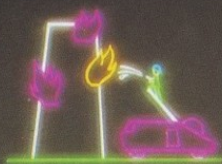
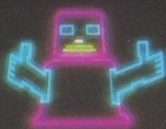


More The Computer Games Series

Series Editor: Tim Hartnell

GAMES FOR YOUR ZX SPECTRUM

£££££'s of entertaining games for only £3.50



MORE GAMES FOR YOUR ZX SPECTRUM

**By
Graham Carter**

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TO PAUL F.

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Editor's Introduction

Your computer is waiting to challenge you. Moving graphics games, brain stretchers, word games and puzzles are all here and ready to entertain you.

A wide variety of games are included in this book. The programs have been written by some of the most talented young programmers working in this country at the moment, and represent a variety of approaches to solving programming problems.

An examination of the listings should teach you many tricks and techniques to apply to your own programming. And once you have mastered the programs in their present form, you might want to try your hand at improving them. There is no such thing as a 'perfect program', so these games are sure to benefit from your programming skill.

All that now remains is for you to turn the page and enter the programs. I can only hope that you enjoy playing the games as much as we did when preparing this volume.

Tim Hartnell, series editor
London
March 1983

Author's Introduction

The Sinclair ZX Spectrum is a relatively cheap personal computer with some advanced, professional computer features.

The programs in this book all use the Spectrum's colour facilities, and many use the high resolution plotting features to add realism to the games.

The book includes arcade games, strategy games, adventure games and gambling games. In games against the computer, a balance has been maintained to equalise out the computer's and the player's chances of winning. Many of the programs use useful routines which you can incorporate into your own programs.

Here, then is a collection of games to suit programmers of all ages.

Graham Carter
Stanwell, Middlesex
August 1983

Program Notes

Space Cavern

Line 1 contains the machine code routine and must contain 151 zeros.

N.B. Save a copy of the program on cassette before attempting to RUN for the first time.

Rescue

Line 380 graphic A B

Line 390 graphic C D E F

Line 400 graphic G H I J K L M

Line 410 graphic N O P Q

Line 420 graphic R S T U

Bazooka

Line 60 graphic A B B C, 7 shifted, D E E F

Line 100 graphic 8 shifted twice

Line 160 graphic 3 shifted twice, 3 shifted, 3 unshifted, 6 shifted, 5 shifted, 5 unshifted.

Line 480 graphic 8 shifted, 8 shifted.

Towering Inferno

Line 53 graphic A

21

Line 10 graphic A B repeated.

Stunt Motorcycle

Lines 120, 140, 150, 180, 200, 210, 1070 graphic E

Line 1010 graphic D

Line 1020 graphic A

Line 1040 graphic B

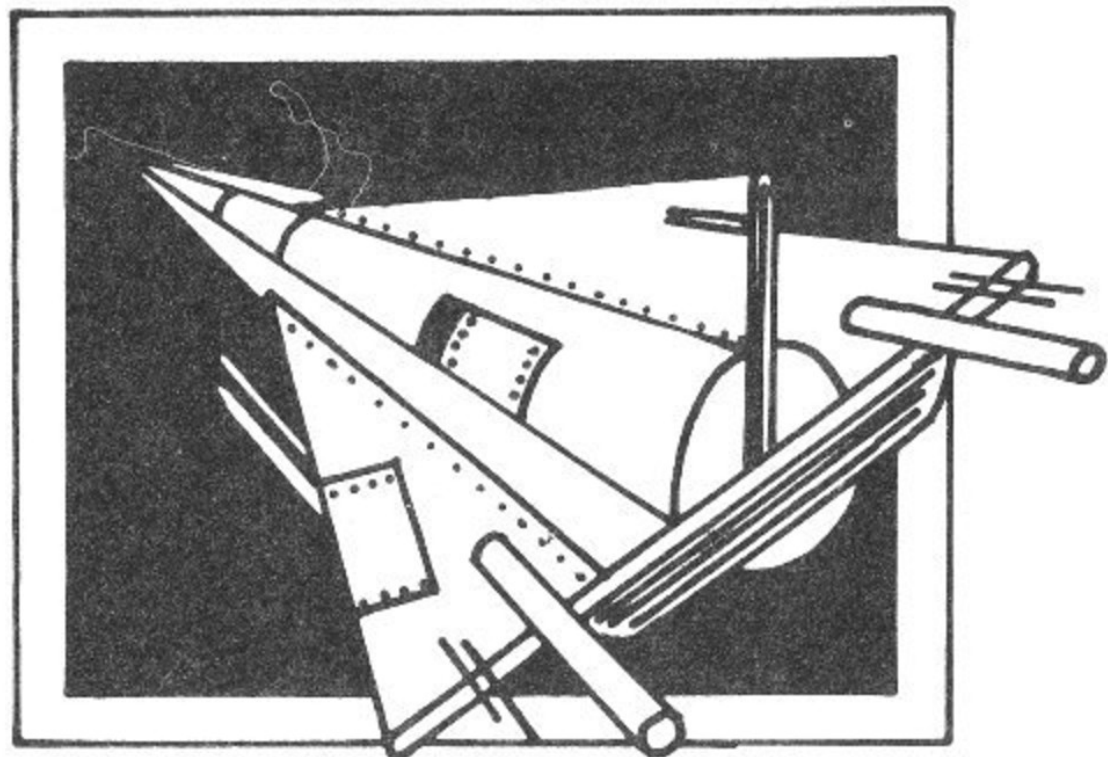
Line 1060 graphic C

SPACE CAVERN

This game will keep arcade game fans happy for a long, long time. This is a very fast, challenging game written partly in machine code to achieve the extra speed necessary for a good action game.

You control a space cruiser and must try to travel through the dangerous Space Cavern. The path is twisting and turning; the tunnel into the cavern gets narrower and narrower.

You control your craft with the up and down cursor keys. A game of 'Space Cavern' is a real challenge for your reflexes.



MORE GAMES FOR YOUR ZX SPECTRUM

```
      1 REM *****
```

```

5 IF PEEK 23909=201 THEN GO T
0 80

```

10	LET	3\$="042	209	092	062	002
050	060	092	062	017	215	005
215	062	016	215	062	001	062
002	215	055	208	092	215	000
215	062	032	215	034	208	"

014	024	013	006	031	035	126	043
119	035	016	249	035	121	254	000
032	240	042	208	092	077	033	008
086	121	254	000	"			

```

20 LET A$=A$+"040 007 017 032
000 065 025 016 253 126 254 000
032 005 062 001 050 210 092 062
022 215 121 215 062 006 215 062
144 215 237 091 "
```

```

25 LET A$=A$+"211 092 033 031
088 014 024 067 054 000 013 197
006 032 035 016 253 193 016 244
066 054 045 013 197 006 032 035
016 253 193 016 "

```

```

30 LET A$=A$+"244 065 054 000
197 006 032 035 016 253 193 016
245 201 " 23760 4

```

```
40 FOR a=23765 TO 23909
```

```
50 POKE a,VAL a$( TO 3)
```

60 LET A=3: B=5: C=7

70 NEXT 3

127 124 123 122 121 120 119 118 117 116 115 114 113 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

ಇಂಥ ಒಂದು ಸಂದರ್ಭವೇ ಇದ್ದು, ಅದರಲ್ಲಿ ಒಬ್ಬರು ಸ್ವಾಮಿಯು ತನ್ನ ಸ್ವಾಮಿಯನ್ನು ಕುರಿತು ಹೇಳುತ್ತಿದ್ದನು.

```

90 FOR N=0 TO 7

```

```
1000 POKE USR "a"+D,VAL ##( TO 3
```

```
110 LET 数组=数组(5 TO 10)
```

120 NEXT D

130 RANDOMIZE

1994

148 POKF 23769.19: POKF 23761.1

POKE 03750, 0

150 PAPER 5 INK @: BORDER @: C

451

```
160 LET SC=0: LET a=5: LET n=10
```

... ..

165 PRINT INK 0: PAPER 0: AT 21.

১৯৭৬: ১৭৭ ১৯৭৬: ১৭৭

SPACE CAVERN

```

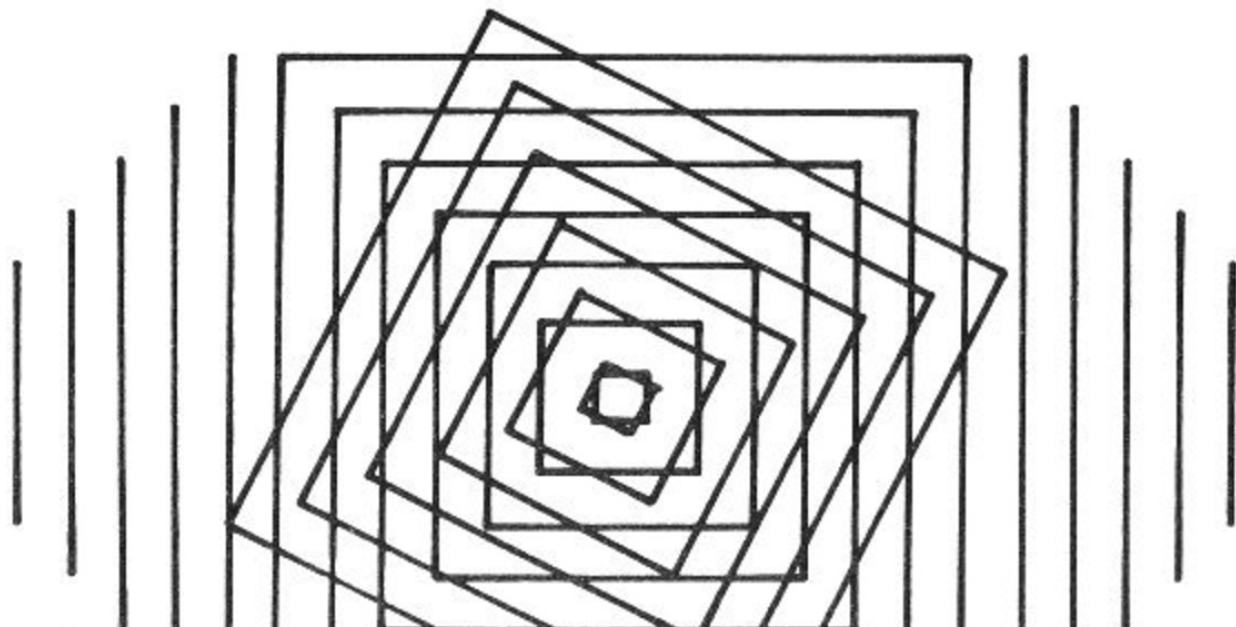
190 LET L=a/2
200 LET g=21-a
210 IF a>14 THEN LET L=6: LET
g=6
220 GO SUB 1000
230 NEXT a
240 LET a=6
250 LET b=a-INT (RND*10)
260 IF b<1 THEN LET b=1
270 FOR L=a TO b STEP -1
280 IF PEEK 23762=1 THEN GO TO
2000
290 GO SUB 1000
300 NEXT L
310 LET a=b+INT (RND*10)
320 IF a>21-g THEN LET a=21-g
330 FOR L=b TO a
340 IF PEEK 23762=1 THEN GO TO
2000
350 GO SUB 1000
360 NEXT L
370 LET sc=sc+13
380 IF sc/117=INT (sc/117) THEN
LET g=g-1
390 IF g<2 THEN LET g=2
400 GO TO 250
1000 IF INKEY$="6" THEN LET n=n+
1
1010 IF INKEY$="7" THEN LET n=n-
1
1020 POKE 23761,n
1030 POKE 23763,L
1040 POKE 23764,g
1050 LET z=USR 23765
1060 RETURN
2000 LET p=PEEK 23760
2010 FOR n=1 TO 10
2020 FOR L=0 TO 7
2030 PRINT INK L;AT p,8;CHR$ 143
2035 BEEP .005,n*2+L*5
2040 NEXT L: NEXT n
2050 PRINT INK 0;AT p,8;CHR$ 143
2060 PRINT PAPER 7; INK 0;AT 9,1
0;"score = ";sc
2070 IF sc<=hi THEN PRINT PAPER
7; INK 0;AT 13,8;"high score = "
;hi
2080 IF sc>hi THEN LET hi=sc: PR
INT FLASH 1; PAPER 0; INK 7;AT 1
3,8;"HIGH SCORE = ";hi

```

MOIRE

This program generates high-resolution colour patterns on the screen, and is a very good demonstration of the Spectrum's plotting capabilities.

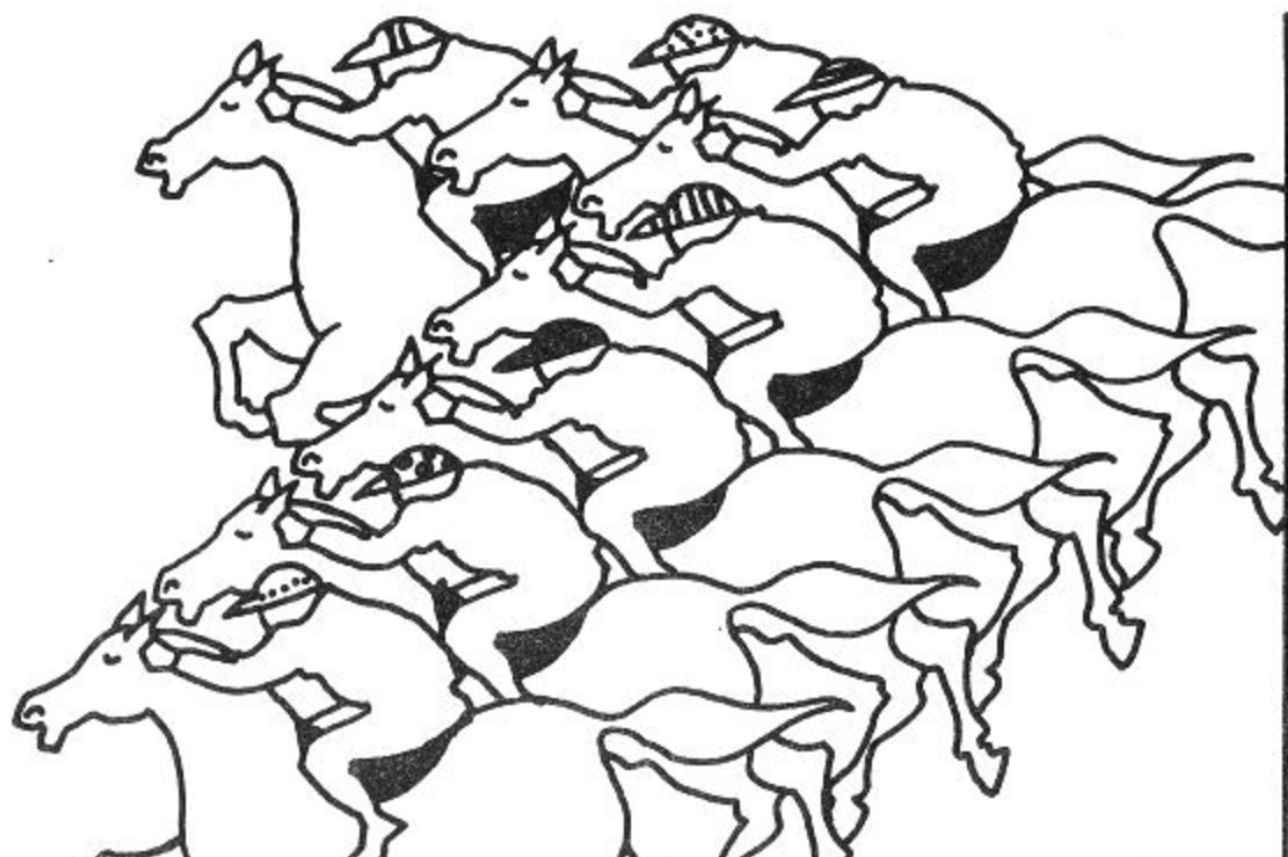
```
10 REM Moire
20 REM Martyn Latimer
30 REM Daniel Mills
40 LET i=6: OVER 1: BORDER 0:
PAPER 0: CLS : INK 9: FOR a=1 TO
255
45 IF RND>.9 THEN LET i=INT (R
ND*7)+1
50 INK i: PLOT a,0: DRAW 255-(
a*2),175
60 NEXT a
70 FOR a=0 TO 175
75 IF RND>.9 THEN LET i=INT (R
ND*7)+1
80 INK i: PLOT 0,a: DRAW 255,1
75-(a*2)
90 NEXT a
100 PAUSE 100: GO TO 40
```



A DAY AT THE CHASES

Why bother to travel to the racetrack and lose all your money when you can gamble to your heart's content in the comfort of your own home? This game puts you on a course of your choice, betting a portion of your £200 on one of eight horses. There are different odds, a pay-out for winning and a graphic display of the race in progress with the horses jumping the fences and galloping to the finishing post.

The game is simple to follow. To place a bet, just enter the number of the required horse and the amount you wish to bet and gamble away!



MORE GAMES FOR YOUR ZX SPECTRUM

```

5 INVERSE 0: PAPER 4: INK 0:
BORDER 1
10 BRIGHT 0: CLS
20 GO SUB 1470
30 DIM h(8)
35 LET n=200
36 DIM d(8)
38 GO SUB 1000
40 FOR p=1 TO 8
41 LET h(p)=0
42 LET d(p)=0
43 NEXT p
44 CLS
45 FOR L=4 TO 20
50 PRINT AT L,29;CHR$ 134;AT L
,8;"/";AT L,16;"/";AT L,24;"/"
55 NEXT L
60 INK 1: PAPER 7: INVERSE 1
62 PRINT AT 0,0;"
"
64 PRINT "          A Day At The
Chases
"
66 PRINT "
"
68 FOR p=1 TO 16: PRINT CHR$ 9
6;CHR$ 36;: NEXT p
70 INVERSE 0: INK 0: PAPER 4
80 FOR p=1 TO 8
82 IF h(p)=1 THEN PRINT AT p*2
+3,d(p);CHR$ 142;CHR$ 142
84 IF h(p)=1 THEN GO TO 150
85 LET r=RND
87 PRINT AT p*2+3,d(p);" "
90 IF r>.9 THEN LET d(p)=d(p)+
2
95 IF r>.45 AND r<.9 THEN LET
d(p)=d(p)+1
98 IF r<.35 THEN LET d(p)=d(p)
+3
99 IF p<4 AND RND<.5 THEN LET
d(p)=d(p)+INT (RND*3)
100 IF p<7 AND p>3 AND RND<.34
THEN LET d(p)=d(p)+1
108 IF d(p)=8 OR d(p)=16 OR d(p
)=24 THEN GO SUB 350
110 IF d(p)>=29 THEN GO TO 490
120 PRINT AT p*2+3,d(p);p
150 NEXT p
152 LET n=n-1
155 FOR p=1 TO 8
156 IF h(p)=1 THEN LET n=n+1
158 NEXT p

```

DAY AT THE CHASES

```

195 CLS
200 GO TO 640
350 LET J=RND
360 IF J>.5 THEN PRINT AT P*2+3,
d (p); CHR$ 141; CHR$ 141
370 IF J>.5 THEN LET h (p)=1
380 RETURN
490 CLS
500 PAUSE 50
520 FOR s=1 TO 21
530 FOR L=0 TO 31: PRINT CHR$ 1
34:: NEXT L
540 NEXT S
545 PAPER 4: INK 0: INVERSE 1:
PRINT AT 7,6;"
"
550 PRINT AT 8,6;" The Winner w
as ";p;" "
560 PRINT AT 9,6;"
": INVERSE 0
570 PAUSE 100
580 CLS
600 IF p=z AND z>4 THEN LET m=m
+(m*2)
610 IF p=z AND z>6 THEN LET m=m
+(m*3)
620 IF p=z AND z<7 AND z>3 THEN
LET m=m+(m*4)
630 IF p=z THEN PRINT "WELL DON
E"
640 IF z<>p THEN PRINT "Hard Lu
ck, Try Again."
650 IF m<1 THEN GO TO 800
700 PAUSE 100
710 GO SUB 1000
720 GO TO 40
800 CLS
810 PRINT "You have run out of
money."
820 PRINT "Good-Bye!"
1000 REM **All betting instruct-
ions here**
1005 CLS
1010 PRINT " "; CHR$ 142; " A D
AY AT THE 'CHASES "; CHR$ 141
1015 PRINT " "; CHR$ 139; CHR$ 139
;" ***** "; CH
R$ 135; CHR$ 135
1020 PRINT "Welcome, punter."
1025 PRINT "Choose your horse:

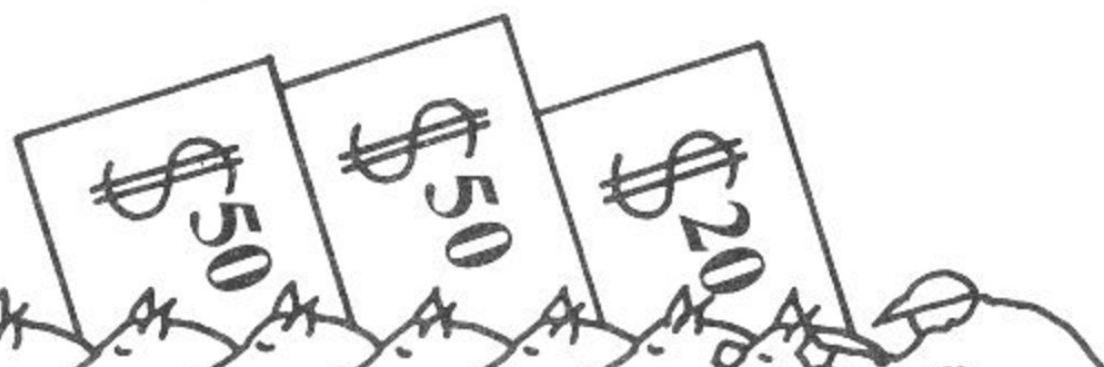
```

MORE GAMES FOR YOUR ZX SPECTRUM

```

2 to 1"
1060 PRINT AT 11,4;"4 Mill Roug
h 4 to 1"
1070 PRINT AT 12,4;"5 Crystal c
lear 4 to 1"
1075 PRINT AT 13,4;"6 Frisky Fi
lly 4 to 1"
1080 PRINT AT 14,4;"7 Brown Bea
uty 8 to 1"
1090 INPUT Z
1095 IF Z<1 OR Z>8 THEN GO TO 10
90
1120 CLS
1130 PRINT "How much do you wan
t to bet?"
1140 PRINT "You have ";CHR$ 96;
m
1150 INPUT mo
1160 IF mo<1 OR mo>m THEN GO TO
1150
1170 LET m=m-mo
1180 PRINT "You Now Have ";CHR$
96;m
1200 PAUSE 100
1300 RETURN
1470 CLS
1480 PAPER 1: INK 7
1482 PRINT "Choose course: Aintr
ee=1
1484 PRINT TAB 15;"Leopardstown=
2
1486 PRINT TAB 15;"Ascot=3
1488 PRINT TAB 15;"Cheltenham=4
1490 PRINT TAB 15;"Newbury=5
1500 INPUT a
1510 LET a=((a/10)*2)-0.05
1520 PAPER 4: INK 0
1790 CLS
1800 RETURN

```



AIR SEA RESCUE

While on holiday one year, Tim Hartnell capsizes his pedal-boat! You must fly to his rescue in your helicopter, or be haunted by his ghost for the rest of your life.

Use keys 5, 6 and 7 to manoeuvre the helicopter in the direction indicated by the arrows above these keys.



