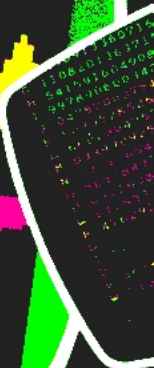
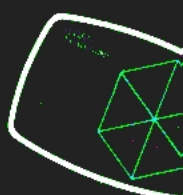
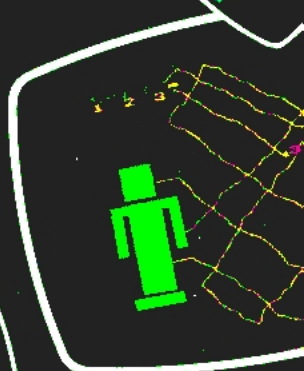
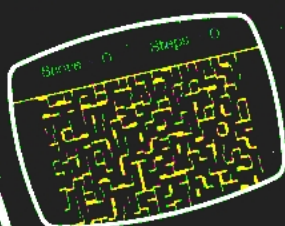
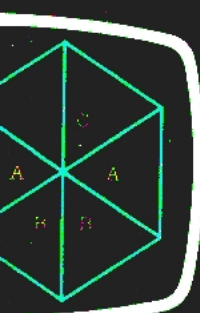
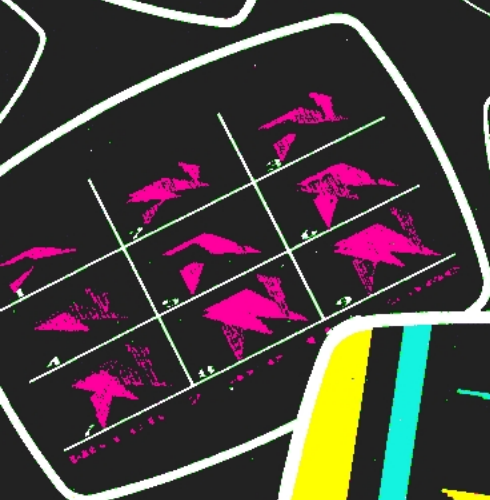


BRAINTEASERS

FOR THE BBC AND
ELECTRON COMPUTERS

G. LUDINSKI



PROGRAMS TO PUZZLE AND AMUSE

**Brainteasers
for the
BBC and Electron computers**

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for the
BBC and Electron computers

Geneviève Ludinski

Phoenix Publishing Associates
Bushey, Herts

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First published in Great Britain by
PHOENIX PUBLISHING ASSOCIATES
14 Vernon Road, Bushey, Herts, WD2 2JL

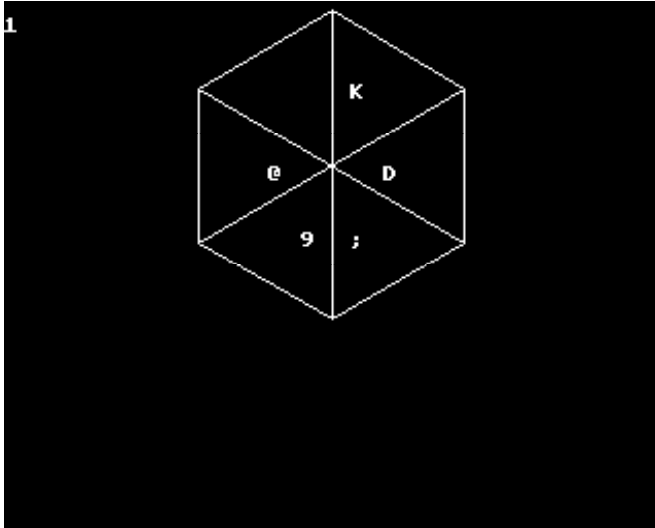
ISBN 0 9465 7603 3

Printed in Great Britain by
Billing & Sons Limited
Cover design by
David Berkoff
Typesetting by
Prestige Press (UK) Ltd.

CONTENTS

Introduction	1
Hexagon Puzzle	2
Safecracker	6
Fractions and Percentages	10
A-Maze-Ing	14
Saints to Sinners	18
Spot the Difference	23
Relations	28
Don't Paint the Cat	33
Francis Drake Adventure Game	37
Name the Graph	47
Close Encounters of the Fourth Kind	51
Sequence Countdown	55
Spiral Mazes	59
What's Yours	62
Pattern Pairs	66
Concentration Test	70
Wire Maze	74
Profit and Loss	78
Odd One Out	83
Decisive Hero	86
Fraction Car Chase	91
Western Adventure Game	95
Detective	99
Elementary Statistics	104
3-D Brainstorm	109
Bar Charter	114
Stats Painter	118
Who Dunnit	122
Word Search	126

HEXAGON PUZZLE



You are really up against the clock on this one as you must solve as many puzzles as possible, in just 200 seconds. A series of numbers, or letters, will be positioned around five of the sides of a hexagon and you will be asked to provide the missing letter or number. The relationship between the numbers or letters may be with their corresponding number or letter on the opposite side of the hexagon, or it may follow in sequence from an adjacent number.

The decision is yours.

How to play

Key in the number, or letter, of your choice and press RETURN key.

Programming hints

The program has a tuner that displays the time in seconds on the screen while the computer is waiting for the player to key in something. This is a very useful facility and is done by setting the system variable TIME to zero at the start of the program. Time will then hold the time in seconds multiplied by 100. This can be displayed on occasions throughout the program but is more effective being displayed constantly, especially when the program is waiting for the player to key in something. This is done by using INKEY\$(10) in a loop which keeps checking if a key has been pressed and if it has not, it displays the time (see line 470). When a key has been found to be pressed, the program waits for the rest of the digits to be keyed and knows you have finished when the return key is pressed, i.e. GET\$=CHR\$(13).

One change to make the puzzle easier, is to reduce the size of the numbers used. S(2) on line 150 is the value of the first number in the sequence if the pattern is a sequence of numbers going round the hexagon. IC on line 160 is related to the interval between the numbers going round the hexagon. So if the 9 in line 150 is changed to a smaller number and IC is always 1 this will make the puzzle easier.

If you wish to make the puzzle more difficult (and you must be brave or a genius to want to do so), then you could either increase the possible values of S(2) or IC or increase the number of different types of sequence. At

present there are five different types of sequences depending on whether W is 0 to 4. If you allow W to become 5 or larger in line 170, you could add a new sequence for W=5 after line 230.

```

10 REM HEXAGON PUZZLE
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 4
40 DIM S(8),IP$(255)
50 CLS
60 VDU23,224,0,1,2,4,136,80,32,0
70 TE=0:CR=0:TIME=0
80 CLS
90 TE=TE+1
100 IF TE=11 OR TIME >=20000 THEN GOTO
670
110 REM
120 REM WORK OUT SEQUENCE
130 REM
140 S(1)=0
150 S(2)=INT(RND(1)*9+1)
160 IC=INT(RND(1)*4+1)
170 W=INT(RND(1)*5)
180 FOR I=3 TO 8
190 IF W=0 THEN S(I)=2*S(I-1)-S(I-2)+I
C:MS$="The interval increases by "+STR$(
IC)+" each time"
200 IF W=1 THEN S(I)=S(I-1)-S(I-2)+IC:
MS$="Each number is the sum of the previ
ous two plus "+STR$(IC)
210 IF W=2 THEN S(I)=S(2)^(I-1):MS$="E
ach number is "+STR$(S(2))+" to the powe
r of 2,3,4, 5,6 and 7"
220 IF W=3 AND I > 5 THEN S(3)=S(2):S(
4)=IC:S(5)=INT((S(2)+IC)/2):S(I)=S(2)*S(
I-3):MS$="Each number is "+STR$(S(2))+"
times the number opposite it"
230 IF W=4 AND I > 5 THEN S(3)=S(2):S(
4)=IC:S(5)=INT((S(2)+IC)/2):S(I)=IC*S(11
-I):MS$="The numbers on the left hand si
de of the wheel are "+STR$(IC)+" times th
e numbers on the right hand side"
240 NEXT I
250 FOR I=1 TO 13:PRINT:NEXT I
260 REM
270 REM DISPLAY NUMBER WHEEL
280 REM
290 X1=640:Y1=704
300 X2=X1+259.81:Y2=Y1+150:Y3=Y1-150:X
3=X1-259.81
310 MOVE X1,Y1+300
320 DRAW X2,Y2
330 DRAW X2,Y3
340 DRAW X1,Y1-300
350 DRAW X3,Y3
360 DRAW X3,Y2
370 DRAW X1,Y1+300
380 DRAW X1,Y1-300
390 MOVE X2,Y2:DRAW X3,Y3
400 MOVE X2,Y3:DRAW X3,Y2
410 IF S(8) > 26 THEN LE=0:PRINTTAB(21
,5);S(3):PRINTTAB(23,10);S(4):PRINTTAB(2
1,14);S(5):PRINTTAB(14,14);S(6):PRINTTAB
(12,10);S(7)
420 IF S(8) <= 26 THEN LE=1:PRINTTAB(2
1,5);CHR$(64+S(3)):PRINTTAB(23,10);CHR$(

