POINT
640 I3=I2*100
650 I4=INT(I3+0.5)
660 I2=I4/100
670 RETURN
680 REM CALCULATE LAST PAYMENT
690 I2=P2*(I/100)
700 I2=I2/12
710 GOSUB 630
720 P0=P2
730 P=P2+I2
740 P2=0
750 R=I2+R
760 GOTO 420
```

CHAPTER 19

Depreciation Schedule

If you're in business and have equipment that you depreciate, then the depreciation schedule can help you. It calculates a 5 year depreciation schedule, using the "sum of the years" method. It's written in BASIC for your microcomputer. See Program 19-1 for the program listing.

THE PROGRAM

The program assumes that your equipment will last 5 years. The first year deduction is 5/15 times the total cost of the equipment. The second, third, fourth, and fifth year deduction is 4/15, 3/15, 2/15, and 1/15 times the cost, respectively.

After you run the program, enter the total amount for depreciation and the starting year. A schedule will then be displayed. See Fig. 19-1 for a sample run.

It does not take into account the "salvage" value of the equipment. It assumes there is no salvage value. But if your equipment has a value after the 5 years, then you must subtract that amount from the fifth year deduction.

Check with your accountant before you use this schedule. He may recommend another method of calculating depreciation that is more suited to your type of business.

```
RUN
DEPRECIATION SCHEDULE
COPYRIGHT (C) 1979 BY HOWARD BERENBON

THIS PROGRAM WILL PRINT A 5 YEAR SCHEDULE
TO HELP YOU DEPRECIATE BUSINESS EQUIPMENT.
IT USES THE SUM OF THE YEARS METHOD.

ENTER THE TOTAL AMOUNT FOR DEPRECIATION.
? 25484

? 1980

      FIVE YEAR DEPRECIATION SCHEDULE
      USING THE SUM OF THE YEARS METHOD.

TOTAL AMOUNT FOR DEPRECIATION=$ 2548

YEAR #          DEPRECIATION      AMOUNT LEFT
1980             840.84             1707.16
1981             662.48             1044.68
1982             509.6              535.08
1983             331.24             203.84
1984             203.84              0

READY
>
```

Fig. 19-1. Depreciation schedule sample run.

Program 19-1. Depreciation Schedule Program Listing

```
100 PRINT CHR$(125); "DEPRECIATION SCHEDULE"
110 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
120 PRINT
130 PRINT "THIS PROGRAM WILL PRINT A 5 YEAR SCHEDULE"
140 PRINT "TO HELP YOU DEPRECIATE BUSINESS EQUIPMENT."
150 PRINT "IT USES THE SUM OF THE YEARS METHOD."
160 PRINT
170 PRINT "ENTER THE TOTAL AMOUNT FOR DEPRECIATION"
180 INPUT A
190 PRINT "ENTER THE STARTING YEAR OF DEPRECIATION"
200 INPUT Y:PRINT CHR$(125)
210 POSITION 6,1:PRINT "FIVE YEAR DEPRECIATION SCHEDULE"
220 POSITION 6,2:PRINT "USING THE SUM OF THE YEARS METHOD."
230 GOSUB 360
240 PRINT
250 PRINT "TOTAL AMOUNT FOR DEPRECIATION=$";A
260 PRINT
270 PRINT "YEAR #","DEPRECIA","AMOUNT LEFT"
280 PRINT
290 PRINT Y,B*Q,Q-(B*Q)
300 PRINT Y+1,C*Q,Q-(H+I)
310 PRINT Y+2,D*Q,Q-(H+I+J)
320 PRINT Y+3,E*Q,Q-(H+I+J+K)
330 PRINT Y+4,Q-(H+I+J+K),S
340 PRINT
350 END
360 REM DATA FOR YEARS 1 THROUGH 5
370 Q=A
380 B=0.33
390 C=0.26
400 D=0.2
410 E=0.13
420 F=0.07
430 H=B*Q
440 I=C*Q
450 J=D*Q
460 K=E*Q
470 L=F*Q
480 S=0
490 RETURN
```


CHAPTER 20

ACRS Depreciation Schedule

This program will calculate and display the accelerated cost recovery system (ACRS) depreciation schedule, mandatory for most tangible property that you place into service after December 31, 1980. ACRS applies to both new and used "recovery property." Recovery property is most tangible property that is either used in a trade or business, or held for the production of income. The expected salvage value of the property is not subtracted from the total amount for depreciation. The program is written in BASIC for your microcomputer. See Program 20-1 for the program listing.

THE PROGRAM

The program will calculate the ACRS depreciation schedule for 3-year, 5-year, and 10-year property. After you run the program, enter a 1 for 3-year depreciation, enter a 2 for 5-year depreciation, or enter a 3 for 10-year depreciation. Then enter the beginning year of depreciation and the total amount for depreciation. The ACRS depreciation schedule will be calculated and displayed starting with the beginning year of depreciation. See Fig. 20-1 for a sample run.

```
ACRS DEPRECIATION SCHEDULE
COPYRIGHT (C) 1982 BY HOWARD BERENBON
```

```
THIS PROGRAM WILL DISPLAY THE ACRS
DEPRECIATION SCHEDULE MANDATORY FOR
ASSETS PLACED INTO SERVICE AFTER
DECEMBER 31, 1980.
```

```
ENTER 1 FOR 3-YEAR DEPRECIATION
ENTER 2 FOR 5-YEAR DEPRECIATION
ENTER 3 FOR 10-YEAR DEPRECIATION
? 1
```

```
ENTER BEGINNING YEAR OF DEPRECIATION
? 1982
```

```
ENTER TOTAL AMOUNT FOR DEPRECIATION
? 34520
```

```
ACRS DEPRECIATION SCHEDULE
```

```
BEGINNING YEAR: 1982
TOTAL AMOUNT FOR DEPRECIATION: $34520.00
```

YEAR	AMOUNT
1982	\$8630.50
1983	\$13118.10
1984	\$12772.90

Fig. 20-1. ACRS depreciation schedule sample run.

Program 20-1. ACRS Depreciation Schedule Program Listing

```
100 PRINT CHR$(125); "ACRS DEPRECIATION SCHEDULE"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1982 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM WILL DISPLAY THE ACRS"
150 PRINT "DEPRECIATION SCHEDULE MANDATORY FOR"
160 PRINT "ASSETS PLACED INTO SERVICE AFTER"
170 PRINT "DECEMBER 31, 1980."
180 PRINT :PRINT "ENTER 1 FOR 3-YEAR DEPRECIATION"
190 PRINT "ENTER 2 FOR 5-YEAR DEPRECIATION"
200 PRINT "ENTER 3 FOR 10-YEAR DEPRECIATION"
210 INPUT A:IF A<1 OR A>3 THEN 180
220 ON A GOTO 230,340,470
230 PRINT CHR$(125):GOSUB 670:REM 3-YEAR DEPRECIATION
240 GOSUB 690
250 P1=0.25:P2=0.38:P3=0.37
260 GOSUB 710
270 D1=INT(P1*T*100+0.5)/100
280 D2=INT(P2*T*100+0.5)/100
290 D3=INT(P3*T*100+0.5)/100
300 GOSUB 750:PRINT Y,D1
310 PRINT Y+1,D2
320 PRINT Y+2,D3
330 END
340 PRINT CHR$(125):GOSUB 670:REM 5-YEAR DEPRECIATION
350 GOSUB 690
360 P1=0.15:P2=0.22:P3=0.21
370 GOSUB 710
380 D1=INT(P1*T*100+0.5)/100
390 D2=INT(P2*T*100+0.5)/100
400 D3=INT(P3*T*100+0.5)/100
410 GOSUB 750:PRINT Y,D1
420 PRINT Y+1,D2
430 PRINT Y+2,D3
440 PRINT Y+3,D3
450 PRINT Y+4,D3
460 GOTO 330
470 PRINT CHR$(125):GOSUB 670:REM 10-YEAR DEPRECIATION
480 GOSUB 690
490 P1=0.08:P2=0.14:P3=0.12:P4=0.1:P5=0.09
500 GOSUB 710
510 D1=INT(P1*T*100+0.5)/100
520 D2=INT(P2*T*100+0.5)/100
530 D3=INT(P3*T*100+0.5)/100
540 D4=INT(P4*T*100+0.5)/100
550 D5=INT(P5*T*100+0.5)/100
560 GOSUB 750:PRINT Y,D1
570 PRINT Y+1,D2
580 PRINT Y+2,D3
590 PRINT Y+3,D4
600 PRINT Y+4,D5
610 PRINT Y+5,D5
620 PRINT Y+6,D5
```

Program 20-1-cont. ACRS Depreciation Schedule Program Listing

```
630 PRINT Y+7,D5
640 PRINT Y+8,D5
650 PRINT Y+9,D5
660 GOSUB 330
670 PRINT "ENTER BEGINNING YEAR OF DEPRECIATION"
680 INPUT Y:PRINT :RETURN
690 PRINT "ENTER TOTAL AMOUNT FOR DEPRECIATION"
700 INPUT T:PRINT :RETURN
710 PRINT CHR$(125);"ACRS DEPRECIATION SCHEDULE":PRINT
720 PRINT "BEGINNING YEAR: ";Y
730 PRINT "TOTAL AMOUNT FOR DEPRECIATION: ";T
740 RETURN
750 PRINT :PRINT "YEAR","AMOUNT":PRINT :RETURN
```

CHAPTER 21

Bar Chart of Sales

Bar charts are useful in helping interpret business activities. Here's a program that will chart yearly business unit sales, for up to eight items, on a horizontal bar chart. It is written in BASIC for your microcomputer. See Program 21-1 for the program listing.

THE PROGRAM

After you run the program, it will request your entry of the year of the chart. Then it will ask for the number of items to chart (limit your entry to eight or less). Now enter the unit sales for each item in your chart. The quantity may vary from one unit to up to 1,000,000 units. After all quantities are entered, the program finds the highest quantity and uses that number to adjust the scale factor of the chart. But it is recommended that you chart items of relatively close sales quantities to help simplify the chart and comparisons. An example of this would be to chart unit sales for products that have sold quantities from 100 to 1000 instead of, say, 100 to 10,000. Because of the great difference in quan-

tity between 100 and 10,000, the 10,000 units sales would produce a bar, but the 100 units would not. Also, if the quantity entered is above the 1,000,000 unit limit of the program, then the computer will display RE-START and the program will start over.

THE CHART

After all data is entered, the program will display a horizontal bar chart of your business sales of the desired items, for the year entered. On the left side of the display is the item number, and to the right is the bar (made up of # signs) representing the scaled quantity of the units entered. The words UNITS TIMES and the scale factor are displayed below the chart. The scale factor may be a 1, 10, 100, 1000, or 10000, depending upon the highest number entered for unit sales.

After the chart is displayed, a legend follows with the item number and the quantity for each of the items entered. The program then displays: ANOTHER CHART 1-YES 0-NO. Enter a 1 to run the program again, or enter a 0 to end.

See Fig. 21-1 for a sample run.

BAR CHART OF SALES
 ATARI
 COPYRIGHT (C) 1982 BY HOWARD BERENBON

THIS PROGRAM WILL CHART YEARLY
 BUSINESS SALES USING A HORIZONTAL
 BAR FOR UP TO EIGHT ITEMS.

ENTER THE YEAR OF THE CHART
 ? 1982
 ENTER NUMBER OF ITEMS TO CHART
 (LIMIT TO 8 OR LESS)
 ? 4
 ITEM 1

ENTER UNIT SALES OF ITEM 1
 ? 500
 ITEM 2

ENTER UNIT SALES OF ITEM 2
 ? 250
 ITEM 3

ENTER UNIT SALES OF ITEM 3
 ? 750
 ITEM 4

ENTER UNIT SALES OF ITEM 4
 ? 1000

HORIZONTAL BAR CHART
 UNIT SALES-YEAR: 1982

ITEM	SALES
1	500
2	250
3	750
4	1000

#.	UNITS
1	500
2	250
3	750
4	1000

ANOTHER CHART 1=YES 0=NO

Fig. 21-1. Bar chart of sales sample run.

Program 21-1. Bar Chart of Sales Program Listing

```

100 PRINT CHR$(125);"BAR CHART OF SALES"
110 PRINT "ATARI":DIM S(8)
120 PRINT "COPYRIGHT (C) 1982 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM WILL CHART YEARLY"
150 PRINT "BUSINESS SALES USING A HORIZONTAL"
160 PRINT "BAR FOR UP TO EIGHT ITEMS.":PRINT
170 PRINT "ENTER THE YEAR OF THE CHART":INPUT Y
180 PRINT "ENTER NUMBER OF ITEMS TO CHART"
190 PRINT "(LIMIT TO 8 OR LESS)"
200 INPUT I:IF I>8 THEN 180
210 FOR B=1 TO I:PRINT CHR$(125)
220 PRINT "ITEM ";B:PRINT
230 PRINT "ENTER UNIT SALES OF ITEM ";B
240 INPUT B1:S(B)=B1
250 NEXT B:PRINT CHR$(125)
260 GOSUB 480:IF H>10000000 THEN PRINT "RE-START":PRINT :GOTO 170
270 IF H<=100 THEN S=1:GOTO 330
280 IF H<=1000 THEN S=10:GOTO 330
290 IF H<=10000 THEN S=100:GOTO 330
300 IF H<=100000 THEN S=1000:GOTO 330
310 IF H<=1000000 THEN S=10000:GOTO 330
320 REM DISPLAY CHART
330 POSITION 7,0:PRINT "HORIZONTAL BAR CHART"
340 POSITION 7,1:PRINT "UNIT SALES-YEAR: ";Y
350 PRINT " ITEM -----"
360 FOR E=1 TO I:PRINT E;
370 T=(S(E)/S)/4:T=INT(T+0.5)
380 FOR F=1 TO T:POSITION F+7,E+2:PRINT "#";
390 NEXT F:PRINT :NEXT E
400 PRINT " -----"
410 PRINT "      0      25      50      75      100"
420 PRINT "      UNITS TIMES ";S
430 PRINT "#.", "UNITS"
440 FOR E=1 TO I:PRINT E,S(E):NEXT E
450 PRINT "ANOTHER CHART 1-YES 0-NO ";:INPUT R
460 IF R=1 THEN PRINT CHR$(125):GOTO 170
470 END
480 D=S(1)
490 FOR B=2 TO I
500 H=S(B)
510 IF H>D THEN 530
520 H=D
530 NEXT B:RETURN

```

SECTION IV

Home Applications

This section describes some useful home application programs including a recipe amount calculator; a diet program for the overweight or underweight person; a medical expense record program to keep those expenses in order; an electric usage analysis program; a gas mileage calculator for checking your car engine performance; and finally, a message taker that accepts and displays 6 separate messages.

CHAPTER 22

Recipe Amount Calculator

After you run the program, enter the recipe name and the number of ingredients in the recipe. Then enter the number of servings allowed and the number of servings required for that recipe.

Enter each ingredient amount in decimal form. For example: 1.5 is the correct entry for a measure of 1½. When all of the ingredients are entered, the program will print a list of the converted amounts beginning with ingredient number 1. See Fig. 22-1 for a sample run.

```
RECIPE AMOUNT CALCULATOR
ATARI
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM CALCULATES THE REQUIRED
AMOUNT OF INGREDIENTS FOR THE NUMBER
OF SERVINGS IN A PARTICULAR RECIPE.

ENTER RECIPE NAME
? IRISH COFFEE

ENTER THE NUMBER OF INGREDIENTS IN RECIPE
? 4

ENTER THE NUMBER OF SERVINGS ALLOWED
? 1

ENTER THE NUMBER OF SERVINGS REQUIRED
? 12

ENTER EACH INGREDIENT AMOUNT, AS GIVEN
IN THE RECIPE. THIS AMOUNT MUST BE IN
A DECIMAL FORM (1 1/2=1.5).