MORE GAMES FOR YOUR ZX SPECTRUM

```

10 INVERSE 0: PAPER 0: INK 7:
BORDER 0: BRIGHT 0
20 GO TO 460
30 LET a=0
40 LET dx=INT (RND*29)
50 LET y=20
60 LET x=0
70 IF dx<2 THEN GO TO 40
80 IF dx>24 THEN GO TO 40
90 CLS
100 FOR b=1 TO 25
110 LET y=y+(INKEY$="8")-(INKEY
$="5")
120 LET x=x+(INKEY$="6")-(INKEY
$="7")
130 IF x=13 AND y+4=dx OR x=13
AND y+3=dx OR x=13 AND y+2=dx TH
EN GO TO 230
140 GO SUB 290
150 IF x=13 AND y+4=dx THEN GO
TO 230
160 NEXT b
170 CLS
180 PRINT AT 1,0;"You have fail
ed miserably. Tim Hartnell will
haunt you forever."
190 PRINT AT 6,0;"Again?"
200 INPUT a$
210 IF CODE a$=89 OR CODE a$=12
1 THEN GO TO 30
220 STOP
230 LET a=a+1
240 PRINT AT 0,0; FLASH 1;"Cong
ratulations!"
250 PAUSE 75
260 CLS
270 PRINT "You have saved Tim H
artnell"
280 GO TO 190
290 IF a=1 THEN GO TO 350
300 LET z=INT (RND*10)
310 IF z=1 OR z=2 THEN LET dx=d
x+2
320 IF z=8 OR z=9 THEN LET dx=d
x-2
330 IF dx>24 THEN LET dx=24
340 IF dx<2 THEN LET dx=2
350 PRINT AT 19,0; PAPER 5;"
360 IF x>1 THEN PRINT AT x-1,y-
1;"
370 IF x>=1 THEN PRINT AT 0,0;"

```

AIR SEA RESCUE

```

390 PRINT "AT x+1,y; INK 6;" CD
EF
400 PRINT "AT x+2,y; INK 6;" GH
IJKLM
410 PRINT "AT x+3,y; INK 6;" NO
PQ
420 PRINT "AT x+4,y; INK 6;" RS
TU
430 IF x<13 THEN PRINT AT x+5,y
;"
440 PRINT AT 18,dx;" ";CHR$ 9
2;CHR$ 111;CHR$ 47;" "
450 RETURN
480 FOR n=USR "a" TO USR "u"+7:
READ r
490 POKE n,r: NEXT n
880 GO TO 30
890 DATA 24,6,3,0,0,0,0,0,0,0,0,0
,192,96,4,2,1,0,0,0,0,63,224,0
,192,24,6,3,62,224,1,15,0,0,3,24
8,224,96,144,250
900 DATA 0,0,127,128,0,0,0,0,0,0,0,0
7,8,24,32,64,128,128,48,255,32,3
2,32,32,32,32,8,255,0,0,0,0,0,0
64,224,47,22,9,8,7,2,0,0,255,0,1
28,255,48,0,0,0,224,15,0,224,15,
0,36,56,78,156,36,34,193,129
910 DATA 128,128,128,128,128,128,128
9,135,122,16,48,32,64,128,0,0,12
8,0,0,0,0,0,3,1,5,3,1,1,3,2,4,4,
142
920 DATA 154,175,74,244,0,255,2
55,0,0,255,0,0,255,0,255,0,3,255
,0,0,255,0,255,0,80,160,160,80,2
55,0,255,0

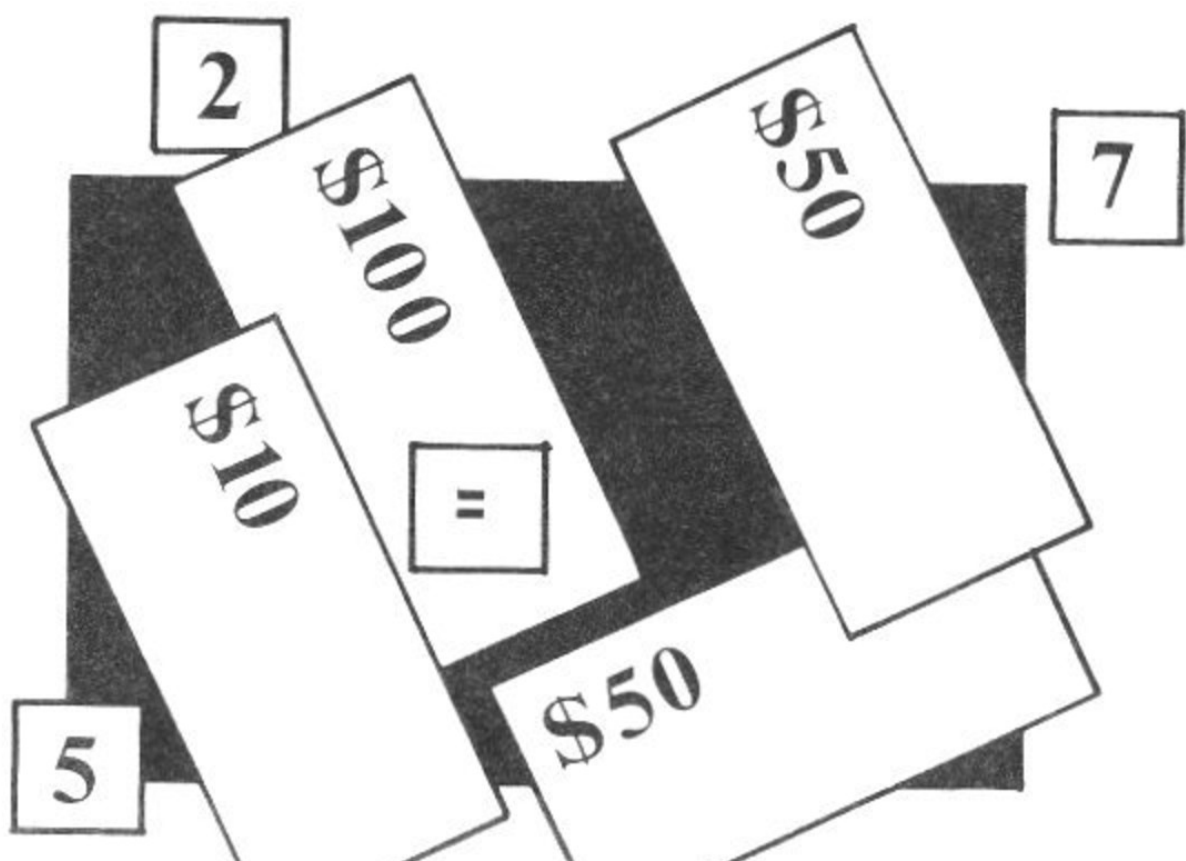
```



007 DICEMASTER

In this multi-player game you must try to throw a seven with your two dice. You win double your bet if you throw a seven and receive your money back if you throw an odd number, but if you throw an even number you lose your money. You have a choice of six game lengths and as many players as you like. The computer updates the situation every round and skilfully calculates its bet according to its financial situation, and how recent games have gone.

The game stops after one go, but if you require a repeat option, then add the following line: 490 GO TO 5




```

1 INVERSE 0: BORDER 1: PAPER
5: INK 1
2 BRIGHT 1: CLS
5 GO SUB 500
9 LET Z=0
10 LET V=0
15 CLS
16 INPUT "Length of game?(1-6;
6=Long)";L
18 IF L<1 OR L>6 THEN GO TO 16
19 LET L=L+5
20 INPUT "How many players?";P
33 DIM A$(P+1,12): DIM M(P+1)
35 FOR K=1 TO P: INPUT "Name?"
; A$(K)
45 LET M(K)=40
50 NEXT K
55 LET A$(P+1)="Computer"
57 LET M(P+1)=40
60 PRINT
65 FOR K=1 TO P+1
66 IF M(K)<=0 THEN NEXT K
67 CLS
68 PRINT "Enter your bet, ";A$
(K)
69 IF K=P+1 THEN LET C=INT (.2
5*M(K))
70 IF K=P+1 AND Z>2 THEN LET C
=C+INT (.1*M(K)*(2*Z/3))
71 IF K=P+1 AND RND>.8 THEN LE
T C=C+INT (M(K)/6)
72 IF K=P+1 AND RND<.2 THEN LE
T C=C-INT (M(K)/6)
73 PRINT
75 IF K=P+1 THEN PRINT "Comput
er bets ";C
77 IF K=P+1 THEN GO TO 80
78 INPUT C
79 IF C>M(K) THEN GO TO 68
80 PRINT
82 INPUT "Press ""ENTER"" to t
hrow dice";N$
90 LET DD=INT (RND*6)+1
100 LET D=INT (RND*6)+1
105 PRINT
110 PRINT D,DD
115 LET T=D+DD
117 PRINT
120 PRINT "Total of ";T
135 IF T/2=INT (T/2) THEN GO SU

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

147 IF K=P+1 AND T<>7 THEN LET
Z=Z+1
150 CLS
160 NEXT K
162 LET U=U+1
165 PRINT "End of round, ";U
167 FOR K=1 TO P+1: IF M(K)<=0
THEN NEXT K
170 PRINT "A$(K); " has ";M(K)
172 PRINT
174 NEXT K
175 IF U=L THEN GO TO 460
176 INPUT "Press ""ENTER""";N$
180 GO TO 65
300 PRINT
310 IF K=P+1 THEN PRINT "*****
***** I win! *****"
320 IF K<>P+1 THEN PRINT "*****
***** You win! *****"
330 LET M(K)=M(K)+2*C
400 RETURN
420 PRINT
430 IF K<>P+1 THEN PRINT "You (
ose, Buddy!"
432 IF K=P+1 THEN PRINT "I lost
!"
435 LET M(K)=M(K)-C
440 RETURN
460 PAUSE 300
462 CLS
464 FOR T=1 TO 20
465 PRINT "+++++"
+++++"
468 NEXT T
470 PRINT AT 8,8;"End of game"
480 PAUSE 1000
490 GO TO 5
500 CLS
505 PRINT "          007 - Dicemas
ter"
510 PRINT "You have £40 to bet
on the"
520 PRINT "two dice. You win if
the dice"
530 PRINT "come up seven. You
lose if the"
540 PRINT "dice total an even n
umber. Any"
550 PRINT "other score does not
count"
560 PRINT "-----Press any key t
o start-----"
570 IF INKEY$="" THEN GO TO 570

```

REPEAT

Repeat is a simple game where you must repeat the selection of characters that appear on the screen. Concentrate now, they only appear for a very short time. Every time you guess the correct combination of symbols, an extra character is added on. When you have guessed all the characters correctly, you win the game.

```

60 INVERSE 0: PAPER 0: BORDER
0: INK 6
90 BRIGHT 1: CLS
100 LET x=6+INT (RND*10)
110 DIM f$(x)
120 FOR n=1 TO x
130 LET f$(n)=CHR$ (48+INT (RND
*10))
140 NEXT n
150 PRINT "This number has ";LE
N (f$); " figures."
160 PAUSE 25
170 FOR t=1 TO LEN (f$)
180 PRINT AT 10,10; INK 7; BRIG
HT 0; f$(1 TO t)
190 PAUSE 12
200 CLS
210 PRINT "Enter guess"
220 INPUT a$
230 IF a$<>f$(1 TO t) THEN GO T
O 300
240 PRINT AT 14,7; INK 4;CHR$ 1
34;CHR$ 134;CHR$ 134;"Correct!";
CHR$ 137;CHR$ 137;CHR$ 137
250 PAUSE 40
260 CLS
270 NEXT t
280 PRINT AT 10,10;"You win."
290 STOP
300 PRINT '...: INVERSE 1: PRINT

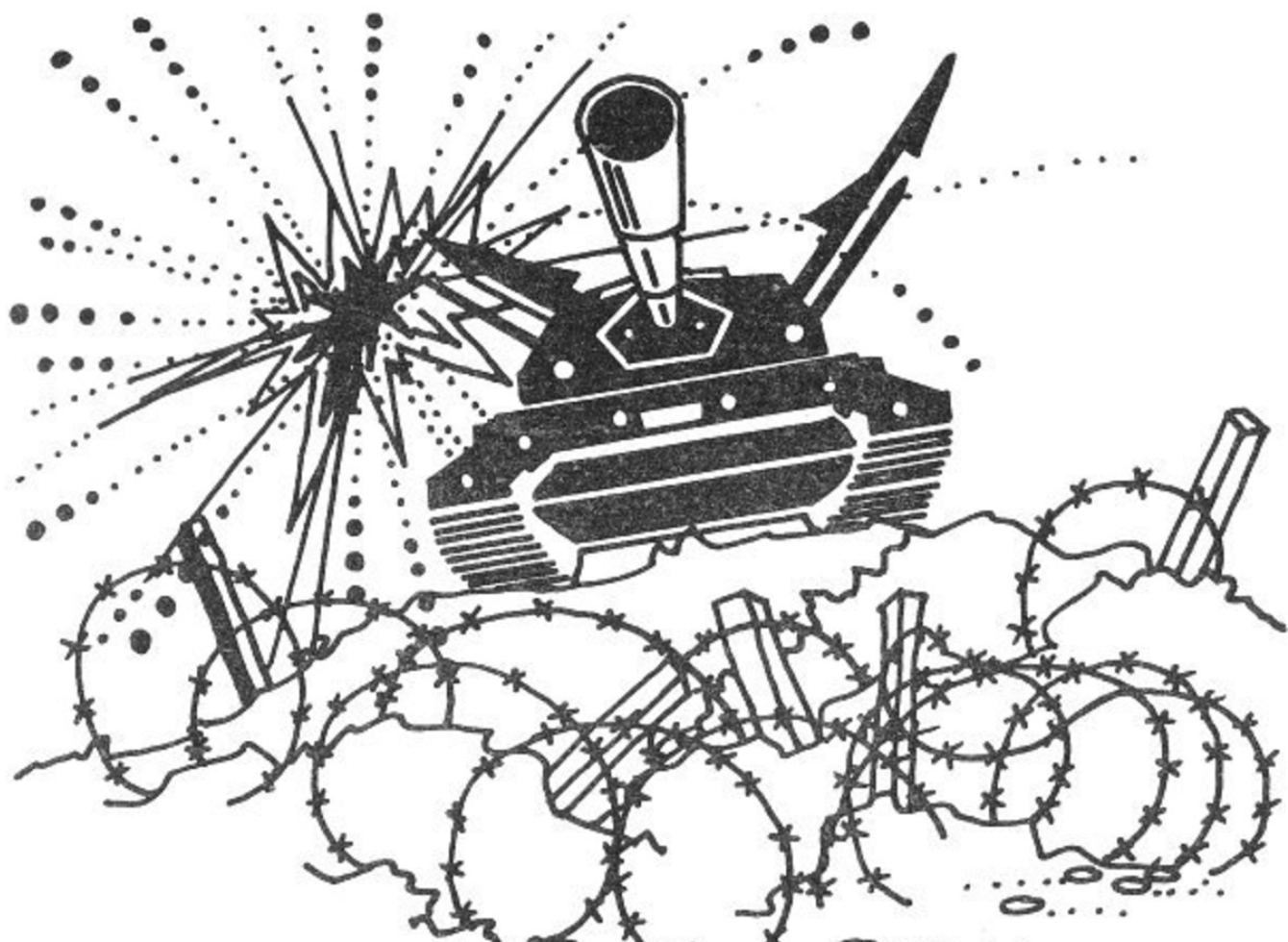
```

BAZOOKA!

You lie in wait behind a pile of sandbags, with your anti-tank gun loaded and ready for use. An enemy tank appears on the horizon, but there is a large wall in your line of fire. You raise the turret of your gun and fire! The shell arcs over the wall and penetrates the tank's armour, turning it into a mass of mangled metal. There is little time for praise, however, as another tank comes into view.

In this game you must judge your angle and velocity for the shell to clear the wall and hit the tank.

The shell's journey is plotted according to genuine formulae as it hurtles towards the tank.



BAZOOKA

```

5 BORDER 0: PAPER 0: INK 7
7 CLS
11 GO SUB 530
13 RANDOMIZE
15 CLS
18 LET try=0
20 DIM a$(32)
30 LET wall=5+INT (RAND*18)
40 LET hgt=3+INT (RAND*6)
50 LET tank=wall+2+INT (RAND*12)
7-wall())
60 PRINT AT 19,tank; INK 5;"--"
";AT 20,tank; INK 5;"ABBC";AT 2
1,tank; INK 5;"DEEF"
70 FOR a=1 TO hgt
80 PRINT AT 22-a,wall; INK 6;"
G"
90 NEXT a
100 PRINT AT 20,1; INK 4;"==";A
T 21,0; INK 4;"=="
110 PRINT AT 8,3;"Enter angle o
f projection"
120 INPUT ang
130 IF ang<1 OR ang>90 THEN GO
TO 120
140 PRINT AT 8,0;a$
150 LET x=1+(ang>10)+(ang>33)+(
ang>55)+(ang>77)
160 PRINT AT 20,1; INK 4;("=="
AND x=1)+("==" AND x=2)+("==" AN
D x=3)+("==" AND x>3)
170 PRINT AT 19,1; INK 4;("=="
AND x=3)+("==" AND x=4)+("==" AND
x=5)
180 PRINT AT 8,6;"Enter shell v
elocity"
190 INPUT vel
200 IF vel<10 THEN GO TO 180
202 LET try=try+1
205 LET vel=vel/4
210 PRINT AT 8,0;a$
220 LET ang=ang*PI/180
230 LET hori=COS ang*vel
240 LET vert=SIN ang*vel
243 LET v=0
246 LET w=0
250 LET t=0
260 LET y=2+hori*t
270 LET x=18-INT (vert*t-4.9*t
*t))

```

```

290 PRINT AT v,w;" "
300 LET v=x: LET w=y
320 LET t=t+.2
330 IF x>20 THEN GO TO 360
340 IF y>=wall-1 AND y<=wall+1
AND x>=21-hgt THEN GO TO 360
350 GO TO 260
360 PRINT AT v,w;" "
370 IF x>20 THEN GO TO 400
380 PRINT AT 8,5;"Oops, you hit
the wall"
390 GO TO 420
400 IF y>=tank AND y<=tank+4 TH
EN GO TO 470
410 PRINT AT v,w;" "
415 PRINT AT 8,9;"You missed it
"
420 PRINT AT 10,4;"Hit any key
to try again"
430 IF INKEY$="" THEN GO TO 430
440 PRINT AT 19,1;" "
450 PRINT AT 8,0;a$;AT 10,0;a$
460 GO TO 100
470 FOR n=1 TO 15
480 PRINT AT 20,tank+1;"■ ";AT
20,tank+1;"■"
490 NEXT n
495 CLS
500 PRINT AT 8,4;"Great shot -
that took you"
505 PRINT AT 10,12;try;: IF try
=1 THEN PRINT "go."
506 IF try<>1 THEN PRINT "goes
"
508 PRINT AT 12,9;"Press any ke
y."
510 IF INKEY$="" THEN GO TO 510
520 RUN
530 FOR n=USR "a" TO USR "g"+7:
READ r
540 POKE n,r: NEXT n
690 RETURN
700 DATA 1,3,7,15,31,63,127,255
: DATA 255,255,255,255,255,255,2
55,255: DATA 128,192,224,240,248
,252,254,255: DATA 63,64,156,162
,162,156,64,63: DATA 255,0,60,12
6,126,60,0,255: DATA 252,2,57,63
,69,57,2,252: DATA 0,126,255,126
,0,126,255,126

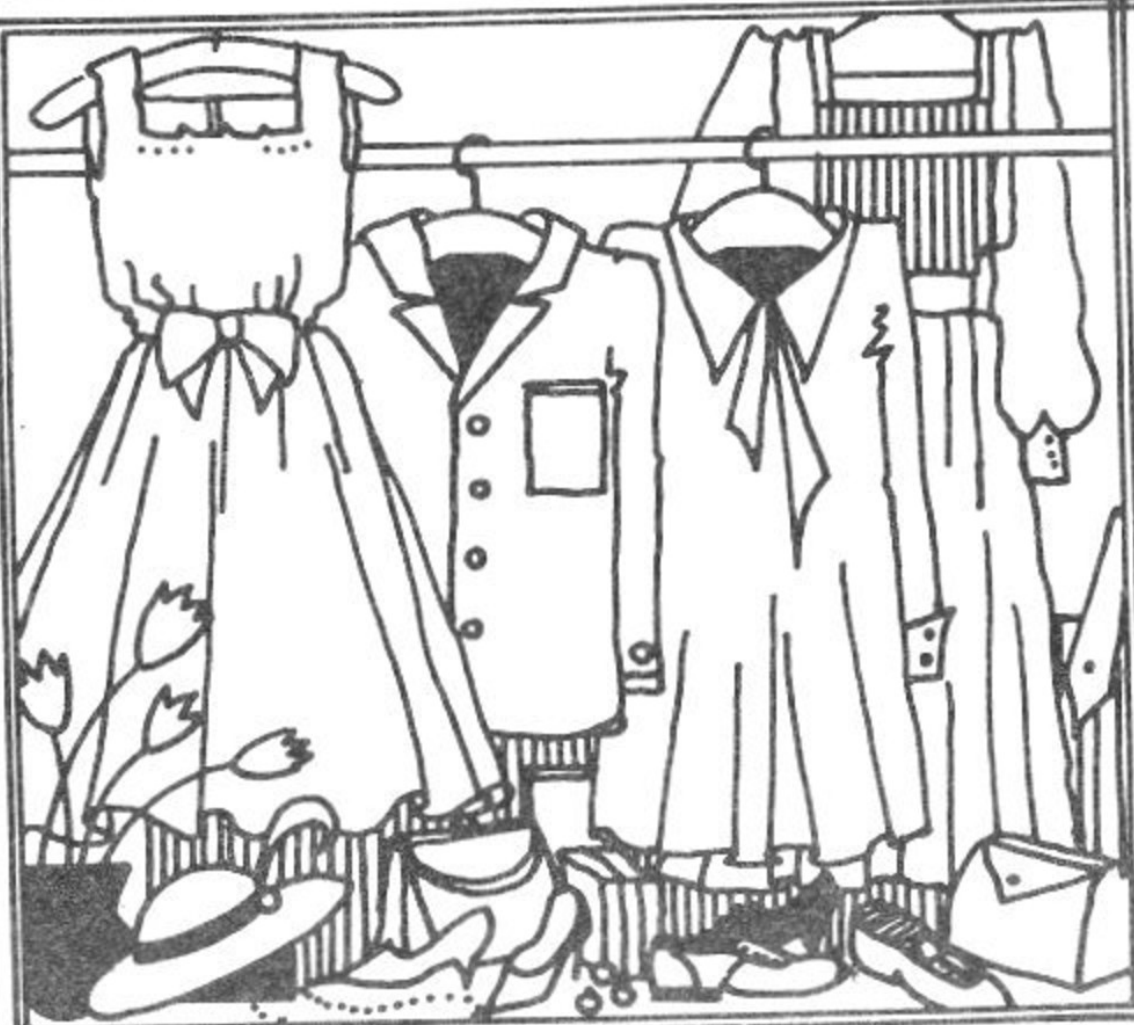
```

JUNKSHOP

Why not grab anything that you don't want and take a stroll down to your local junk shop?

This program allows you to try to sell anything which you wish to get rid of to the owner of the junk shop. You must haggle over the price with him; he is a very stubborn man and will not accept anything valued at more than £200.