```

```

64+S(4)):PRINTTAB(21,14);CHR$(64+S(5)):P
RINTTAB(18,14);CHR$(64+S(6)):PRINTTAB(16
,10);CHR$(64+S(7))
430 REM
440 REM INPUT ANSWER
450 REM
460 IX=1
470 IP$(IX)=INKEY$(10):IF IP$(IX)=" " T
HEN PRINTTAB(0,1);INT(TIME/100):GOTO 470
480 PRINTTAB(IX+13,5);IP$(IX);:IX=IX+1
:IP$(IX)=GET$:IF IP$(IX) <> CHR$(13) THE
N GOTO 480
490 I$=" ":FOR I=1 TO IX-1:I$=I$+IP$(I)
:NEXT I
500 REM
510 REM CHECK ANSWER
520 REM
530 *FX 15,1
540 IF LE=0 AND ABS(VAL(I$) - S(8)) <=
LEN(I$)/2 THEN COLOUR1:VDU8:PRINTTAB(19
,5);CHR$(224):CR=CR+1:COLOUR3:GOTO 610
550 IF LE=1 AND (I$=CHR$(64+S(8)) OR I
$=CHR$(65+S(8))) THEN COLOUR1:VDU8:PRINT
TAB(19,5);CHR$(224):CR=CR+1:COLOUR3:GOTO
610
560 PRINTTAB(0,21)"No, the answer = ";
570 IF LE=0 THEN PRINT S(8)
580 IF LE=1 THEN PRINT CHR$(64+S(8))
590 IF LE=1 THEN PRINT'"Replace each l
etter by its position number e.g. 1
for A, 2 for B etc.'"
600 PRINT:PRINT MS$
610 PRINTTAB(0,30)"Press <RETURN> to c
ontinue"
620 REPEATUNTILGET=13
630 GOTO80
640 REM
650 REM SCORE SHEET
660 REM
670 CLS:PRINT
680 PRINT"Number of puzzles completed
= ";TE
690 PRINT'"Number correct = ";CR
700 PRINT'"Time taken = ";INT(TIME/100
);" seconds"
710 IQ=INT(CR*100/5.3)
720 PRINT'"Your IQ level (numeracy) =
";IQ
730 PRINT
740 IF CR >= 7 THEN PRINT"This is clas
sed as SUPERIOR (upper 10%)":GOTO770
750 IF CR = 6 THEN PRINT"This is class
ed as GOOD (upper 20%)":GOTO770
760 IF CR = 5 THEN PRINT"This is class
ed as FAIR (upper 60%)"
770 REM

```

SAFECRACKER



Are you a quick-thinker or a deep thinker? I hope you are one or the other, or you will never be able to crack open someone else's safe!

This game can be played two different ways, depending on whether you are a quick or deep thinker. If you are not sure which you are, then I suggest you play it both ways, and find out which way gives you the highest score.

In all cases, a closed safe is displayed and you are given two clues about the secret code that opens it. If you work out the exact answer before keying in the code, you are given 2 minutes to do it. If you make guesses, then you are only allowed 16 seconds. Wrong answers are ignored.

If you take too long you are surprised by the caretaker who switches on the light. He then presses the alarm button and you hear the police sirens wailing and you know all is lost!

If you do manage to crack the code in time, the safe opens, revealing gold bullion.

How to play

You are given two clues such as those shown above. The code is always two digits. Key in the number (you do not need to press RETURN).

To end the program, press E.

Programming hints

This program contains two useful procedures. PROC BLOCK draws a rectangle whose lower left hand corner is X,Y and whose width is W and height is H. PROC_PARLL draws a parallelogram with two sides vertical. Put the coordinates of the lower, left-hand corner in X1, Y1 and those of the upper right hand corner X2, Y2.

If you want to make the game easier, you can increase the time allowed to guess or reduce the number of digits allowed in the code or both.

To increase the time allowed for guesses, increase the value of TM in line 230. To increase the time allowed when only one answer is keyed in, increase the value of TM in line 210.

To the reduce the number of digits allowed, reduce the number inside the RND brackets for XX and YY in line 510.

If you find the game too easy then do the opposite.

```

10 REM SAFE CRACKER
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE5:VDU23;8202;0;0;0;19,1,0;0;19
,3,0;0;
40 BL=0:RD=1:YE=2:WH=3:B=128
50 SC=0
60 TIME=0
70 COLOUR BL+B:COLOUR WH
80 CLS
90 PRINTTAB(0,1)"Score":PRINT" ";SC
100 REM
110 REM DRAW SAFE CLOSED
120 REM
130 GCOL 0,RD:PROC_BLOCK(0,0,1280,400)
140 GCOL 0,WH:PROC_BLOCK(400,350,400,6
00)
150 GCOL 0,BL:MOVE450,400:DRAW750,400:
DRAW750,900:DRAW450,900:DRAW450,400
160 COLOUR BL:COLOUR B+WH:PRINTTAB(10,
12)"*"
170 PROC_QUESTION
180 COLOUR RD+B:COLOUR WH:PRINTTAB(0,2
2)"If you multiply the 1st digit by ";A1
;" and the 2nd digit by ";ABS(B1);" an
d ";S1$;" the result is ";C1;".
190 PRINT"The 1st digit ";S2$
200 PRINT"the 2nd digit is ";C2:PRINT"
What is the code":VDU19,1,1;0;19,2,3;0;1
9,3,7;0;
210 TM=6000
220 I1$=INKEY$(0):IF TIME < TM AND I1$
=" " THEN GOTO 220
230 IF I1$<>LEFT$(A$,1) AND I1$<>"E" A
ND TIME < TM THEN TM=800:GOTO220
240 IF I1$="E" THEN GOTO700
250 IF TIME >= TM THEN GOTO380
260 PRINT I1$;
270 I2$=INKEY$(0):IF TIME < TM AND I2$
=" " THEN GOTO270
280 IF I2$<>RIGHT$(A$,1)AND TIME < TM
THEN GOTO270
290 IF TIME >= TM THEN GOTO 380
300 PRINT'I2$;
310 I$=I1$+I2$
320 IF I$=A$ THEN SC=SC+1:PROC_OPEN
330 PRINT" No, the code is ";A$
340 GOTO 60
350 REM
360 REM SWITCH LIGHT ON AND PLAY POLIC
E SIREN SOUNDS
370 REM
380 PRINT" No, the code is ";A$:VDU19,
BL,3,0,0,0:FORI=1TO6:SOUND1,-15,109,8:SO
UND1,-15,101,8:NEXT:RB$=INKEY$(1000):VDU
19,BL,0,0,0,0:VDU19,1,0;0;19,2,0;0;19,3,
0;0;:GOTO60
390 REM