INGREDIENT # 1
? 1

INGREDIENT # 2
? 1

INGREDIENT # 3
? 1

INGREDIENT # 4
? 2

RECIPE NAME: IRISH COFFEE
SERVINGS: 12

INGREDIENT #    AMOUNT
1              12
2              12
3              12
4              24
```

Fig. 22-1. Recipe amount calculator sample run.

Program 22-1. Recipe Amount Calculator Program Listing

```
100 PRINT CHR$(125);"RECIPE AMOUNT CALCULATOR"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT :DIM A$(25)
140 PRINT "THIS PROGRAM CALCULATES THE REQUIRED"
150 PRINT "AMOUNT OF INGREDIENTS FOR THE NUMBER"
160 PRINT "OF SERVINGS IN A PARTICULAR RECIPE."
170 PRINT
180 PRINT "ENTER THE RECIPE NAME"
190 INPUT A$
200 PRINT
210 PRINT "ENTER THE # OF INGREDIENTS IN RECIPE"
220 INPUT I
230 PRINT
240 PRINT "ENTER THE NUMBER OF SERVINGS ALLOWED"
250 INPUT A
260 PRINT
270 PRINT "ENTER THE NUMBER OF SERVINGS REQUIRED"
280 INPUT B:PRINT CHR$(125)
290 PRINT
300 DIM A(I)
310 PRINT "ENTER EACH INGREDIENT AMOUNT, AS GIVEN"
320 PRINT "IN THE RECIPE. THIS AMOUNT MUST BE IN"
330 PRINT "A DECIMAL FORM (1 1/2=1.5).":PRINT
340 FOR X=1 TO I
350 PRINT "INGREDIENT # ";X
360 INPUT Y:A(X)=Y
370 NEXT X
380 PRINT
390 REM CALCULATE AND LIST INGREDIENT AMOUNTS
400 PRINT "RECIPE NAME: ";A$
410 PRINT "SERVINGS: ";B
420 PRINT
430 PRINT "INGREDIENT #","AMOUNT"
440 C=B/A
450 FOR X=1 TO I
460 PRINT X,,C*A(X)
470 FOR T=1 TO 708
480 NEXT T
490 NEXT X
500 END
```

CHAPTER 23

The Basic Diet

Are you noticing your waistline expand while you spend more and more time in front of your system? If so, it's probably due to lack of exercise and improper diet. Now you can get help from the basic diet program. See Program 23-1 for the program listing.

The program will help you to your weight loss goal, or tell you if you're underweight. It will decide what your proper weight should be (within 5%), from the input of your current weight, height, and

sex. It will determine the number of pounds you should lose to attain your goal. Then, a weight loss table is printed, derived from your input of the desired weekly weight loss. Finally, a daily calorie value is given (within 10%) to maintain your weight, after you reach your goal. A sample run is given in Fig. 23-1.

Table 23-1. 1100 Calorie Diet

```
? 1
ENTER CURRENT WEIGHT (LBS)
? 152
ENTER HEIGHT (FT,IN)
? 5,8
ENTER SEX 1=MALE 2=FEMALE
? 1

YOUR CURRENT WEIGHT IS 152 LBS

YOUR PROPER WEIGHT SHOULD BE 150 LBS
YOUR WEIGHT LOSS GOAL IS 2 LBS

ENTER DESIRED WEEKLY WEIGHT LOSS IN LBS
? .5

WEIGHT LOSS TABLE

CURRENT WEIGHT= 152 LBS
WEEK #      WEIGHT      TOTAL LOSS (LBS)
1           151.5       .5
2           151         1
3           150.5       1.5
4           150         2

YOU HAVE 4 WEEKS TO REACH 150 LBS
AFTER REACHING YOUR GOAL, YOU SHOULD
MAINTAIN YOUR WEIGHT WITH 1900 CALORIES
PER DAY (WITHIN 10%).
```

Breakfast

1 egg with 1 teaspoon of margarine
1 piece of melba toast
Coffee or tea, with milk and sugar substitute
Tomato juice

Lunch

4 oz meat, fish, or chicken with 1 teaspoon of margarine
1 piece of melba toast
1 cup of salad with diet dressing
or
1 cup cooked vegetables
1 cup fresh fruit or ½ cup jello

Dinner

5 oz meat, fish, or chicken with 1 teaspoon of margarine
1 piece of melba toast
1 cup of salad with diet dressing
1 cup cooked vegetables
1 cup fresh fruit or ½ cup jello

Anytime drinks

Coffee or tea, with milk and sugar substitute
Diet soda
Tomato juice
Skim milk

Food Between Meals

Raw vegetables
Dill pickles
Diet gelatin
Mushrooms

Condiments

Mustard Catsup
Relish Horseradish
Onions Herbs
Spices Soy sauces

Fig. 23-1. The basic diet sample run.

THE DIET

A 1100 calorie diet is provided to help you lose weight. See table 23-1 for the diet. A list of calorie and protein values for some of the more common foods is given in Table 23-2. Before following the diet, consult your physician for the go-ahead.

EXERCISE

Set up a plan of exercise. Daily running, walking, or bicycling will help burn off some of those unused calories; and it's good for you.

THE PROGRAM

The program is written in BASIC, and is compatible with most systems. It calculates an adult's weight, above the age of 25, using his or her height and sex. It also calculates a daily calorie value, for maintaining the proper weight. You may find that the calculated weight is less than expected. But this lower weight is healthier for you, unless your doctor says otherwise.

Table 23-2. Food Calorie List With Protein Values

	Portion	Calories	Protein (grams)
Meat, Fish, Eggs			
Meat, fish, poultry	3 oz cooked	245	23
Hot dog	1 medium	155	6
Ham	1 oz	80	6
Tuna	2 oz	115	16
Bacon	2 slices	100	5
Eggs	1 medium	80	6
Dairy			
Milk, whole	8 oz	160	9
Milk, skim	8 oz	90	9
Milk, chocolate	8 oz	190	9
Cheese, American or Swiss	1 oz	110	8
Cheese Food	1 oz	90	6
Cottage cheese	1 oz	30	4
Butter	1 tablespoon	100	-
Cream, light	2 tablespoons	60	1
Half-and-half	¼ cup	80	2
Ice cream, vanilla	½ cup	145	3
Main Dishes			
Spaghetti, Italian	1 cup, with cheese	260	9
Macaroni and cheese	¾ cup	350	14
Meat and vegetable stew	¾ cup	160	12
Bread			
Bread	1 slice	60	2
Biscuit	1 medium	140	3
Crackers	2 medium	35	1
Rye wafers	2 small	45	2

Table 23-2-cont

	Portion	Calories	Protein (grams)
Vegetables			
Green beans	4 oz cooked	15	1
Carrots	4 oz cooked	20	2
Green leafy	4 oz cooked	20	2
Peas	4 oz cooked	60	5
Corn	4 oz cooked	85	3
Potatoes	1 medium, cooked	80	2
Tossed salad	¾ cup, without dressing	30	2
Salad dressing	1 tablespoon	75	-
Fruits			
Orange	1	60	1
Melon	½	60	1
Peach	1	35	1
Strawberries	8 oz	55	1
Apple	1	70	-
Avocado	¼	90	1
Cooked fruits, lightly sweetened	4 oz	100	1
Fruit juice	4 oz	50	1
Cookies, Cakes, Candy			
Cookies, plain	2 small	120	1
Cupcakes, iced	1 medium	185	2
Brownies	1-2" x 2" x ¼"	140	2
Doughnut	1 medium	125	1
Cake, iced	medium piece	370	4
Cake, sponge	medium piece	115	3
Candy bar, chocolate	¾ oz	130	2
Fudge	1" square	100	-
Marshmallows	1 average	25	-
Snacks			
Nuts, roasted	30 peanuts	165	6
Potato chips	10 medium	115	1
Popcorn, lightly buttered	½ cup	35	-
Pizza	1 medium piece	185	7
Hamburger and bun	1 medium	300	17
Hot dog and bun	1 medium	270	9
Drinks			
Milkshake, 5 oz milk, 2 scoops ice cream	1 medium	340	8
Malted milkshake	1 medium	300	13
Cocoa, with milk	1 cup	175	7
Eggnog	8 oz	290	15
Soda, cola	8 oz	95	-
Lemonade	10 oz	130	-
Beer, Wine, Liquor			
Beer	8 oz	114	-
Wine, red	4 oz	85	-
Gin, whisky, rum, vodka	1 ½ oz	107	-
Miscellaneous			
Jelly, honey, syrup	1 tablespoon	60	-
Chocolate sauce	2 tablespoons	90	1
Sugar, granulated	1 tablespoon	45	-

Program 23-1. The Basic Diet Program Listing

```
100 PRINT CHR$(125);"THE BASIC DIET"
110 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
120 PRINT
130 PRINT "THIS PROGRAM CALCULATES YOUR PROPER  WEIGHT"
140 PRINT "(WITHIN 5%) TO DETERMINE IF YOU HAVE A"
150 PRINT "POTENTIAL WEIGHT PROBLEM."
160 PRINT "IT THEN PRINTS THE NUMBER OF LBS YOU  ARE"
170 PRINT "REQUIRED TO LOSE TO ATTAIN YOUR GOAL, AND"
180 PRINT "A WEIGHT LOSS TABLE WITH YOUR DESIRED"
190 PRINT "WEEKLY WEIGHT LOSS. FINALLY, A DAILY  CALORIE"
200 PRINT "REQUIREMENT IS GIVEN TO HELP IN MAINTAINING"
210 PRINT "YOUR PROPER WEIGHT."
220 PRINT
230 PRINT "ENTER A '1' TO CONTINUE"
240 INPUT A
250 PRINT
260 PRINT "ENTER CURRENT WEIGHT (LBS)"
270 INPUT W
280 PRINT "ENTER HEIGHT (FT,IN)"
290 INPUT F,I
300 IF F<4 THEN 280
310 IF F>7 THEN 280
320 PRINT "ENTER SEX  1=MALE  2=FEMALE"
330 INPUT S
340 PRINT
350 REM CALCULATE WEIGHT
360 GOSUB 750
370 IF W2=W THEN 1050
380 W4=W-W2
390 IF W<W2 THEN 850
400 GOSUB 960
410 PRINT
420 GOSUB 930
430 PRINT "YOUR WEIGHT LOSS GOAL IS ";W4;" LBS"
440 PRINT
450 PRINT "ENTER DESIRED WEEKLY WEIGHT LOSS-LBS"
460 INPUT A:PRINT CHR$(125)
470 N=1
480 PRINT
490 POSITION 10,1:PRINT "WEIGHT LOSS TABLE"
500 PRINT
510 PRINT "CURRENT WEIGHT= ";W;" LBS"
520 PRINT "WEEK #","WEIGHT","TOTAL LOSS (LBS)"
530 V=A
540 W6=W
550 Y=W4/A
560 IF Y>INT(Y) THEN Y=Y+1
570 FOR M=1 TO Y
580 IF (W6-A)<W2 THEN 1100
590 PRINT N,W6-A,V
600 V=V+A
610 W6=W6-A
620 N=N+1
```

Program 23-1-cont. The Basic Diet Program Listing

```
630 FOR Q=1 TO 600
640 NEXT Q
650 NEXT M
660 PRINT
670 PRINT "YOU HAVE ";N-1;" WEEKS TO REACH ";W2;" LBS"
680 REM CALCULATE DAILY CALORIES
690 GOSUB 980
700 PRINT "AFTER REACHING YOUR GOAL, YOU SHOULD"
710 PRINT "MAINTAIN YOUR WEIGHT WITH ";Z:PRINT "CALORIES"
720 PRINT "PER DAY (WITHIN 10%). "
730 PRINT
740 END
750 REM CALCULATE WEIGHT FROM HEIGHT
760 I1=F*12
770 I2=I1+I
780 IF S=1 THEN 820
790 REM FEMALE WEIGHT
800 W2=95+((I2-59)*5)
810 RETURN
820 REM MALE WEIGHT
830 W2=110+((I2-60)*5)
840 RETURN
850 GOSUB 960
860 REM UNDERWEIGHT MESSAGE
870 PRINT
880 GOSUB 930
890 PRINT "YOU ARE UNDERWEIGHT BY ";W2-W;" LBS"
900 PRINT
910 GOSUB 980
920 GOTO 700
930 REM LIST WEIGHT GOAL
940 PRINT "YOUR PROPER WEIGHT SHOULD BE ";W2;" LBS"
950 RETURN
960 PRINT "YOUR CURRENT WEIGHT IS ";W;" LBS"
970 RETURN
980 IF S=1 THEN 1020
990 U=(W2-90)/5
1000 Z=1150+U*50
1010 RETURN
1020 X=(W2-100)/5
1030 Z=1400+X*50
1040 RETURN
1050 PRINT "YOU ARE AT THE PROPER WEIGHT OF ";W;" LBS"
1060 PRINT "NO WEIGHT LOSS IS REQUIRED"
1070 PRINT
1080 GOSUB 980
1090 GOTO 700
1100 A=W6-W2
1110 PRINT N,W2,W4
1120 GOTO 620
```

CHAPTER 24

Medical Expense Record

This program is used to display your medical expenses, with expense type, cost, and cumulative total. It's written in BASIC for your microcomputer. It should also run without modifications in most home computer BASICs. See Program 24-1 for the program listing.

expense and the cost, until all your yearly medical expenses are entered. The last DATA statement must be DATA END.

After you run the program, enter the year of the record. Then enter a 1 to display your medical expense record. See Fig. 24-1 for a sample run.

THE PROGRAM

The data is entered using DATA statements beginning with program line 1000. Enter the type of

```
MEDICAL EXPENSE RECORD
COPYRIGHT (C) 1980 BY HOWARD BERENBON

USE THIS PROGRAM TO DISPLAY A RECORD OF YOUR
YEARLY MEDICAL EXPENSES.

ENTER THE TOTAL YEARLY EXPENSE DATA IN DATA STATEMENTS,
BEGINNING AT LINE 1000. ENTER IN THE FOLLOWING FORMAT:
1000 DATA DENTAL APP.,63,EYE EXAM,45,PHYSICAL,79
      (EXPENSE TYPE),(COST)
THE LAST DATA STATEMENT MUST READ, DATA END. SOME BASICS
REQUIRE QUOTES AROUND STRINGS IN DATA STATEMENTS,
ADD THEM WHERE REQUIRED.

ENTER YEAR OF RECORD
? 1980

ENTER '1' TO BEGIN
?