• JUNK SHOP •

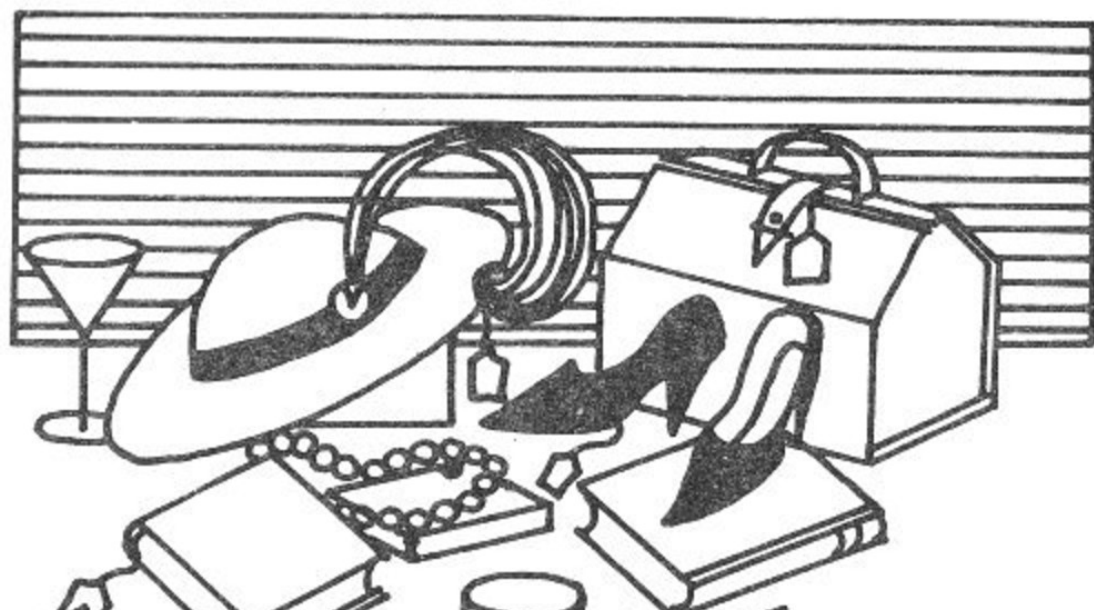


MORE GAMES FOR YOUR ZX SPECTRUM

```

10 RANDOMIZE
20 CLS
30 LET d=0
40 INPUT "What do you want to
sell? ";a$
50 IF RAND<.8 THEN GO TO 90
60 PRINT "Sorry, I am not int
erested in ";a$+"("s" AND a$IL
EN a$)<>"s")
70 PAUSE 75
80 RUN
90 CLS
100 INPUT "How much are you ask
ing? ";a
110 IF a>100+RAND*100 THEN GO TO
60
120 LET c=a
130 LET b=d+INT (RAND*(a-d))+2
140 IF b>=a THEN GO TO 1000
150 PRINT "I will give you £";b
160 PRINT "What do you say?"
170 INPUT b$
180 CLS
190 IF b$="YES" OR b$="yes" OR
b$="Yes" THEN GO TO 1010
200 IF VAL b$>c-RAND*c/3 OR VAL
b$>a THEN GO TO 60
210 LET a=VAL b$
220 LET d=b
230 GO TO 130
1000 LET b=a
1010 CLS
1020 PRINT "I will take your ";a
$
1040 PAUSE 50
1050 RUN

```



ESCAPE!

You are in a P.O.W. camp in Germany, and are trying to escape through a tunnel beneath your hut.

There are two types of soil to dig through, but one type is much harder than the other, and digging through it uses up more of your valuable time.

Use the cursor keys to move in any direction, as you work towards the exit at the top left-hand corner of the screen.

```

10 INVERSE 0: CLEAR
15 PRINT "Enter a number for t
he maze pattern."
20 INPUT Z
25 IF Z<=0 OR Z>65535 THEN GO
TO 20
30 RANDOMIZE Z
35 LET sec=0
40 DIM x(600)
45 FOR a=1 TO 600
50 LET b=RND*1
55 IF b<.3 THEN LET x(a)=61
60 IF b>=.3 THEN LET x(a)=48
70 NEXT a
80 CLS
85 FOR a=1 TO 600
90 PRINT CHR$(x(a));
100 NEXT a
110 LET c=27+RND*100
120 FOR n=22527 TO 23135
130 POKE n,c
140 NEXT n
150 LET y=0: LET x=10
200 PRINT AT x,y;CHR$ 94
210 LET ox=x: LET oy=y
230 LET y=y+(INKEY$="8")-(INKEY
$="5")
235 PAUSE 15
240 LET x=x+(INKEY$="6")-(INKEY
$="7")

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

270 PRINT AT 0x,0y;" "
280 IF x=0 AND y=0 THEN GO TO 3
300
290 GO TO 200
300 LET sec=INT (sec/4)
310 LET min=INT (sec/60)
350 PRINT AT 20,0; INK 7;"It to
ok you ";min;" minutes and" sec-
(min*60);" seconds to escape"
360 INPUT "Another go? (Y or N
)";w$
370 IF w$="N" OR w$="n" THEN ST
OP
380 INPUT "Press A for a new m
aze, or B for the one just played
";w$
390 IF w$="B" OR w$="b" THEN GO
TO 80
400 RUN
1000 LET q$=SCREEN$(x,y)
1010 IF CODE q$=61 THEN LET sec=
sec+1
1020 IF CODE q$=48 THEN LET sec=
sec+25
1050 RETURN

```



QUIZ

This program stores questions and answers in DATA statements, and presents them in a random order.

It is easy to add more questions, or to alter the ones provided.

```

5 INVERSE 0: PAPER 3: BORDER
3: INK 7: CLS
10 LET R=0
20 LET SC=0
50 GO TO 500
55 LET R=R+1
57 IF R>6 THEN GO TO 350
60 PRINT "Question number ";R
70 PRINT "-----"
80 PRINT "...The answer is a n
umber."
90 PRINT "Q$; "?"
100 INPUT N
120 IF N=0 THEN GO TO 300
130 FOR T=1 TO 30: PRINT INK 0;
"Wrong!";
160 NEXT T
170 PAUSE 50
180 GO TO 50
300 LET SC=SC+1
320 PRINT "Correct!"
330 PAUSE 50
340 GO TO 50
350 PAPER 4: BORDER 4: INK 0: C
LS
360 PRINT AT 10,10;"Your score
was ";SC: PAUSE 50
450 STOP
500 FOR N=1 TO INT (RND*11)+5
510 READ Q$,A
520 NEXT N: CLS : RESTORE
530 GO TO 55
550 DATA "Year of Tchaikovsky's
Overture",1812
560 DATA "No. of wings on a bip
1200" 2

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

600 DATA "Atmospheric Pressure
(in pounds)",14
610 DATA "27 x 16",432
620 DATA "Baker's Dozen",13
630 DATA "John Buchan's -- Step
s",39
640 DATA "Gross",144
650 DATA "Degrees in a triangle
",180
660 DATA "Year of Churchill's d
eath",1965
670 DATA "How many points for 5
lue in sno-oker",5
680 DATA "Orwell's year of dest
iny",1984
690 DATA "Percentage U.A.T.",15
700 DATA "Britain's newest TV c
hannel",4
710 DATA "Number of MP's in Par
liament",650
720 DATA "Price of a 1st class
stamp",16
730 DATA "Year of first VW Beet
le",1939
740 DATA "1739-956",783
750 DATA "No. of countries in E
EC",11
760 DATA "Year of Queen's coron
ation",1953

```

C O W
 G R A M M A R
 R E P H R A S E S
 T O G R A M

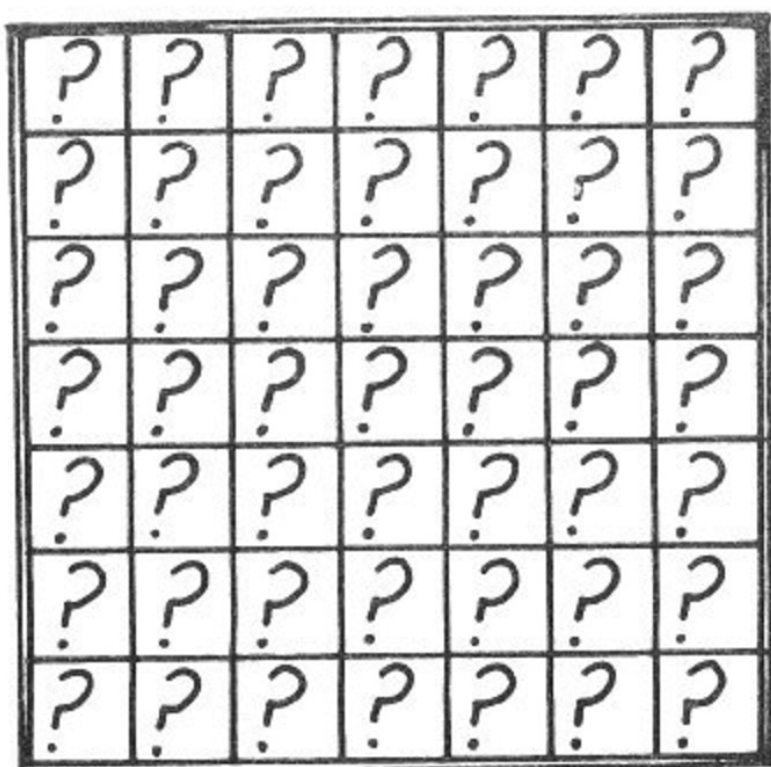
QUIZ

```

770 DATA "Pounds in a stone",14
780 DATA "No. of legs on a spider",8
790 DATA "Number of states in U.S.A.",50
800 DATA "Number of stripes on U.S. flag",13
810 DATA "ASCII code for *",42
820 DATA "Decimal of binary 1111110",254

```

?	?	?	?	?	?	?
---	---	---	---	---	---	---

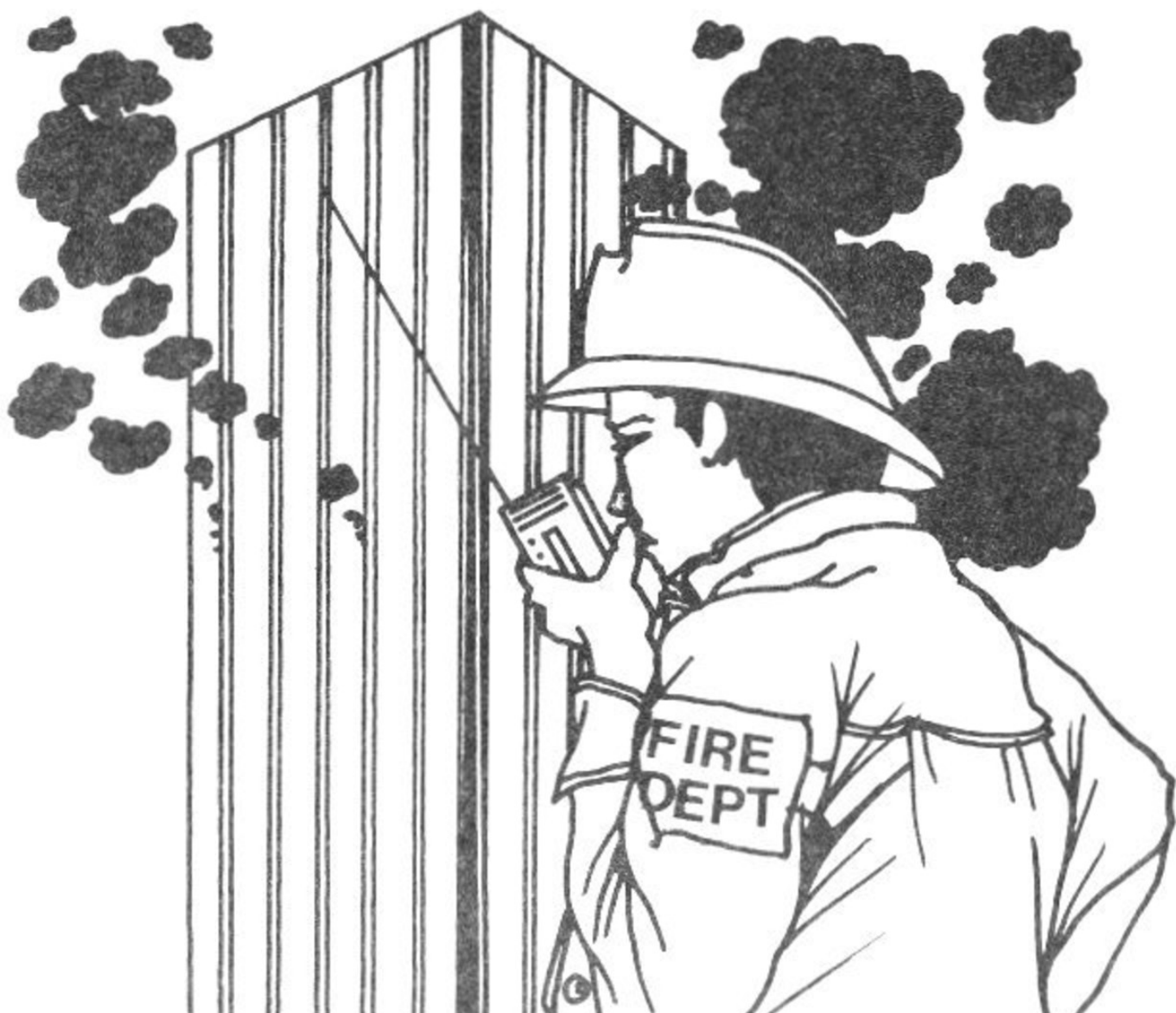


TOWERING INFERNO

A 30-storey skyscraper is on fire and you, as Fire Chief, must save the ten people who are still trapped in the burning building.

As they jump from the windows, you must catch them in your blanket.

To move the blanket, press 2 for left and 5 for right.



TOWERING INFERNO

```

1  1 INVERSE 0: BORDER 0: PAPER
2  2 INK 7: CLS
3  3 GO SUB 900
4  4 GO SUB 960
5  5 LET P=0: LET S=P
6  6 LET F=1: LET G=9
10 10 LET E=10: CLS
12 12 FOR X=2 TO 20
15 15 INVERSE 1: PRINT AT X,0;"
    "
18 18 NEXT X: INVERSE 0
19 19 FOR X=0 TO 31: PRINT AT 21,
x; CHR$ 131;: NEXT X
23 23 FOR X=3 TO 16 STEP 2
24 24 PRINT AT X,1;" ";AT X,3;" "
;AT X,5;" ";AT X,7;" "
28 28 NEXT X
50 50 PRINT AT 20,E-1;CHR$ 131;CH
R$ 131
51 51 FOR T=1 TO 8: NEXT T
53 53 PRINT AT F,G;"A"
59 59 PRINT AT 20,E-1;" "
60 60 IF INKEY$="5" THEN LET E=E+
1  1
62 62 IF E>31 THEN LET E=31
70 70 IF INKEY$="2" THEN LET E=E-
1  1
72 72 IF E<10 THEN LET E=10
85 85 PRINT AT F,G;" "
90 90 LET F=F+1
94 94 IF F>18 THEN GO TO 105
100 100 LET G=G+INT (RND*4)-1
102 102 IF G<10 THEN LET G=10
105 105 IF F=21 THEN GO TO 165
110 110 GO TO 50
165 165 LET P=P+1
170 170 IF G=E OR G=E-1 THEN GO TO
300
179 179 PRINT AT 21,G;CHR$ 140
180 180 FOR R=1 TO 40: INVERSE 1: P
RINT AT 7,16;"Splat!": INVERSE 0
182 182 PRINT AT 7,16;"Splat!": NEX
T R
185 185 PRINT AT 9,12;"Score= ";S;"
out of ";P
186 186 PAUSE 200
187 187 IF P=10 THEN GO TO 360
190 190 CLS : GO TO 5
220 220 LET S=S+1

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

340 GO TO 185
360 CLS
370 FOR X=1 TO 21
380 PRINT "*****"
*****
390 NEXT X
395 FOR K=7 TO 13
400 PRINT AT K,4;"

410 NEXT K
460 PRINT AT 8,5;"Your final score is ";S
470 PRINT AT 10,1;"You will be demoted unless you" do better next time."
490 GO TO 500
491 FOR K=1 TO 60
493 INVERSE 1: PRINT AT 10,0;"Well done!": INVERSE 0
495 PRINT AT 10,0;"Well done!"
498 NEXT K
500 PAUSE 250
510 RUN
900 CLS
910 PRINT AT 6,6;"The Towering Inferno"
920 PRINT AT 8,9;"2=Left, 5=Right"
930 PRINT AT 14,5;"Press any key to start"
940 IF INKEY$="" THEN GO TO 940
950 RETURN
960 FOR N=0 TO 7
970 READ R: POKE USR "a"+N,R
980 NEXT N
990 DATA 60,66,66,60,255,24,36,36
1000 RETURN

```

RULER OF LOS SINCLAIROS

No, not the 12-inch kind, the kind that rules a country. You are the dictator of a Banana Republic in Central America. The peasants have demanded that you rule for the next 12 years.

The incentives to stay the course are enormous — a peaceful retirement with a large pension! However, managing the country is not as easy as it sounds. Only your grovelling friend, the Spectrum, gives you any information whatsoever.

You must try to increase your lands without feeding the peasants poorly; if you starve them, they will rise up in revolution.

Each peasant requires two sacks of corn for nourishment a year. To buy an extra acre of land you need ten sacks of corn.

Only enter the number of extra acres of land needed, not the amount of corn that the extra land will cost.

I will leave the rest of the strategy up to you; there is still a lot to find out. Happy Ruling!

N.B. When the program pauses, press a key to continue.



MORE GAMES FOR YOUR ZX SPECTRUM

```

5 REM #When program pauses
press anykey #
10 INVERSE 0: PAPER 1: INK 7:
BORDER 1
15 CLS
30 LET c=1000
35 LET a=100
40 LET r=500
45 LET n=1
50 LET l$="***** * * * *****
***** * * * * * *
* * ***** * * *
*** * * * * *
* * * ***** ***
* *
52 CLS
55 PRINT l$
60 PAUSE 4e4
70 CLS
100 PRINT "In year ";n;" of our
glorious rul-er's reign"
120 PRINT "You have oh Master,
"
130 PRINT ", " a population of
";r;" loyal subjects,"
140 PRINT ", " a corn store of
";c;" sacks"
150 PRINT ", " and ";a;" acres
of land."
190 PAUSE 300
200 CLS
210 PRINT "How much extra land,
Master?"
220 INPUT L
225 LET a=a+L
230 LET c=-L*10
240 IF a<0 THEN GO TO 1000
250 PRINT "How many sacks as f
ood, Master?"
260 INPUT f
262 IF L=0 AND f=r THEN PRINT "
Do something constructive.": GO
TO 190
265 IF f>r+100 THEN PRINT "Yo
ur peasants will be very fat.":
PAUSE 80
270 LET c=c-2*f
280 IF a<0 THEN GO TO 1000
290 IF r-f>r/4 THEN GO TO 1500
300 LET r=r+(f-r)*RND
310 IF r<50 THEN GO TO 1000
315 LET r=INT (r)

```

RULER OF LOS SINCLAIROS

```

350 GO TO 52
500 CLS
520 FOR g=1 TO 91
530 PRINT "*****You did it oh
Master*****"
540 IF g/18=INT (g/18) THEN CLS

550 NEXT g
555 PRINT : l$
560 PRINT "Well done! The loy
al subjects of Los Sinclairos ar
e very happy."
570 PRINT "They will give you
a peaceful retirement, leaving
you alone"
580 PRINT "with you Spectrum.
I hope you are happy."
590 PAUSE 4e4
600 CLS
610 PRINT "Oh, before you go,
I thought you would like to know
that"
620 PRINT "You and your peasant
s harvested a total of ";c;" sac
ks of corn."
630 PRINT AT 10,4;"Press any ke
y to start."
635 IF INKEY$<>"" THEN RUN
640 PRINT AT 17,8;"another game
"
650 PAUSE 5
660 INVERSE 1: PRINT AT 17,8;"a
nother game": INVERSE 0
670 PAUSE 5
680 PRINT AT 17,8;"another game
"
690 PAUSE 5
700 GO TO 635
705 PRINT "Bad harvest,
oh Master..."
710 LET c=c-INT (RND*(c/4))
720 LET c=c+a
730 PRINT "Press any key to re
turn"
740 IF INKEY$="" THEN GO TO 740
750 RETURN
1000 CLS
1010 PRINT "You failed,you
greedy barbarian"
1020 PRINT "and were overc

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

leaving their "
1080 PRINT "country's economy in
the hands of ignorant fools is
a bad thing"
1090 PRINT "and they have theref
ore decided to let computer loo
k after"
1100 PRINT "their affairs..."
1110 PAUSE 4e4
1120 PRINT "A ZX Spectrum, of co
urse!"
1130 STOP
1500 CLS
1505 FOR t=1 TO 30
1510 PRINT AT 10,11; INK 5; PAPER
7;"REVOLUTION"
1515 BORDER 5
1520 PRINT AT 10,11;"revolution"
1525 BORDER 1
1530 NEXT t
1540 PRINT "Press a key to sur
vive."
1542 IF INKEY$="" THEN GO TO 154
2
1545 PRINT "
1550 FOR t=1 TO 16
1560 PRINT " ";
1570 PAUSE 20
1580 NEXT t
1600 IF RND<.25 THEN GO TO 1000
1605 LET d=INT (RND*(3*n))+10
1615 LET e=INT (RND*(8*n))+40
1620 CLS
1630 PRINT "%%%%%%%%Revolution st
opped%%%%%%%%"
1640 PRINT "But let that be a
lesson to you."
1650 PRINT "You also lost ";d;"
acres in"
1660 PRINT "the uprising, as wel
l as ";e
1670 PRINT "sacks of corn burnt
in a fire."
1680 LET r=r-d
1690 LET a=a-e
1700 PAUSE 250
1710 GO TO 300

```

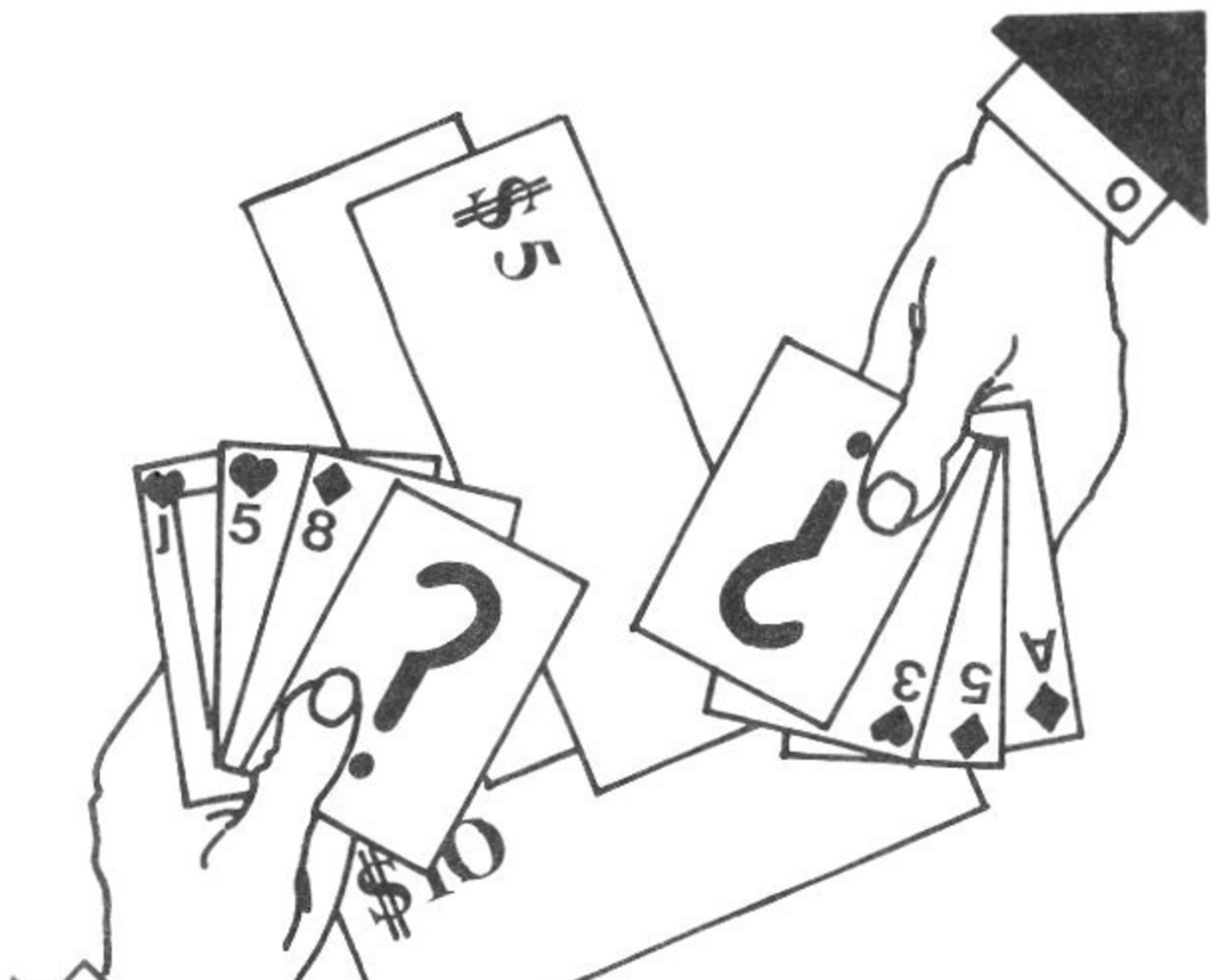

21

This is the Spectrum version of the classic card game played all over the world.