```



```

400 DEFPROC_BLOCK(X,Y,W,H)
410 MOVE X,Y:MOVE X+W,Y
420 PLOT 85,X,Y+H
430 PLOT 85,X+W,Y+H
440 ENDPROC
450 DEFPROC_PARLL(X,Y,X1,Y1,X2,Y2)
460 MOVE X,Y
470 MOVE X1,Y1:PLOT 85,X,Y+Y2-Y1
480 PLOT 85,X2,Y2
490 ENDPROC
500 DEFPROC_QUESTION
510 A1=RND(8)+1:B1=RND(8)+1:XX=RND(10)
-1:YY=RND(10)-1
520 W1=(-1)^RND(2):W2=(-1)^RND(2)
530 B1=B1*W1
540 C1=(A1*XX)+(B1*YY)
550 C2=XX+(W2*YY)
560 S1$="add them then":IF W1=-1 THEN
S1$="subtract them"
570 S2$="plus":IF W2=-1 THEN S2$="minus"
580 A$=STR$(ABS(XX))+STR$(ABS(YY))
590 ENDPROC
600 REM
610 REM DRAW SAFE OPEN
620 REM
630 DEFPROC_OPEN
640 GCOL 0,WH:PROC_BLOCK(300,350,450,4
00,450,900)
650 GCOL 0,BL:PROC_BLOCK(450,400,300,5
00)
660 GCOL 0,YE:PROC_BLOCK(450,400,300,2
00)
670 GCOL 0,BL:MOVE300,330:DRAW450,400:
DRAW450,900:DRAW300,830
680 COLOUR B+BL:PRINTTAB(2,2);SC:RB$=I
NKEY$(1000):VDU19,1,0;0;19,2,0;0;19,3,0;
0;
690 ENDPROC

```

FRACTIONS AND PERCENTAGES

```
26 Highest score 0 Score 0
Quiz game 3 - Fractions and percentages
Hello, what is your name ?EVE
Here are some problems EVE

85% converted into a fraction =
```

If you have trouble converting percentages to fractions and vice versa then this is for you.

How to play

The playing instructions are the same as those in the Profit and Loss program which is to be found elsewhere in this book.

Programming hints

The procedure PROC_CALC is a useful procedure

converting the computer into a calculator. It could be used on its own if a large number of calculations had to be made and a calculator was not to hand. It uses the keyword EVAL to evaluate the result of an expression contained in B\$. B\$ is the accumulated input.

The conversion from fraction to percentage routine expects the percentage value to be entered to two places of decimals, i.e. it expects the player to key in 66.66 not 66.7. If the programmer requires more or fewer decimal places, then A\$ in line 510 should be changed accordingly. The trick to write a number to a certain number of decimal places is to multiply it by 10 to the power of the number of decimal places you require, then find the integral part, then divide by the same number. In the program the fraction F/G is multiplied by a further 100 before conversion as the number is a percentage.

Even though the answer is given to a certain number of decimal places any answer, provided it is within 1 of the correct answer, is accepted. This is so that the answer is marked correct however inaccurate the method used to obtain it. The most accurate method is to use the calculator routine provided but players may prefer to use mental arithmetic for speed.

Different types of problems can be added as described in Profit and Loss.

```

10 REM QUIZ - FRACTIONS AND P
ERCENTAGES
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 4
40 DIM IP$(255)
50 S$="
"
60 HC$=" Highest score ":HK$=" Sc
ore "
70 COLOUR1:COLOUR 128:PRINT:PRINT:PRI
NT:PRINT"Quiz game 3 - Fractions and per
centages"
80 PRINT:PRINT
90 INPUT"Hello, what is your name ",N
AM$:PRINT:PRINT"Here are some problems "
```

```

;:IF NAM$ <> "NO SOUND" THEN PRINTNAM$ E
LSE PRINT
  100 W=1:C=0:T=1:I$="":TIME=0:P=0:MAX=0
  102 P=P+1
  104 PROC_QUESTION
  110 PRINT:PRINTQ$ = ";:PROC_KEYIN:PRI
NT
  120 IFI$="?" THEN PROC_CALC
  130 IF W=-1 ANDI$=A$ AND I$<>" " THEN G
OTO 160
  140 IF W=1 AND ABS(VAL(I$)-VAL(A$))< 1
AND I$<>" " THENGOTO160
  150 GOTO180
  160 PRINT:PRINT"Yes, congratulations":
C=C+1:PRINT:IF NAM$="NO SOUND" THEN GOTO
210
  170 SOUND1,-10,12,10:SOUND1,-10,20,10:
SOUND1,-10,28,10:SOUND1,-10,32,20:SOUND1
,-10,14,20:GOTO 210
  180 IF T=1 THEN PRINTTAB(0,14)"No, "H$
", try again":T=2:GOTO110
  190 PRINT:PRINT"Sorry, the answer is =
":PRINT:PRINT L$:PRINT:PRINT M$
  200 PRINT:PRINT N$
  210 IF TIME>=30000 THEN PROC_SCORE
  220 PRINT:PRINT"Do you want more (Y/N)
":PROC_KEYIN:PRINT
  230 IF I$<>"Y" AND I$<>"N" AND I$<>" "
AND I$<>"YES" AND I$<>"NO" THEN GOTO 220
  240 IF I$="Y" OR I$="YES" OR I$=" " THE
N T=1:CLS:GOTO102
  242 PROC_SCORE
  244 GOTO 9999
  248 DEFPROC_QUESTION
  250 L$="":M$="":N$="":B=40
  260 W=-W:F=RND(9)
  270 G=RND(9):J1=RND(19)
  280 IF F=G OR F/G=INT(F/G) OR G/F=INT(
G/F) THEN GOTO 260
  290 IF F<G THEN E=INT(F/G*100):J=J1*5
  300 IF G<F THEN E=INT(G/F*100):H=G:G=F
:F=H:J=J1*2
  310 E$=STR$(E):F$=STR$(F):G$=STR$(G):J
$=STR$(J)
  320 IF W=1 THEN GOTO 410
  330 Q$=J$+"% converted into a fraction
"
  340 H$="P % is P/100. If top and botto
m of fraction are exactly divisibile by
the same numbers, then divide by thes
e numbers"
  350 HU=100:FOR I=1 TO 8
  360 IF J/5=INT(J/5) AND HU/5=INT(HU/5)
THEN J=J/5:HU=HU/5
  370 IF J/2=INT(J/2) AND HU/2=INT(HU/2)
THEN J=J/2:HU=HU/2
  380 NEXTI:A$=STR$(J)+"/"+STR$(HU)
  390 L$=A$
  400 M$="as "+J$+"/100 = "+A$
  410 IF W=-1 THEN GOTO 460
  420 Q$=F$+"/"+G$+" expressed as a perc
entage"
  430 H$="P/Q is (P/Q) x 100 %"
  440 A$=STR$(INT(F*10000/G)/100):L$=A$+
"% "
  450 M$="as (" +F$+"/"+G$+" ) x 100 = "+A
$
  460 ENDPROC
  470 DEFPROC_CALC
  480 VP=VPOS:PRINTTAB(0,22)"

```

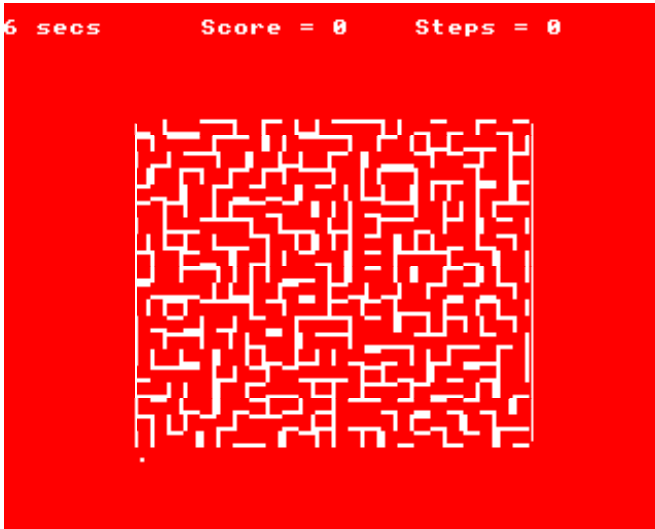
C

```

calculator Mode                                "TAB(0,22)
490 B$=" "
500 I$=GET$:PRINT I$;:B$=B$+I$:IFI$ <>
"=" AND I$<>"?" AND B$<>"AC" THEN GOTO 500
510 IF B$="?" ORI$="?" THEN GOTO 550
520 IF B$="AC" THEN PRINT TAB(0,23);S$;TAB
(0,22):B$="":GOTO 490
530 IF LEN(B$)<=1 THEN GOTO 490
540 PRINT EVAL LEFT$(B$,LEN(B$)-1);TAB(
0,22):GOTO 490
550 PRINT TAB(0,22);S$;S$;TAB(0,VP-1):P
ROC_KEYIN
552 ENDPROC
560 DEFPROC_KEYIN
570 IX=1:VP=VPOS:HP=POS
572 IP$(IX)=INKEY$(10):IF IP$(IX)=" " T
HEN COLOUR0:COLOUR129:PRINT TAB(0,1);INT(
TIME/100);" ";HC$;MAX;HK$;C:COLOUR 1
:COLOUR128:GOTO 572
580 PRINT TAB(IX+HP,VP);IP$(IX);:IX=IX+
1:IP$(IX)=GET$:IF IP$(IX)<>CHR$(13) THEN
GOTO 580
590 I$="":FOR I=1 TO IX-1:I$=I$+IP$(I):
NEXT I
600 ENDPROC
610 DEFPROC_SCORE
620 CLS
622 PRINT:PRINT
630 PRINT:PRINT"Number of problems com
pleted = ";P
640 PRINT:PRINT"Number correct = ";C
650 TM=INT(TIME/100):PRINT:PRINT"Time
taken in seconds = ";TM
660 IF C<>0 THEN PRINT:PRINT"Time per
problem in seconds = ";INT(TM/C)
670 IF C>MAX THEN MAX=C
680 TIME=0:P=0:C=0
690 ENDPROC
700 REM
9999 REM