1
MEDICAL EXPENSE RECORD
YEAR 1980
NUMBER      EXPENSE TYPE      COST      CUM. TOTAL
1           EYE EXAM          45         45
2           DENTAL APP.       63         108
3           PHYSICAL          79         187
4           DENTAL APP.       25         212
5           EMERGENCY         12.5       224.5
6           DERMATOLOGIST      15         239.5
7           BLOOD TEST        15         254.5
8           THROAT EXAM       15         269.5
9           DERMATOLOGIST      10.5       280
TOTAL MEDICAL EXPENSE FOR YEAR 1980 IS $ 280
```

Fig. 24-1. Medical expense record sample run.

Program 24-1. Medical Expense Record Program Listing

```
100 DIM M$(20):PRINT CHR$(125);"MEDICAL EXPENSE RECORD: ATARI"  
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"  
120 PRINT  
130 PRINT "USE THIS PROGRAM TO DISPLAY A RECORD OF YOUR"  
140 PRINT "YEARLY MEDICAL EXPENSES."  
150 PRINT  
160 PRINT "ENTER THE TOTAL YEARLY EXPENSE DATA IN DATA STATEMENTS,  
"  
170 PRINT "BEGINNING AT LINE 1000. ENTER IN THE FOLLOWING FORMAT:  
"  
180 PRINT "1000 DATA DENTAL APP.,63,EYE EXAM,45,PHYSICAL,79"  
190 PRINT "      (EXPENSE TYPE),(COST)"  
200 PRINT "THE LAST DATA STATEMENT MUST READ,      DATA END. SOME BA  
SICS"  
210 PRINT "REQUIRE QUOTES AROUND STRINGS IN DATA STATEMENTS,"  
220 PRINT "ADD THEN WHERE REQUIRED."  
230 PRINT  
240 PRINT "ENTER YEAR OF RECORD"  
250 INPUT A  
260 PRINT  
270 PRINT "ENTER '1' TO BEGIN"  
280 INPUT B:PRINT CHR$(125)  
290 PRINT "MEDICAL EXPENSE RECORD"  
300 PRINT "YEAR ";A  
310 PRINT  
320 N=1:Z=6  
330 M1=0  
340 PRINT "NUM. EXPENSE TYPE      COST      CUM. TOT"  
350 PRINT  
360 READ M$  
370 IF M$="END" THEN 470  
380 READ M  
390 M1=M+M1  
400 POSITION 2,Z:PRINT N:POSITION 7,Z:PRINT M$  
405 POSITION 24,Z:PRINT M:POSITION 32,Z:PRINT M1  
410 GOSUB 440  
420 N=N+1:Z=Z+1:IF Z=23 THEN Z=6:PRINT CHR$(125)  
430 GOTO 360  
440 FOR C=1 TO 496  
450 NEXT C  
460 RETURN  
470 PRINT  
480 PRINT "TOTAL MEDICAL EXPENSE FOR YEAR ";A;"      IS $";M1  
490 END  
900 REM ENTER MEDICAL EXPENSE DATA IN DATA STATEMENTS BEGINNING  
910 REM WITH LINE 1000. FIRST ENTER THE TYPE OF EXPENSE THEN  
920 REM THE COST. ALTERNATE BETWEEN TYPE AND COST UNTIL YOU  
930 REM HAVE ENTERED ALL YOUR EXPENSES. THE LAST DATA  
940 REM STATEMENT MUST READ, DATA END  
1000 DATA EYE EXAM,45,DENTAL APP.,63,PHYSICAL,79  
1010 DATA DENTAL APP.,25,EMERGENCY,12.50,DERMATOLOGIST,15  
1020 DATA BLOOD TEST,15,THROAT EXAM,15,DERMATOLOGIST,10.50  
1030 DATA END
```


Electric Energy Usage

Conservation is the key to reducing our energy consumption and costs, with the rising price and pending shortages of all types of energy. You can help out by using the electric energy usage program. It will indicate differences in electric 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, but it will run in most home computer BASICs without modification. See Program 25-1 for the program listing.

THE PROGRAM

The program requires that your yearly electric usage data be 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 12 months of electric usage units, beginning with January of that year. Program line 1010 holds the data for the "recent" year. Example:

```
1000 DATA 1977,400,300,425,355,275,290,320,
        425,350,455,470,525
1010 DATA 1980,450,320,478,350,325,310,340,
        490,450,500,510,600
```

The "base" year can be any past year; possibly the year you moved into your house or apartment, or even the previous year. The "recent" year would be a full year's data for recent energy consumption. See Fig. 25-1 for a sample RUN.

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

ANALYSIS

If there's a significant monthly increase in electric usage, pay close attention to those months. You may be using more energy than necessary. Check your insulation for possible air leaks. This can cause your furnace or air conditioner to work overtime and use more electricity than necessary.

Other increases may be due to neglect. Make sure that lights and electrical appliances are shut off when not needed. Alternately, you may have an appliance that is defective, and using more electricity than it should. Check that your appliances are in proper working order.

BASE YEAR 1977		AV/MO=	382.5
TOTAL UNITS= 4590			
MONTH	UNITS	% TOTAL	
1	400	8.71	
2	300	6.53	
3	425	9.25	
4	355	7.73.	
5	275	5.99	
6	290	6.31	
7	320	6.97	
8	425	9.25	
9	350	7.62	
10	455	9.91	
11	470	10.23	
12	525	11.43	
ENTER '1' FOR COMPARISON?			

RECENT YEAR 1980		AV/MO=	426.917
TOTAL UNITS= 5123		RECENT-BASE=	533
MO.	UNITS	% TOTAL	+ OR - FROM BASE
1	450	8.78	50
2	320	6.24	20
3	478	9.33	53
4	350	6.83	-5
5	325	6.34	50
6	310	6.05	20
7	340	6.63	20
8	490	9.56	65
9	450	8.78	100
10	500	9.75	45
11	510	9.95	40
12	600	11.71	75

Fig. 25-1. Electric energy usage sample run.

Program 25-1. Electric Energy Usage Program Listing

```
100 DIM A(50)
110 PRINT CHR$(125);"ELECTRIC ENERGY USAGE"
120 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
130 PRINT
140 PRINT "THIS PROGRAM WILL COMPARE AND DISPLAY"
150 PRINT "A 'BASE' YEAR AND 'RECENT' YEAR ELECTRIC"
160 PRINT "ENERGY USAGE, IN UNITS."
170 PRINT
180 PRINT "ENTER THE 'BASE' YEAR DATA AT LINE      1000,"
190 PRINT "AND THE 'RECENT' YEAR DATA AT LINE      1010."
200 PRINT
210 PRINT "ENTER A '1' TO DISPLAY"
220 PRINT "THE 'BASE' YEAR DATA"
230 INPUT A:PRINT CHR$(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
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 -FROM 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 GOTO 530
980 REM ENTER 'BASE' YEAR ELECTRIC DATA IN LINE 1000
990 REM ENTER 'RECENT' YEAR ELECTRIC DATA IN LINE 1010
1000 DATA 1977,400,300,425,355,275,290,320,425,350,455,470,525
1010 DATA 1980,450,320,478,350,325,310,340,490,450,500,510,600
```

CHAPTER 26

Gas Mileage Calculator

A good way of checking the performance of your car engine is to periodically test its gas mileage. This program can help you out. It's written in BASIC for your microcomputer, but will run in most home computer BASICs. See Program 26-1 for the program listing.

THE PROGRAM

The program begins by accepting the EPA mileage value. If your engine has two values listed (for city and highway), then take an average before entering the value. This data will be used in determining the performance of your engine.

Next, enter the data for calculating mileage. Enter the odometer reading taken before filling your gas tank. Then, enter the mileage reading taken after the next fill up, and the number of gallons required for the fill up.

The program displays the mileage, from the data entered, and checks to see if your engine is meeting the EPA mileage value (within 10%). It will recommend a tune-up, if your mileage is 10% below the EPA value. See Fig. 26-1 for a sample run.

```
RUN
GAS MILEAGE CALCULATOR
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM CALCULATES GAS MILEAGE,
AND CHECKS YOUR ENGINES PERFORMANCE

ENTER THE EPA MILEAGE VALUE
? 19

ENTER ODOMETER MILEAGE BEFORE FILLING TANK
? 27059

ENTER ODOMETER MILEAGE AFTER NEXT FILL UP
? 27270

ENTER NO. OF GALLONS OF GAS REQUIRED FOR FILL UP
? 13

MILEAGE= 16.2308 MILES PER GALLON
THE EPA MILEAGE VALUE= 19

YOUR CAR ENGINE IS PERFORMING BELOW THE
EPA VALUE BY 2.76923 MILES PER GALLON.
HAVE YOUR ENGINE CHECKED.
IT MAY BE IN NEED OF A TUNE-UP.
```

Fig. 26-1. Gas mileage calculator sample run.

Program 26-1. Gas Mileage Calculator Program Listing

```
100 PRINT CHR$(125);"GAS MILEAGE CALCULATOR"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT
130 PRINT "THIS PROGRAM CALCULATES GAS MILEAGE,"
140 PRINT "AND CHECKS YOUR ENGINES PERFORMANCE"
150 PRINT
160 PRINT "ENTER THE EPA MILEAGE VALUE"
170 INPUT E
180 PRINT
190 PRINT "ENTER ODOMETER MILEAGE BEFORE FILLING TANK"
200 INPUT M
210 PRINT
220 PRINT "ENTER ODOMETER MILEAGE AFTER NEXT FILL UP"
230 INPUT M1
240 PRINT
250 PRINT "ENTER NO. OF GALLONS OF GAS REQUIRED FOR FILL UP"
260 INPUT G
270 REM CALCULATE MILEAGE, AND CHECK PERFORMANCE
280  $S = (M1 - M) / G$ 
290  $T = 0.9 * E$ 
300 PRINT
310 PRINT "MILEAGE=";S;" MILES PER GALLON"
320 PRINT "THE EPA MILEAGE VALUE=";E
330 PRINT
340 IF S<T THEN 390
350 PRINT "YOUR MILEAGE IS CONSISTENT WITH THE"
360 PRINT "EPA VALUE (WITHIN 10%). YOUR CAR"
370 PRINT "ENGINE SHOULD BE PERFORMING WELL."
380 END
390 PRINT
400 PRINT "YOUR CAR ENGINE IS PERFORMING BELOW THE"
410 PRINT "EPA VALUE BY ";E-S;" MILES PER"
420 PRINT "GALLON. HAVE YOUR ENGINE CHECKED."
430 PRINT "IT MAY BE IN NEED OF A TUNE-UP."
440 GOTO 380
```

CHAPTER 27

Message Taker

The Message Taker is a program that accepts 6 messages to be displayed by your home computer. It's written in BASIC for your microcomputer. See Program 27-1 for the program listing.

THE PROGRAM

The program begins by displaying the commands. Enter an L to access the message list, or an E to enter a message.

Message Entry Mode

In the message entry mode you can enter 1 or all 6 messages. Enter the number of the message that you wish to enter or change. If there is an existing message under that message number, then the com-

puter will indicate it. Then enter "whom the message is from" and "whom the message is directed to." Finally, enter the message from the keyboard. When entering, do not use the comma (,) or colon (:) otherwise errors will result. The program will accept a 113 character entry per message.

Message Access Mode

In the message access mode, a list of the 6 messages will be displayed. A '0' after the message number indicates empty and a '1' indicates full. Each message number includes "whom the message is from" and "whom the message is directed to." Enter the message number to display the message. See Fig. 27-1 for a sample run.

```
RUN
MESSAGE TAKER
COPYRIGHT (C) 1980 BY HOWARD BERENSON

THIS PROGRAM ACCEPTS 6 MESSAGES AS DATA
STRINGS AND DISPLAYS EACH ON COMMAND.

COMMANDS:

ENTER 'L' TO DISPLAY A MESSAGE
ENTER 'E' TO ENTER/CHANGE A MESSAGE
? E

MESSAGE ENTRY MODE: ENTER/CHANGE

ENTER MESSAGE # (1-6)
ENTER '7' TO RETURN TO 'COMMAND'

? 1

MESSAGE # 1
MESSAGE 'FROM' (NAME)?
? RICK

MESSAGE 'TO' (NAME)?
? DAVID
```

Fig. 27-1. Message taker sample run.

```

MESSAGE # 1
ENTER MESSAGE (LIMIT TO 250 CHARACTERS)

? DAVID I STOPPED BY EARLIER BUT YOU WEREN'T HOME. I'LL SEE YOU
  LATER FOR A 'GO' GAME. RICK . . . .

MESSAGE ENTRY MODE: ENTER/CHANGE

ENTER MESSAGE # (1-6)
ENTER '7' TO RETURN TO 'COMMAND'

? 2

MESSAGE # 2
MESSAGE 'FROM' (NAME)?
? HOWARD

MESSAGE 'TO' (NAME)?
? DAVID

MESSAGE # 2
ENTER MESSAGE (LIMIT TO 250 CHARACTERS)

? DAVID I'LL BE A LITTLE LATE TONIGHT. WILL YOU CALL RICK AND
  BRUCE TO REMIND THEM OF THE 'DUNGEONS AND DRAGONS' GAME CALLED
  FOR TONIGHT? I'VE ALREADY TALKED TO HARRY. THANKS . . . . .

MESSAGE ACCESS MODE: LIST
(0 INDICATES EMPTY)

#           FROM           TO
1  =  1      RICK          DAVID
2  =  1      HOWARD        DAVID
3  =  0
4  =  0
5  =  0
6  =  0

ENTER # (1-6) TO DISPLAY MESSAGE
ENTER A '7' TO RETURN TO 'COMMAND'

? 1

MESSAGE # 1
FROM: RICK      TO: DAVID

DAVID I STOPPED BY EARLIER BUT YOU WEREN'T HOME. I'LL SEE YOU
  LATER FOR A 'GO' GAME. RICK . . . .

ENTER # (1-6) TO DISPLAY MESSAGE
ENTER A '7' TO RETURN TO 'COMMAND'

? 2

```

Fig. 27-1-cont. Message taker sample run.

Program 27-1. Message Taker Program Listing

```
100 PRINT CHR$(125);"MESSAGE TAKER: ATARI":CLR
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT
130 PRINT "THIS PROGRAM ACCEPTS 6 MESSAGES AS DATA"
140 PRINT "STRINGS AND DISPLAYS EACH ON COMMAND."
150 A=113:B=30:REM DIMENSION ARRAYS
160 DIM A$(1),Z(10),M1$(A),T1$(B),F1$(B),M2$(A),T2$(B),F2$(B)
165 DIM M3$(A),T3$(B),F3$(B),M4$(A),T4$(B),F4$(B)
170 DIM M5$(A),T5$(B),F5$(B),M6$(A),T6$(B),F6$(B)
175 FOR C=1 TO 10:Z(C)=0:NEXT C
180 PRINT :PRINT "COMMANDS:"
190 PRINT
200 PRINT "ENTER 'L' TO DISPLAY A MESSAGE"
210 PRINT "ENTER 'E' TO ENTER/CHANGE A MESSAGE"
220 INPUT A$
230 IF A$="L" THEN 260
240 IF A$="E" THEN 460
250 GOTO 180
260 PRINT CHR$(125)
270 PRINT "MESSAGE ACCESS MODE: LIST"
280 PRINT "('0' INDICATES EMPTY-'1' FULL)"
290 PRINT
300 PRINT "#","FROM","TO"
310 PRINT
320 FOR A=1 TO 6
330 PRINT A;" = ";Z(A);" ";
335 ON A GOSUB 850,860,870,880,890,900
340 G=A+5:POSITION 22,G
345 ON A GOSUB 910,920,930,940,950,960
350 NEXT A
360 PRINT :PRINT "ENTER # (1-6) TO DISPLAY MESSAGE"
370 PRINT "ENTER A '7' TO RETURN TO 'COMMAND'"
380 PRINT
390 INPUT Z
400 IF Z=0 THEN 360
410 IF Z>6 THEN 180
420 GOSUB 780
430 PRINT
440 ON Z GOSUB 970,980,990,1000,1010,1020
450 GOTO 360
460 PRINT CHR$(125)
470 PRINT "MESSAGE ENTRY MODE: ENTER/CHANGE"
480 PRINT
490 PRINT "ENTER MESSAGE # (1-6)"
500 PRINT "ENTER '7' TO RETURN TO 'COMMAND'"
510 PRINT
520 INPUT Z
530 IF Z(Z)=0 THEN 610
540 PRINT "MESSAGE #";Z;" IS FILLED"
550 PRINT
560 PRINT "DO YOU WISH TO CHANGE MESSAGE #";Z
570 PRINT "ENTER '1' YES OR '0' NO"
```

Program 27-1-cont. Message Taker Program Listing