You and the computer take turns in trying to get as close to 21 as possible without exceeding that figure. You can also achieve five-card tricks in this version.

The computer is a difficult, but not unbeatable, opponent who weighs up the situation carefully before making a decision.

This game is extremely friendly to play, with all the instructions contained in the program.



MORE GAMES FOR YOUR ZX SPECTRUM

```

1 GO SUB 5000: INK 1: PAPER 7
5 INVERSE 0: BRIGHT 1: BORDER
2: CLS
10 LET p$="BABABABABABAB21ABAB
ABABABABABABA"
20 PRINT INK 2;p$
25 RANDOMIZE
26 LET b=0
28 LET c=0
30 PRINT "Please enter your name"
32 INPUT n$
33 CLS
34 PRINT ,n$
35 PRINT , " I will toss a coin
to see who goes first.
Do you want heads
or tails? (press H or T)"
40 LET a$=INKEY$
50 IF NOT (a$="h" OR a$="t" OR
a$="H" OR a$="T") THEN GO TO 40
60 PRINT ,a$
70 LET x=INT (RND*2)
80 IF x=0 THEN LET b$="Heads"
90 IF x=1 THEN LET b$="tails"
100 PRINT 'b$; ", ";
110 LET a=1
120 IF x=1 AND a$="H" OR x=1 AND
a$="h" OR x=0 AND a$="T" OR x=0
AND a$="t" THEN LET a=0
130 IF a=0 THEN PRINT "I win"
140 IF a=1 THEN PRINT "You win"
";n$; " "
141 PAUSE 50
142 LET x=0
144 LET y=0
145 FOR f=1 TO 10
146 PRINT "Press any key for
game ";f
147 PAUSE 190
148 IF INKEY$="" THEN GO TO 148
150 IF a=0 THEN GO SUB 2000
160 IF a=1 OR a=0 AND x>0 THEN
GO SUB 1000
170 IF a=1 AND y<>0 THEN GO SUB
2000
175 IF y=0 THEN LET x=1
177 IF x=0 THEN LET y=1
180 IF x>y THEN LET b=b+1
190 IF x<y THEN LET c=c+1
200 PRINT " Computer: ";n$; "

```

```

230 PRINT "I enjoyed that."
240 IF b>c THEN PRINT "Maybe you
u will beat me next time."
250 IF b<=c THEN PRINT "I will
l beat you next time."
260 PRINT "Another game? (Y/N)
1"
270 INPUT a$
280 IF a$="y" OR a$="Y" THEN RU
N
290 PRINT "Bye then."
300 STOP
1000 PRINT "Your cards have
been dealt. Press any key to t
urn them over."
1010 IF INKEY$="" THEN GO TO 101
0
1020 GO SUB 3000
1025 PAUSE 75: CLS
1025 IF p=1 THEN GO SUB 3500
1030 PRINT " ";p
1040 LET y=p
1045 LET L=1
1050 PAUSE 25: GO SUB 3000
1051 IF p=1 THEN GO SUB 3500
1055 IF L=3 THEN CLS
1060 PRINT " ";p
1070 LET y=y+p
1075 LET L=L+1
1080 PRINT ",,L;" cards. Total="
;y
1090 POKE 23692,255
1105 IF L=5 AND y<=21 THEN GO TO
1200
1106 IF y>21 THEN GO TO 1400
1108 IF y=21 THEN GO TO 1500
1110 PRINT "Twist or stick? (
Press T or S)"
1120 LET a$=INKEY$
1125 IF NOT (a$="T" OR a$="t" OR
a$="S" OR a$="s") THEN GO TO 11
20
1130 PRINT " ";a$
1135 PAUSE 75
1140 IF a$="t" OR a$="T" THEN GO
TO 1050
1150 CLS
1160 RETURN
1200 PAUSE 50: CLS
1205 PRINT "You have a five-card

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

t. I win."
1410 LET y=0
1420 RETURN
1500 CLS
1505 PRINT "Well done - you have
scored 21."
1508 LET y=21
1510 IF l=2 THEN PRINT ",,p$": LET
y=23
1520 RETURN
2000 PRINT "Press any key to de
al me two cards."
2010 IF INKEY$="" THEN GO TO 201
0
2020 GO SUB 3000
2030 CLS
2040 IF p=1 THEN GO SUB 4000
2050 PRINT ",,"";p
2060 LET x=p
2070 LET m=1
2080 GO SUB 3000
2090 IF p=1 THEN GO SUB 4000: PA
USE 50
2100 IF m=3 THEN CLS
2110 PRINT ",,"";p
2120 LET x=x+p
2130 LET m=m+1
2140 PRINT ",,m;" cards. Total="
;x
2145 PRINT "Press any key."
2147 IF INKEY$="" THEN GO TO 214
7
2150 IF m=5 AND x<=21 THEN GO TO
2400
2160 IF x>21 THEN GO TO 2500
2170 IF x=21 THEN GO TO 2600
2180 IF x>14+INT (RND*3) AND a=0
THEN GO TO 2700
2190 IF x>14+INT (RND*3) AND RND
>.3 THEN GO TO 2700
2200 PAUSE 75: PRINT ",,"I think
I will twist."
2210 GO TO 2080
2400 CLS
2410 PRINT "I have a five-card t
rick."
2420 IF a=0 THEN PRINT ",,"You mu
st get Pontoon to beat me."
2430 IF a=1 AND y=22 THEN PRINT
"You still beat me though, as yo
u got Pontoon."
2440 IF a=1 AND y<22 THEN PRINT
"Tha beats you. I win."

```



```

2510 PRINT "Oh dear - I have bus
t. You win."
2520 LET x=0
2530 RETURN
2600 CLS
2610 PRINT "I have scored 21"
2620 IF m=2 THEN PRINT ",,p$"
2630 LET x=21
2640 IF m=2 THEN LET x=23
2650 RETURN
2700 CLS
2710 PRINT " I think I will stic
k."
2720 RETURN
3000 LET p=INT (RND*13)+1
3010 IF p>10 THEN LET p=10
3015 PAUSE 75
3020 RETURN
3500 IF y>10 THEN GO TO 4100
3505 PRINT ",," An Ace. Do you
want it to be high or low? (Pres
s H OR L)"
3510 LET a$=INKEY$
3520 IF NOT (a$="H" OR a$="L" OR
a$="h" OR a$="l") THEN GO TO 35
10
3525 PRINT 'a$
3530 IF a$="H" OR a$="h" THEN LE
T p=11
3535 PAUSE 100
3540 RETURN
4000 IF x>=7 OR x<=10 THEN LET p
=11
4010 IF x<7 OR x>10 THEN LET p=1
4020 PRINT ",," I have an Ace."
4030 IF p=1 THEN PRINT "I think
I will make it low."
4040 IF p=11 THEN PRINT "I think
I will make it high."
4050 RETURN
4100 PRINT ",," An Ace. It had bet
ter be low or you will bust."
4120 RETURN
5000 FOR n=USR "a" TO USR "b"+7:
READ r
5010 POKE n,r: NEXT n
5040 RETURN
5050 DATA 0,36,126,126,60,60,24,
24,0,24,60,126,255,126,60,24

```

MINEFIELD

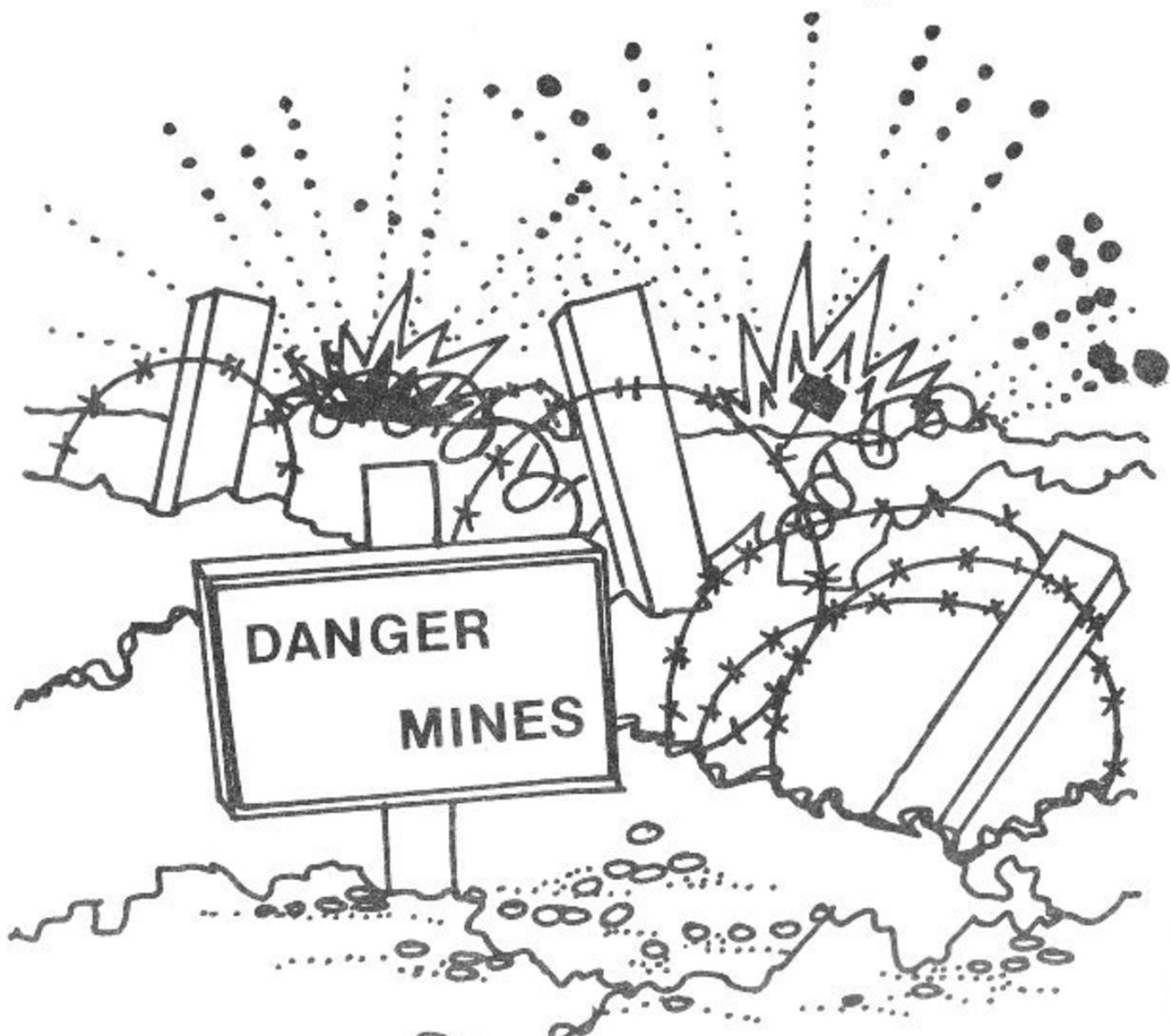
You must try to escape from the minefield in this strategy game written for the Spectrum by Simon Gould.

Use the cursor keys to move carefully around the screen, but take note of the warning sign.

At the beginning of the game, you must enter the number of mines that will be planted in the minefield. Any number less than 35 can be used.

If you tread on a mine you will explode and the locations of the other mines will be shown.

There is a timer and an on-screen scoring feature.



MINEFIELD

```

5 INVERSE 0: INK 7: PAPER 2
10 BORDER 2
20 LET SC=0
25 LET A$=""

30 RANDOMIZE
40 CLS
45 PRINT "Number of mines (2 -
35) ";
50 INPUT MNS
54 IF MNS<2 OR MNS>35 THEN GO
TO 40
55 PRINT "=";MNS
60 DIM M(MNS,2)
70 FOR N=1 TO MNS
80 LET M(N,1)=INT (RND*20)+1
90 LET M(N,2)=INT (RND*32)
100 NEXT N
105 CLS
110 PRINT AT 21,0; INK 5;"Timer
= SCORE=";SC
120 LET t=0
130 LET X=19
140 LET Y=INT (RND*28)
150 PRINT AT X-2,Y-1;A$
160 LET t=t+1
170 PRINT AT 21,6;t
180 IF t=100 THEN GO TO 1000
190 GO SUB 300
191 LET a=X
192 LET b=Y
195 LET B$=INKEY$
196 IF B$="" THEN GO TO 150
200 LET X=X+(B$="6" AND X<23) - (
B$="7" AND X>3)
210 LET Y=Y+(B$="8" AND Y<30) - (
B$="5" AND Y>0)
220 PRINT AT a-2,b-1;"..

230 GO TO 150
300 PRINT AT 0,11; BRIGHT 1; IN
K 6;" EXIT
310 IF X=3 AND Y>11 AND Y<20 TH
EN GO TO 2000
320 LET n=1
325 IF X=20 THEN LET X=X-1: PR
INT AT X+1,Y-1;" "
330 LET XC=M(n,1)-X
340 LET YC=M(n,2)-Y

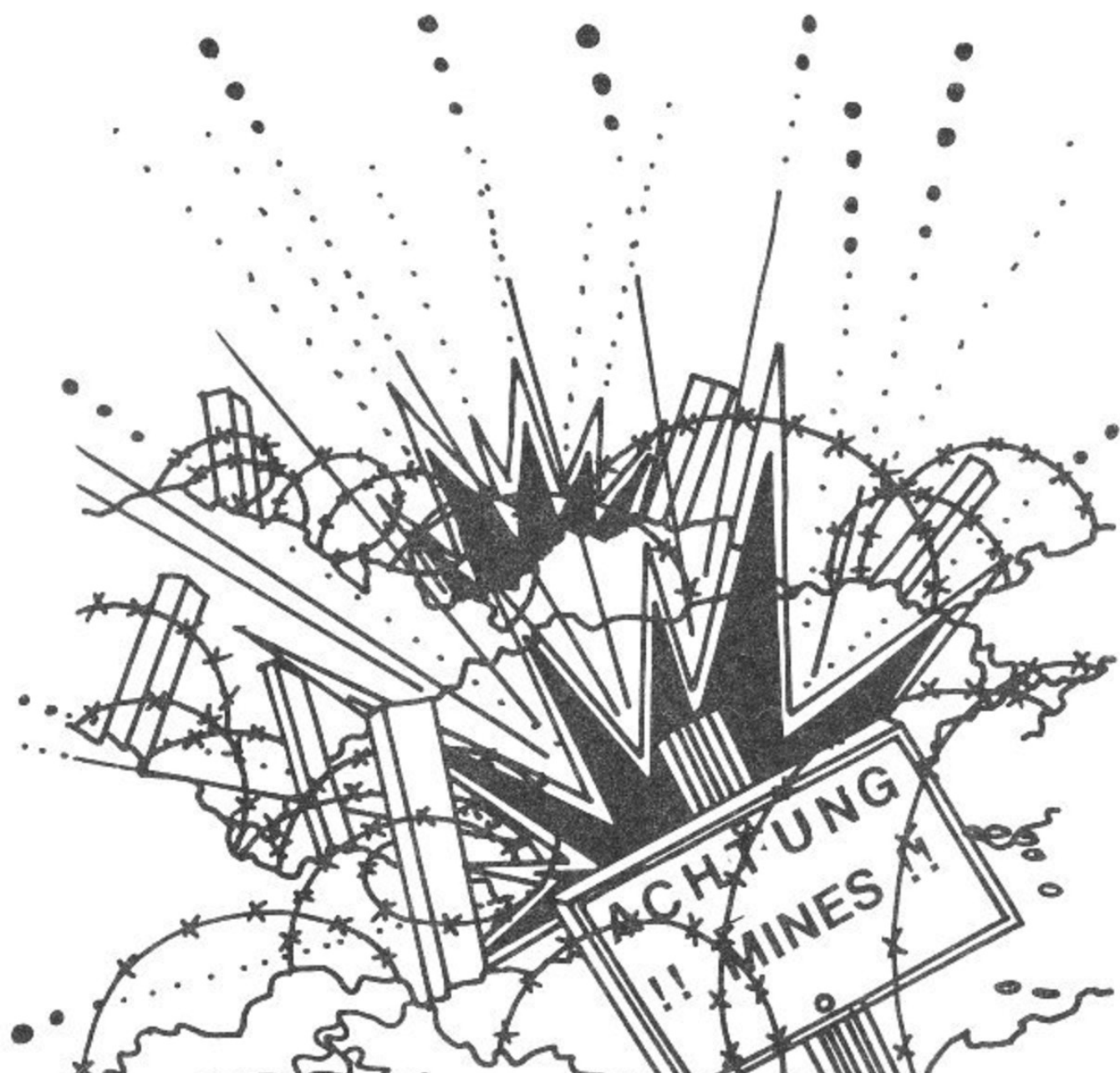
```

MORE GAMES FOR YOUR ZX SPECTRUM

```

380 GO TO 330
1000 PRINT AT x-2,y-1; FLASH 1; "
    ";AT x-2,y;"    ";AT x,y+1;"
..
1010 FOR n=1 TO mns
1020 PRINT AT m(n,1),m(n,2);"#
1030 NEXT n
1040 FOR n=0 TO 100
1050 NEXT n
1060 RUN
2000 LET sc=sc+100
2010 PRINT AT 10,5;"Mission Succ
essful"
2020 PRINT AT 12,5;"Stand by for
the next field"
2030 FOR N=0 TO 100: NEXT N
2050 GO TO 105

```



DROID

Here is your chance to program a real robot, a small droid, to reach the bottom of the maze. You must enter the correct commands for the droid.

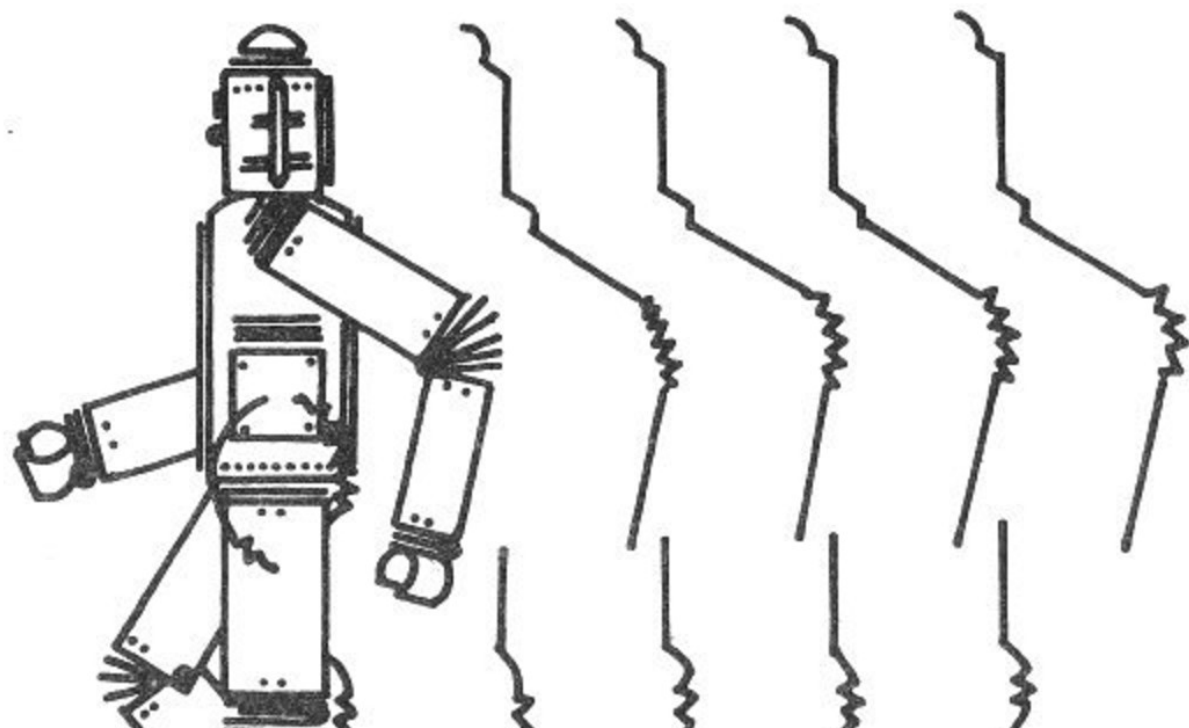
Use l for left, r for right, u for up and d for down. Every instruction you give the droid will move him one space in the appropriate direction. If you make any mistakes in the initial entry, just type Ø to rub out.

You can have a maximum of 60 instructions. The droid's memory is very small and after every 20 instructions the screen clears so you cannot see what you have previously entered.

You must rely on your mental dexterity and memory to get the droid out of the maze safely.

When you have finished typing in your instructions, press the 9 key and watch him move. If he hits a wall along the way, he will be destroyed.

Happy programming!