```

A-MAZE-ING



YOU are in the middle of a complicated maze, and your objective is to reach the outside in the quickest possible time, but also with the fewest number of moves possible.

Don't rush headlong into this one as a little forward planning can save you time and points.

Every step counts as a point and every time you try to cross a barrier counts as a point.

You must aim for the top right hand corner or the exit nearest to that one.

How to play

You are represented by a dot in the lower left hand side of the maze, and you move by using the ARROW cursor keys.

Your score will be displayed at the top of the screen. The number of steps taken has a greater effect on your final score than the time factor.

You may, of course, retrace your steps and begin again from any point you wish to. When you have reached the outside, or you wish to give up, press the ESCAPE key.

We hope you make it, as there are plenty more 'Brainteasers' waiting for you on the outside.

Programming hints

The maze is created of cells, each of which have one side blocked off. The cell shapes are drawn using VDU 23 to create user-defined graphics.

You could increase the size of the maze by changing 20 and 24 in lines 230 and 250. The maze shown is 24 columns wide by 20 rows. The maze shown is 24 columns wide by 20 rows. The maze array M% must be DIMensioned 1 column and 2 rows larger than the actual array to allow for checking the (X+1)th column and (Y+1)th row. If you want the array in the centre of the screen you should change the PRINT statements in lines 220 and 240.

The lines drawn down the side of the maze in lines 300 and 310 would have to be changed, so would the start

position of the dot in lines 320 and 330. In a 20 row maze, the 21st row is the row the dot starts on, so special conditions apply to this row in lines 370 to 430. If a different number of rows is chosen this 21 must be changed.

```

10 REM A-MAZE-ING
20 REM COPYRIGHT (C) G.LUDINSKI 1983
22 ON ERROR RUN
30 MODE4:VDU23;8202;0;0;0;
40 DIM M%(25,22)
50 CLS:COLOUR1:COLOUR128
52 VDU 19,0,1,0,0,0
54 VDU 23;8202;0;0;0;
60 LA$=CHR$(136):RA$=CHR$(137):DA$=CH
R$(138):UA$=CHR$(139)
70 GOTO 110
80 DEF FNB(N$)
90 TF=0
100 FOR L=0 TO 7
110 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
120 NEXT
130 =TF
140 VDU23,224,3,3,3,3,3,3,3,3
150 VDU23,225,0,0,0,0,0,0,255,255
160 VDU23,226,192,192,192,192,192,192,192,
192,192
170 VDU23,227,255,255,0,0,0,0,0,0
180 VDU23,228,3,3,3,FNB("00011011"),FN
B("00011011"),3,3,3
190 VDU23,229,0,0,0,FNB("00011000"),FN
B("00011000"),0,255,255
200 VDU23,230,192,192,192,FNB("1101100
0"),FNB("11011000"),192,192,192
210 VDU23,231,255,255,0,FNB("00011000"
),FNB("00011000"),0,0,0
220 PRINT:PRINT:PRINT:PRINT:PRINT:PRIN
T
230 FOR I=1 TO 20
240 PRINT:PRINT " ";
250 FOR J=1 TO 24
260 M%(J,I)=INT(RND(1)*4)
270 PRINT CHR$(224+M%(J,I));
280 NEXT:NEXT
300 MOVE256,174:DRAW256,790
310 MOVE1028,174:DRAW1028,790
320 ST=0:X=1:Y=21:X1=0:Y1=0:TIME=0
330 PRINT TAB(X+7,Y+6)" ";CHR$(8);
340 *FX4,1
350 SC=ST+INT(TIME/500)
360 I$=INKEY$(0):IF I$="" OR I$ < CHR$
(136) OR I$ > CHR$(139) THEN PRINT TAB(0
,1);INT(TIME/100);" secs"TAB(12,1)"Score
=";SC;TAB(25,1)"Steps=";ST:GOTO 340
370 IF (X=1 AND I$=LA$) OR (X=24 AND I
$=RA$) OR (Y=1 AND I$=UA$) OR (Y=21 AND
I$=DA$) THEN GOTO 330
380 IF I$ = LA$ AND ((M%(X-1,Y) <> 0 A
ND M%(X,Y) <> 2) OR Y=21) THEN X=X-1
390 IF I$ = RA$ AND ((M%(X+1,Y) <> 2 A
ND M%(X,Y) <> 0) OR Y=21) THEN X=X+1
400 IF I$ = DA$ AND ((M%(X,Y+1) <> 3 A
ND M%(X,Y) <> 1) OR Y=21) THEN Y=Y+1
410 IF I$ = UA$ AND ((M%(X,Y-1) <> 1 A
ND M%(X,Y) <> 3) OR Y=21) THEN Y=Y-1

```



```

420 ST=ST+1
430 IF Y=21 THEN PRINT TAB(X+7,27) ". ";
:GOTO 430
440 PRINT TAB(X+7,Y+6);CHR$(M%(X,Y)+22
8);CHR$(8);
450 IF X=X1 AND Y=Y1 THEN SOUND 1,-15,
53,10
460 X1=X:Y1=Y
470 GOTO 330

```

SAINTS TO SINNERS



Here is a musical test for the members of your family who have a keen ear for a tune.

The object of the game is to guess the tune being played and to make it easy, to begin with, we have allowed your computer to play the entire tune. After the first ten 'numbers' you will only hear a short snatch from the tune.

We have included a very large selection of tunes suitable for 'saints and sinners'.

To make life more difficult for the player we have entered the tunes using a special code, so that they cannot be guessed at in advance.

How to play

When you think that you have guessed the title of the tune being played correctly, type in the full title, press RETURN and find out if your ear is musical or tin.

Programming hints

Lines 200-480 contain the procedure that plays the tune. The notes of the tune are held in the first and second, if any, elements of the array A\$ and the name of the tune is held in N\$. W is the indicator determining which tune is to be played. The tune stored in array A\$ is terminated by the letters XXXXX. If more than one element of the array is needed to store the tune, the first element is terminated by the letters NNNNN. Storing data in a string variable is a very useful trick when there are too many fields to be assigned to use DATA statements, as you will be accessing data randomly, not sequentially. See the section entitled Possible alterations for further details.

The obvious alterations that can be made are that when you know the names of the tunes you will want to change them. If you wish to increase the number of tunes that can be played then you must increase the maximum value of W held in line 100. You could then include your tunebetween 380 and 390 starting with a statement ensuring that the tune is skipped over if the value of W is ensuring that the tune is skipped over if the value of W is not the correct one. You could then work out the tune you require on an instrument, or else you could copy a musical score. If you are copying a musical score then you should refer to the User Guide, but if you are doing it for fun then I recommend a child's musical instrument which usually just has the octave which starts with middle

C which is the most common octave. The pitch numbers for this octave are:

Middle	C 053
.....	D 061
.....	E 069
.....	F 073
.....	G 081
.....	A 089
.....	B 097
.....	C 101

The duration of the notes should be smaller numbers than specified in the User Guide as processing the array takes time. Therefore I suggest that the durations should be 03, 08 and 18 approximately for notes of short, middle or long duration. When you have worked out the pitch and duration of all the notes, you should assign them to the first and, if more room is required, the second element of the array. The pitch number must have three digits and the duration must have two and they should be joined together and separated from details of the next note by a space. As stated before, the first element is terminated by NNNNN and the second element by XXXXX.