```
580 INPUT C
590 IF C=1 THEN 610
600 GOTO 460
610 IF Z=0 THEN 460
620 IF Z>6 THEN 180
630 PRINT CHR$(125)
640 PRINT
650 PRINT "MESSAGE # ";Z:PRINT
660 PRINT "MESSAGE 'FROM' (NAME)?"
670 ON Z GOSUB 1030,1040,1050,1060,1070,1030
680 PRINT
690 PRINT "MESSAGE 'TO' (NAME)?"
700 ON Z GOSUB 1090,1100,1110,1120,1130,1140
710 PRINT CHR$(125)
720 PRINT "MESSAGE #";Z
730 PRINT "ENTER MESSAGE (LIMIT - 113 CHARACTERS)"
740 PRINT
750 ON Z GOSUB 1150,1160,1170,1180,1190,1200
760 Z(Z)=1
770 GOTO 460
780 PRINT CHR$(125)
790 PRINT "MESSAGE # ";Z
800 PRINT :PRINT "FROM: ";
810 ON Z GOSUB 850,860,870,880,890,900
820 POSITION 20,3:PRINT "TO: ";
830 ON Z GOSUB 910,920,930,940,950,960
840 PRINT :RETURN
850 PRINT F1$:RETURN
860 PRINT F2$:RETURN
870 PRINT F3$:RETURN
880 PRINT F4$:RETURN
890 PRINT F5$:RETURN
900 PRINT F6$:RETURN
910 PRINT T1$:RETURN
920 PRINT T2$:RETURN
930 PRINT T3$:RETURN
940 PRINT T4$:RETURN
950 PRINT T5$:RETURN
960 PRINT T6$:RETURN
970 PRINT M1$:RETURN
980 PRINT M2$:RETURN
990 PRINT M3$:RETURN
1000 PRINT M4$:RETURN
1010 PRINT M5$:RETURN
1020 PRINT M6$:RETURN
1030 INPUT F1$:RETURN
1040 INPUT F2$:RETURN
1050 INPUT F3$:RETURN
1060 INPUT F4$:RETURN
1070 INPUT F5$:RETURN
1080 INPUT F6$:RETURN
1090 INPUT T1$:RETURN
1100 INPUT T2$:RETURN
```


Program 27-1-cont. Message Taker Program Listing

```
1110 INPUT T3$:RETURN
1120 INPUT T4$:RETURN
1130 INPUT T5$:RETURN
1140 INPUT T6$:RETURN
1150 INPUT M1$:RETURN
1160 INPUT M2$:RETURN
1170 INPUT M3$:RETURN
1180 INPUT M4$:RETURN
1190 INPUT M5$:RETURN
1200 INPUT M6$:RETURN
```

the program, and the program's impact on the students' learning and development.

The program's impact on the students' learning and development was measured using a variety of methods, including:

• Pre- and post-program surveys of student attitudes and beliefs.

• Student self-reports of learning and development.

• Student self-reports of career and life goals.

• Student self-reports of academic achievement.

• Student self-reports of social and emotional development.

• Student self-reports of leadership skills.

• Student self-reports of civic engagement.

• Student self-reports of community service.

• Student self-reports of volunteerism.

• Student self-reports of social responsibility.

• Student self-reports of ethical behavior.

• Student self-reports of environmental stewardship.

• Student self-reports of global citizenship.

• Student self-reports of social justice.

• Student self-reports of human rights.

• Student self-reports of peace and conflict resolution.

• Student self-reports of non-violence.

• Student self-reports of social change.

• Student self-reports of social activism.

• Student self-reports of social entrepreneurship.

• Student self-reports of social innovation.

• Student self-reports of social impact.

• Student self-reports of social responsibility.

• Student self-reports of social justice.

• Student self-reports of human rights.

• Student self-reports of peace and conflict resolution.

• Student self-reports of non-violence.

• Student self-reports of social change.

• Student self-reports of social activism.

• Student self-reports of social entrepreneurship.

• Student self-reports of social innovation.

• Student self-reports of social impact.

SECTION V

Utilities

This section includes programming techniques for BASIC time delays and random number generation; a hex to decimal and decimal to hex conversion program; and a digital dice program.

CHAPTER 28

BASIC Time Delays

Most of the programs described in Section I of this book use BASIC time delays to slow the computer from the world of microseconds to the world of seconds. This may be done in BASIC using the FOR-NEXT loop. The following is a FOR-NEXT loop that may be used to create any length delay:

```
1000 FOR A = 1 TO X
1010 NEXT A
```

where X is the number of times the computer runs through the loop, for the required delay.

The value of X is dependent upon the speed of the BASIC and the required delay length.

1 SECOND DELAY

A 1 second delay requires $X = 443$. For a delay longer than 1 second, multiply X by the number of seconds required in the delay.

MILLISECOND DELAY

The 1 second delay program can be changed for shorter delay lengths. Divide X by 1000 and multiply by the required number of milliseconds for a millisecond delay. Let M equal the number of milliseconds. The following subroutine will create a 100 millisecond delay:

```
1000 M = 100
1010 FOR A = 1 TO X/1000 * M
1020 NEXT A
1030 RETURN
```

where X is the number of loops the BASIC requires for a delay of 1 second.

Generating Random Numbers

Random number generation is required for programming games and simulations. It's fairly straightforward to program random numbers in BASIC, using the RND statement. Here are some examples for generating random numbers.

It's easy to program random number generation with your microcomputer. All that's required is using the following statement:

$$X = \text{INT}(\text{RND}(0) * Y + 1)$$

where Y is the largest random number required, and X is the number generated each time the statement is used. To generate random numbers from 1 to 52,

for a 52 card shuffle and draw, see Program 29-1 for the program listing. All card numbers are displayed as they appear in array B. Program line 1070 is used to generate the random numbers. Each time a number is generated the array A is checked to see if the number has already been chosen. If not, then the number is stored in array B. This continues until all 52 cards are drawn. Finally, lines 1120 through 1140 display the card numbers in the order that they were drawn. The program may be used as a subroutine when designing card games.

A sample run for the 52 card shuffle and draw program is seen in Fig. 29-1.

```

RUN
8  33  18  28  51  43  7  10  52  3  16  46  21  45  5  31  20
2  38  29  32  36  26  15  14  47  25  4  23  11  13  42  6
39 48  22  17  12  37  44  19  30  41  35  24  34  50  49  9
40 27  1

```

Fig. 29-1. The 52 card shuffle and draw sample run.

Program 29-1. Card Shuffle and Draw Program Listing

```
1000 REM ATARI 52 CARD SHUFFLE AND DRAW
1020 DIM A(53),B(53)
1030 FOR X=1 TO 52
1040 A(X)=X
1050 NEXT X
1060 FOR Y=1 TO 52
1070 X=INT(RND(0)*52+1)
1080 IF A(X)=0 THEN 1070
1090 A(X)=0
1100 B(Y)=X
1110 NEXT Y
1120 FOR A=1 TO 52
1130 PRINT B(A);" ";
1140 NEXT A
1150 END
```

CHAPTER 30

Hex to Decimal and Decimal to Hex Conversions

Here's a base conversion program for your microcomputer. It's written in BASIC, and will run in any system with 4K BASIC or higher. The program converts a hex number (base 16) to decimal (base 10), and decimal to hex. See Program 30-1 for the program listing.

In the decimal to hex mode, you can enter any decimal number up to 65535 (that's hex FFFF). Its hex equivalent will be displayed.

In the hex to decimal mode, you must enter the hex number in the following format, with commas between the numbers, in the following format:

enter 3,5,15,13 if the hex number is 35FD

The numbers 10, 11, 12, 13, 14, and 15 are entered in place of the letters A, B, C, D, E, and F, respectively. Then its decimal equivalent will be displayed. See Fig. 30-1 for a sample run.

```
RUN
HEX TO DECIMAL AND DECIMAL TO HEX CONVERSIONS
COPYRIGHT (C) 1980 BY HOWARD BERENSON

CONVERSIONS
ENTER '1' FOR HEX TO DECIMAL
      '2' FOR DECIMAL TO HEX
? 1

ENTER HEX # UP TO (FFFF) 15,15,15,15
ENTER 0-9, AND A-F:
A=10 B=11 C=12 D=13 E=14 F=15
EXAMPLE: A41F IS ENTERED AS: 10,4,1,15

? 15,14,13,12
HEX FEDC = 65244 DECIMAL

CONVERSIONS
ENTER '1' FOR HEX TO DECIMAL
      '2' FOR DECIMAL TO HEX
? 2

ENTER DECIMAL # UP TO 65535

? 65244
DECIMAL 65244 = FEDC HEX

CONVERSIONS
ENTER '1' FOR HEX TO DECIMAL
      '2' FOR DECIMAL TO HEX
?
```

Fig. 30-1. Hex to decimal and decimal to hex sample run.

Program 30-1. Hex to Decimal and Decimal to Hex Program Listing

```
100 PRINT CHR$(125);"HEX TO DECIMAL AND DECIMAL TO HEX      CONVERS
IONS"
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"
120 PRINT
130 PRINT
140 PRINT "CONVERSIONS"
150 PRINT "ENTER '1' FOR HEX TO DECIMAL"
160 PRINT "      '2' FOR DECIMAL TO HEX"
170 INPUT A
180 IF A=1 THEN 220
190 IF A=2 THEN 860
200 GOTO 130
210 PRINT
220 PRINT CHR$(125);"ENTER HEX # UP TO (FFFF) 15,15,15,15"
230 PRINT "ENTER 0-9, AND A-F:"
240 PRINT "A=10 B=11 C=12 D=13 E=14 F=15"
250 PRINT "EXAMPLE: A41F IS ENTERED AS 10,4,1,15"
260 PRINT
270 INPUT C,D,E,F
280 IF C>15 THEN 220
290 IF D>15 THEN 220
300 IF E>15 THEN 220
310 IF F>15 THEN 220
320 G=F*1
330 H=E*16
340 I=D*(16*16)
350 J=C*(16*16*16)
360 K=G+H+I+J
370 X=6
380 N=C
390 POSITION 2,7:PRINT "HEX  ";
400 GOSUB 520
410 N=D
420 X=X+1
430 GOSUB 520
440 N=E
450 X=X+1
460 GOSUB 520
470 N=F
480 X=X+1
490 GOSUB 520
500 POSITION X+2,7:PRINT " = ";K;" DECIMAL"
510 GOTO 130
520 POSITION X+1,7:IF N=0 THEN 540
530 ON N GOTO 560,580,600,620,640,660,680,700,720,740,760,780,800,
820,840
540 PRINT "0";
550 RETURN
560 PRINT "1";
570 RETURN
580 PRINT "2";
590 RETURN
600 PRINT "3";
```

Program 30-1-cont. Hex to Decimal and Decimal to Hex Program Listing

```
610 RETURN
620 PRINT "4";
630 RETURN
640 PRINT "4"
650 RETURN
660 PRINT "6";
670 RETURN
680 PRINT "7";
690 RETURN
700 PRINT "8";
710 RETURN
720 PRINT "9";
730 RETURN
740 PRINT "A";
750 RETURN
760 PRINT "B";
770 RETURN
780 PRINT "C";
790 RETURN
800 PRINT "D";
810 RETURN
820 PRINT "E";
830 RETURN
840 PRINT "F";
850 RETURN
860 PRINT CHR$(125);"ENTER DECIMAL UP TO 65535"
870 PRINT
880 INPUT A
890 IF A>65535 THEN 860
900 W=0:G=0:Y=0:Z=0
910 W=INT(A)/16
920 G=INT(W)/16
930 Y=INT(G)/16
940 Z=INT(Y)/16
950 L=W-INT(W):C=L*16
960 O=G-INT(G):D=O*16
970 P=Y-INT(Y):E=P*16
980 M=Z-INT(Z):F=M*16
990 POSITION 2,7:PRINT "DECIMAL ";A;" = ";
1000 X=19
1010 N=F
1020 GOSUB 520
1030 N=E:X=X+1
1040 GOSUB 520
1050 N=D:X=X+1
1060 GOSUB 520
1070 N=C:X=X+1
1080 GOSUB 520
1090 POSITION X+2,7:PRINT " HEX"
1100 GOTO 130
```

CHAPTER 31

Digital Dice

This program may be used as a subroutine in games. Each time it's run it generates the throw of a pair of six-sided dice. The program is written in BASIC for your microcomputer. See Program 31-1 for the program listing.

The dice are drawn using asterisks (*). See Fig. 31-1 for a sample run.

```
RUN
DIGITAL DICE:
COPYRIGHT (C) 1980 BY HOWARD BERENBON

THIS PROGRAM GENERATES A RANDOM
THROW OF THE DICE.

ENTER A '1' TO THROW THE DICE
? 1

*****
* 3 *
*****

*****
* 6 *
*****

TOTAL DICE THROW = 9

ENTER A '1' TO THROW THE DICE
?
```

Fig. 31-1. Digital dice sample run.

Program 31-1. Digital Dice Program Listing