MORE GAMES FOR YOUR ZX SPECTRUM

```

5 DIM s$(60): GO SUB 9000
10 INVERSE 0: CLS
15 RANDOMIZE
20 GO SUB 1000
22 LET sc=0
24 LET q=0
25 PRINT AT 19,5; "><"
30 FOR n=1 TO 20
40 IF INKEY$("<") THEN GO TO 40
42 LET a$=INKEY$
43 IF a$="9" THEN GO TO 90
44 IF a$="0" THEN GO TO 500
46 IF a$("<") AND a$(">") AND
a$("<") AND a$(">") THEN GO TO 4
50 LET s$(q+n)=a$
60 PRINT AT 19,5+n; s$(q+n); "<"
70 NEXT n
80 PRINT AT 19,5; "
85 LET q=q+21
86 IF q=60 THEN GO TO 2150
88 GO TO 25
90 PRINT AT 19,5; " "; AT 19,5+n
; " "
92 LET q=0
93 PRINT AT 21,11; "Score= 0"
94 PRINT AT 19,6; s$(q+1 TO q+2
20)
100 LET n=1
105 IF s$(q+n)=" " THEN GO TO 2
20
110 LET x=x+(s$(n+q)="r")-(s$(n
+q)="l")-32*(s$(n+q)="u")+32*(s$
(n+q)="d")
120 IF s$(n+q)="d" THEN LET sc=
sc+6
122 LET sc=sc-(sc(">"))
125 PRINT AT 21,19; sc
130 PRINT AT 18,4+n; CHR$ 131; CH
R$ 143; AT 20,4+n; CHR$ 32; CHR$ 13
1
140 LET c=INT (x/32): LET v=x-(
c*32)
145 IF SCREEN$ (c,v)("<") THEN
GO TO 2000
150 PRINT AT c,v; "0"
155 IF c=17 THEN GO TO 3000
160 LET n=n+1
165 IF INKEY$("<") THEN GO TO 16
5
170 IF n(">")20 THEN GO TO 105

```

DROID

```

200 PAUSE 100
220 CLS
230 PRINT AT 8,2;"You did not g
ive the robot"
240 PRINT AT 10,2;"enough infor
mation to reach"
250 PRINT AT 12,5;"the base of
the screen."
255 PRINT AT 14,7;"Your score w
as ";SC
260 PRINT AT 16,5;"Another game
? (y/n)"
270 LET a$=INKEY$
280 IF a$="" OR a$(">"y" AND a$("<"n" THEN GO TO 270
290 IF a$="y" THEN RUN
300 STOP
500 IF n=1 THEN GO TO 40
502 LET n=n-1
505 PRINT AT 19,5+n;"<"
510 GO TO 40
1000 FOR n=0 TO 31: PRINT AT 0,n
;CHR$ 140;: NEXT n
1010 BRIGHT 1: PRINT AT 20,0; PA
PER 0; INK 6;CHR$ 144;: FOR a=2
TO 31: PRINT PAPER 0; INK 6;CHR$
145;: NEXT a: PRINT PAPER 0; IN
K 6;CHR$ 146: BRIGHT 0
1020 FOR n=1 TO 15 STEP 2
1030 PRINT AT n,0;CHR$ 133;AT n,
31;CHR$ 138
1040 PRINT AT n+1,0; PAPER 1; IN
K 1;"xxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxx"
1050 NEXT n
1060 PRINT AT 17,0;CHR$ 133;AT 1
7,31;CHR$ 138
1070 FOR n=2 TO 16 STEP 2
1080 LET y=1
1090 LET y=y+INT (RND*15)+3*(y(">"1)
1100 LET z=INT (RND*2)
1110 IF y>29 THEN GO TO 1140
1120 PRINT AT n,y; (" " AND z=0) +
(" " AND z=1)
1130 GO TO 1090
1140 NEXT n
1150 LET x=80
1160 LET c=INT (x/32): LET v=x-(
c*32)

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

2005 FOR n=1 TO 10
2010 PRINT AT c,v;CHR$ 133
2015 PAUSE 5
2020 PRINT AT c,v;CHR$ 131
2025 PAUSE 5
2030 PRINT AT c,v;CHR$ 138
2035 PAUSE 5
2040 PRINT AT c,v;CHR$ 140
2045 PAUSE 5
2050 NEXT n
2060 CLS
2070 PRINT AT 8,2;"The robot has
hit a wall and"
2080 PRINT AT 10,9;"is now in bi
ts."
2090 GO TO 255
2100 LET L=q+n
2120 PRINT AT 8,3;"Your robot go
t through the"
2130 PRINT AT 10,8;"maze in ";L;
"moves."
2140 GO TO 255
2150 CLS
2160 PRINT AT 8,1;"You may burn
out the robot's"
2170 PRINT AT 10,13;"memory."
2180 GO TO 260
3000 CLS : PRINT ""TAB 11;"WEL
L DONE"
3010 PRINT ""TAB 5;"YOUR ROBOT HA
S ESCAPED"
3020 GO TO 2100
9000 FOR a=USR "a" TO USR "c"+7
9010 READ us: POKE a,us: NEXT a
9020 RETURN
9030 DATA 63,127,106,245,234,117
,127,63
9040 DATA 255,255,170,85,170,85,
255,255
9050 DATA 252,254,174,87,175,86,
254,252

```


APOLLO

In this program, supplied by Peter Shaw, you must take control of the Apollo 24 as it falls to Earth. To do this you must apply thrust using the 1-9 keys. Key 1 will apply the least amount of thrust, whereas 9 will give you the maximum power.

When you hit the ground you will be informed of your performance. (It is sometimes better to crash just to see the animation!)



MORE GAMES FOR YOUR ZX SPECTRUM

```

10 REM APOLLO
20 REM
30 PRINT AT 10,10;"PLEASE WAIT
..
40 GO SUB 2130
50 GO SUB 2370
60 BORDER 0: PAPER 0: INK 5: C
LS
70 LET ch=1
80 CLS
90 FOR f=1 TO 25: PRINT AT 8,1
2;"APOLLO";: BEEP .05,f: PRINT A
T 8,12; INVERSE 1;"APOLLO": BEEP
.05,-f: NEXT f
100 PRINT AT 8,12; FLASH 1;"APO
LLO"
110 PRINT AT 3,0;"Do you want i
nstructions ? (y/n)"
120 POKE 23658,8
130 LET i$=INKEY$: IF i$="" THE
N GO TO 120
140 IF i$="Y" THEN GO TO 1800
150 IF i$(">"N" THEN GO TO 130
160 CLS
170 RANDOMIZE : LET E=0: LET G=
0
180 LET R=INT (50R (RND*5000))
190 LET X=31: LET S=0: LET V=10
0: LET U=500: LET H=1000: LET M=
2.5
200 LET M$=CHR$ 130: LET M$=M$+
M$+M$+M$
210 LET B$=CHR$ 138
220 LET A$=B$+M$+B$+M$+B$+M$+B$
+M$+B$+M$+B$
230 PRINT AT 0,1; INK 7;"Time=0
00";AT 3,5; INK 4;"0";TAB 16;"FU
EL";TAB 29;"500";TAB 5; INK 6;A$
;AT 8,5; INK 5;"0";TAB 15;"HEIGH
T";TAB 28;"1000";TAB 5; INK 6;A$
;AT 13,5; INK 3;"0";TAB 13;"FINE
HEIGHT";TAB 29;"100";AT 14,5; I
NK 6;A$;AT 18,16; INK 2;"SPEED";
TAB 5; INVERSE 1;"DOWN"; INVERSE
0;" ";A$(2 TO 19);" "; INVERSE
1;"UP"
240 FOR I=40 TO 240 STEP 4
250 PLOT I,32*4
260 BEEP .005,I/5
270 PRINT AT 0,14; FLASH 1;"RE-
FUELING"
280 NEXT I

```

APOLLO

```

320 INPUT ""
330 IF H<=1000 THEN PLOT (H/20+
10)*4,22*4
340 IF H>1000 THEN PRINT AT 10,
31; INK 6; INVERSE 1;">"
350 IF H<=100 THEN PLOT (H/2+10
)*4,12*4
360 IF S=R THEN GO SUB 2040
370 IF E=1 THEN LET Q=Q-1
380 IF Q=0 AND E=1 THEN GO SUB
2080
390 LET F$=INKEY$: IF F$<"0" OR
F$>"9" OR E=1 THEN LET F$=""
400 LET F=2*VAL F$
410 IF F>U THEN LET F=U
420 BEEP .1,U/15: BEEP .005,F*2
430 PRINT AT 0,7; INK 7;S;" "
440 IF F<>0 THEN GO SUB 2110
450 LET U1=INT (U/10+10): LET U
=U-F
460 LET U2=INT (U/10+11)
470 FOR P=U1 TO U2 STEP -1
480 PLOT OVER 1;P*4,32*4
490 NEXT P
500 PRINT AT 3,21; ("LOW" AND U<
=50); AT 3,21; ("OUT" AND U=0)
510 LET U=U-F/M+1
520 LET S=S+1
530 PLOT OVER 1;X*4,8
540 LET X=36-U/LN (2+ABS U)
550 PLOT X*4,8
560 PRINT AT 10,31;" "
570 IF H<=1000 THEN PLOT OVER 1
; (H/20+10)*4,22*4
580 IF H<=100 THEN PLOT OVER 1;
(H/2+10)*4,12*4
590 LET H=H-U/2
600 IF H>0 THEN GO TO 330
610 CLS
620 PRINT "Speed ";.1*INT (10*v
); " m/s, Time "55;" secs"
630 PRINT "Fuel remaining ";.
1*INT (2*U);"%"
640 LET D=INT ((U-0.1)/5)
650 IF D<0 THEN LET D=0
660 IF D=0 THEN PRINT AT 5,5;"S
AFE LANDING."; AT 6,5;"
"
670 IF D=1 THEN PRINT AT 5,5;"B
UMPY LANDING."; AT 6,5;"

```


MORE GAMES FOR YOUR ZX SPECTRUM

```

700 IF D=4 THEN PRINT AT 5,5;"C
ATASTROPHIC LANDING.";AT 6,5;"_
710 IF D>10 THEN GO TO 1190
720 IF D>6 THEN PRINT AT 7,1;"Y
OU HAVE MADE A ";INT (V/2);" ft
CRATER";TAB 5;"IN THE MOON'S SUR
FACE."
730 GO SUB 1690
740 IF D=0 THEN GO TO 1380
750 PRINT AT 12,14;" ";TAB 14;"
760 FOR Z=12 TO 20
770 PRINT AT Z-1,12;" "
780 PRINT AT Z,12;"1/"
790 NEXT Z
800 IF D<>1 AND D<>2 THEN GO TO
830
810 PRINT AT 15,5;"**OUCH**"
820 FOR Z=1 TO 20: NEXT Z
830 PRINT AT 15,5;" "
840 IF D=1 THEN GO TO 1780
850 LET Y=22
860 FOR Z=13 TO 20
870 PRINT AT Z-1,Y-.3;" ";AT
Z,Y;CHR$ 142;" <"
880 BEEP .05,-Z
890 LET Y=Y+.3
900 NEXT Z
910 IF D=2 THEN GO TO 1780
920 LET Z$=""
930 LET K=14
940 PRINT AT 11,K; INK 6;Z$;TAB
K;" ";CHR$ 144;CHR$ 140;CHR$
140;CHR$ 145;AT 13,K;" ";CHR$
146;" ";CHR$ 147;TAB K;" ";CH
R$ 148;CHR$ 133;CHR$ 138;CHR$ 14
9;TAB K;" ";CHR$ 150;CHR$ 140;
CHR$ 140;CHR$ 151;;TAB K;" ";CH
R$ 152;CHR$ 153;" ";CHR$ 154;CH
R$ 155;TAB K;" ";CHR$ 156;CHR$ 1
57;CHR$ 158;CHR$ 140;CHR$ 140;CH
R$ 159;CHR$ 160;CHR$ 161;TAB K;"
";CHR$ 162;" ";CHR$ 163;CHR$ 1
64;" ";CHR$ 162
950 BEEP 1,-9: BEEP .5,-3: BEEP
1,-9
960 INK 6
970 IF D=3 THEN GO TO 1780
980 PRINT AT 18,K+1;CHR$ 151
990 BEEP .5,-4

```

APOLLO

```

1030 BEEP .5,-10
1040 IF D<3 THEN INK 5: GO TO 17
80
1050 FOR O=12 TO 18: LET NO=O
1060 PRINT AT NO,K;Z$;TAB K;(S$(
1) AND NO+1<18);AT NO+2,K;(S$(2)
AND NO+2<18);TAB K;(S$(3) AND N
O+3<18);TAB K;(S$(4) AND NO+4<18
);TAB K;(S$(5) AND NO+5<18);TAB
K;(S$(6) AND NO+6<18)
1070 BEEP O/10,-O
1080 PRINT AT 18,10;CHR$ 151;CHR
$ 153;AT 18,30;(CHR$ 144+CHR$ 14
9 AND NO>13);AT 18,14;(CHR$ 151+
CHR$ 154+CHR$ 155 AND NO>14);AT
18,4;(CHR$ 147+CHR$ 145+CHR$ 151
AND NO>15);AT 18,17;(CHR$ 163+C
HR$ 151+CHR$ 153+CHR$ 154+CHR$ 1
56+CHR$ 151+CHR$ 145 AND NO>16)
1090 NEXT O
1100 INK 5
1110 PAUSE 40
1120 FOR Z=1 TO 5
1130 PRINT AT 16,16;"R.I.P."
1140 PAUSE 10
1150 PRINT AT 16,16;" "
1160 PAUSE 10
1170 NEXT Z
1180 GO TO 160
1190 PRINT AT 21,4;CHR$ 141; INV
ERSE 1;" "; INV
ERSE 0;CHR$ 142
1200 PRINT AT 20,5;CHR$ 141; INV
ERSE 1;" "; INVER
SE 0;CHR$ 142
1210 PRINT AT 19,6;CHR$ 141; INV
ERSE 1;" "; INVERSE
0;CHR$ 142
1220 PRINT AT 18,8;CHR$ 141; INV
ERSE 1;" "; INVERSE 0;C
HR$ 142
1230 FOR Z=13 TO 18
1240 PRINT AT Z,13;" ":"
1250 PAUSE 6
1260 NEXT Z
1270 FOR Z=1 TO 10
1280 PRINT AT 19,13; INVERSE 1;"
*";AT 19,13; INVERSE 0;"*"
1290 NEXT Z
1300 PRINT AT 21,4;CHR$ 141; INV

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

ERSE 1;" ";CHR$ 131;CHR$ 143;
CHR$ 131;" ";CHR$ 129
1330 PRINT AT 18,8;CHR$ 141; INV
ERSE 1;" ";CHR$ 131; INVERSE 0;
" "; INVERSE 1;CHR$ 131;" ";
CHR$ 129
1340 PRINT AT 7,1;"YOU HAVE MADE
A ";INT (V/2);"ft CRATER IN THE
MOON'S SURFACE."
1350 FOR Z=18 TO 13 STEP -1: PRI
NT AT Z,13;" ": PAUSE 10: NEXT Z
1360 PRINT AT 16,11;"R.I.P."
1370 GO TO 1780
1380 FOR Z=1 TO 60: NEXT Z
1390 PRINT AT 13,16;"O"
1400 PRINT AT 13,16; INVERSE 1;"
";CHR$ 140
1410 PRINT AT 13,16;CHR$ 131;CHR
$ 138;AT 11,15;" O "
1420 PRINT AT 10,15;" O ";AT 11,
15;CHR$ 131;CHR$ 143;CHR$ 131;AT
13,16;" "
1430 PRINT AT 9,15;" O ";AT 10,1
5;CHR$ 131;CHR$ 143;CHR$ 131;AT
11,15;CHR$ 133;CHR$ 131;CHR$ 138
1440 FOR Z=1 TO 6
1450 PRINT AT 9,15;" O ";AT 10,1
5;CHR$ 131;CHR$ 143;CHR$ 131;AT
11,15;CHR$ 133;CHR$ 131;CHR$ 138
1460 PAUSE 4
1470 PRINT AT 9,15;CHR$ 134;"O";
CHR$ 137;AT 10,15;" ";CHR$ 143;"
";AT 11,15;CHR$ 137;CHR$ 131;CH
R$ 134
1480 PAUSE 4
1490 NEXT Z
1500 PRINT AT 9,15;" O ";AT 10,1
5;CHR$ 131;CHR$ 143;CHR$ 131;AT
11,15;CHR$ 133;CHR$ 131;CHR$ 138
1510 FOR Z=1 TO 20: NEXT Z
1520 PRINT AT 10,15;CHR$ 129: PA
USE 1: PRINT AT 10,15;" "
1530 FOR Z=11 TO 9 STEP -1
1540 PRINT AT Z,21;CHR$ 133
1550 PAUSE 8
1560 NEXT Z
1570 PAUSE 10
1580 PRINT AT 9,22; INVERSE 1;"
";AT 10,22;" "
1590 PAUSE 8
1600 PRINT AT 9,23; INVERSE 1;"
";AT 10,23;" "

```


APOLLO

```

1640 FOR Z=1 TO 10
1650 PRINT AT 9,15;CHR$ 134;AT 1
0,15;" "
1660 PAUSE 8
1670 NEXT Z
1680 GO TO 160
1690 INK 6: PRINT AT 12,14;S$(1)
1700 PRINT AT 13,14;S$(2)
1710 PRINT AT 14,14;S$(3)
1720 PRINT AT 15,14;S$(4)
1730 PRINT AT 16,14;S$(5)
1740 PRINT AT 17,14;S$(6)
1750 PRINT AT 18,14;S$(7)
1760 PRINT AT 19,10; INK 2;"_____

```

```

1770 INK 5: RETURN
1780 FOR A=1 TO 100: NEXT A
1790 GO TO 160
1800 CLS
1810 PRINT INK 6;"                      APO
LLO"
1820 PRINT INK 5;"_____

```

```

1830 PRINT INK 6;"You are the c
ommander of Apollo 24. You must
try to land your craft on the
lunar surface at a speed of less
than 5 mps.

```

```

Skillful manov
uvring is required but computer
reports indicate that your lan
ding site is good."

```

```

1840 PRINT INK 7;"Use keys 1-9
to give thrust.",,"At any time
your fuel line couldblock.",,"
Press any key to start.."

```

```

1850 PAUSE 0
1860 GO TO 160
1870 LET X=22: LET Y=9
1880 FOR Z=1 TO 27
1890 PRINT AT 10,Z;" (**)"
1900 IF Z=3 THEN PRINT AT 8,15;"
?"
1910 IF Z=5 THEN PRINT AT 8,15;"
GULP"
1920 IF Z=6 THEN PRINT AT 8,15;"
":AT 9,15;" ":AT 10,15;" 0
"

```

```

1930 IF Z=9 THEN PRINT AT 10,15;
":AT 11,15;" 0 ";AT 13,16;CH
R$ 134;CHR$ 134

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

1960 IF Z=18 THEN PRINT AT 9,15;
" O ";AT 10,15;CHR$ 131;CHR$ 143
;CHR$ 131;AT 11,15;CHR$ 133;CHR$
131;CHR$ 138
1970 IF Z=24 THEN PRINT AT 9,21;
"
1980 IF Z>24 THEN PRINT AT Y,X;"
": LET X=X+0.3: LET Y=Y+1.3
1990 PRINT AT Y,X; INVERSE 1;"
"
2000 NEXT Z
2010 CLS
2020 PAUSE 40
2030 GO TO 160
2040 LET Q=INT (RAND*6)+3
2050 PRINT AT 0,11; INVERSE 1;"F
UEL BLOCK FOR ";Q;" secs"
2060 LET E=1
2070 RETURN
2080 PRINT AT 0,11;"
";AT 1,11;"
"
2090 LET E=0
2100 RETURN
2110 PRINT AT 4,1;"T";AT 6,1;"H"
;AT 8,1;"R";AT 10,1;"U";AT 12,1;
"S";AT 14,1;"T": FOR A=1 TO 4: N
EXT A: PRINT AT 4,1;" ";AT 6,1;"
";AT 8,1;" ";AT 10,1;" ";AT 12,
1;" ";AT 14,1;" "
2120 RETURN
2130 FOR A=USR "A" TO USR "U"+7
2140 READ US: POKE A,US
2150 NEXT A: RETURN
2160 DATA 32,168,251,32,63,17,15
,4
2170 DATA 0,0,0,14,14,254,204,40
2180 DATA 8,24,40,68,68,66,65,64
2190 DATA 32,24,20,34,34,66,130,
2
2200 DATA 64,64,65,198,198,68,68
,72
2210 DATA 2,2,130,67,67,34,34,18
2220 DATA 104,104,24,14,7,63,193
,193
2230 DATA 22,22,24,113,196,253,1
31,131
2240 DATA 7,7,14,20,20,28,42,42
2250 DATA 193,65,65,65,65,65,65,
65
2260 DATA 131,129,129,129,129,12
9,129,129

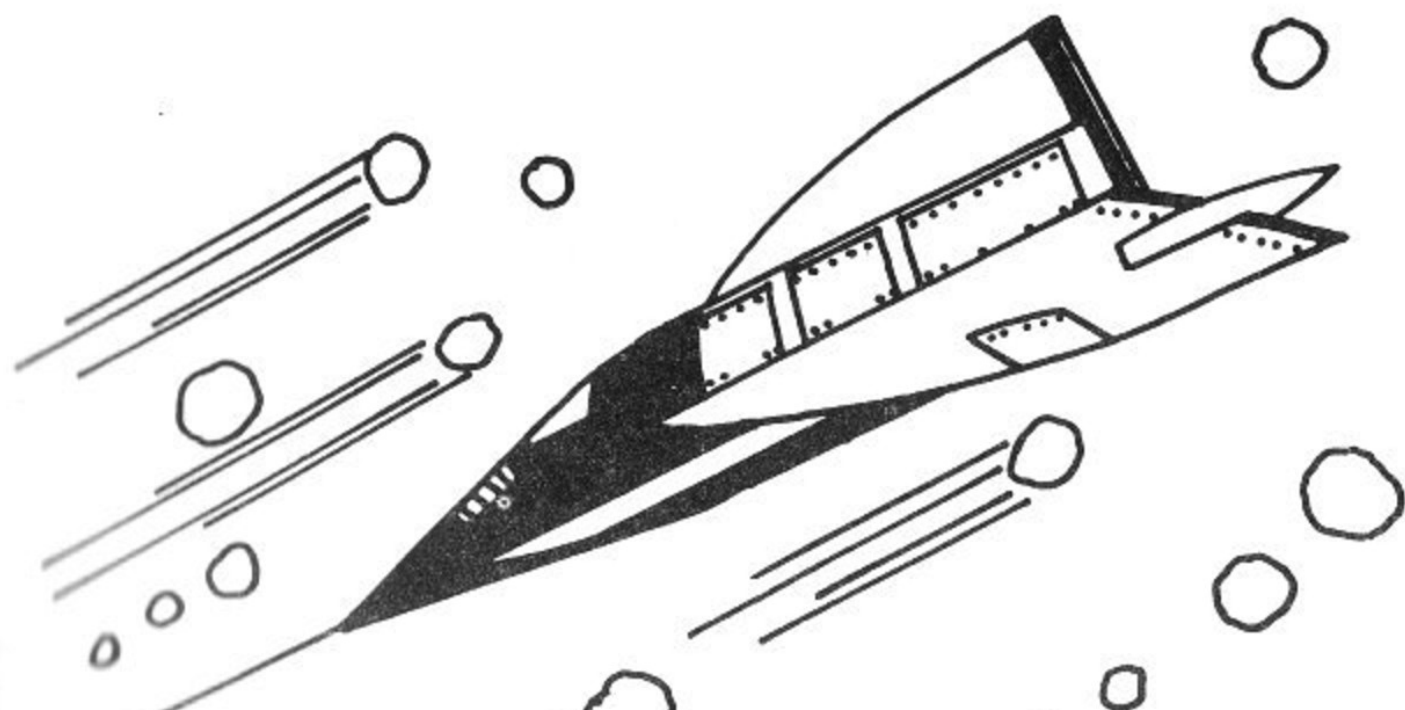
```

APOLLO

```

,255,3
2300 DATA 65,65,65,65,65,255,192
,128
2310 DATA 129,129,129,129,129,25
5,3,1
2320 DATA 102,99,163,161,161,255
,255,224
2330 DATA 0,0,0,128,128,192,240,
120
2340 DATA 24,24,24,24,24,24,255,
126
2350 DATA 63,127,255,1,1,1,15,7
2360 DATA 253,254,255,128,128,12
8,240,224
2370 DIM S$(7,9)
2380 LET S$(1)=" "+CHR$ 144+CHR
$ 140+CHR$ 140+CHR$ 145
2390 LET S$(2)=" "+CHR$ 146+"__
"+CHR$ 147
2400 LET S$(3)=" "+CHR$ 148+CHR
$ 143+CHR$ 143+CHR$ 149
2410 LET S$(4)=" "+CHR$ 150+CHR
$ 140+CHR$ 140+CHR$ 151
2420 LET S$(5)=" "+CHR$ 152+CHR$
153+" "+CHR$ 154+CHR$ 155
2430 LET S$(6)=CHR$ 156+CHR$ 157
+CHR$ 158+CHR$ 140+CHR$ 140+CHR$
159+CHR$ 160+CHR$ 161
2440 LET S$(7)=CHR$ 162+" "+CHR
$ 163+CHR$ 164+" "+CHR$ 162
2450 RETURN

```



CHARACTER

In this program, written by Peter Shaw, you can redefine your graphics with ease. There are many 'character designers' on the market at the moment, but you now have your very own fast and easy-to-use definer.

The commands at your disposal are:

Cursor keys (5-8) move flashing cursor in direction of arrows.