I do not expect you will bother to put the name of the tune in code, but in case you do N\$ is made up of the ASCII values of the letters of the name of the tune, remembering to include spaces which have an ASCII value of 32. If you do not bother to code the name of the tune, assign the name to NAM\$ and make sure the program skips to line 120.

```

10 REM SAINTS TO SINNERS
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE5:VDU23;8202;0;0;0;
40 DIM A$(2)
50 NT=0

```

```

60 CLS
70 NT=NT+1
80 PRINT:PRINT" Saints to sinners":PR
OC_RADIO
90 PROC_RADIO
100 W=INT(RND(1)*5)
110 PROC_TUNE(W)
120 NAM$="":FOR I=1 TO LEN(N$) STEP 2:
NAM$=NAM$+CHR$(VAL(MID$(N$,I,2))):NEXT I
130 PRINT:PRINT"What is this tune ca
lled?":PRINT
140 INPUT I$
150 IF I$=NAM$ THEN PRINT:PRINT"You ar
e right":GOTO180
160 PRINT:PRINT"No, it is called ":PRIN
T NAM$
170 PRINT:PRINT"Do you want more Y/N"
180 INPUT I$:IF I$="Y" OR I$="" THEN G
OTO 70
190 GOTO 600
200 DEFPROC_TUNE(W)
210 A$(1)="":A$(2)="":N$=""
220 IF W<>0 THEN GOTO 250
230 A$(1)="06105 08115 08915 09725 000
05 09705 10110 10105 09710 08105 09710 0
8910 00005 06105 06920 07720 08110 08905
09705 06910 08915 10105 09720 08920 081
25 00005 XXXXX"
240 N$="807665738373823268396577798582
"
250 IF W<>1 THEN GOTO 290
260 A$(1)=STRING$(2,"05310 06110 06910
05310 00010")+STRING$(2,"06910 07310 0
8120 00005")+ "NNNNN"
270 A$(2)=STRING$(2,"08105 08905 08105
07305 06910 05310 00010")+STRING$(2,"0
5310 04110 05320 00010")+ "XXX"
280 N$="70826982693274656781856983"
290 IF W<>2 THEN GOTO 320
300 A$(1)="06905 06105 05310 06105 069
05 07305 08110 00005 08905 09705 10110 0
9710 08910 08110 00010 08905 09705 10110
09710 08910 08110 08910 09710 10110 081
10 07310 06910 00010 XXXXX"
310 N$="8472693270738283843278796976"
320 IF W<>3 THEN GOTO 350
330 A$(1)="05310 06910 07320 00005 073
05 00001 07305 06905 07305 08110 00001 0
8110 07320 00005 07310 08910 10110 00005
08905 00001 08905 08105 07302 00001 073
02 06905 07320 XXXXX"
340 N$="797867693273783282798965763268
6586736839833267738489"
350 IF W<>4 THEN GOTO 390
360 A$(1)="06905 00001 06905 07310 081
20 00001 07305 06905 06110 00001 06110 0
6905 00001 06905 07310 08120 00010 06905
00001 06905 07310 08120 00001 06905 073
10 08920 NNNNN"
370 A$(2)="00010 08110 08910 10120 000
01 10105 09705 08910 00001 08910 00005 0
8105 07305 06910 00001 06910 XXX"
380 N$="746932843965737769"
390 IF NT>10 THEN A$(1)=RIGHT$(A$(1), 6
*INT(RND(1)*17+3))
400 FOR J=1 TO 2
410 FOR I=1 TO 255 STEP 6
420 IF MID$(A$(J), I, 3)="NNN" THEN I=25
5:GOTO460
430 IF MID$(A$(J), I, 3)="XXX" THEN I=25

```

```

5 : J=2 : GOTO 460
  440 IF MID$(A$(J), I, 3) = "000" THEN SOUN
D 1, 0, 0, VAL(MID$(A$(J), I+3, 2)) : GOTO 460
  450 SOUND 1, -15, VAL(MID$(A$(J), I, 3)), V
AL(MID$(A$(J), I+3, 2))
  460 NEXT I
  470 NEXT J
  480 ENDPROC
  490 DEFPROC_RADIO
  500 GCOL0, 1 : PROCBLOCK(300, 150, 600, 250)
  510 GCOL0, 2 : PROCBLOCK(330, 330, 540, 50)
  520 GCOL0, 3 : PROCBLOCK(300, 400, 10, 30)
  530 PROCBLOCK(300, 430, 600, 10)
  540 PROCBLOCK(890, 400, 10, 30)
  550 ENDPROC
  560 DEFPROC_BLOCK(X, Y, W, H)
  570 MOVE X, Y : MOVE X+W, Y
  580 PLOT 85, X, Y+H
  590 PLOT 85, X+W, Y+H
  600 ENDPROC
  610 REM

```


SPOT THE DIFFERENCE



I suppose that this could have been called STARS AND STRIPES, the difference as you will see when you run this colourful eye test.

Two pictures, composed of stars and stripes, in red, white and blue appear on the screen, and you will be asked to identify which of the items is different.

How to play

Items are keyed as follows:

Red Stripe	1
White stripe	2
Blue stripe	3

Red star	4
White star	5
Blue star	6

Identify the differences and key in the number and press RETURN. If you are correct you will hear a high pitched tune, but if you are wrong your answer will be crossed.

To help you, numbers previously keyed in are displayed in brackets. When all the numbers required have been keyed in a further tune will be played. Just hope that it is high pitched for a correct answer.

To continue, or stop, press Y or N or RETURN.

At conclusion you will see your score sheet showing tries, correct answers and time/average taken.

Programming hints

YOU might find the routine PROC_STAR useful in your non-commercial programs as it draws a star. You just have to specify the bottom left-hand corner of the star (X,Y), the width of the bottom of the star (W), the height of the star (H) and the colour that it is to be displayed in (CL).

You could make the puzzle easier by increasing the range of possible values for the shapes that are going to be different. The function FNM(MIN,MAX) is used to define the minimum and maximum value of any shape. Remember if you increase the MAX value you must reduce MIN by the same value, or the picture will extend beyond the allocated area.

```
10 REM SPOT THE DIFFERENCE
```

```

20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE5:VDU23;8202;0;0;0;19,1,0;0;19
, 2, 0;0;19,3,0;0;
40 DIM WH(6), AN$(6)
50
60 TIME=0:CR=0:NQ=0
70 GOTO240
80 REM
90 REM RANDOM NUMBER IN RANGE
100 REM
110 DEF FNM(MIN,MAX)=INT((MAX-MIN)*RND
(1)+MIN)
120 REM
130 REM U.D.G. CALCULATOR
140 REM
150 DEF FNB(N$)
160 TF=0
170 FOR L=0 TO 7
180 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
190 NEXT L
200 =TF
210 REM
220 REM STARS AND STRIPES
230 REM
240 VDU23,224,30,30,30,30,30,30,30,30
250 VDU23,225,0,FNB("00010000"),FNB("0
011100"),FNB("11111110"),FNB("01111100"
),FNB("01101100"),FNB("11000110"),FNB("1
0000010")
260 RI$=CHR$(224):ST$=CHR$(225)
270 REM
280 REM START
290 REM
300 CLS
310 NQ=NQ+1
320 REM
330 REM FRAMEWORK
340 REM
350 GCOL 0,3:COLOUR3:COLOUR128
360 MOVE0,256:DRAW1279,256
370 DRAW1279,1023:DRAW0,1023:DRAW0,256
380 MOVE640,256:DRAW640,1023
390 REM
400 REM DRAW PATTERNS
410 REM
420 NZ=0
430 FOR I=1 TO 6
440 WH(I)=INT(2*RND(1))
450 IF WH(I)=1 THEN NZ=NZ+1
460 NEXT I
470 IF NZ=0 THEN GOTO430
480 FOR S=0 TO 1
490 FOR J=1 TO 3
500 IF S<>0 THEN GOTO580
510 X=FNM(J*160-80,160*(J+1)-80)
520 W=FNM(20,80)
530 IJ=J
540 CL=J:IF J=2 THEN CL=3
550 IF J=3 THEN CL=2
560 PROC_STRIPE(X,W,CL)
570 PROC_STRIPE(X+640+(WH(IJ)*FNM(
20,40)),W+(WH(IJ)*FNM(20,40)),CL)
580 IF S<>1 THEN GOTO680
590 X=FNM(160,480)
600 Y=FNM(256,896)
610 W=FNM(80,2*(640-X)/3)
620 H=FNM(128,768-Y)
630 IJ=J+3
640 CL=J:IF J=2 THEN CL=3
650 IF J=3 THEN CL=2