```
100 PRINT CHR$(125);"DIGITAL DICE: ATARI"  
110 PRINT "COPYRIGHT (C) 1980 BY HOWARD BERENBON"  
120 PRINT  
130 PRINT "THIS PROGRAM GENERATES A RANDOM"  
140 PRINT "THROW OF THE DICE."  
150 PRINT  
160 PRINT "ENTER '1' TO THROW THE DICE"  
170 INPUT A  
180 IF A<>1 THEN 320  
190 GOSUB 330  
200 PRINT  
210 GRAPHICS 1:PRINT #6;"*****"  
220 PRINT #6;"* ";X:POSITION 6,1:PRINT #6;"*"  
230 PRINT #6;"*****"  
240 PRINT #6  
250 PRINT #6  
260 PRINT #6;"*****"  
270 PRINT #6;"* ";Y:POSITION 6,6:PRINT #6;"*"  
280 PRINT #6;"*****"  
290 PRINT #6  
300 PRINT #6;"TOTAL DICE THROW=";X+Y  
310 GOTO 150  
320 END  
330 FOR A=1 TO 6  
340 X=INT(RND(0)*6+1)  
350 Y=INT(RND(0)*6+1)  
360 NEXT A  
370 FOR A=1 TO 443  
380 NEXT A  
390 RETURN
```

SECTION VI

The Unusual

This section deals with the subject of fortune telling, with The Tarot Card Reader Program. Not only is it unusual, but it's the longest program in the book. It requires almost 16K to run.

CHAPTER 32

The Tarot Card Reader

Are you open to the unusual? Do you believe that there are things in life that cannot be explained, yet have a profound effect on us? The positions of the planets may affect us, as astrologers believe. The moon has a tidal effect on the oceans and seas, causing their levels to change over a period of time.

In ancient times, picture cards were used to predict the future and explain the past. These cards, called The Tarot, are still used today. In fact, the modern deck of 52 cards is based on The Tarot.

The Tarot consists of 78 cards, with pictures and symbols. There are four suits:

1. Cups
2. Wands
3. Pentacles
4. Swords

There are 14 cards per suit, plus 22 other cards called the Major Arcana. When any of the Major Arcana appear in a card layout, called a reading, their meaning has a greater influence than other cards in the reading.

The cards are numbered Ace through 10, and named Page, Knight, Queen, and King. Some of the names are different from the modern deck. It appears that the Jack has replaced the Page, and the Knight is gone from the modern deck.

THE PROGRAM

The Tarot Card Reader program is based on the ancient deck of 78 cards, used in fortune telling. It's written in BASIC for your microcomputer. See Program 32-1 for the program listing. It requires 16K to run.

Each card has two meanings, one for right side up and another for reversed. The meaning of each pic-

ture is stored in PRINT statements, beginning at line 1310. There are 156 meanings in all. Since the pictures are too detailed to draw graphically, their meanings are interpreted from the symbols and subjects, and listed briefly.

THE READING

The person who desires a prediction thinks of a question on any subject, or asks the question out loud. Ten cards are randomly selected, using the numbers from 1 through 78, and stored in the array A. If a duplicate number appears, then another card is drawn. The meanings are accessed using the ON GOSUB statements at lines 1130, 1133, 1135, 1137, 1139, and 1141.

Each card is dealt with a position meaning, as well as a face meaning. See Fig. 32-1 for the sample run. The first card drawn has the position number 1. Its position in the reading relates to the Atmosphere That Surrounds The Question. The second card drawn relates to the Opposing Forces. The meaning of each card is interpreted with its position meaning.

Enter a 1 to draw each card. If the card is reversed, this will be indicated. Read the reversed meaning, just below the right-side-up meaning. After all 10 cards are drawn, you may review the reading by entering an R. Enter a 1 to display each card. To start a new reading, enter an A. To end the program, enter an E.

ACCURACY

There is no guarantee that the readings will prove accurate. But if they appear to hold some truth, then you may be dealing with forces beyond your control, if not a coincidence.

THE TAROT CARD READER
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THE TAROT READER WILL ATTEMPT TO PREDICT YOUR
FUTURE AND DETERMINE YOUR DESTINY USING THE 78 CARD
TAROT DECK. IT IS SIMILAR TO A MODERN DAY CARD DECK
EXCEPT IT HAS 1 EXTRA CARD PER SUIT AND 22 OTHER
CARDS CALLED THE MAJOR ARCANA.
THE MAJOR ARCANA ARE SAID TO BE SUGGESTIVE OF MAGIC
AND MYSTERY, WITH CARDS LIKE 'THE TOWER' AND 'THE WHEEL
OF FORTUNE'. THEY ARE NOT RELATED TO THE MODERN DAY CARDS.
ENTER A '1' TO CONTINUE?

THE TAROT CARD READER

THE TAROT READER WILL DEAL 10 CARDS FROM
THE DECK OF 78. 1ST YOU MUST THINK OF A QUESTION
TO ASK IT. THEN YOU WILL BE ASKED TO SHUFFLE THE
DECK. THE CARDS WILL BE DEALT ONE AT A TIME.
EACH CARD HAS TWO MEANINGS, ONE FOR RIGHT-SIDE-UP
AND ANOTHER FOR REVERSED. THAT'S 156 POSSIBLE MEANINGS.
IN THE DECK, EACH CARD ALSO HAS A POSITION MEANING.
1ST THE POSITION MEANING WILL BE PRINTED, THEN THE
CARD MEANING. EVALUATE EACH CARD MEANING IN RELATION
TO YOUR QUESTION AND ITS POSITION IN THE DEAL.
ENTER A '1' TO CONTINUE?

POSITION MEANINGS

#1-ATMOSPHERE THAT SURROUNDS THE QUESTION
#2-OPPOSING FORCES
#3-BASIS OF THE MATTER
#4-INFLUENCE THAT IS JUST PASSING
#5-SOMETHING THAT MAY HAPPEN IN THE FUTURE
#6-THINGS THAT WILL COME TO PASS IN THE NEAR FUTURE
#7-NEGATIVE FEELINGS, THE QUERENT'S FEARS
#8-FAMILY OPINION
#9-HOPES AND IDEAS IN THE MATTER
#10-THE FINAL OUTCOME

THINK OF A QUESTION TO ASK
ENTER A '1' TO SHUFFLE THE CARDS?

NOW SHUFFLING

THE TAROT CARD READER

ENTER A '1' TO DRAW?

THE TAROT CARD READER
CARD # 1

#1-ATMOSPHERE THAT SURROUNDS THE QUESTION
3 OF SWORDS
TEARS, SEPARATION, QUARRELING
REVERSED-CONFUSION, LOSS, SORROW

THE TAROT CARD READER

ENTER A '1' TO DRAW?

Fig. 32-1. The Tarot card reader sample run.

THE TAROT CARD READER
CARD # 2

#2-OPPOSING FORCES

10 OF SWORDS
DISPAIR, RUIN, DEFEAT, TEARS, TROUBLE
REVERSED-SOME SUCCESS, COURAGE

THE TAROT CARD READER

ENTER A '1' TO DRAW?

THE TAROT CARD READER
CARD # 3

#3-BASIS OF THE MATTER

4 OF SWORDS
REST AFTER WAR, BANISHMENT, RELAXATION OF ANXIETY
REVERSED-RENEWED ACTIVITY, QUALIFIED SUCCESS, SOCIAL UNREST

THE TAROT CARD READER

ENTER A '1' TO DRAW?

Fig. 32-1-cont. The Tarot card reader sample run.

Program 32-1. The Tarot Card Reader Program Listing

```
100 DIM A(80),B(80),C(80),BZ$(1),V$(13)
110 DIM W$(9),X$(8),Y$(10),Z$(9):GOTO 330
120 FOR A=1 TO 78
130 C(A)=0
140 NEXT A
150 REM MIX AND DRAW CARDS
160 FOR A=1 TO 78
170 X=INT(RND(0)*78+1)
180 A(A)=X
190 IF C(A)=1 THEN 170
200 C(A)=1
210 B(A)=INT(RND(0)*2+1)
220 NEXT A
230 RETURN
330 XX=0:Q=1:PRINT CHR$(125);"THE TAROT CARD READER":PRINT "ATARI"
340 PRINT "COPYRIGHT (C) 1979 BY HOWARD BERENBON"
350 PRINT
360 Z$="REVERSED-":W$=" OF WANDS":X$=" OF CUPS"
365 Y$=" OF SWORDS":V$=" OF PENTACLES"
370 PRINT "THE TAROT CARD READER WILL ATTEMPT TO PREDICT YOUR"
380 PRINT "FUTURE AND DETERMINE YOUR DESTINY      USING THE 78 CARD"
"
390 PRINT "TAROT DECK. IT IS SIMILAR TO A MODERN DAY CARD DECK"
400 PRINT "EXCEPT IT HAS 1 EXTRA CARD PER SUIT    AND 22 OTHER"
410 PRINT "CARDS CALLED THE MAJOR ARCANA."
420 PRINT "THE MAJOR ARCANA ARE SAID TO BE SUGGESTIVE OF MAGIC"
430 PRINT "AND MYSTERY, WITH CARDS LIKE THE TOWER AND THE WHEEL"
440 PRINT "OF FORTUNE. THEY ARE NOT RELATED TO    THE MODERN DAY CA"
RDS."
450 PRINT "ENTER A '1' TO CONTINUE":INPUT C1
460 GOTO 590
470 PRINT CHR$(125)
480 PRINT "THE TAROT CARD READER"
490 REM GET A CARD
500 PRINT "CARD #";PP
510 PRINT :PRINT
520 IF XX=1 THEN 1260
530 REM CHECK FOR REVERSED
540 IF B(PP)=2 THEN 560
550 RETURN
560 PRINT Z$
570 PRINT
580 RETURN
590 PRINT CHR$(125)
600 POSITION 10,1:PRINT "THE TAROT CARD READER"
610 PRINT
620 PRINT "THE TAROT READER WILL DEAL 20 CARDS    FROM"
630 PRINT "THE DECK OF 78. 1ST YOU MUST THINK OF A QUESTION"
640 PRINT "TO ASK IT. THEN YOU WILL BE ASKED TO SHUFFLE THE"
650 PRINT "DECK. THE CARDS WILL BE DEALT ONE AT A TIME."
660 PRINT "EACH CARD HAS TWO MEANINGS, ONE FOR RIGHT-SIDE-UP"
670 PRINT "AND ANOTHER FOR REVERSED. THAT'S 156    POSSIBLE MEANINGS"
"
```

Program 32-1-cont. The Tarot Card Reader Program Listing

```
680 PRINT "IN THE DECK, EACH CARD ALSO HAS A      POSITION MEANING.
690 PRINT "1ST THE POSITION MEANING WILL BE      PRINTED, THEN THE
"
700 PRINT "CARD MEANING. EVALUATE EACH CARD MEAN-ING IN RELATION"
710 PRINT "TO YOUR QUESTION AND ITS POSITION IN  THE DEAL."
720 PRINT "ENTER A '1' TO CONTINUE":INPUT C1
730 PRINT CHR$(125)
740 POSITION 10,1:PRINT "POSITION MEANINGS"
750 GOTO 4430
760 PRINT "1-ATMOSPHERE THAT SURROUNDS THE      QUESTION"
770 RETURN
780 PRINT "2-OPPOSING FORCES"
790 RETURN
800 PRINT "3-BASIS OF THE MATTER"
810 RETURN
820 PRINT "4-INFLUENCE THAT IS JUST PASSING"
830 RETURN
840 PRINT "5-SOMETHING THAT MAY HAPPEN IN THE    FUTURE"
850 RETURN
860 PRINT "6-THINGS THAT WILL COME TO PASS IN   THE NEAR FUTURE"
870 RETURN
880 PRINT "7-NEGATIVE FEELINGS, THE QUERENT'S   FEARS"
890 RETURN
900 PRINT "8-FAMILY OPINION"
910 RETURN
920 PRINT "9-HOPES AND IDEAS IN THE MATTER"
930 RETURN
940 PRINT "10-THE FINAL OUTCOME"
950 RETURN
960 PRINT
970 PRINT "THINK OF A QUESTION TO ASK":PRINT
990 PRINT "ENTER A '1' TO SHUFFLE CARDS":INPUT C1
1000 PRINT CHR$(125)
1010 PRINT "NOW SHUFFLING"
1020 REM DRAW AND DISPLAY CARDS
1030 GOSUB 120
1040 FOR PP=1 TO 10
1050 PRINT :PRINT "THE TAROT CARD READER":PRINT
1060 PRINT "ENTER A '1' TO DRAW":INPUT C1
1070 GOSUB 470
1080 ON PP GOSUB 760,780,800,820,840,860,880,900,920,940
1090 PRINT
1100 C=A(PP)
1105 IF C<=13 THEN 1133
1110 IF C<=26 THEN C=C-13:GOTO 1135
1115 IF C<=39 THEN C=C-26:GOTO 1137
1120 IF C<=52 THEN C=C-39:GOTO 1139
1125 IF C<=65 THEN C=C-52:GOTO 1141
1127 C=C-65
1130 ON C GOSUB 3910,3950,3990,4030,4070,4110,4150,4190,4230,4270,
4310,4350,4390
```

Program 32-1-cont. The Tarot Card Reader Program Listing

```
1131 NEXT PP
1132 GOTO 1160
1133 ON C GOSUB 1310,1350,1390,1430,1470,1510,1550,1590,1630,1670,
1710,1750,1790
1134 GOTO 1131
1135 ON C GOSUB 1830,1870,1910,1950,1990,2030,2070,2110,2150,2190,
2230,2270,2310
1136 GOTO 1131
1137 ON C GOSUB 2350,2390,2430,2470,2510,2550,2590,2630,2670,2710,
2750,2790,2830
1138 GOTO 1131
1139 ON C GOSUB 2870,2910,2950,2990,3030,3070,3110,3150,3190,3230,
3270,3310,3350
1140 GOTO 1131
1141 ON C GOSUB 3390,3430,3470,3510,3550,3590,3630,3670,3710,3750,
3790,3830,3870
1142 GOTO 1131
1150 NEXT PP
1160 BZ$=" ":PRINT :PRINT "ANOTHER READING-ENTER 'A'"
1170 PRINT "REPEAT LAST READING=ENTER 'R'"
1180 PRINT "END PROGRAM-ENTER 'E'"
1190 INPUT BZ$
1200 IF BZ$="A" THEN 330
1210 IF BZ$="R" THEN 1250
1220 IF BZ$="E" THEN 1240
1230 GOTO 1160
1240 END
1250 XX=1:Q=1:GOTO 1040
1260 X=B(Q)
1270 IF X=2 THEN 1290
1280 Q=Q+1:RETURN
1290 PRINT Z$:PRINT :Q=Q+1
1300 RETURN
1310 PRINT "KEY 0-THE FOOL"
1320 PRINT "A DREAMER HAS THE DESIRE TO ACCOMPLISH A GREAT GOAL."
1330 PRINT Z$;"FOLLY, INDISCRETION, THOUGHT-LESS ACTION"
1340 RETURN
1350 PRINT "KEY 1-MAGICIAN"
1360 PRINT "WILL, MASTERY, CREATIVE, ORGANIZER"
1370 PRINT Z$;"INDECISION, WEAK WILL, INEPTITUDE"
1380 RETURN
1390 PRINT "KEY 2-HIGH PRIESTESS"
1400 PRINT "HIDDEN INFLUENCES, UNREVEALED FUTURE"
1410 PRINT Z$;"CONCEIT, SENSUAL ENJOYMENT"
1420 RETURN
1430 PRINT "KEY 3-THE EMPRESS"
1440 PRINT "WEALTH, MARRIAGE, FERTILITY"
1450 PRINT Z$;"INFERTILITY, INACTION, LOSS OF POSSESSIONS"
1460 RETURN
1470 PRINT "KEY 4-THE EMPEROR"
1480 PRINT "LEADERSHIP,AUTHORITY, MENTAL ACTIVITY, DOMINATION"
1490 PRINT Z$;"LOSS OF CONTROL, INJURY IN BATTLE"
1500 RETURN
```

Program 32-1-cont. The Tarot Card Reader Program Listing

```
1510 PRINT "KEY 5-THE HIEROPHANT"
1520 PRINT "PREFER RELIGION,RITUAL,SOCIAL APPROVAL"
1530 PRINT Z$;"UNCONVENTIONALITY, INVENTOR, NEW IDEAS"
1540 RETURN
1550 PRINT "KEY 6-THE LOVERS"
1560 PRINT "CHOICE, TEMPTATION, ATTRACTION"
1570 PRINT Z$;"QUARRELS, INFIDELITY,POSSIBLE WRONG CHOICE"
1580 RETURN
1590 PRINT "KEY 7-THE CHARIOT"
1600 PRINT "TRIUMPH, SUCCESS"
1610 PRINT Z$;"RESTLESSNESS,DECADENT DESIRES"
1620 RETURN
1630 PRINT "KEY 8-STRENGTH"
1640 PRINT "SPIRITUAL POWER, LOVE TRIUMPHS"
1650 PRINT Z$;"DISCORD, ABUSE OF POWER"
1660 RETURN
1670 PRINT "KEY 9-THE HERMIT"
1680 PRINT "SILENT COUNSEL, PRUDENCE, DISCRETION"
1690 PRINT Z$;"IMMATURITY, FOOLISH VICES"
1700 RETURN
1710 PRINT "KEY 10-WHEEL OF FORTUNE"
1720 PRINT "SUCCESS, GOOD LUCK"
1730 PRINT Z$;"FAILURE, SETBACKS"
1740 RETURN
1750 PRINT "KEY 11-JUSTICE"
1760 PRINT "JUSTICE, BALANCE, EDUCATION"
1770 PRINT Z$;"INJUSTICE; INEQUALITY"
1780 RETURN
1790 PRINT "KEY 12-THE HANGED MAN"
1800 PRINT "WISDOM, SUSPENDED DECISIONS"
1810 PRINT Z$;"ARROGANCE, WASTED EFFORT"
1820 RETURN
1830 PRINT "KEY 13-DEATH"
1840 PRINT "TRANSFORMATION, CHANGE, DESTRUCTION & RENEWAL"
1850 PRINT Z$;"DISASTER, REVOLUTION, TEMPO-RARY STAGNATION"
1860 RETURN
1870 PRINT "KEY 14-TEMPERANCE"
1880 PRINT "ADAPTION, TEMPERING, HARMONY"
1890 PRINT Z$;"COMPETING INTERESTS, CORRUPTION, SEPARATION"
1900 RETURN
1910 PRINT "KEY 15-THE DEVIL"
1920 PRINT "BLACK MAGIC, DISCONTENT, DEPRESSION, ILLNESS"
1930 PRINT Z$;"THE BEGINNING OF SPIRITUAL UNDERSTANDING"
1940 RETURN
1950 PRINT "KEY 16-THE TOWER"
1960 PRINT "CHANGE, CONFLICT, CATASTROPHE"
1970 PRINT Z$;"THE GAIN OF FREEDOM AT GREAT COST, OPPRESSION"
1980 RETURN
1990 PRINT "KEY 17-THE STAR"
2000 PRINT "INSIGHT, INSPIRATION,HOPE, GOOD HEALTH"
2010 PRINT Z$;"PESSIMISM, STUBBORNNESS"
2020 RETURN
2030 PRINT "KEY 18-THE MOON"
```

Program 32-1-cont. The Tarot Card Reader Program Listing