S — Set block

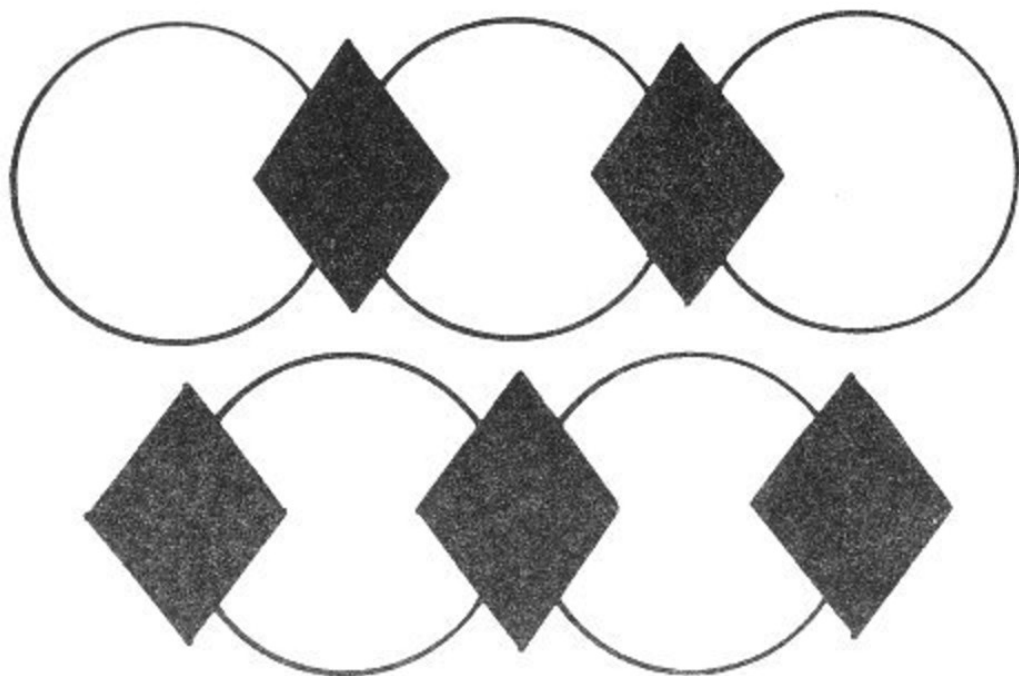
R — Reset (erase) block

P — Put (add to set) present character in 'display square'

G — Get character from set and display in 'display square'

M — Display Menu 2

Menu 2 includes all save and load commands necessary to get the most out of your user definable graphics.



CHARACTER

```

10 REM CHARACTER DESIGNER
20 REM PETER SHAW 1983
30 REM
40 POKE 23658,8: GO SUB 990
50 GO SUB 850: REM SQUARE
60 GO SUB 730: REM MENU
70 PRINT AT 2,13: PAPER 7; "PRE
SENT GRAPHICS: "
80 PRINT AT 4,11; "A B C D E F
G H I J K"
90 PRINT AT 5,11; P$( TO 21)
100 PRINT AT 7,11; " L M N O P Q
R S T U"
110 PRINT AT 8,11; P$(22 TO )
120 REM
130 LET A=1: LET B=1
140 PRINT AT P(A,B,1),P(A,B,2);
OVER 1; BRIGHT 1; FLASH 1; INK
(1 AND C(A,B)=0)+(0 AND C(A,B));
" "
150 IF INKEY$="8" AND B<8 THEN
PRINT AT P(A,B,1),P(A,B,2); OVER
1;" ": LET B=B+1
160 IF INKEY$="5" AND B>1 THEN
PRINT AT P(A,B,1),P(A,B,2); OVER
1;" ": LET B=B-1
170 IF INKEY$="6" AND A<8 THEN
PRINT AT P(A,B,1),P(A,B,2); OVER
1;" ": LET A=A+1
180 IF INKEY$="7" AND A>1 THEN
PRINT AT P(A,B,1),P(A,B,2); OVER
1;" ": LET A=A-1
190 IF INKEY$="R" AND C(A,B)=0
THEN GO TO 210
200 IF INKEY$="R" AND C(A,B)=1
THEN LET C(A,B)=0: PRINT AT P(A,
B,1),P(A,B,2); OVER 1; INVERSE 1
;" "
210 IF INKEY$="5" AND C(A,B)=1
THEN GO TO 240
220 IF INKEY$="5" AND C(A,B)=0
THEN LET C(A,B)=1: PRINT AT P(A,
B,1),P(A,B,2); OVER 1; INVERSE 1
;" "
230 IF INKEY$="P" THEN GO TO 26
0
240 IF INKEY$="G" THEN GO TO 35
0
250 IF INKEY$="M" THEN GO SUB 5
00

```

MORE GAMES FOR YOUR ZX SPECTRUM

```

300 IF A$<"A" OR A$>"U" THEN GO
TO 290
310 FOR A=1 TO 8
320 POKE USA A$+A-1, (128 AND C(
A,1))+(64 AND C(A,2))+(32 AND C(
A,3))+(16 AND C(A,4))+(8 AND C(A
,5))+(4 AND C(A,6))+(2 AND C(A,7
))+(C(A,8))
330 NEXT A
340 GO TO 70
350 INPUT "WHICH CHARACTER (A-U
)?";A$
360 IF A$<"A" OR A$>"U" THEN GO
TO 350
370 DIM C(8,8): FOR A=1 TO 8: L
ET U=PEEK ((USA A$)+A-1)
380 IF U>=128 THEN LET C(A,1)=1
: LET U=U-128
390 IF U>=64 THEN LET C(A,2)=1:
LET U=U-64
400 IF U>=32 THEN LET C(A,3)=1:
LET U=U-32
410 IF U>=16 THEN LET C(A,4)=1:
LET U=U-16
420 IF U>=8 THEN LET C(A,5)=1:
LET U=U-8
430 IF U>=4 THEN LET C(A,6)=1:
LET U=U-4
440 IF U>=2 THEN LET C(A,7)=1:
LET U=U-2
450 IF U=1 THEN LET C(A,8)=1: L
ET U=U-1
460 NEXT A
470 GO SUB 860: FOR A=1 TO 8: F
OR B=1 TO 8
480 IF C(A,B)=1 THEN PRINT AT P
(A,B,1),P(A,B,2); OVER 1; INVERS
E 1;"
490 NEXT B: NEXT A: GO TO 70
500 CLS
510 PRINT PAPER 1,, INK 9;"
      MENU 2"
520 PRINT "TAB 3;"5 - SAVE U
HOLE SET
530 PRINT "TAB 3;"D - SAVE BLOC
K"
540 PRINT "TAB 3;"F - SAVE SING
LE CHARACTER"
550 PRINT "TAB 3;"J - LOAD SET"
560 PRINT "TAB 3;"K - LOAD BLOC
K"
570 PRINT "TAB 3;"L - LOAD SING

```

CHARACTER

```

E A$
600 LET S=0: LET F=0
610 IF A$="R" THEN CLS : GO SUB
730: GO TO 470
620 IF A$="S" THEN LET S=USR "A
": LET F=USR "U"+8
630 IF A$="D" THEN INPUT "START
FROM (A-U) "; LINE S$: LET S=US
R S$: INPUT "FINISH ("; (S$); "-U)
"; LINE K$: LET F=USR K$+8
640 IF A$="F" THEN INPUT "CHARA
CTER (A-U) "; LINE S$: LET S=USR
S$: LET F=USR S$+8
650 IF A$="J" OR A$="K" OR A$="
L" THEN GO TO 700
660 IF S=0 AND F=0 THEN GO TO 5
00
670 INPUT "NAME OF FILE ? "; N$:
IF LEN N$<1 OR LEN N$>9 THEN GO
TO 670
680 SAVE N$CODE S,F-S
690 LET A$="R": GO TO 610
700 INPUT "FILE NAME ? (JUST PR
ESS ENTER TO LOAD THE FIRST FILE
ON TAPE) "; N$
710 LOAD N$CODE
720 GO TO 690
730 PLOT 31,80: DRAW 193,0
740 DRAW 0,-73: DRAW -193,0: DR
AW 0,73
750 FOR A=15 TO 20
760 PRINT AT A,4; PAPER 5;"

770 NEXT A
780 PRINT AT 12,4; BRIGHT 1; PA
PER 5;"
790 PRINT AT 13,4; BRIGHT 1; PA
PER 5;"
800 PRINT AT 14,4; BRIGHT 1; PA
PER 5;"
810 PRINT AT 16,5; PAPER 8;"CUR
SOR (ARROW) KEYS:"
820 PRINT AT 17,5; PAPER 8;"MOU
E FLASHING CURSOR"
830 PRINT AT 18,5; PAPER 8;"S-S
ET: R-RESET: M-MENU 2"
840 PRINT AT 19,5; PAPER 8;"G-G
ET CHAR: P-PUT CHAR"
850 RETURN
860 PRINT AT 1,2;"

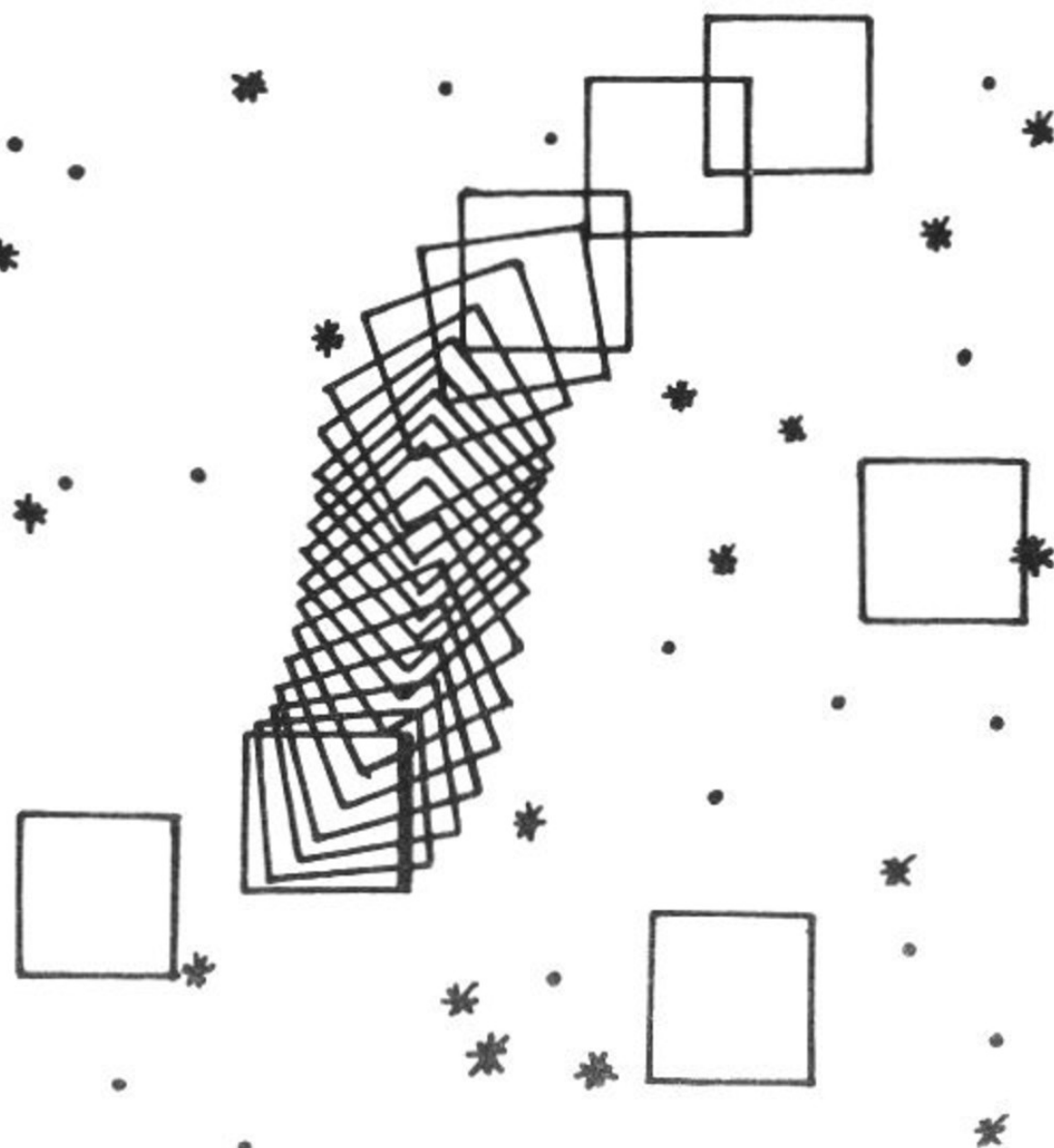
```


MORE GAMES FOR YOUR ZX SPECTRUM

```

930 PRINT TAB 2; "_____";
940 PRINT TAB 2; "_____";
950 FOR A=16 TO 80 STEP 8
960 PLOT A,96: DRAW 0,64
970 NEXT A
980 RETURN
990 BORDER 6: PAPER 6: INK 9: C
LS
1000 LET P$=""
1010 FOR A=144 TO 164: LET P$=P$
+CHR$ A+" ": NEXT A
1020 DIM C(8,8): DIM P(8,8,2)
1030 FOR A=1 TO 8: FOR B=1 TO 8
1040 LET C(A,B)=0
1050 LET P(A,B,1)=A+1: LET P(A,B
,2)=B+1
1060 NEXT B: NEXT A
1070 RETURN

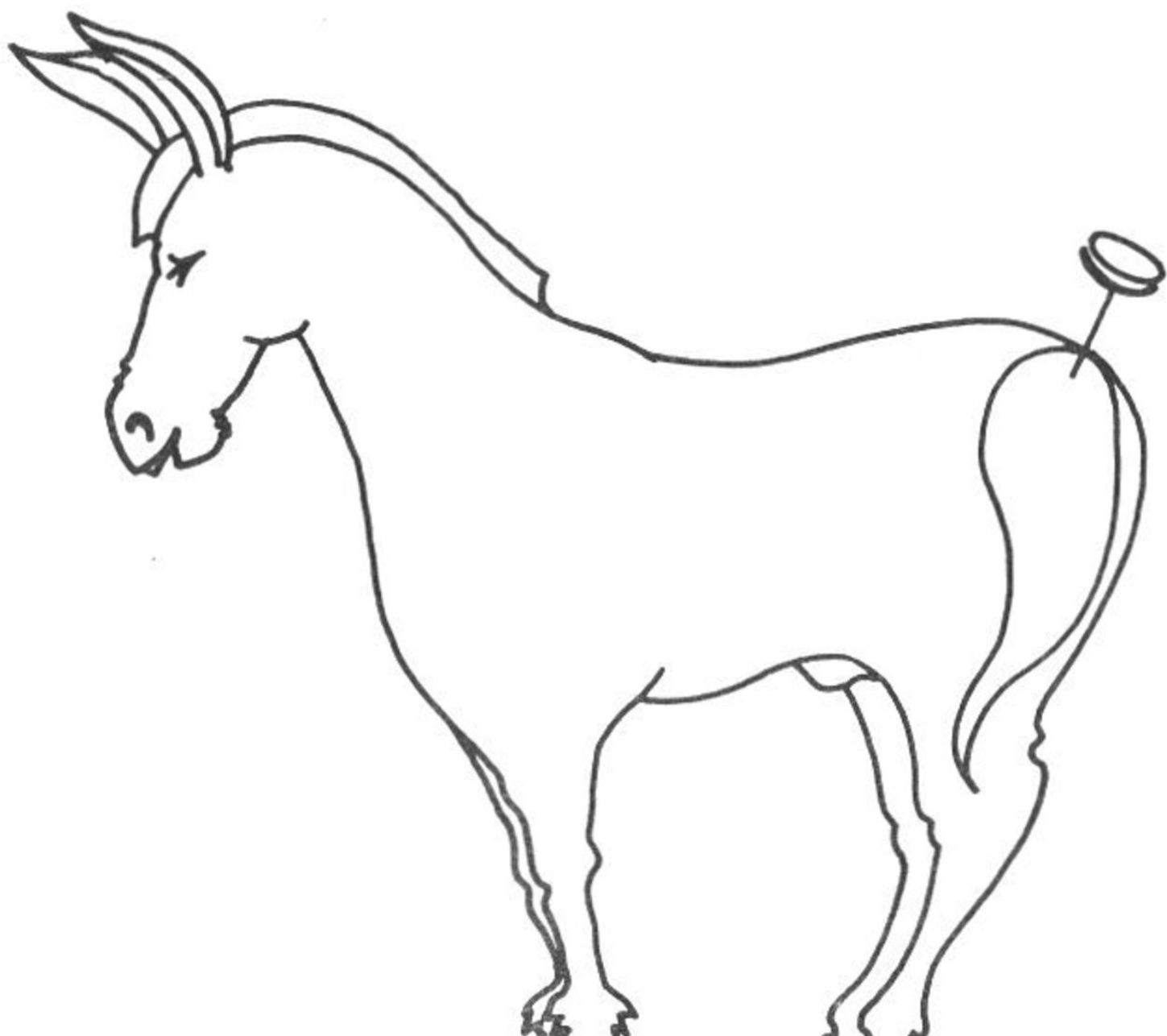
```



DONKEY

This is a simple, fun game. You must guess the position of the donkey's tail.

The donkey appears on the screen for a short length of time and then disappears. You will be asked to enter the horizontal and vertical co-ordinates of the point where you think the donkey's tail should be. You can have up to four guesses.



MORE GAMES FOR YOUR ZX SPECTRUM

```

5 INVERSE 0: BORDER 0: PAPER
0: INK 7: CLS
10 RANDOMIZE
20 LET a=0: LET b=a: LET n=a
30 LET y=INT (RND*25)+1
40 LET x=INT (RND*18)+2
50 CLS
60 LET a$=CHR$ 32+CHR$ 141
70 LET b$=CHR$ 32+CHR$ 133+CHR
$ 131+CHR$ 138
80 PRINT AT x,y; INK 3;a$;AT x
+1,y; INK 3;b$;AT a,b; INK 5;CHR
$ 47
90 IF a=x AND b=y+4 THEN GO TO
230
100 IF n=4 THEN GO TO 200
110 PAUSE 20
120 CLS
130 PRINT "Tail position"
140 PRINT "Vertical position 2
-19"
150 INPUT a
160 PRINT "Horizontal position
5-30"
170 INPUT b
180 LET n=n+1
190 GO TO 50
200 PRINT AT x-2,2;"You lose"
210 PRINT "x;" "y+4"
220 STOP
230 INVERSE 1: PRINT AT x-2,2;"
Correct, you took ";n;" goes"
235 INVERSE 0: PRINT AT x-2,2;"
Correct";
240 IF INKEY$="" THEN GO TO 230
250 RUN

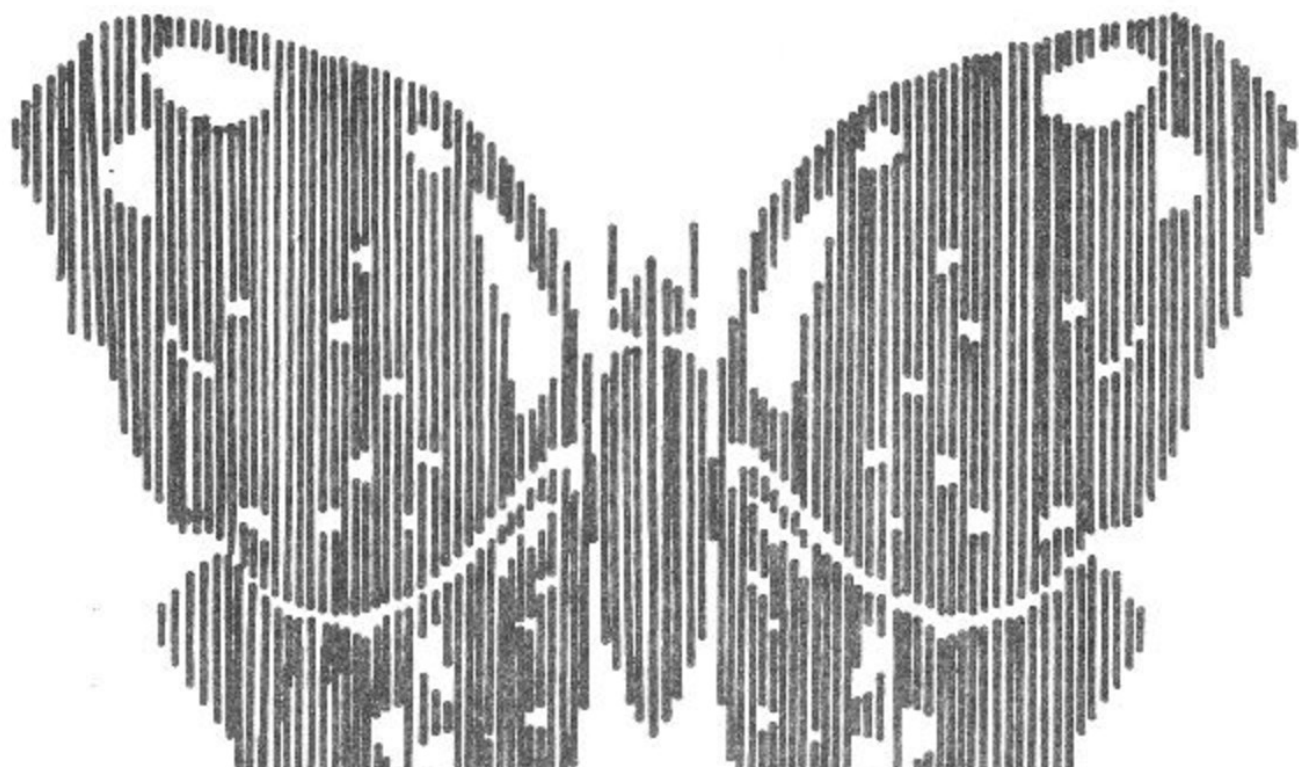
```



BUTTERFLY

This is another high-resolution plotting program, showing the advanced graphic capabilities of the computer.

```
10 REM BUTTERFLY
20 REM DANIEL HILLS
30 REM MARTYN LATIMER
40 BORDER 0: PAPER 0: INK 0: 5
RIGHT 1
50 CLS
60 LET A=INT (RND*128)
70 LET B=INT (RND*88)
80 LET C=INT (RND*7)+1
90 INK C
100 PLOT 128-A,88-B
110 PLOT 128+A,88-B
120 PLOT 128-A,88+B
130 PLOT 128+A,88+B
140 IF RND>.99 THEN GO TO 40
150 GO TO 60
```

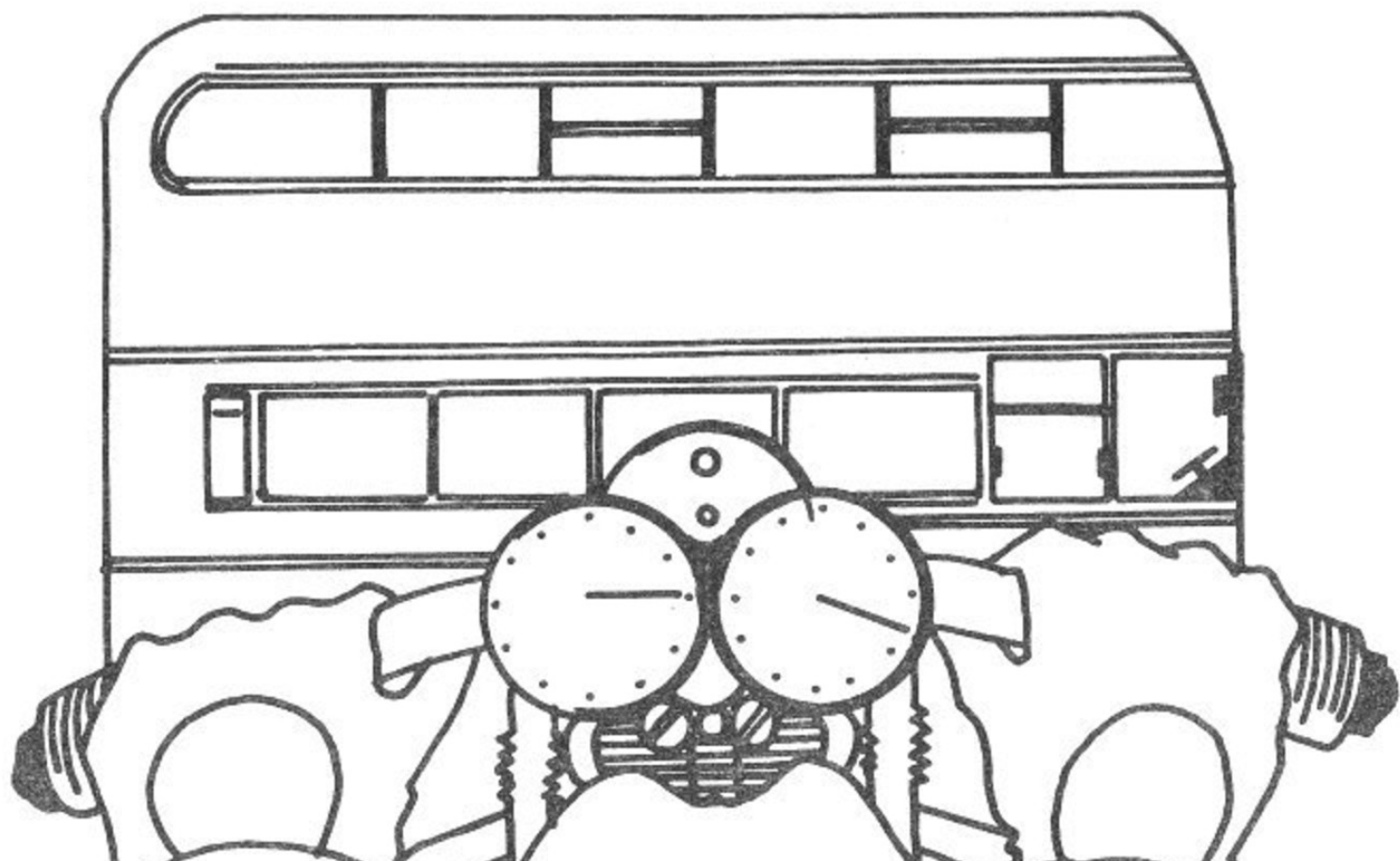


MOTORCYCLE STUNTMAN

In this game, it's on with your crash helmet and away you go. Your object is to jump over a line of buses, which change in number randomly every game.