```

```

660      PROC_STAR(X,Y,W,H,CL)
670      PROC_STAR(X+640+(WH(IJ)*FNM(20
,40)),Y+(WH(IJ)*FNM(20,40)),W+(WH(IJ)*FN
M(20,40)),H+(WH(IJ)*FNM(20,40)),CL)
680      NEXT J
690      NEXT S
700      REM
710      REM QUESTION
720      REM
730      PRINTTAB(0,25)"Which are different
?" ;:COLOUR1:PRINT" 1. ";RI$;:COLOUR3:P
RINT" 2. ";RI$;:COLOUR2:PRINT" 3. ";RI$
740      COLOUR1:PRINT" 4. ";ST$;:COLOUR3
:PRINT" 5. ";ST$;:COLOUR2:PRINT" 6. ";ST
$
750      VDU19,1,1;0;19,2,4;0;19,3,7;0;:PRO
C_ANSWER
760      COLOUR3
770      IR$=""
780      FOR I=1 TO (LEN(A$)+1)/2
790          I$=INKEY$(0):IF I$="" THEN GOTO 7
90
800          PRINTI$;" (" ;IR$;" ) ";
810          KI=0
820          FOR K=1 TO NA
830              IF I$=AN$(K) THEN AN$(K)="0":K
I=1:SOUND 1,-15,101,10:IR$=IR$+I$
840              NEXT K
850              IF K=0 THEN PRINT" X" ELSE PRINT
860                  RB$=INKEY$(100):VDU11:PRINT"
":VDU11
870          NEXT I
880          FOR I=1 TO NA
890              IF AN$(I)<>"0" THEN GOTO 920
900          NEXT I
910          GOTO 930
920          PRINT'"No, ans=" ;A$:SOUND 1,-15,73
,10:SOUND 1,-15,69,5:GOTO940
930          PRINT'"Yes, you're right":SOUND 1,
-15,101,30:CR=CR+1
940          PRINT'"More (Y/N) ";
950          INPUT R$:VDU19,1,0;0;19,2,0;0;19,3
,0;0;
960          IF R$<>"N" THEN GOTO 300
970          REM
980          REM SCORE SHEET
990          REM
1000         CLS:PRINT:PRINT"Spot the differenc
e":FOR I=1 TO 9:PRINT:NEXTI
1010         PRINT:PRINT"Puzzles attempted=" ;NQ
1020         PRINT:PRINT"Puzzles correct=" ;CR
1030         PRINT:PRINT"Time taken=" ;INT(TIME/
100):PRINT"secs"
1040         IF CR<>0 THEN PRINT:PRINT"Time/puz
zle=" ;INT(TIME/(CR*100)):PRINT"secs"
1050         PRINTTAB(0,25);:VDU19,3,7;0;:END
1060         DEFPROC_STRIPE(X,W,CL)
1070         GCOL 0,CL
1080         MOVE X,256:MOVE X+W,256
1090         PLOT 85,X,1024
1100         PLOT 85,X+W,1024
1110         ENDPROC
1120         DEFPROC_STAR(X,Y,W,H,CL)
1130         GCOL 0,CL
1140         MOVE X+(W/2),Y+(H/3)
1150         MOVE X,Y:PLOT 85,X+(W/2),Y+H
1160         MOVE X+(W/2),Y+(H/3)
1170         MOVE X+W,Y:PLOT 85,X+(W/2),Y+H
1180         MOVE X+(W/2),Y+(H/3)
1190         MOVE X-(W/2),Y+(2*H/3):PLOT 85,X+(

```

```

3 * W / 2 ) , Y + ( 2 * H / 3 )
1200  ENDPROC
1210  DEFPROC_ANSWER
1220  A$ = " " : IM = 0
1230  FOR L = 1 TO 6
1240      IF WH ( L ) = 1 THEN IM = IM + 1 : AN$ ( IM ) =
STR$ ( L ) : A$ = A$ + STR$ ( L ) + " , "
1250  NEXT L
1260  A$ = LEFT$ ( A$ , LEN ( A$ ) - 1 )
1270  NA = IM
1280  ENDPROC
1290  REM

```


RELATIONS



This following program is one where you should deny yourself, and any other player, the use of paper and pencil if you really want some mental exercise.

The screen will display a four by four matrix of numbers to the left hand side. On the right hand side will be shown a number, or numbers, in red.

You have to combine two, or more, of the numbers in any of the rows to arrive at the same figure as the red number/s.

How to play

To reach your answer you may use any of the following operators:

- + plus
- minus
- * multiplication
- / division
- ^ to the power of
- SQR square root of

Example: If the red number is 1 and the row is 9 2 4 8 the solution would be

$\text{SQR}(9)+2-4$

This, followed by RETURN, would give 1 as it's answer.

Correct answers will mean that you will be asked if you wish to proceed. Answer Y or No followed by RETURN.

If you answer incorrectly, your computer will explain, and show, the correct solution.

A score sheet appears after 200 seconds which will show your results and give an IQ rating against your reasoning powers.

Programming hints

The matrix is displayed in double height, double width characters. This is done by using Mode 5 to give double width characters and then defining 20 user defined characters which consist of the top halves of the numbers 0 to 9 and the bottom halves of the numbers 0 to 9. The

pattern for the numbers 0 to 9 is found by calling the OSWORD routine with the hexadecimal number A in the accumulator (%A). The OSWORD routine is at &FFF1. See the User Guide for further details if you are not familiar with machine code or the ROM routines.

If you wish to increase the number of rows or columns of the matrix then you must change the maximum value of I (row) or J (column) in the FOR . . . NEXT loops.

```

10 REM RELATIONS
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 REM ON ERROR PROC_ERROR:GOTO 830
40 MODE5:VDU23;8202;0;0;0;19,1,0;0;19
,2,0;0;19,3,0;0;
50 DIM A(4,4),X(16),Y(16)
60 CLS
70 REM
80 REM CREATE DOUBLE HEIGHT CHARACTER
S
90 REM
100 A%=&A
110 X%=0:Y%=&A
120 FOR I=0 TO 9
130 ?&A00=ASC(STR$(I))
140 CALL (&FFF1)
150 VDU23,128+(2*I),?&A01,?&A01,?&A0
2,?&A02,?&A03,?&A03,?&A04,?&A04
160 VDU23,128+(2*I)+1,?&A05,?&A05,?&
A06,?&A06,?&A07,?&A07,?&A08,?&A08
170 NEXT I
180 TIME=0:NO=0:CR=0
190 REM
200 REM GENERATE NUMBERS
210 REM
220 CLS
230 PRINT " Relations "
240 PRINT "
250 IF TIME >= 20000 THEN GOTO 890
260 NO=NO+1
270 FOR I=1 TO 4
280 FOR J=1 TO 4
290 A(I,J)=RND(9)
300 NEXT J
310 NEXT I
320 REM
330 REM DISPLAY NUMBERS
340 REM
350 COLOUR128:COLOUR2
360 FOR I=1 TO 4
370 PRINT
380 FOR T=1 TO 2
390 FOR J=1 TO 4
400 IF T=1 THEN PRINT " ";CHR$(12
8+(2*A(I,J))) ;
410 IF T=2 THEN PRINT " ";CHR$(12
8+(2*A(I,J))+1) ;
420 NEXT J
430 PRINT
440 NEXT T