```
2040 PRINT "INTUITION, IMAGINATION, DECEPTION"
2050 PRINT Z$;"STORMS WILL BE WEATHERED,      PEACE AT A COST"
2060 RETURN
2070 PRINT "KEY 19-THE SUN"
2080 PRINT "HAPPINESS, SUCCESS, ATTAINMENT"
2090 PRINT Z$;"FUTURE PLANS CLOUDED"
2100 RETURN
2110 PRINT "KEY 20-JUDGMENT"
2120 PRINT "A LIFE WELL LIVED, AWAKENING, RENEWAL"
2130 PRINT Z$;"WEAKNESS, DISILLUSION, SEPARATION"
2140 RETURN
2150 PRINT "KEY 21-THE WORLD"
2160 PRINT "COMPLETION, REWARD, SUCCESS, TRAVEL,  CHANGE OF RESIDE
NCE"
2170 PRINT Z$;"SUCCESS YET TO BE WON, FEAR  OF TRAVEL-CHANGE"
2180 RETURN
2190 PRINT "ACE";W$
2200 PRINT "BEGINNING OF AN ENTERPRISE, INVENTION,JOURNEY, OR FAMI
LY"
2210 PRINT Z$;"JOURNEY DEFERRED, CLOUDED JOY, FALSE STARTS"
2220 RETURN
2230 PRINT "2";W$
2240 PRINT "BOLDNESS, COURAGE, KINDNESS & GENEROS-ITY"
2250 PRINT Z$;"RESTLESSNESS, OBSTINACY, FEAR"
2260 RETURN
2270 PRINT "3";W$
2280 PRINT "REALIZATION OF HOPE, ESTABLISHED STRENGTH, WEALTH, POW
ER"
2290 PRINT Z$;"BEWARE OF HELP OFFERED,WEALTH MAY SLIP AWAY"
2300 RETURN
2310 PRINT "4";W$
2320 PRINT "PEACE, PROSPERITY, HARMONY, ROMANCE"
2330 PRINT Z$;"MEANING REMAINS THE SAME"
2340 RETURN
2350 PRINT "5";W$
2360 PRINT "STRIFE, COMPETITION, OBSTACLES,LAWSUIT"
2370 PRINT Z$;"GENEROSITY, VICTORY"
2380 RETURN
2390 PRINT "6";W$
2400 PRINT "GOOD NEWS, VICTORY AFTER STRIFE, PLEA-SURE, SUCCESS"
2410 PRINT Z$;"REWARDS ARE DELAYED, WATCH  FOR ENEMY"
2420 RETURN
2430 PRINT "7";W$
2440 PRINT "VICTORY, SUCCESS"
2450 PRINT Z$;"IGNORANCE, PRETENSE, THREAT"
2460 RETURN
2470 PRINT "8";W$
2480 PRINT "GREAT HASTE, HOPE, MESSAGES, JOURNEY"
2490 PRINT Z$;"DELAY, STAGNATION, JEALOUSY"
2500 RETURN
2510 PRINT "9";W$
2520 PRINT "STRENGTH, POWER, HEALTH"
2530 PRINT Z$;"WEAKNESS, ILL HEALTH, OBSTACLES"
```

Program 32-1-cont. The Tarot Card Reader Program Listing

```
2540 RETURN
2550 PRINT "10";W$
2560 PRINT "POWER UNWISELY USED"
2570 PRINT Z$;"INTRIGUES, SEPARATION, EMIGRATION"
2580 RETURN
2590 PRINT "PAGE";W$
2600 PRINT "COURAGE, BEAUTY, DESIRES POWER, MESSENGER"
2610 PRINT Z$;"CRUEL, UNSTABLE, DOMINEERING, BAD NEWS"
2620 RETURN
2630 PRINT "KNIGHT";W$
2640 PRINT "A HASTY YOUNG MAN, DEPARTURE"
2650 PRINT Z$;"JEALOUS LOVER, DISCORD, FRUS-TRATION"
2660 RETURN
2670 PRINT "QUEEN";W$
2680 PRINT "SHE HAS GREAT POWER, SUCCESS, KINDNESS"
2690 PRINT Z$;"DOMINEERING, OBSTINATE, RE- VENGEFUL"
2700 RETURN
2710 PRINT "KING";W$
2720 PRINT "HANDSOME & PASSIONATE, HONESTY, FRIENDLY"
2730 PRINT Z$;"INTOLERANT, PREDJUDICED, SEVERE"
2740 RETURN
2750 PRINT "ACE";X$
2760 PRINT "GREAT LOVE, JOY, CONTENTMENT"
2770 PRINT Z$;"FALSE LOVE. CLOUDED JOY. IN- STABILITY"
2780 RETURN
2790 PRINT "2";X$
2800 PRINT "HARMONY, FRIENDSHIP, LOVE AFFAIR"
2810 PRINT Z$;"FALSE LOVE, FOLLY, PASSION, MISUNDERSTANDING"
2820 RETURN
2830 PRINT "3";X$
2840 PRINT "SUCCESS, ABUNDANCE, PLEASURE, VICTORY"
2850 PRINT Z$;"PLEASURE TURNS TO PAIN, SUC- CESS TO ASHES"
2860 RETURN
2870 PRINT "4";X$
2880 PRINT "STATIONARY, WEARINESS, DISSATISFACTION WITH SUCCESS"
2890 PRINT Z$;"AWAKENING, NEW GOALS, NEW AMBITION"
2900 RETURN
2910 PRINT "5";X$
2920 PRINT "DISAPPOINTMENT, SORROW, LOSS OF FRIENDSHIP, REGRET"
2930 PRINT Z$;"RETURN OF ENJOYMENT, A FRIEND OR LOVED ONE"
2940 RETURN
2950 PRINT "6";X$
2960 PRINT "HAPPINESS, ENJOYMENT, FROM THE PAST. NEW OPPORTUNITIE
S"
2970 PRINT Z$;"CLINGING TO THE PAST. WORTH- LESS ASSOCIATES"
2980 RETURN
2990 PRINT "7";X$
3000 PRINT "DREAMS, IMAGINATION. FORCES SCATTERED. DECEPTION"
3010 PRINT Z$;"GOOD RESOLUTIONS, NEW DETERMINATION"
3020 RETURN
3030 PRINT "8";X$
3040 PRINT "SUCCESS ABANDONED. JOURNEYING. DISAPPOINTMENT IN LOVE"
3050 PRINT Z$;"JOY, A NEW LOVE"
```

Program 32-1-cont. The Tarot Card Reader Program Listing

```
3060 RETURN
3070 PRINT "9";X$
3080 PRINT "MATERIAL SUCCESS, SATISFACTION"
3090 PRINT Z$;"FALSE FREEDOM, DECEPTION OR ILLNESS"
3100 RETURN
3110 PRINT "10";X$
3120 PRINT "CONTENTMENT, HAPPINESS, SUCCESS,FRIENDSHIP"
3130 PRINT Z$;"LOSS OF FRIENDSHIP. BETRAYAL. WASTE"
3140 RETURN
3150 PRINT "PAGE";X$
3160 PRINT "ARTS. NEWS, A MESSAGE"
3170 PRINT Z$;"OBSTACLES, SEDUCTION, DECEPTION, UNPLEASANT NEWS"
3180 RETURN
3190 PRINT "KNIGHT";X$
3200 PRINT "PROPOSITION, INVITATION, MESSAGES"
3210 PRINT Z$;"SENSUAL, IDLE, UNTRUTHFUL"
3220 RETURN
3230 PRINT "QUEEN";X$
3240 PRINT "SUCCESS, HAPPINESS, PLEASURE"
3250 PRINT Z$;"DISHONESTY, IMMORALITY"
3260 RETURN
3270 PRINT "KING";X$
3280 PRINT "LIBERALITY, GENEROSITY, CREATIVE INTELLIGENCE"
3290 PRINT Z$;"FIERCE NATURE UNDER CALM EXTERIOR"
3300 RETURN
3310 PRINT "ACE";Y$
3320 PRINT "CONQUEST, POWER, ACTIVITY"
3330 PRINT Z$;"CONQUEST, DISASTER, OBSTACLES, LOSS"
3340 RETURN
3350 PRINT "2";Y$
3360 PRINT "TENSION. INDECISION. BALANCED FORCES, LOSS"
3370 PRINT Z$;"RELEASE. DISLOYALTY. MOVEMENT OF AFFAIRS"
3380 RETURN
3390 PRINT "3";Y$
3400 PRINT "TEARS, SEPARATION, QUARRELING"
3410 PRINT Z$;"CONFUSION, LOSS, SORROW"
3420 RETURN
3430 PRINT "4";Y$
3440 PRINT "REST AFTER WAR, BANISHMENT, RELAXATION OF ANXIETY"
3450 PRINT Z$;"RENEWED ACTIVITY, QUALIFIED SUCCESS, SOCIAL UNREST"
"
3460 RETURN
3470 PRINT "5";Y$
3480 PRINT "FAILURE, DEFEAT. DEGRADATION. UNFAIRNESS"
3490 PRINT Z$;"CHANCE OF LOSS. SORROW. WEAKNESS"
3500 RETURN
3510 PRINT "6";Y$
3520 PRINT "SUCCESS AFTER ANXIETIES. JOURNEY"
3530 PRINT Z$;"NO IMMEDIATE WAY OUT OF DIFFICULTIES"
3540 RETURN
3550 PRINT "7";Y$
3560 PRINT "UNSTABLE EFFORT, PARTIAL SUCCESS"
3570 PRINT Z$;"UNEXPECTED GOOD. SOUND ADVICE"
```


Program 32-1-cont. The Tarot Card Reader Program Listing

```

3580 RETURN
3590 PRINT "8";Y$
3600 PRINT "IMPRISONMENT, FEAR, BETRAYAL"
3610 PRINT Z$;"NEW BEGINNINGS, FREEDOM"
3620 RETURN
3630 PRINT "9";Y$
3640 PRINT "SUFFERING, LOSS, MISERY. OPPRESSION. ILLNESS"
3650 PRINT Z$;"PATIENCE, UNSELFISHNESS. TIME HEALS"
3660 RETURN
3670 PRINT "10";Y$
3680 PRINT "DISPAIR, RUIN, DEFEAT, TEARS, TROUBLE"
3690 PRINT Z$;"SOME SUCCESS. COURAGE"
3700 RETURN
3710 PRINT "PAGE";Y$
3720 PRINT "MESSAGE, SPYING. GRACE, DEXTERITY"
3730 PRINT Z$;"FRIVOLITY AND CUNNING. UNEX- PECTED"
3740 RETURN
3750 PRINT "KNIGHT";Y$
3760 PRINT "COMING OR GOING OF MISFORTUNE"
3770 PRINT Z$;"EXTRAVAGENCE. TYRANNY"
3780 RETURN
3790 PRINT "QUEEN";Y$
3800 PRINT "MOURNING, PRIVATION. KINDNESS. GRACE- FULNESS"
3810 PRINT Z$;"UNRELIABILITY. GOSSIP. DECEIT, MALICE"
3820 RETURN
3830 PRINT "KING";Y$
3840 PRINT "POWER, STRENGTH, AUTHORITY"
3850 PRINT Z$;"DISTRUSTFUL. HARSH, PLOTTING, BARBARITY"
3860 RETURN
3870 PRINT "ACE";V$
3880 PRINT "WEALTH, MATERIAL GAIN, PROSPERITY,      PLEASURE, BEAUTY
"
3890 PRINT Z$;"MISERLINESS, GREED. A FALSE  START"
3900 RETURN
3910 PRINT "2";V$
3920 PRINT "JUGGLE TWO SITUATIONS, GAIETY,HARMONY. NEWS, MESSAGES"
3930 PRINT Z$;"SIMULATED ENJOYMENT"
3940 RETURN
3950 PRINT "3";V$
3960 PRINT "MATERIAL INCREASE. MASTER CRAFTSMAN, SKILLED ARTIST"
3970 PRINT Z$;"LACK OF SKILL. IGNORANCE.      SELFISHNESS"
3980 RETURN
3990 PRINT "4";V$
4000 PRINT "MATERIAL GAIN, SUCCESS, GIFTS, INHERI-TANCE,MISERLY"
4010 PRINT Z$;"PREJUDICE,SUSPICION,SETBACKS. SPENDTHRIFT"
4020 RETURN
4030 PRINT "5";V$
4040 PRINT "UNEMPLOYMENT, LOSS, LONELINESS, DEST- ITUTION"
4050 PRINT Z$;"CHARITY, NEW EMPLOYMENT,MONEY REGAINED"
4060 RETURN
4070 PRINT "6";V$
4080 PRINT "GAIN, GIFTS, INHERITANCE"
4090 PRINT Z$;"JEALOUS. BRIBES. BAD DEBTS"

```

Program 32-1-cont. The Tarot Card Reader Program Listing