Hold down any key and watch your speed increase. Release the brakes (by taking your finger off the key) and watch your motorcycle fly over the ramps.

This game uses accurate formulae for thrust and velocity, and is excellent fun.



MOTORCYCLE STUNTMAN

```

5  INVERSE 0: GO SUB 3000
10  RANDOMIZE
15  LET bus=INT (RND*17)+2
20  GO SUB 1000
30  LET m=0
32  PRINT AT 1,11;"0 M.P.H."
35  IF INKEY$="" THEN GO TO 35
40  LET m=m+5+INT (RND*6)
42  PAUSE 3
45  IF m>170 THEN LET m=170
50  PRINT AT 1,11;m;" M.P.H."
60  IF INKEY$<>"" THEN GO TO 40
65  LET mp=m
70  LET z=INT (RND*11)
80  LET m=m+(z-5)-40
90  LET j=9+INT (m/7.5+.5)
100 IF m<-5 THEN LET j=6
110 FOR n=1 TO 4
120 PRINT AT 10,n-1;" ";AT 10,n
;"E"
130 NEXT n
140 PRINT AT 10,4;" ";AT 9,5;"E"
;"
150 PRINT AT 9,5;" ";AT 8,6;"E"
160 IF j=6 THEN GO TO 200
170 FOR n=7 TO j
180 PRINT AT 8,n-1;" ";AT 8,n;"
;"
185 PAUSE 2
190 NEXT n
200 PRINT AT 8,j;" ";AT 9,j+1;"
;"
210 PRINT AT 9,j+1;" ";AT 10,j+
2;"E"
220 IF j<>bus+7 THEN GO TO 2000
230 FOR n=j+3 TO 31
240 PRINT AT 10,n-1;" ";AT 10,n
;"E"
250 NEXT n
255 PAUSE 25
260 PRINT AT 10,31;" "
270 CLS
280 PRINT AT 4,11;"Great jump!"
290 PRINT AT 6,2;"You cleared a
(1 ";bus;" buses at"
300 PRINT AT 8,6;"a speed of ";
sp;" M.P.H."
310 PAUSE 120
320 NEXT n
330 RUN

```


MORE GAMES FOR YOUR ZX SPECTRUM

```

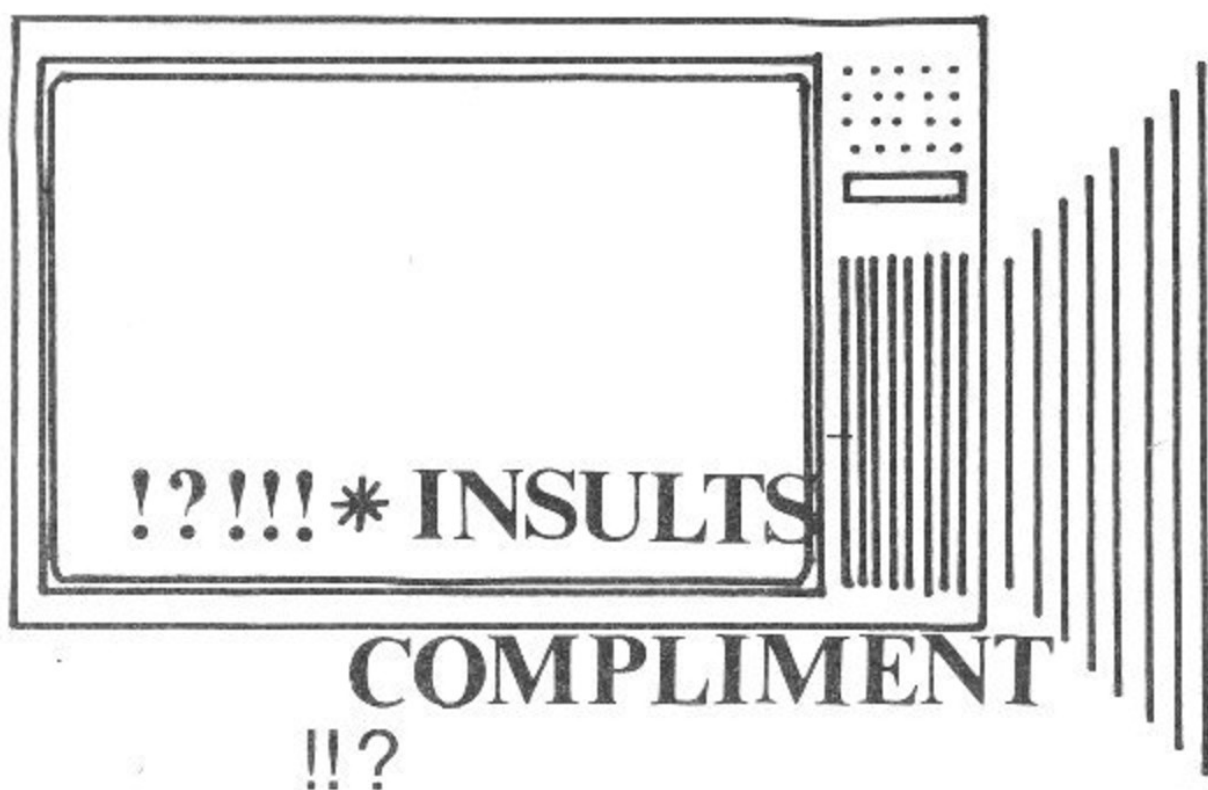
1040 PRINT AT 10,n; INK 2;"B"
1050 NEXT n
1060 PRINT AT 10,bus+7;" C";AT 9
,bus+7;" "
1070 PRINT AT 10,0;"E"
1080 RETURN
2000 FOR f=1 TO 10
2010 PRINT AT 10,j+2;" ";AT 10,j
+2;" "
2020 NEXT f
2030 PAUSE 40
2040 CLS
2045 IF j<bus+7 THEN GO TO 2100
2050 PRINT AT 4,3;"You went too
fast and you"
2060 PRINT AT 6,4;"missed the la
dding ramp."
2070 PRINT AT 8,7;"Try a slower
speed."
2080 PAUSE 120
2090 GO TO 20
2100 PRINT AT 4,1;"You went too
slow and your bike"
2110 PRINT AT 6,9;"is a write-of
f."
2120 PRINT AT 8,3;"Try again on
a new bike"
2130 PAUSE 120
2150 GO TO 20
3000 FOR n=USR "a" TO USR "e"+7:
READ r
3010 POKE n,r: NEXT n
5000 DATA 0,1,3,7,15,31,63,255
5010 DATA 0,60,66,124,66,60,90,6
5
5020 DATA 0,128,192,224,240,248,
252,255
5030 DATA 0,85,219,85,219,85,219
,85
5040 DATA 32,96,80,110,50,82,181
,66
5050 GO TO 10

```

INSULTS/ COMPLIMENTS

These two programs use the useful routine of extracting information stored in strings to generate compliments or insults.

This technique has many uses in games programs.



```

10 RANDOMIZE
20 LET A$="SILLYUGLYFOOLISHSTU
PIDTIRESONEBARMYTHICKGORHLESSDOZ
EYSENSELESS"
30 DIM B(10): DIM D(10): RESTO
RE 30: FOR A=1 TO 10: READ B(A),
D(A): NEXT A
40 LET C$="FOOLIDIOTMANIACTUIT
IMBECILEBLOCKHEADMORONDOLTCOWARD

```


MORE GAMES FOR YOUR ZX SPECTRUM

```

80 BEEP .1,INT (RAND*20)+10: PO
KE 23692,-1: PRINT AT 21,0''
90 PRINT PAPER INT (RAND*7)+1;
INK 9;A$(B(A) TO B(A+1)-1);" ";C
$(D(B) TO D(B+1)-1)
100 GO TO 60

```

COMPLIMENTS

```

10 RANDOMIZE
20 LET A$="NICEWISEBEAUTIFULCL
EVERCHARMINGWITTYFRIENDLYBRILLIA
NTSMARTLOVELY"
30 DIM B(10): DIM D(10): RESTO
RE 30: FOR A=1 TO 10: READ B(A),
D(A): NEXT A
40 LET C$="PERSONPROGRAMMERCHA
RMERGENIUSWITOPERATORSAGEINDIVID
UALHEROACE"
50 DATA 1,1,5,7,9,17,18,24,24,
30,32,33,37,41,45,45,54,55,59,59
,65,62
60 LET A=INT (RAND*9)+1
70 BORDER (A/2)+2: LET B=INT (
RAND*9)+1
80 BEEP .1,INT (RAND*20)+10: PO
KE 23692,-1: PRINT AT 21,0''
90 PRINT PAPER INT (RAND*7)+1;
INK 9;A$(B(A) TO B(A+1)-1);" ";C
$(D(B) TO D(B+1)-1)
100 GO TO 60

```



How To Write Better Programs

By Tim Hartnell, series editor

There are a number of fine programs in this book, and many of the regular computer magazines contain other such ones. But no matter how good the programs from published sources are, you are certain to get more pleasure from running them if they have been partially or completely written by you. Putting your personal stamp on programs, altering them to reflect your wishes and creativity, is an excellent way to improve the programs, and eventually, of course, you'll become a better and more imaginative programmer.

Programs in magazines, and in books like this one, are ideal as starting points for your own developments. You may also find that advertisements for software packages can be fruitful 'idea-starters'. You only need to read the description of what the commercially available program does, and you will have the first step towards creating your own program. You have to be careful, of course, not to infringe copyright either in the screen displays, in the name of the program, or the names of the 'characters' within the program. However, you will probably find that at a certain point in its development the program will take on a life of its own, growing and evolving away from the

prove published programs, but do not then present them to magazines as if they were originals. I have lost count of the number of times one of my own programs, from one of my books, has been submitted to me for publication.

Always watch out for new ideas as you look through books, game and computer magazines, or wander through video game arcades. It may be worth keeping notes of ideas you come across for games, for character shapes, for sounds, for dramatic endings and so on. Thus you will never be short of ideas, and you will also be able to merge the material together to produce better games which hold the player's attention for longer.

Games tend to fall into one of three categories, and it is worth making sure of the category into which your proposed program will fall *before* you start to program, since the category of game materially alters the programming approach. This is not to say that, as you develop a program, it will not move from one category into another, nor that a particular game might not extend across two categories, but it is nevertheless useful to keep the various groups separate in your mind, just to clarify your thoughts. The three categories are:

1. Board games
2. 'Arcade' (that is, highly visual, fast moving, noisy, real time) games
3. Games of chance (such as Roulette and Snap).

In board games, the quality of play is more important than lightning-fast response, while the arcade-type programs must be kept moving at all costs, even if some 'intelligence' from your Martian intruders must be sacrificed to achieve this. Games of chance depend more on their ease of play ('user-friendly' inputs), and an approach to true randomness, than do either of the other categories.

You will find that games programs tend to fall into types, which are subdivisions of the three above mentioned categories. Many board games are variants of

started off in the 'real world' of dice and cards. Looking at a program description, or a games machine, and trying to categorise the game you see can help trigger new ideas which fit within that particular game's genre.

There is a school of thought within programming — generally called 'structured programming' — which believes that discipline at the beginning of the games-writing process is essential. While less interesting than sitting down at the computer right away, a much better program is produced in the end. I once wrote a program called *Dome Dweller*, a simulation program in which the player is in charge of a 'lunar dome' and must decide which products to manufacture and sell in order to buy oxygen and food for the station's inhabitants. (This program was used in my book *The Book of Listings*, written with Jeremy Ruston, and published by the BBC.) Once I had decided the overall scenario, I worked out the screen display, and came up with an idea as follows:

Oxygen supplies are low

There are 96 people living within your dome in year 3

Money credit is \$5,693

Annual maintenance charge is \$226

Oxygen tanks hold 811 units

Oxygen costs \$8 per unit

Each dome dweller needs 5 units a year

Food stocks stand at 2122

Each dweller needs 3 units a year (\$6 each, \$576 for dome. This will last 7 years at present population.)

You can trade your unique lunar sculptures with the people who live in other domes. You use up 2 units of oxygen making each one, and sell them for \$30.

As you can probably guess from this 'sample printout',

making each sculpture uses up oxygen, so you must balance your wish to make money against the need to use the oxygen intelligently.

You may well wish to try writing such a program yourself. You should end up with an enjoyable program, and writing it will do much to help you develop your programming skills. The first thing to do is to make a list of what the program has to do:

- Set up the needed variables
- Tell the player the 'state of the dome'
- Ask how much oxygen to be bought
- Check if can afford this, if so buy it, if not go back and ask again
- Ask how much food to be bought
- Check if can afford this, if so buy it, if not go back and ask again
- Update oxygen quantity
- Update food quantity
- Reduce money left total
- Ask how many items of sculpture to be made
- Check if there is enough oxygen to make this many, if not go back and ask again
- Reduce oxygen quantity by amount needed to make the number of sculptures specified, increase money total to reflect value of sculptures made
- Increase the population total slightly, add one to the 'current year'
- Check if there is enough food in stocks to feed whole population
- Check if there is enough oxygen for whole population
- Check if there is any money
- If any of these conditions are negative (eg not enough food) send action to an 'end of game' routine
- If all are positive, loop back to tell the player the

using the list above, together with the 'sample printout' information. There is, however, a secret I should like to share with you which unlocks programming problems almost instantly. You can actually write all the vital parts of a program in minutes, so you can see the raw framework of a program like this running long before you fill in the details. And once you have a framework you can work on it for as long as you like, knowing as you do so that — at every moment in program development — you have a working program. You do not have to wait until the end until you can run it to see how you are going. The 'secret' is to hold the entire program within a series of subroutine calls, all held within a perpetual loop. Here's how it could work with this program. The very first lines you enter in your computer are as follows:

```

10 REM DOME DWELLER
20 GOSUB 1000: REM ASSIGN VARIABLES
30 GOSUB 2000: REM PRINT OUT STATE OF
  DOME
40 GOSUB 3000: REM OXYGEN
50 GOSUB 4000: REM FOOD
60 GOSUB 5000: REM SCULPTURE
70 GOSUB 6000: REM UPDATE POPULATION
80 GOSUB 7000: REM CHECK ON STATE OF
  DOME
90 IF (all conditions positive, from GOSUB 7000)
  THEN GOTO 30
100 REM End of game ...

```

As you can see once you have the 'master loop' set up in this way, it is relatively simple to fill in each of the subroutines one by one, testing each as you do so, and elaborating each one so that you end up eventually with a very good program. The only thing you need now is a list of the variables which you will use with the program.

I find the best way to do this is to use explicit names for

programs as easy as possible to transfer between different computers you can stick to two letter variable names, or you can take advantage (if your computer allows it) of long names (such as OXYUSE for the amount of oxygen used) for variables. Then you have no doubts whatsoever as to the meaning of each variable name. To show how this can work, and to illustrate a further advantage of explicit variable names, here are the variables used in Dome Dweller:

FOLK — population of dome
CASH — money in treasury
FOOD — food stocks on hand
FOODCOST — how much each unit of food costs
FOODNEED — how many units of food were consumed per person per year
ARTCOST — how much oxygen was used up making each piece of sculpture
ARTPAY — how many dollars each piece of sculpture was sold for
OXY — oxygen stocks on hand
OXYNEED — how many units of oxygen were consumed per person per year
OXYCOST — how much each unit of oxygen cost to buy
REPAIR — the cost of annual repairs to the dome
YEAR — the year of the dome's life

Using explicit variable names in this way — although they use up more memory than do single or double-letter variable names — makes it very simple to follow through a program, working out what each section of the program actually does. Moreover, and this is the further advantage mentioned, it is very easy when writing the program to insert the formulae required for calculations. By this I mean that if, for example, you wished to include (as I do in this program) an indication of how much oxygen is need-

include within the printouts for the state of the dome a line like:

```
PRINT "THERE ARE ";FOLK;" IN THE DOME"
PRINT "IN YEAR ";YEAR
PRINT "EACH PERSON NEEDS ";OXYNEED;"
    UNITS OF"
PRINT "OXYGEN EACH YEAR, ";
    OXYNEED*FOLK;" NEEDED"
PRINT "FOR THE WHOLE DOME"
```

It also makes it very easy to check on whether purchases are possible. For example, to buy food, you could say:

```
PRINT "HOW MUCH FOOD WILL YOU BUY?"
INPUT A
IF A*FOODCOST > CASH THEN GOTO (get
    another A)
```

So the suggestions given here for improving your programs by the use of 'structured programming' include the following:

- draw up a sample printout, or mock-up of the final screen display
- draw up a list of what the program has to do each time through a 'master control loop'
- change this list to a series of subroutine calls
- use explicit variable names if possible

It is useful if you are designing programs for others to use to ensure that it is quite clear what the player should do when running the program. There is little point, especially when memory is limited, in including a long set of instructions within the program, but you should certainly write such instructions down. In addition, user prompts should be explicit (such as ENTER THE NUMBER OF GOES YOU WANT) and should include warnings of the limits which will be placed on the input (HOW MANY CARDS WILL YOU START WITH: 1, 2 OR 3 ?, for instance)

ing a choice earlier on in the program will not cause it to crash or come up with stupid results later on.

If you read through this section of the book several times and try to apply the ideas to your own programming work, you should find your work quality improves significantly, and also that you can spend more time improving and embellishing a program and less in the raw mechanical task of getting the thing running.

GLOSSARY

A

Accumulator — the place within the computer in which arithmetic computations are performed and where the results of these computations are stored.

Algorithm — the series of steps the computer follows to solve a particular problem.

Alphanumeric — this term is usually used in relation to a keyboard, as in 'it is an alphanumeric keyboard', which means that the keyboard has letters as well as numbers. It is also used to refer to the 'character set' of the computer. The character set comprises the numbers and letters the computer can print on the screen.

ALU (Arithmetic/Logic Unit) — the part of the computer which does arithmetic (such as addition, subtraction) and where decisions are made.

AND — a Boolean logic operation that the computer uses in its decision-making process. It is based on Boolean algebra, a system developed by mathematician George Boole (1815-64). In Boolean algebra the variables of an expression represent a logical operation such as OR and NOR.

ASCII — stands for American Standard Code for Information Exchange, the most widely used encoding system for English language alphanumerics. There are 128 upper and lower case letters, digits and some special characters. ASCII

(which the computer can understand directly). Assembly language is a low level programming language which uses easily memorised combinations of two or three letters to represent a particular instruction which the assembler then converts so the machine can understand it. Examples of these are ADD (add), and SUB (subtract). A computer programmed in assembly language tends to work more quickly than one programmed in a higher level language such as BASIC.

B

BASIC — an acronym for Beginners All-Purpose Symbolic Instruction Code. It is the most widely used computer language in the microcomputer field. Although it has been criticised by many people, it has the virtue of being very easy to learn. A great number of BASIC statements resemble ordinary English.

Baud — named after Baudot, a pioneer of telegraphic communications. Baud measures the rate of transfer of information and is approximately equal to one bit per second.

BCD — an abbreviation for Binary Coded Decimal.

Benchmark — a test against which certain functions of the computer can be measured. There are a number of so-called 'standard Benchmark tests', but generally these only test speed. This is rarely the aspect of a microcomputer that is most of interest to the potential buyer.

Binary — a numbering system that uses only zeros and ones.

Bit — an abbreviation for Binary Digit. This is the smallest unit of information a computer circuit can recognise.

Bootstrap — a short program or routine which is read into the computer when it is first turned on. It orients the computer to accept the longer, following program.

Bug — an error in a computer program which stops the program from running properly. Although it is generally used to mean only a fault or an error in a program, the term bug can also be used for a fault in the computer hardware.

Bus — a number of conductors used for transmitting signals such as data instructions, or power in and out of a computer.

Byte — a group of binary digits which make up a computer word. Eight is the most usual number of bits in a byte.

C

CAI — Computer Assisted Instruction.

CAL — Computer Assisted Learning. The term is generally used to describe programs which involve the learner with the learning process.

Chip — the general term for the entire circuit which is etched onto a small piece of silicon. The chip is, of course, at the heart of the microcomputer.

Clock — the timing device within the computer that synchronises its operations.

COBOL — a high level language derived from the words Common Business Orientated Language. COBOL is designed primarily for filing and record-keeping.

Comparator — a device which compares two things and produces a signal related to the difference between the two.

Compiler — a computer program that converts high

Computer — a device with three main abilities or functions:

- 1) to accept data
- 2) to solve problems
- 3) to supply results

CPU — stands for Central Processing Unit. This is the heart of the computer's intelligence, where data is handled and instructions are carried out.

Cursor — a character which appears on the TV screen when the computer is operating. It shows where the next character will be printed. On a computer there are usually 'cursor control keys' to allow the user to move the cursor around the screen.

D

Data — information in a form which the computer can process.

Debug — the general term for going through a program and correcting any errors in it, that is, chasing down and removing bugs (see Bug).

Digital Computer — a computer which operates on information which is in a discrete form.

Disk/Disc — this is a magnetically sensitised plastic disk, a little smaller than a single play record. This is used for storing programs and for obtaining data. Disks are considerably faster to load than a cassette of the same length program. The disk can be searched very quickly while a program is running for additional data.

Display — the visual output of the computer, generally on a TV or monitor screen.

Dot Matrix Printer — a printer which prints either the listing of a program or that which is displayed on the

Dynamic Memory — a memory unit within the computer which 'forgets' its contents when the power is turned off.