```



```

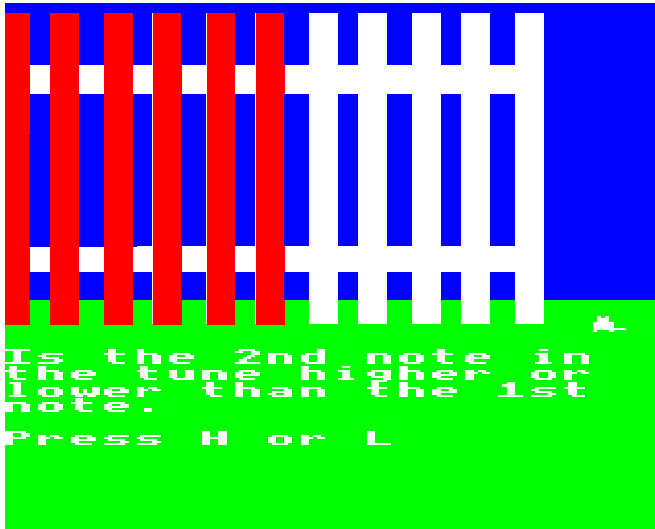
450 NEXT I
460 REM
470 REM GENERATE RED NUMBER
480 REM
490 S1=RND(2):S2=INT(RND(1)*10):SM=VAL
(STRS$(S1)+STR$(S2))
500 COLOUR 1
510 PRINTTAB(13,9);CHR$(128+(2*S1));CH
R$(128+(2*S2))
520 PRINTTAB(13,10);CHR$(128+(2*S1)+1)
;CHR$(128+(2*S2)+1)
530 COLOUR3
540 REM
550 REM CHECK ANSWER
560 REM
570 PRINTTAB(0,17)"Combine a row or
column to be equal to the red number"
580 PRINT
590 PRINT"Use + - * / ^ SQR ()"
600 VDU19,1,1;0;19,2,3;0;19,3,7;0;
610 INPUT I$
620 IF I$="" THEN PROC_ERROR:GOTO 830
630 IF EVAL(I$) <> SM THEN PRINT'"No, t
hey are not = ";SM:GOTO830
640 N$=""
650 FOR I=1 TO LEN(I$)
660 NU$=MID$(I$,I,1)
670 IF NU$ >= "0" AND NU$ <= "9" THE
N N$=N$+NU$
680 NEXT I
690 IF LEN(N$) > 4 OR LEN(N$) = 0 THEN
PROC_ERROR:GOTO830
700 SG$=""
710 FOR T=1 TO 2
720 FOR I=1 TO 4
730 SG$=SG$+"X"
740 FOR J=1 TO 4
750 IF T=1 THEN SG$=SG$+STR$(A(I
,J))
760 IF T=2 THEN SG$=SG$+STR$(A(J
,I))
770 NEXT J
780 NEXT I
790 SG$=SG$+"X"
800 NEXT T
810 IF INSTR(SG$,N$)=0 THEN PROC_ERROR
:GOTO830
820 PRINT:PRINT"Yes, you're right":CR=
CR+1
830 PRINT:PRINT"Do you want more Y/N";
840 INPUT R$
850 IF R$ <> "N" THEN GOTO220
860 REM
870 REM SCORE SHEET
880 REM
880 CLS
900 TM=TIME/100
910 PRINT'"Number attempted=";NO
920 PRINT'"Number correct=";CR
930 PRINT'"Time taken=";INT(TM);"secs"
940 IQ=INT((CR*100)/5.3):IF IQ > 150 T
HEN IQ=150
950 PRINT'"IQ lvl (reasoning)=";IQ
960 IF CR >= 7 THEN PRINT'"This is SUP
ERIOR (upper 10%)":END
970 IF CR = 6 THEN PRINT'"This is GOOD
(upper 30%)":END
980 IF CR > 4 THEN PRINT'"This is FAIR
(upper 60%)":END
990 GOTO1030

```

```
1000 DEFPROC_ERROR
1010 PRINTTAB(0,26) "Error, wrong number
s "
1020 ENDPROC
1030 END
1040 REM
```

N.B. In lines 110 - 160 inclusive, you will see & and ?. Do not confuse these with numbers 8 and 7.

DON'T PAINT THE CAT



Seems a strange title for a program. I mean, who would want to emulsion paint the family mogg anyway?

Well you see, the family have decided that you have to paint the garden fence. You lost the draw - it might have been your sister instead who had to do it, but never mind there is always next time. Across the fence from you and your fantastic paint brush, is your neighbour's transistor. As a mental challenge you have decided to paint the fence according to the high/low pitch of your neighbour's music.

Look out for your cat, it's parked at the end of the fence.

How to play

As the game begins you will hear just two notes to compare but, everytime you get the answer correct the next tune will have an extra note.

You will be told which two notes to compare, and you must key in H or L for High or Low.

If you get it wrong you must wait for the fence, and the poor old pussy, to be painted.

If you take too long to answer, the cat will wind up getting covered in paint anyway.

Press the RETURN key when you want a new tune.

Programming hints

If you can work out the answer long before the cat is painted, then reduce the 50 if INKEY\$(50) in line 540.

If you find that it is too difficult to tell the difference between notes, then increase the 5 after the '*' sign in line 470.

Alternately you can increase the time allowed to answer, or reduce the difference between the notes, by doing the opposite of what is described above.

```

10 REM DON'T PAINT THE CAT!
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 5
40 DIM N(10)
50 CLS
60 VDU 19,0,4,0,0,0,19,2,2,0,0,0
70 GOTO 170
80 REM
90 REM U.D.G. CALCULATOR
100 REM
110 DEF FNB(N$)
```

```

120 TF=0
130 FOR L=0 TO 7
140     TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
150 NEXT L
160 =TF
170 REM
180 REM CAT SHAPE
190 REM
200 VDU 23,224,FNB("01010000"),FNB("0
11110000"),FNB("01110000"),FNB("1111100"
),FNB("11111000"),FNB("11111000"),255,FN
B("10001000")
210 REM
220 REM DRAW FENCE
230 REM
240 FOR J=2 TO 9
250     COLOUR 128:CLS
260     GCOL 0,2:PROC_BLOCK(0,0,1280,450
)
270     GCOL 0,3
280     FOR I=0 TO 1000 STEP 100
290         PROC_BLOCK(I,400,50,600)
300     NEXT I
310     PROC_BLOCK(0,500,1050,50):PROC
_BLOCK(0,850,1050,50)
320     COLOUR3:COLOUR130:PRINTTAB(18,
19);CHR$(128)
330     COLOUR3:COLOUR130
340     W1=RND(J):W2=RND(J):IF W1=W2 T
HEN 340
350     T1$="th":TS$="th":IF W1=1 THEN
T1$="st"
360     T2$="th":IF W2=1 THEN T2$="st"
370     IF W1=2 THEN T1$="nd"
380     IF W2=2 THEN T2$="nd"
390     IF W1=3 THEN T1$="rd"
400     IF W2=3 THEN T2$="rd"
410     PRINTTAB(0,21)"Is the ";W1;T1$
;" note in the tune higher or lower th
an the ";W2;T2$;" note."'"Press H or L
";
420     N(0)=0
430     FOR K=1 TO J
440         REM
450         REM PLAY THE TUNE
460         REM
470         N(K)=INT(RND(5)*5+50):IF N
(K)=N(K-1) THEN 470
480         IF J=2 AND N(1)=N(2) THEN
GOTO 470
490         SOUND 1,-15,N(K),10:SOUND
1,0,0,1
500     NEXT K
510     IF N(W1)>N(W2) THEN A$="H"
520     IF N(W1)<N(W2) THEN A$="L"
530     GCOL 0,1:I=-100:IS$="":ID=0
540     IS=INKEY$(50):IF IS$="" OR ID=1
THEN I=I+100:PROC_BLOCK(I,400,50,600):I
F I<1000 THEN 540
550     IF IS=A$ AND ID=0 THEN PRINT'"
Yes, you're right":GOTO600
560     IF I<1000 THEN PRINT IS$;:ID=1:
GOTO540
570     COLOUR1:PRINTTAB(18,19);CHR$(1
28):SOUND1,-1,80,1:SOUND0,-15,7,20:COLOU
R3
580     IF A$="H" THEN PRINTTAB(0,28)"
No, it's higher (H)"
590     IF A$="L" THEN PRINTTAB(0,28)"
No, it's lower (L)"

```

```

600      COLOUR3:PRINTTAB(0,30)"Hit RETUR
N for more";:INPUT RB$
610      IF I$ <> A$ THEN GOTO 250
620      NEXT J
630      PRINTTAB(0,27)"A musician like
yourself shouldn't be painting fences!
":GOTO 700
640      REM
650      DEFPROC_BLOCK(X,Y,W,H)
660      MOVE X,Y:MOVE X+W,Y
670      PLOT 85,X,Y+H
680      PLOT 85,X+W,Y+H
690      ENDPROC
700      END

```

FRANCIS DRAKE ADVENTURE GAME



This by far and away the most ambitious, interesting and testing program in this book.