```
4100 RETURN
4110 PRINT "7";V$
4120 PRINT "LOSS OF FORTUNE. PAUSE. DISAPPOINTMENT"
4130 PRINT Z$;"IMPATIENCE. LITTLE GAIN"
4140 RETURN
4150 PRINT "8";V$
4160 PRINT "LEARNING A TRADE OR PROFESSION. SKILL. EMPLOYMENT"
4170 PRINT Z$;"DANGER OF FAILURE. INTRIGUE. FALSE VANITY"
4180 RETURN
4190 PRINT "9";V$
4200 PRINT "SOLITARY ENJOYMENT. INHERITANCE. MATERIAL WELL BEING"
4210 PRINT Z$;"DANGER OF LOSS,OF HOME,FRIENDSHIP. CANCELLED PROJEC
T"
4220 RETURN
4230 PRINT "10";V$
4240 PRINT "RICHES, INHERITANCE. FAMILY MATTERS"
4250 PRINT Z$;"FAMILY MISFORTUNE, LOSS OF INHERITANCE"
4260 RETURN
4270 PRINT "PAGE";V$
4280 PRINT "REFLECTION, CAREFULNESS, GOOD MANAGE- MENT"
4290 PRINT Z$;"DISSIPATION AND EXCESS. WASTEFULNESS, LUXURY"
4300 RETURN
4310 PRINT "KNIGHT";V$
4320 PRINT "UTILITY, SERVICEABLENESS, WORTHINESS"
4330 PRINT Z$;"STATIC, DULL, TIMID, IDLE, CARELESS"
4340 RETURN
4350 PRINT "QUEEN";V$
4360 PRINT "OPULENCE, SECURITY, TRUST. MOODY"
4370 PRINT Z$;"MISTRUST, SUSPICION, DEPEND- ENCE. CHANGEABLE"
4380 RETURN
4390 PRINT "KING";V$
4400 PRINT "STEADY TEMPERAMENT, SLOW TO ANGER. MONETARY SUCCESS
"
4410 PRINT Z$;"STUPIDITY. THRIFTLESS. VICE"
4420 RETURN
4430 PRINT
4440 GOSUB 760
4450 GOSUB 780
4460 GOSUB 800
4470 GOSUB 820
4480 GOSUB 840
4490 GOSUB 860
4500 GOSUB 880
4510 GOSUB 900
4520 GOSUB 920
4530 GOSUB 940
4540 GOTO 960
```

SECTION VII

Graphics and Sound

This section includes a joystick test program with sound, and a joystick message writer program that uses only a single joystick and trigger button to enter and display messages. Also included are three short routines that mix graphics and text modes on one display, and three more that demonstrate horizontal and vertical scrolling; several short programs that demonstrate Atari color graphics using the DRAWTO, PLOT, and XIO statements; and finally, a moving star program that simulates motion through space.

CHAPTER 33

Joystick Test Program

This program will test any joysticks plugged into your game controller jacks. The program is written in BASIC for your microcomputer. See Program 33-1 for the program listing.

THE PROGRAM

After you run the program, it requests that you enter the number of the joystick to test (1, 2, 3, or 4), or 5 to end. If you enter 1, the program will begin by testing the trigger button on joystick 1, by asking you to press the button. After you've pressed the button, then **BUTTON PRESSED** will be displayed. You are now ready to test the nine positions of your joystick, or you may quit the test by pressing the trigger button. Program lines 290 through 420 are used to test the position of the joystick and print the position numbers near the bottom of the screen. If the joystick is not moved, the number 15 will be displayed. See Fig. 33-1 for the joystick positions and their values. Also, a sound is generated for each position of the joystick. Moving the joystick up will sound the musical note middle C, and continuing the movement in a clockwise motion will take you up through the scale. See Table 33-1 for the position numbers and their corresponding musical notes. To end the test and return to the main menu, just press the trigger button.

See Fig. 33-2 for a sample run.

Table 33-1. Joystick Position Numbers and Their Corresponding Musical Notes

Position Number	Musical Note
14	C
6	D
7	E
5	F
13	G
9	A
11	B
10	C

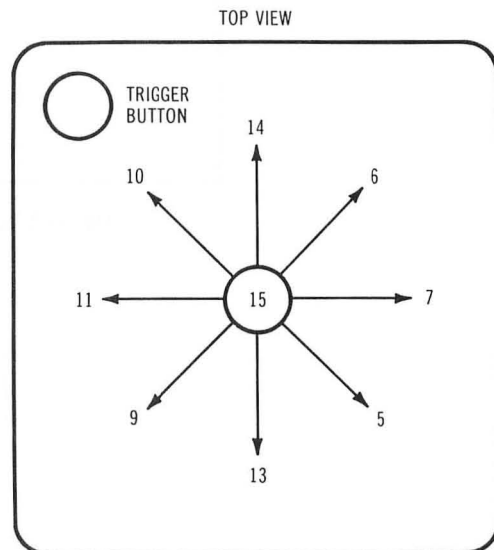


Fig. 33-1. Joystick positions and their values.

JOYSTICK TEST PROGRAM
 ATARI
 COPYRIGHT (C) 1982 BY HOWARD BERENBON
 PLUG JOYSTICKS INTO YOUR ATARI TO TEST
 JOYSTICKS 1, 2, 3, OR 4 POSITIONS

ENTER THE NUMBER OF JOYSTICK TO TEST
 1-JOYSTICK 1 4-JOYSTICK 4
 2-JOYSTICK 2 5-END
 3-JOYSTICK 3
 ?1

C H E C K I N G S T I C K 1
 P R E S S B U T T O N T O T E S T
 B U T T O N P R E S S E D

M O V E J O Y S T I C K
 P R E S S B U T T O N T O Q U I T

		1 4	
1 0			.6
1 1	1 5		7
9			5
	1 3		

Fig. 33-2. Joystick test program sample run.

Program 33-1. Joystick Test Program Listing

```
100 GRAPHICS 0:PRINT "JOYSTICK TEST PROGRAM"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1982 BY HOWARD BERENBON"
130 PRINT
140 PRINT "PLUG JOYSTICKS INTO YOUR ATARI TO TEST";
150 PRINT "JOYSTICKS 1, 2, 3, OR 4 POSITIONS"
160 PRINT
170 PRINT
180 PRINT "ENTER THE NUMBER OF JOYSTICK TO TEST"
190 PRINT "      1-JOYSTICK 1      4-JOYSTICK 4"
200 PRINT "      2-JOYSTICK 2      5-END"
210 PRINT "      3-JOYSTICK 3"
220 INPUT S:IF S=5 THEN 460
230 S1=S-1:GRAPHICS 1+16:PRINT #6;"CHECKING STICK ";S
240 PRINT #6:PRINT #6;"PRESS BUTTON TO TEST":PRINT #6
250 IF STRIG(S1)=1 THEN 250
260 PRINT #6;"BUTTON PRESSED":GOSUB 450:GRAPHICS 1+16
270 POSITION 0,1:PRINT #6;"MOVE JOYSTICK":PRINT #6
280 PRINT #6;"PRESS BUTTON TO QUIT"
290 T=STICK(S1):SETCOLOR 0,3,8
300 IF STRIG(S1)=0 THEN 100
310 X=10:Y=17:POSITION X,Y:PRINT #6;"15";
320 IF T=13 THEN Z=81:X=10:Y=22:POSITION X,Y:GOTO 410
330 IF T=9 THEN Z=72:X=7:Y=21:POSITION X,Y:GOTO 410
340 IF T=11 THEN Z=64:X=6:Y=17:POSITION X,Y:GOTO 410
350 IF T=10 THEN Z=60:X=7:Y=13:POSITION X,Y:GOTO 410
360 IF T=14 THEN Z=121:X=10:Y=12:POSITION X,Y:GOTO 410
370 IF T=6 THEN Z=108:X=14:Y=13:POSITION X,Y:GOTO 410
380 IF T=7 THEN Z=96:X=15:Y=17:POSITION X,Y:GOTO 410
390 IF T=5 THEN Z=91:X=14:Y=21:POSITION X,Y:GOTO 410
400 GOTO 290
410 PRINT #6;T:SOUND 0,Z,10,8:FOR A=1 TO 100
420 NEXT A:SOUND 0,0,0,0:POKE 77,0
430 POSITION X,Y:PRINT #6;" ";
440 GOTO 290
450 FOR C=1 TO 800:NEXT C:RETURN
460 END
```

CHAPTER 34

Stick Message Writer

Here's a program that allows you to enter and display messages using only a joystick. It may be useful for people who are handicapped, who could move a joystick and press a button, but cannot type at a terminal without difficulty. The operator moves the joystick to display the desired character in the upper right-hand corner of the screen. Then the trigger button is pressed to record the character, and move it to the message area below. There is also a printout option. It's written in BASIC for your microcomputer. See Program 34-1 for the program listing.

THE PROGRAM

Connect your joystick to game controller jack 1. After you run the program, using joystick 1, first set the joystick to its center position and then press the trigger button for message entry. The screen is used to build and display your message with the character available, displayed at the upper right-hand corner. You have a 255 character message limit.

To move through the character set, you move the joystick up or down, and as you do this, a tone is

sounded; a higher tone is heard when moving the joystick up and a lower one when moving it down. Once you find the desired character, press the trigger button to transfer it to the message area below. To add spaces between words, either move the joystick to the right, momentarily, or find SP displayed in the lower end of the character set, and press the trigger button to transfer it to your message. To backspace and erase what you just wrote, move the joystick to the left, momentarily. Finally, to end your message session, move the joystick, diagonally, towards the trigger button. The computer will display the following:

```
----- END OF MESSAGE
STICK UP-PRINTOUT
STICK RIGHT-MESSAGE
STICK DOWN-END
```

Moving the joystick up, momentarily, will give you a printout of your message (make sure that your printer is switched on). Moving the joystick to the right, momentarily, will allow you to enter another message. And moving the joystick down will end the program.

See Fig. 34-1 for a sample run.

STICK MESSAGE WRITER
ATARI
COPYRIGHT (C) 1982 BY HOWARD BERENBON

THIS PROGRAM ALLOWS YOU TO ENTER
AND DISPLAY MESSAGES USING ONLY A
JOYSTICK. IT MAY BE USEFUL FOR PEOPLE
WHO ARE HANDICAPPED, WHO COULD MOVE A
JOYSTICK, BUT NOT TYPE AT A TERMINAL.

THE OPERATOR MOVES THE JOYSTICK TO
DISPLAY THE DESIRED CHARACTER IN THE
UPPER RIGHT-HAND CORNER OF THE SCREEN.
THEN THE TRIGGER BUTTON IS PRESSED TO
RECORD THE CHARACTER, AND MOVE IT TO
THE MESSAGE AREA BELOW. THERE IS ALSO
A MESSAGE PRINTOUT OPTION.

PRESS TRIGGER BUTTON TO START ENTRY

S T I C K M E S S A G E W R I T E R

- - - - -

T

- - - - -

T H I S I S A T E S T -

- - - - E N D O F M E S S A G E
S T I C K U P - P R I N T O U T
S T I C K R I G H T - M E S S A G E
S T I C K D O W N - E N D

Fig. 34-1. Stick message writer sample run.

Program 34-1. Stick Message Writer Program Listing

```
100 PRINT CHR$(125);"STICK MESSAGE WRITER"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1982 BY HOWARD BERENBON"
130 PRINT :DIM A$(255),B$(1),C$(2)
140 PRINT "THIS PROGRAM ALLOWS YOU TO ENTER"
150 PRINT "AND DISPLAY MESSAGES USING ONLY A"
160 PRINT "JOYSTICK. IT MAY BE USEFUL FOR PEOPLE"
170 PRINT "WHO ARE HANDICAPPED, WHO COULD MOVE A"
180 PRINT "JOYSTICK, BUT NOT TYPE AT A TERMINAL."
190 PRINT
200 PRINT "THE OPERATOR MOVES THE JOYSTICK TO"
210 PRINT "DISPLAY THE DESIRED CHARACTER IN THE"
220 PRINT "UPPER RIGHT-HAND CORNER OF THE SCREEN."
230 PRINT "THEN THE TRIGGER BUTTON IS PRESSED TO"
240 PRINT "RECORD THE CHARACTER, AND MOVE IT TO"
250 PRINT "THE MESSAGE AREA BELOW. THERE IS ALSO"
260 PRINT "A MESSAGE PRINTOUT OPTION."
270 PRINT
280 PRINT "PRESS TRIGGER BUTTON TO START ENTRY"
290 X=STRIG(0):IF X=1 THEN 290
300 GRAPHICS 1+16:A$="":SETCOLOR 0,4,8
310 PRINT #6;"STICK MESSAGE WRITER":C$="- ":POSITION 14,2
320 PRINT #6;"-----":POSITION 14,6:PRINT #6;"-----"
330 C=STICK(0):IF C=15 THEN 330
340 Z=64:REM CHOOSE CHARACTERS
350 Z=Z+1:IF Z=91 THEN Z=90
360 POSITION 16,4:IF Z=32 THEN PRINT #6;"SP":GOTO 380
370 PRINT #6;CHR$(Z);
380 GOSUB 690:SOUND 0,0,0,0
390 IF LEN(A$)>0 THEN IF STICK(0)=11 THEN 510
400 IF STICK(0)=10 THEN 530
410 IF STICK(0)=14 THEN SOUND 0,50,12,8:GOTO 350
420 IF STRIG(0)=0 THEN 460:REM ADD CHARACTER TO STRING
430 IF STICK(0)=13 THEN SOUND 0,70,14,8:Z=Z-1:IF Z=31 THEN Z=32
440 IF STICK(0)=7 THEN B$=" ":GOSUB 680:GOTO 470
450 GOTO 360
460 GOSUB 680:POKE 77,0:B$=CHR$(Z)
470 A$(LEN(A$)+1)=B$
480 POSITION 0,8:PRINT #6;A$;C$
490 GOTO 410
500 END
510 A$(LEN(A$))="":GOTO 480
520 GOTO 410
530 POSITION 0,20:PRINT #6;"---- END OF MESSAGE"
540 PRINT #6;"STICK UP-PRINTOUT"
550 PRINT #6;"STICK RIGHT-MESSAGE"
560 PRINT #6;"STICK DOWN-END"
570 M=STICK(0):IF M=15 THEN 570
580 GOSUB 680:IF M=14 THEN 620
590 IF M=7 THEN 300
600 IF M=13 THEN 500
610 POKE 77,0:GOTO 570
620 GOSUB 650
```

Program 34-1-cont. Stick Message Writer Program Listing

```
630 LPRINT A$:GOSUB 650
640 GOTO 570
650 FOR A=1 TO 5
660 LPRINT " ":NEXT A
670 RETURN
680 FOR A=1 TO 40:NEXT A:RETURN
690 FOR A=1 TO 20:NEXT A:PRINT #6;" "":RETURN
```

Custom Display Lists

Here are three program examples that demonstrate the ability to alter the standard display screen of your Atari. They combine small text, large text, and graphics in the same display, by modifying the parameters that the computer uses to generate graphics and text displays. These parameters are placed into a special format for the computer to use called a DISPLAY LIST. The programs are written in BASIC for your microcomputer. See Program 35-1 for example 1, Program 35-2 for example 2, and Program 35-3 for example 3.

By modifying the Display List, you can create custom displays that combine text and graphics. Modifications to the DISPLAY LIST Load Memory Scan (LMS) address are used to create horizontal and vertical scrolling. (See Chapter 36 for programs on this subject.)

THE PROGRAM

Before you run these programs, list them so you have something on the display to look at before you alter the display list. Run each program, and then type LIST again and press return. Notice how the display reacts as the program lines are listed on the display.

To restore your Atari to the normal display screen, press SYSTEM RESET.

BACKGROUND

In order to alter the DISPLAY LIST, the address of the list for your computer must be found. This address is calculated using the contents of memory locations 560 and 561. The following program line places the DISPLAY LIST address in variable DL:

```
120 DL=PEEK(560)+256*PEEK(561)
```

After you run the program, the variable DL holds the address of the start of the DISPLAY LIST. Then the lines 130 through 160 use the POKE statements to alter specific sets of data that are used to tell the computer the type of line to display—graphics or text. Since the Atari has several different screen modes available, different combinations of graphics and text may be displayed.

Program example 1 displays regular text, large text, and low resolution graphics. Program example 2 displays regular and large text, and medium resolution graphics. Finally, program example 3 displays regular and large text, and high resolution graphics.

For more information on Custom Display Lists, refer to the following Atari Manual:

De Re Atari, A Guide to Effective Programming.
Sunnyvale: Atari Program Exchange,
APX-90008, 1981.

Program 35-1. Custom Display Lists Program Listing, Example 1

```
100 REM CUSTOM DISPLAY LISTS
110 REM DISPLAY SMALL AND LARGE TEXT, AND GRAPHICS-EX1
120 DL=PEEK(560)+256*PEEK(561)
130 FOR A=DL+7 TO DL+14:POKE A,8
140 NEXT A
150 FOR A=DL+20 TO DL+30:POKE A,6
160 NEXT A
```

Program 35-2. Custom Display Lists Program Listing, Example 2

```
100 REM CUSTOM DISPLAY LISTS
110 REM DISPLAY SMALL AND LARGE TEXT, AND GRAPHICS-EX2
120 DL=PEEK(560)+256*PEEK(561)
130 FOR A=DL+7 TO DL+16:POKE A,10
140 NEXT A
150 FOR A=DL+20 TO DL+30:POKE A,6
160 NEXT A
```

Program 35-3. Custom Display Lists Program Listing, Example 3