E

Editor — this term is generally used for the routine within the computer which allows you to change lines of a program while you are writing it.

EPROM — stands for Erasable Programmable Read-Only Memory. This is like the ROM in the computer, except that it is fairly easy to load material into an EPROM and it doesn't disappear when you turn the power off. EPROMs must be placed in a strong ultra violet light to erase them.

Error Messages — the information given by a computer where there is a fault in the coding during a part of a program, usually shown by the computer stopping, and printing a word, or a word and numbers, or a combination of numbers only, at the bottom of the screen. This tells you what mistake has been made. Common mistakes include using the letter O instead of zero in a line, or leaving out a pair of brackets, or one of the brackets, in an expression, or failing to define a variable.

F

File — a collection of related items of information organised in a systematic way.

Floppy Disk — a relatively cheap form of magnetic disk used for storing computer information, and so named

lines, with arrows to represent loops, and decisions written at the branches. It makes writing a program much easier because traps such as infinite loops, or non-defined variables can be caught at an early stage. It may not be worth writing a flow chart for very short programs, but generally a flow chart aids in creating programs.

Firmware — there are three kinds of 'ware' in computers: software 'temporary' programs; hardware like the ROM which contains permanent information; and firmware in which the information is relatively permanent, as in an EPROM (see EPROM).

Flip-Flop — a circuit which maintains one electrical condition until changed to the opposite condition by an input signal.

FORTRAN — an acronym for FORMula TRANslation, this is a high level, problem orientated computer language for scientific and mathematical use.

G

Gate — an electrical circuit which, although it may accept one or more incoming signals, only sends out a single signal.

Graphics — pictorial information as opposed to letters and numbers.

H

Hard Copy — computer output which is in permanent form.

Hardware — the physical parts of the computer (also see software and firmware).

Hexadecimal (Hex) — a numbering system to the base

equals 10, B equals 11, C equals 12, and so on. Hex is often used by microprocessor users.

Hex Pad — a keyboard designed specifically for entering hexadecimal notation.

High Level Language — a programming language which allows the user to talk to the computer more or less in English. In general, the higher the level of the language (that is, the closer it is to English), the longer it takes for the computer to translate it into a language it can use. Lower level languages are far more difficult for human operators but are generally executed far more quickly.

I

Input — the information fed into the computer via a keyboard, a microphone, a cassette or a disk.

Input/Output (I/O Device) — a device which accepts information or instructions from the outside world, relays it to the computer, and then, after processing, sends the information out in a form suitable for storing, or in a form which could be understood by a human being.

Instruction — data which directs a single step in the processing of information by the computer (also known as a command).

Integrated Circuit — a complete electronic circuit imprinted on a semiconductor surface.

Interface — the boundary between the computer and a peripheral such as a printer.

Interpreter — a program which translates the high level

Interactive Routine — part of a program which is repeated over and over again until a specified condition is reached.

J

Jump Instruction — an instruction which tells the computer to go to another part of the program, when the destination of this move depends on the result of a calculation just performed.

K

K — this relates to the size of the memory. Memory is usually measured in 4K blocks. 1K contains 1,024 bytes.

Keyword — the trigger word in a line of programming, usually the first word after the line number. Keywords include STOP, PRINT and GOTO.

L

Language — computer languages are divided into three sections: high level languages, such as BASIC, which are reasonably close to English and fairly easy for humans to use; low level languages, such as Assembler, that use short phrases which have some connection with English (ADD for add and RET for return, for instance); and machine code which communicates more or less directly with the machine.

LCD — this stands for Liquid Crystal Diode. Some computers such as the TRS-80 Pocket Computer use

red numbers which are often used on watch or clock displays are made up of LEDs.

Logic — the mathematical form of a study of relationships between events.

Loop — a sequence of instructions within a program which is performed over and over again until a particular condition is satisfied.

M

Machine Language or Machine Code — an operation code which can be understood and acted upon directly by the computer.

Magnetic Disk — see Disk and Floppy Disk.

Mainframe — computers are generally divided into three groups, and the group a computer falls into depends more or less on its size. The computer you are thinking of buying is a microcomputer; medium sized computers are known as minicomputers; and the giant computers that you sometimes see in science fiction movies are mainframe computers. Until 15 years ago mainframe computers were, in practical terms, the only ones available.

Memory — there are two types of memory within a computer. The first is called ROM (read-only memory); this is the memory that comes already programmed on the computer, which tells the computer how to make decisions and how to carry out arithmetic operations. This memory is unaffected when you turn the computer off. The second type is RAM (random access memory). This memory holds the program you type in at the keyboard or send in via a cassette or disk. In most computers the computer

MODEM — stands for Modulator Demodulator. This is a device which allows two computers to talk to each other over the telephone. The computers usually use a cradle in which a telephone receiver is placed.

Monitor — this has two meanings in computer terms. One meaning is a television-like display. A monitor has no facility for tuning television programs, and usually the picture produced on a monitor is superior to that produced by an ordinary television. The second meaning of a monitor relates to ROM. The monitor of a computer is described as the information it has built in when you buy it. This information allows it to make decisions and carry out arithmetic computations.

Motherboard — a framework to which extra circuits can be added. These extra circuits often give the computer facilities which are not built-in, such as that of producing sound or of controlling a light pen.

MPU — an abbreviation for Microprocessor Unit.

N

Nano-second — a nano-second is one thousand billionth of a second, the unit of speed in which a computer or a memory chip is often rated.

Non-Volatile Memory — memory which is not lost when the computer is turned off. Some of the smaller computers such as the TRS-80 Pocket Computer have non-volatile memory. The batteries hold the program you enter for several hundred hours.

Not — a Boolean logic operation that changes a binary digit into its opposite.

Null String — a string which contains no characters. It is shown in the program as two double quote marks, without anything between them.

as being alphanumeric which means both numbers and letters are provided.

O

Octal — a numbering system which uses eight as the base, and the digits 0, 1, 2, 3, 4, 5, 6 and 7. The Octal system is not used very much nowadays in microcomputer fields. The Hexadecimal system is more common (see Hexadecimal).

Operating System — the software or firmware generally provided with the machine that allows you to run other programs.

OR — an arithmetic operation that returns a 1, if one or more inputs are 1.

Oracle — a method of sending text messages with a broadcast television signal. A teletext set is required to decode the messages. Oracle is run by Independent Television Service in the UK, and a similar service — Ceefax — is provided by the BBC.

Output — information or data fed out by the computer to such devices as a TV-like screen, a printer or a cassette tape. The output usually consists of the information which the computer has produced as a result of running a program.

Overflow — a number too large or too small for the computer to handle.

P

Pad — see Keypad.

PASCAL — a high level language.

Peripheral — anything which is hooked onto a computer, for control by the computer, such as a disk unit, a printer or a voice synthesiser.

Port — a socket through which information can be fed out of or in to a computer.

Prestel — the British telecom name for a system of calling up pages of information from a central computer via the telephone and displaying them on a television screen. A similar commercial version in the United States is known as The Source.

Program — in computer terms program has two meanings. One is the list of instructions that you feed into a computer, and the second is used as a verb, as in 'to program a computer'.

PROM — stands for Programmable Read Only Memory. This is a device which can be programmed, and once it is then the program is permanent (also see EPROM and ROM).

R

Random Access Memory (RAM) — the memory within a computer which can be changed at will by the person using the computer. The contents of RAM are usually lost when a computer is turned off. RAM is the memory device that stores the program that you type in and also stores the results of calculations in progress.

Read-Only Memory (ROM) — in contrast to RAM, information in ROM cannot be changed by the user of the computer, and the information is not lost when the computer is turned off. The data in ROM is put there by the manufacturers and tells the computer how to make decisions and how to carry out arithmetic operations. There are two types of ROM, EPROM and PROM. EPROM is an erasable PROM and PROM is a programmable ROM.

GLOSSARY

Recursion — the continuous repetition of a part of the program.

Register — a specific place in the memory where one or more computer words are stored during operations.

Reserved Word — a word that you cannot use for a variable in a program because the computer will read it as something else. An example is the word TO. Because TO has a specific computer meaning, most computers will reject it as a name for a variable. The same goes for words like FOR, GOTO and STOP.

Routine — this word can be used as a synonym for program, or can refer to a specific section within a program (also see Subroutine).

S

Second Generation — this has two meanings. The first applies to computers using transistors, as opposed to first generation computers which used valves. Second generation can also mean the second copy of a particular program; subsequent generations are degraded by more and more noise.

Semiconductor — a material that is usually an electrical insulator but under specific conditions can become a conductor.

Serial — information which is stored or sent in a sequence, one bit at a time.

Signal — an electrical pulse which is a conveyor of data.

Silicon Valley — the popular name given to an area in California where many semiconductor manufacturers are located.

Software Compatible — this refers to two different computers which can accept programs written for the other.

Static Memory — a non-volatile memory device which retains information so long as the power is turned on, but does not require additional boosts of power to keep the memory in place.

Subroutine — part of a program which is often accessed many times during the execution of the main program. A subroutine ends with an instruction to go back to the line after the one which sent it to the subroutine.

T

Teletext — information transmitted in the top section of a broadcast television picture. It requires a special set to decode it to fill the screen with text information. The BBC service is known as Ceefax, the ITV service as Oracle. Teletext messages can also be transmitted by cable, for example the Prestel service in Britain or The Source in the United States.

Teletype — a device like a typewriter which can send information and also receive and print it.

Terminal — a unit independent of the central processing unit. It generally consists of a keyboard and a cathode ray display.

Time Sharing — a process by which a number of users may have access to a large computer which switches rapidly from one user to another in sequence, so each user is under the impression that he or she is the sole user of the computer at that time.

Truth Table — a mathematical table which lists all the

U

UHF — Ultra High Frequency (300-3000 megaHertz).

Ultra Violet Erasing — Ultra violet light must be used to erase EPROMs (see EPROM).

V

Variable — a letter or combination of letters and symbols which the computer can assign to a value or a word during the run of a program.

VDU — an abbreviation for Visual Display Unit.

Volatile — refers to memory which 'forgets' its contents when the power is turned off.

W

Word — a group of characters, or a series of binary digits, which represent a unit of information and occupy a single storage location. The computer processes a word as a single instruction.

Word-Processor — a highly intelligent typewriter which allows the typist to manipulate text, to move it around, to justify margins and to shift whole paragraphs if necessary on a screen before outputting the information onto a printer. Word-processors usually have memories, so that standard letters and the text of letters, written earlier, can be stored.

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Compiled by Tim Hartnell

The A to Z Book of Computer Games (McIntire, Thomas C, Tab Books, Blue Ridge Summit, Pa.).

This is a fine Tab book to give you program ideas and ready-to-run programs, although some of the games are a disappointment, such as the overly long Othello program which does not even play, but simply records the moves made by two human players. Others, however, such as Fivecard and Hotshot, are well written, and well worth entering into your microcomputer.

BASIC Computer Games (ed. Ahl, David, Creative Computing Press, Morristown, New Jersey).

This is a classic work, the source of more programming ideas than any other computer games book ever published. I had a meal with David Ahl one night in London after a PCW show and discussed the book. He said that he'd been in the personal computer field almost before there were personal computers, and while many of the games in this book do not seem startling now, the fact that people could write and play games for computer interaction at all seemed quite incredible in the late seventies. The Checkers program, and Life for Two are just a couple of the treasures you will find in this splendid program and idea source book.

BASIC Computer Programs for the Home (Sternberg, Charles D, Hayden Book Company, Inc., Rochelle Park, New Jersey).

Traditionally, home computers (when first purchased)

stems from the lack of a readily available, comprehensive set of home applications programs that were easy to use and understand and that satisfied the practical requirements of the home. This book provides a set of programs to make your computer start earning its keep. The programs provide a good cross-section of practical applications; these have been designed so as not to rely upon the availability of tape or disk-storage devices. The programs cover a wide field, and are divided into a number of sections: home financial programs (including household expenses and income tax recording); car related programs (including fuel use and trip planning); 'Kitchen Helpmates' (including diet and meal planning programs); scheduling programs for home use (including a reminder calendar and a couple of programs which I imagine are designed to short circuit arguments about which television programs will be watched); and 'List programs for every purpose' (including Christmas cards, music collections and three versions of an addresses program).

The BASIC Handbook (Lien, David A, Compusoft Publishing, San Diego, California).

This is an encyclopedia of the BASIC language. Now that BASIC is so firmly established throughout the microcomputer world, it is necessary to make its many dialects understandable so that programs can be transported between different computers. When you have found exactly the program you've been looking for, it is very frustrating to be unable to run it on your computer. This book addresses that problem by discussing in detail just about every commonly used BASIC statement, function, operator and command. For the most part, BASIC words mean the same thing to every computer which recognises them. If a computer

application to transform the information into usable form, it is a very valuable reference work indeed. Every BASIC word you have ever heard of (and many you may not have heard of, such as LE, NE, GOTO-OF, RES and TIME) is probably in the book. It may be of limited use to you in your early days of computing, but it should become an indispensable handbook once you get more involved in the subject.

Beat the Odds, Microcomputer Simulations of Casino Games (Sagan, Hans, Hayden Book Company, Inc., Rochelle Park, New Jersey).

The book explains how to play certain casino games (trente-et-quarante, roulette, chemin-de-fer, craps and blackjack) and gives complete program listings in BASIC with commentaries on systems and optimal strategies. Professor Sagan (Professor of Mathematics at North Carolina State University) says he wrote the book in an attempt to convince people that, in the long run, they could not win — except possibly at blackjack — and to explain some popular systems and their pitfalls, and above all to provide very realistic computer simulations of the games themselves. He has succeeded in his attempt. The listings are possibly longer than other computer versions of the same games, but this is because the Sagan versions strictly duplicate the odds involved in playing the game 'in real life', and cover all the eventualities that a real game can produce. The programs are well-structured, and an examination of the listings should give you ideas for improving your own programming.

Beginner's Guide to Chess (Keene, Raymond, Pelham Books Ltd, London).

An ideal guide to simple chess-playing techniques which you can turn into algorithms if you intend to write a chess program of your own.

(which include Fibonacci Follies, Stretch to Sixty and Casting Out 9s) suggest the book's contents. There are some worthwhile brain-stretching puzzles, and 15 or so ideas definitely calling for conversion to computer games.

33 Challenging Computer Games for TRS-80/Apple/PET (Chance, David, Tab Books, Blue Ridge Summit, Pa.).

Even if you don't have any of the three computers named in the title, you will still find the book a goldmine of ideas for your own development, and many of them will run, with minimal alteration, on any BASIC-using computer. Particularly commendable programs are Life Support, Scrambled Eggs and Tank Assault.

Communicating with Microcomputers (Witten, Ian H., Academic Press, London).

This is an introduction to the technology of man/computer communications for the non-specialist. By placing particular emphasis on low-cost techniques associated with small systems and personal computers, the reader's attention is focused on the positive nature of the 'microprocessor revolution' — how machines can help people — rather than the negative aspects which are often highlighted in the non-technical press. The level of the book is suitable for the layman with some acquaintance with electronics. The final section, on speech communication, provides the most fascinating reading.

Computer Appreciation (Fry, T.F., Newnes, Butterworths, 1975).

A fairly 'straight' but useful overview of computer operation, and business applications. Designed to be

organisation of a modern data-processing department. It concludes with a brief consideration of the applications of computers and a discussion on the effects of computers upon management matters. It is surprisingly undated, despite the extraordinary increase in hardware availability and capability since the book was written.

The Computer Book: An Introduction to Computers and Computing (Bradbeer, Robin; De Bono, Peter; Laurie, Peter; BBC Publications).

This book was published in conjunction with the BBC television series 'The Computer Programme', first transmitted on BBC2 from January 1982, and produced by Paul Kriwaczek. I discussed this book with Robin Bradbeer while it was being written, and he told me that the BBC editors were ruthless in pointing out any use of jargon. They insisted, said Robin, that nothing could be taken for granted. This insistence has resulted in a book which anyone can understand. It assumes nothing, not even the knowledge of how to use a shift key — or the effect of using it — on a typewriter. The many illustrations and photographs break up the text, which gives a detailed introduction to computers, especially micros, and their possible applications.

Computer Games for Businesses, Schools and Homes (Nahigian, J Victor and Hodges, William S. Winthrop Publishers Inc., Cambridge, Mass.).

Some of the programs are a little thin for the size and price of the book, but the best ones are well worth adapting to run on your computer. The inclusion of long, clear sample run printouts ensures that you know exactly what the programs will do before you run them. The Tennis and Star Trek programs are especially good.

explanations to keep you creating games programs on your microcomputer for a long time to come.

The Electronic Calculator in Business, Home and School (Birtwistle, Claude, Elliot Right Way Books, Kingswood, Surrey).

To get the best out of a calculator, you need to understand the mathematics which lies behind the operations. That is the purpose of the book, and in general it succeeds in this aim. The maths involved is, however, fairly simple and basic, since the book was written with a wide range of people in mind — the pupil at school, the student at college, the business person and the householder. It is a practical book which should be read and worked through with a calculator to hand.

Everyman's Indoor Games (Brandreth, Gyles, J M Dent and Sons Ltd, London).

If you're looking for games to convert into computer programs, ignore the chapters entitled Parlour Games and Children's Party Games and stick to the rest of the book, a treasure trove of games concepts which are certainly worth using as a starting point. Fox and Geese, Poker Dice and Billiards, as described in the book, are only a few of the programs you might write after reading it.

Games and Puzzles for Addicts (Millington, Roger, M and J Hobbs, Walton-on-Thames).

These games and puzzles first appeared in the weekly computer news-magazine 'Datalink', so they are especially likely to appeal to computer buffs. There are many ideas here that can be converted into games to be played with the computer.

Games for Home, Travel and Parties (Jensen, Helen, Western Publishing Company Inc., Racine, Wisconsin).

Home Computers, Questions and Answers, Hardware
(Didday, Rich, dilithium Press).

The book has two main purposes. Firstly, it is intended to give readers a real feeling for what is involved in home computing, so that they can make rational decisions before buying equipment. Secondly, it is intended to give people who have no specialised knowledge of computing a general background to the subject, and specifically to microcomputers. The book succeeds in imparting enough information to ensure you will have little trouble understanding articles about advanced projects in computer hobbyist magazines, advertisements for home computing equipment, or other people who do have advanced computer knowledge.

Inside BASIC Games (Mateosian, Richard, Sybex).

This book is a guide, albeit a slightly overwritten one, for anyone who wishes to understand computer games. You will learn how to write interactive programs in BASIC and how the principles of systems development are applied to small computers. The book also looks at how the features of specific small computer systems have been supported in BASIC. The sections of the book include: Arithmetic Games, Guessing Games, Time Games, Date Games, Taxman, and programming in 'Free BASIC', a structured BASIC that is translated manually into the actual BASIC instructions to be entered into the computer. Free BASIC is not a language; it is a program description medium (like flowcharts) that has no line numbers, and uses symbolic names for subroutines. Additional chapters look at The Match-Up Game, Craps and Alien Life. If you can contend with the verbiage, you will find this book well worthwhile.

An Introduction to Personal and Business Computing
(Zaks, Rodney, Sybex).

field were grossly pessimistic. He pointed out that the predictions current in 1978, when he wrote this book, have been proved so inaccurate that would-be prophets should take warning and assume that whatever they say will be wrong by a factor of 10 or 100. Despite its age — and computer books do age uncommonly quickly — this book is a good introduction to the field, explaining in clear, snappy English the fundamentals of computer operation. Dr Zaks also gives suggestions on what to look for when buying a computer.

Microsoft BASIC (Knecht, Ken, dilithium Press, Forest Grove, Oregon).

This book presents a complete introduction to programming in Microsoft BASIC. The concepts presented are illustrated with short, working programs. By starting with the simplest and most commonly used commands, and then progressing on to the more complex BASIC commands, Mr Knecht shows how the more powerful versions of the language can save valuable programming time and effort.

The Personal Computer Book (Bradbeer, Robin, Input Two-Nine).

The title says it all. Robin is deeply involved in the microfield in Great Britain. He started the North London Polytechnic Computer Fairs, assisted the BBC with their microcomputer television show (and co-authored *The Computer Book*, published by the BBC), and edited the monthly publication *Educational Computing*. This gave him a strong background from which to write the book. It explains what a computer is and how it works; it elucidates the mysteries inside the 'black boxes' which make up a computer; and it gives a number of very useful appendices, including bus standards, manufacturers and distributors.

detail, the majority of computer systems available on the British market, their price and their capabilities. Overall, this is a very impressive source book.

Personal Computers: What They Are and How to Use Them (Wels, Byron G., Trafalgar House Publishing).

A great deal has happened in the computer world since this book was written in 1978, but there is still a great deal of value and interest in it. The book details some of the personal computers available, and the improvements that are likely to be made in the future. It explains, in layman terms, how a computer works, and how to make it work for you. There is also material on the construction and maintenance of small computer systems.

Play the Game (Love, Brian, Michael Joseph and Ebury Press, London).

This is a splendid book, containing 40 or so full-size reproductions of Victorian (and pre-Victorian) board games, many suitable for playing against a computer. It is even possible to use the boards in the book (the computer then tells you where it is moving on this external board) rather than write a routine within the program to display a board.

The Pocket Calculator Games Book (Schlossberg, Edwin and Brockman, John, Wilton House Publications Ltd., London).

There are many ideas here suitable for conversion into computer games.

57 Practical Programs and Games in BASIC (Tracton, Ken, Tab Books, Blue Ridge Summit, Pa.).

There are more serious programs than games (of the Chi-Square Evaluation and Fibonacci Numbers variety) in this book. They are well-programmed, and supported by adequate (if brief) documentation, and by flow-charts. The Space Wars programs (versions

Problems for Computer Solution (Rogowski, Stephen J, Creative Computing Press, Morristown, New Jersey).

This outlines over 50 simple (and a few not-so-simple) problems which can be solved by writing a program. There are both teacher and student editions of this book; the teacher edition has a suggested program and sample run printout to solve the difficulty. It is an excellent source for educational ideas.

Stimulating Simulations (Engel, C.W., Hayden Book Company, Inc., New Jersey).

Here, according to the cover, are '12 unique programs in BASIC for the computer hobbyist'. Inside you will find some fascinating programs: Forest Fire, Rare Birds and The Devil's Dungeon are three you are sure to enjoy playing, while Diamond Thief (the computer decides who has committed the crime, then challenges you to discover which of the suspects is guilty) is both well written and tightly programmed.

TAKE TWO! 32 Board Games for 2 Players (Tapson, Frank, A & C Black, London).

This book is aimed at children, but it does give many fascinating ideas that could be transformed into computer games (even if some of them are duplicated elsewhere in the book).

24 Tested, Ready-to-Run Game Programs in BASIC (Tracton, Ken, Tab Books, Blue Ridge Summit, Pa.).

Tab Books are prolific publishers in the microcomputer program field, and their books are deservedly successful. If nothing else, reading a book such as this one will give you ideas for structuring programs neatly, and for writing them to ensure the maximum compatibility between different versions of BASIC. Many of the games, such as Auto Rally and Capture the Alien, are (despite their weak titles) well

read it (making notes, and turning down page corners) on the flight to London. And I still hadn't finished it on arrival. If you feel you have come to the end of possible applications for your computer, buy this book and discover that you have barely scratched the surface. It tells you about writing music and stories, aiding a mechanic or a carpenter, solving simultaneous equations, astrology, and much, much more.

The World Computer Chess Championship (Hayes, Jean E., and Levy, David N.L., Edinburgh University Press, Edinburgh).

This is a fascinating account of the world's first machine versus machine chess championship, held in 1974, when the dozen or so computer programs taking part were the only chess programs in existence. The games are analysed in detail, and the final section of the book outlines a board-numbering system which you could use if you're considering writing your own chess program. The book makes you realise how far the computer world has come in only a few years.

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