```
100 REM CUSTOM DISPLAY LISTS
110 REM DISPLAY SMALL AND LARGE TEXT, AND GRAPHICS-EX3
120 DL=PEEK(560)+256*PEEK(561)
130 FOR A=DL+7 TO DL+25:POKE A,14
140 NEXT A
150 FOR A=DL+25 TO DL+35:POKE A,6
160 NEXT A
```

Horizontal and Vertical Scrolling

Here are three short programs that demonstrate the horizontal and vertical scrolling on the Atari. They use a joystick to move memory through the screen. Program 1 produces vertical scrolling. See Program 36-1 for the program listing. Program 2 produces horizontal scrolling. See Program 36-2 for the program listing. Program three combines the techniques of programs 1 and 2 to demonstrate both horizontal and vertical scrolling. See Program 36-3 for the program listing. The programs are written in BASIC for your microcomputer.

PROGRAM 1

To demonstrate vertical scrolling, run the program using a joystick plugged into game controller jack 1. Move the joystick up and down to see the memory move through the display.

PROGRAM 2

To demonstrate horizontal scrolling, run the program using a joystick plugged into game controller jack 1. Move the joystick right and left to move the memory through the display.

PROGRAM 3

Program 3 combines the techniques of programs 1 and 2 to demonstrate horizontal and vertical scrolling with a joystick. Run the program using a joystick plugged into game controller jack 1. Move the joystick up, down, right, and left to move the memory through the display.

Modifications to Program 3

The following are some simple modifications to Program 3 to produce varied graphic effects:

1. Add either of these two lines to scroll through multicolored expanded text:

```
10 GRAPHICS 1+16
    OR
10 GRAPHICS 2+16
```

2. Add this line to scroll through multicolored graphic blocks:

```
10 GRAPHICS 5+16
```

3. Add this line to scroll through multicolored medium resolution graphic blocks:

```
10 GRAPHICS 7+16
```

4. Add this line to scroll through high resolution graphics:

```
10 GRAPHICS 8+16
```

5. Add these lines to POKE the letters "ABC" into a portion of your computer's memory:

```
20 FOR A=9000 TO 20000 STEP 3
30 POKE A,33:POKE A+1,34:POKE
  A+2,35:NEXT A
40 SOUND 0,121,10,8:FOR D=1 TO
  120:NEXT D
50 SOUND 0,0,0,0
```

Use this modification along with modifications 1 through 4. After you run the program, it will take about a minute to POKE "ABC" throughout a part of your memory. When it's done, it will sound a note. Move the joystick up, to find either letters or graphic blocks. If you use it with modification 1, you will find the letters "ABC" in your memory. If you use it with modifications 2, 3, or 4, you will see uniform graphic blocks.

For all of the above examples, press SYSTEMS RESET to return to the normal display screen.

BACKGROUND

Vertical Scrolling

All home computers allow for vertical scrolling of some form or another. Using the LIST command in BASIC demonstrates vertical scrolling. As you list your program lines, they move upward on the display. If you list more program lines than the display will hold, the ones listed first move off the screen at the top to make room for the new lines appearing at the bottom of the screen. This process is called vertical scrolling.

Horizontal Scrolling

Moving the display left and right is called horizontal scrolling. This type of scrolling is not commonly used, or needed, when listing a program. But it is useful in the design of graphic application programs requiring the information on the screen to be moved left and right as well as up and down.

Horizontal scrolling is commonly seen in arcade type game programs, and in some word processors that have windows to display longer lines than the screen format of the computer permits.

But a unique application for combined horizontal and vertical scrolling would be a map display program. The whole map of a given area may be stored

in the computer's memory, with only a small portion displayed at one time. Moving the joystick right, left, up, or down would move the map across the screen.

Horizontal scrolling is not easily implemented on most computers. But the Atari is an exception because it provides an option called Load Memory Scan (LMS) to allow you to easily perform horizontal and vertical scrolling from BASIC. The Load Memory Scan is an address in the computer's DISPLAY LIST (a list of instructions that tells the Atari how to format the screen). It tells Atari's screen display chip, ANTIC, what part of memory should be displayed on the screen. The high and low bytes of this address may be changed using POKE statements, to move the Atari's memory through the display. Programs 1, 2, and 3 use the joystick, in conjunction with the POKE statement, to change the Load Memory Scan address, thus moving the computer's memory through the display.

For more information on horizontal and vertical scrolling, refer to the following Atari manual:

De Re Atari, A Guide to Effective Programming.
Sunnyvale: Atari Program Exchange,
APX-90008, 1981.

Program 36-1. Horizontal Scrolling Program Listing

```
100 REM HORIZONTAL SCROLLING
110 U=0
120 DL=PEEK(560)+256*PEEK(561)
130 L=DL+4:H=DL+5
140 SC=STICK(0)
150 IF SC=11 THEN U=U+1:IF U>255 THEN U=255
160 GOSUB 200
170 IF SC=7 THEN U=U-1:IF U<0 THEN U=0
180 GOSUB 200
190 GOTO 140
200 POKE L,U:FOR A=1 TO 50:NEXT A
210 RETURN
```

Program 36-2. Vertical Scrolling Program Listing

```
100 REM VERTICAL SCROLLING
110 U=0
120 DL=PEEK(560)+256*PEEK(561)
130 L=DL+4:H=DL+5
140 SC=STICK(0)
150 IF SC=14 THEN U=U+1:IF U>255 THEN U=255
160 GOSUB 200
170 IF SC=13 THEN U=U-1:IF U<0 THEN U=0
180 GOSUB 200
190 GOTO 140
200 POKE H,U:FOR A=1 TO 50:NEXT A
210 RETURN
```


Program 36-3. Horizontal and Vertical Scrolling Program Listing

```
100 REM HORIZONTAL AND VERTICAL SCROLLING
110 U=0
120 DL=PEEK(560)+256*PEEK(561)
130 L=DL+4:H=DL+5
140 SC=STICK(0)
150 IF SC=14 THEN U=U+1:IF U>255 THEN U=255
160 IF SC=14 THEN GOSUB 240
170 IF SC=13 THEN U=U-1:IF U<0 THEN U=0
180 IF SC=13 THEN GOSUB 240
190 IF SC=7 THEN U=U-1:IF U<0 THEN U=0
200 IF SC=7 THEN GOSUB 260
210 IF SC=11 THEN U=U+1:IF U>255 THEN U=255
220 IF SC=11 THEN GOSUB 260
230 GOTO 140
240 POKE H,U:FOR A=1 TO 50:NEXT A
250 RETURN
260 POKE L,U:FOR A=1 TO 50:NEXT A
270 RETURN
```

CHAPTER 37

Graphics Using DRAWTO, PLOT, and XIO Statements

Here are several short BASIC programs using the DRAWTO, PLOT, and XIO statements to generate color graphics with your Atari.

PROGRAM 1

Multicolored line drawings. See Program 37-1 for the program listing.

PROGRAM 2

Multicolored line drawings, with sound. See Program 37-2 for the program listing.

PROGRAM 3

Multicolored line drawings, with sound-version 2. See Program 37-3 for the program listing.

PROGRAM 4

Multicolored stars. See Program 37-4 for the program listing.

PROGRAM 5

Box. See Program 37-5 for the program listing.

PROGRAM 6

Box-fill. See Program 37-6 for the program listing.

PROGRAM 7

Box-fill and shadow. See Program 37-7 for the program listing.

PROGRAM 8

Multicolored box designs. See Program 37-8 for the program listing.

PROGRAM 9

Multicolored animated box. See Program 37-9 for the program listing.

PROGRAM 10

Multicolored box designs-II. See Program 37-10 for the program listing.

Program 37-1. Multicolored Line Drawings Program Listing

```
100 REM MULTICOLORED LINE DRAWINGS
110 GRAPHICS 8+16
120 COLOR 1
130 POKE 710,0
140 FOR A=1 TO 50
150 B=INT(RND(0)*310+1)
160 C=INT(RND(0)*190+1)
170 DRAWTO B,C
180 NEXT A
190 FOR D=1 TO 800
200 NEXT D
210 GOTO 110
```

Program 37-2. Multicolored Line Drawings, With Sound Program Listing

```
100 REM MULTICOLORED LINE DRAWINGS, WITH SOUND
110 GRAPHICS 8
120 COLOR 1
130 POKE 710,0
140 FOR A=1 TO 50:SOUND 0,A+2,10,8
150 B=INT(RND(0)*310+1)
160 C=INT(RND(0)*190+1)
170 DRAWTO B,C
180 NEXT A
190 FOR D=1 TO 800
200 NEXT D
210 GOTO 110
```

Program 37-3. Multicolored Line Drawings, With Sound-Version 2 Program Listing

```
100 REM MULTICOLORED LINE DRAWINGS, WITH SOUND-VERSION 2
110 GRAPHICS 8+16
120 COLOR 1
130 POKE 710,0
140 FOR A=1 TO 50
150 B=INT(RND(0)*310+1)
160 C=INT(RND(0)*190+1):SOUND 0,C,6,10
170 DRAWTO B,C
180 NEXT A:SOUND 0,0,0,0
190 FOR D=1 TO 800
200 NEXT D
210 GOTO 110
```

Program 37-4. Multicolored Stars Program Listing

```
100 REM MULTICOLORED STARS
110 GRAPHICS 8+16
120 COLOR 1
130 POKE 710,0
140 FOR A=1 TO 50
150 B=INT(RND(0)*310+1)
160 C=INT(RND(0)*190+1)
170 PLOT B,C:PLOT B,C
180 NEXT A
190 FOR D=1 TO 800
200 NEXT D
210 GOTO 110
```

Program 37-5. Box Program Listing

```
100 REM BOX
110 GRAPHICS 8+16
120 COLOR 1
130 POKE 710,0
140 PLOT 100,50:DRAWTO 130,20
150 DRAWTO 230,20:DRAWTO 200,50
160 DRAWTO 100,50:DRAWTO 100,100
170 DRAWTO 130,100:DRAWTO 200,100
180 DRAWTO 200,50:PLOT 200,100
190 DRAWTO 230,60:DRAWTO 230,20
200 GOTO 200
```

Program 37-6. Box-Fill Program Listing

```
100 REM BOX-FILL
110 GRAPHICS 8+16
120 COLOR 1
130 POKE 710,0
140 PLOT 100,50:DRAWTO 130,20
150 DRAWTO 230,20:DRAWTO 200,50
160 DRAWTO 100,50:DRAWTO 100,100
170 DRAWTO 130,100:DRAWTO 200,100
180 DRAWTO 200,50:PLOT 200,100
190 DRAWTO 230,60:DRAWTO 230,20
200 POSITION 230,60:POKE 765,1
210 XIO 18,#6,0,0,"S:"
220 GOTO 220
```

Program 37-7. Box-Fill and Shadow Program Listing

```
100 REM BOX-FILL AND SHADOW
110 GRAPHICS 8+16
120 COLOR 1
130 POKE 710,0
140 PLOT 100,50:DRAWTO 130,20
150 DRAWTO 230,20:DRAWTO 200,50
160 DRAWTO 100,50:DRAWTO 100,100
170 DRAWTO 130,100:DRAWTO 200,100
180 DRAWTO 200,50:PLOT 200,100
190 DRAWTO 230,60:DRAWTO 230,20
200 POSITION 310,150:POKE 765,1
210 XIO 18,#6,0,0,"S:"
220 GOTO 220
```

Program 37-8. Multicolored Box Designs Program Listing

```
100 REM MULTICOLORED BOX DESIGNS
110 GRAPHICS 8+16
120 COLOR 1:POKE 710,0
130 FOR A=0 TO 70 STEP 2
140 PLOT 100+A,50+A:DRAWTO 130+A,20+A
150 DRAWTO 230+A,20+A:DRAWTO 200+A,50+A
160 DRAWTO 100+A,50+A:DRAWTO 100+A,100+A
170 DRAWTO 130+A,100+A:DRAWTO 200+A,100+A
180 DRAWTO 200+A,50+A:PLOT 200+A,100+A
190 DRAWTO 230+A,60+A:DRAWTO 230+A,20+A
200 NEXT A:GOTO 110
```

Program 37-9. Multicolored Animated Box Program Listing

```
100 REM MULTICOLORED ANIMATED BOX
110 FOR A=0 TO 70 STEP 10
120 GRAPHICS 8+16
130 COLOR 1:POKE 710,0
140 PLOT 100+A,50+A:DRAWTO 130+A,20+A
150 DRAWTO 230+A,20+A:DRAWTO 200+A,50+A
160 DRAWTO 100+A,50+A:DRAWTO 100+A,100+A
170 DRAWTO 130+A,100+A:DRAWTO 200+A,100+A
180 DRAWTO 200+A,50+A:PLOT 200+A,100+A
190 DRAWTO 230+A,60+A:DRAWTO 230+A,20+A
200 NEXT A:GOTO 110
```

Program 37-10. Multicolored Box Design-II Program Listing

```
100 REM MULTICOLORED BOX DESIGNS-II
110 GRAPHICS 8+16
120 COLOR 1:POKE 710,0
130 FOR A=0 TO 70 STEP 10
140 PLOT 100+A,50+A:DRAWTO 130+A,20+A
150 DRAWTO 230+A,20+A:DRAWTO 200+A,50+A
160 DRAWTO 100+A,50+A:DRAWTO 100+A,100+A
170 DRAWTO 130+A,100+A:DRAWTO 200+A,100+A
180 DRAWTO 200+A,50+A:PLOT 200+A,100+A
190 DRAWTO 230+A,60+A:DRAWTO 230+A,20+A
200 NEXT A:GOTO 110
```

CHAPTER 38

Moving Stars Simulation

Here's a program that can be used as a subroutine for games. It consists of a random star display routine and a moving star routine to simulate motion through space. It is written in BASIC for your microcomputer. See Program 38-1 for the program listing.

THE PROGRAM

After you run the program, enter a 1 to begin. It generates a star background, using periods (.), at random locations on the screen. Then it prints an

asterisk (*) at the center of the screen, and moves it at random angles in one of four quadrants towards the edges of the screen. A decreasing tone is generated with the SOUND statement in line 270, as the asterisk moves. It starts out slowly and gradually speeds up, as it appears to move toward you, giving the appearance of motion through space. This is repeated sixteen times, which is determined by the FOR-NEXT loop at line 240. The routine may be converted into a subroutine by deleting lines 100 through 170 and changing line 340 to RETURN.

Program 38-1. Moving Stars Simulation Program Listing

```
100 PRINT CHR$(125);"MOVING STARS SIMULATION"
110 PRINT "ATARI"
120 PRINT "COPYRIGHT (C) 1982 BY HOWARD BERENBON":PRINT
130 PRINT "THIS PROGRAM WILL DISPLAY A SCREEN OF RANDOM STARS,"
140 PRINT "AND THEN SIMULATE MOTION THROUGH SPACE"
150 PRINT
160 PRINT "ENTER A '1' TO BEGIN"
170 INPUT A
180 GRAPHICS 1+16
190 FOR G=1 TO 50
200 X1=INT(RND(0)*18+1):Y1=INT(RND(0)*22+1)
210 POSITION X1,Y1:PRINT #6;"."
220 NEXT G
230 REM MOVING STAR ROUTINE
240 FOR Z=1 TO 16:H=30
250 Y1=12:X1=10:X=INT(RND(0)*4+1)
260 Y=INT(RND(0)*2+1):FOR J=1 TO 6
270 POSITION X1,Y1:PRINT #6;"*";:SOUND 0,100-H,12,8
280 FOR A=1 TO H
290 NEXT A:H=H-5
300 POSITION X1,Y1:PRINT #6;" ";
310 ON X GOSUB 350,360,370,380
320 NEXT J
330 NEXT Z
340 END
350 X1=X1+1:Y1=Y1-Y:RETURN
360 X1=X1-1:Y1=Y1-Y:RETURN
370 X1=X1-1:Y1=Y1+Y:RETURN
380 X1=X1+1:Y1=Y1+Y:RETURN
```

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