This is an authentic historical adventure game based on Francis Drake's circumnavigation of the world, from 1577 to 1580. As you travel in the footsteps of Elizabeth I's free-booting adventurers, you will encounter the same problems and challenges as Drake.

Drake sailed in search of the elusive North West Passage that would allow him access to the Pacific, and the galleons of the Spanish Empire. As history books will already have told you, he did not find the object of his quest, but he did find much more, and so will you as you sail into the Francis Adventure Game.

How to play

Because of the complexity of this adventure the program has been split into two parts. This is because of the limitations of memory, but it will also mean that you do not have to complete entering the program at one sitting. You will have to store both halves on the same side of the tape, if you are 'saving', and, obviously, in the correct order.

Allow a slight gap between the two programs.

Load and run the first program but leave the PLAY button depressed so that the second program will run when loaded.

The first program displays the title and map which can be checked before proceeding.

The second program consists of the text. To test this half Key in MODE 1 : CLS press RETURN.

When the program has been loaded and RUN, you will hear the gentle lapping of waves against the shore.

On the map you will see your position marked by a white sailing ship, docked near the port of Lima.

Every time you use this game, the dangers and treasures will be located in different parts of the ocean, so do not think that you can predict your moves too easily. We didn't feel that it was fair, however, to move the rocks, reefs and Spanish galleons, so try and remember their positions. It will help you considerably.

You must follow Drake's route by first travelling to the

port known as New Albion and thence onward, past Java, to the bottom left hand corner of the map.

Your aim is to reach the bottom of the map with, at least, four times the amount of the cargo with which you began.

If you achieve this feat of daring then you will, naturally, be rewarded by the gift of a knighthood from your grateful, and avaricious, Queen.

You move using the ARROW cursor keys.

If you input wrong information, the cursor will return to the left hand side of the screen and wait for accurate information. Your screen will then be cleared of your previous false data input.

At intervals you will be told the situation at sea and asked which action you would like to take, from the choices shown.

Remember to consider your options carefully as to the amounts of cargo, supplies, cannon balls and crew conditions.

Damage rating is based on a 1 to 10 scale. If you are damaged to the level of 10 then I'm afraid it's into the sea for you, as the Golden Hind settles gently below your feet.

Do your best as the present Government is emptying the coffers more quickly than you are filling them.

Hints and changes you can make

One of the problems of displaying a map on the screen, is how to reduce the memory required and the number of

lines needed to describe the map. This is done by defining a string array M\$, with the number of elements being equal to the number of rows on the map. Standard shapes are then defined using VDU 23. The shapes are as shown below:



Each row of the map is assigned to an element of M\$ using the above shapes, and zero (to represent blanks). Each shape is described as a single digit by subtracting 224 from its shape number. This is displayed using CHR\$(224 + (shape number - 224)).

If you find the adventure too easy, then reduce the cargo (CA), supplies (SU), crew (CR) and/or cannon balls (BA) that you start with. They are on line 410. If you find that knighthood escapes you, then reduce the 400 in line 480.

```

10 REM FRANCIS DRAKE ADVENTURE GAME
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE5:VDU23;8202;0;0;0;
40 PROC_TITLE
50 MODEL:VDU23;8202;0;0;0;
60 DIM M$(17)
70 VDU19,1,4;0;19,2,2;0;
80 COLOUR129:COLOUR2
90 CLS
100 GOTO170
110 DEFFNB(N$)
120 TF=0
130 FOR L=0 TO 7
140 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
150 NEXTL
160 =TF
170 VDU23,225,255,255,255,255,0,0,0,0
180 VDU23,226,0,0,0,0,255,255,255,255
190 B1=FNB("11110000"):VDU 23,227,B1,B
1,B1,B1,B1,B1,B1,B1,B1
200 B1=FNB("00001111"):VDU 23,228,B1,B
1,B1,B1,B1,B1,B1,B1,B1
210 Z1=FNB("11111110");Z2=FNB("11111110
0"):Z3=FNB("1111110000"):Z4=FNB("1111000000")
):Z5=FNB("11100000"):Z6=FNB("11000000"):
Z7=FNB("1000000000")
220 L1=FNB("01111111"):L2=FNB("00111111

```

```

1 " ) : L3 = FNB ( " 000011111 " ) : L4 = FNB ( " 000001111 "
) : L5 = FNB ( " 000000111 " ) : L6 = FNB ( " 000000011 " ) :
L7 = FNB ( " 000000001 " )
230 VDU 23, 229, 255, Z1, Z2, Z3, Z4, Z5, Z6, Z
7
240 VDU 23, 230, L7, L6, L5, L4, L3, L2, L1, 25
5
250 VDU 23, 233, 255, 255, 255, 255, 255, 255
, 255, 255
260 VDU 23, 232, Z7, Z6, Z5, Z4, Z3, Z2, Z1, 25
5
280 M$ ( 1 ) = " 99999930450000000799999999
99000 "
290 M$ ( 2 ) = " 9999993000000000000799999999
95000 "
300 M$ ( 3 ) = " 999999300000000000009999517
30000 "
310 M$ ( 4 ) = " 99999500000000000007799000
30000 "
320 M$ ( 5 ) = " 7995000000000000000099000
00000 "
330 M$ ( 6 ) = " 09980030000000000000079290
00000 "
340 M$ ( 7 ) = " 0479000000000000000001192
00000 "
350 M$ ( 8 ) = " 04800002000000000000000007
02220 "
360 M$ ( 9 ) = " 08700600000000000000000000
19999 "
370 M$ ( 10 ) = " 07806902000000000000000000
04999 "
380 M$ ( 11 ) = " 00709903082200000000000000
69999 "
390 M$ ( 12 ) = " 00022000007981000000000000
49999 "
400 M$ ( 13 ) = " 00000001000000000000000000
09999 "
410 M$ ( 14 ) = " 00000000690800000000000000
04999 "
420 M$ ( 15 ) = " 00000069998900000000000000
00999 "
430 M$ ( 16 ) = " 00000699999980000000000000
00099 "
440 COLOUR129:COLOUR2:PRINT:FOR J=1 TO
16:PRINT " ";CHR$(64+J); " ";:FOR I=2 T
O 31:P=VAL(MID$(M$(J),I,1)):IF P=0 THEN
PRINT " ";:GOTO460
450 PRINTCHR$(127+P);
460 NEXT
470 PRINT
480 NEXT
490 COLOUR130:COLOUR0:PRINTTAB(22,1) ".
New Albion":COLOUR129:PRINTTAB(28,15) "Li
ma";:COLOUR130:PRINT ".":COLOUR129:PRINTT
AB(5,13) "Java":GCOL0,3:MOVE160,992:DRAW1
120,992:DRAW1120,480:DRAW160,480:DRAW160
,992
500 COLOUR129:COLOUR3
510 PRINTTAB(5,17) " 1
2
520 PRINTTAB(5,18) "0123456789012345678
90123456789"
530 PRINT:REMP."Leave the play button
depressed"
540 CHAIN"DRAKE2"
550 END
560 DEFPROC_TITLE
570 COLOUR129:COLOUR3:CLS
580 FORI=1TO14:PRINT:NEXTI
590 PRINT " FRANCIS DRAKE ":PRINT:PRIN

```

```

T "      ADVENTURE  GAME "
  600  FORI=1TO12:PRINT:NEXT
  610  COLOUR2
  620  PRINT"Copyright  (C) ":PRINT"      G.Lud
inski  1983";
  630  FORI=1TO3:SOUND0,-15,70,10:SOUND0,
-15,100,20:SOUND0,-10,70,20:SOUND0,-5,50
,20:SOUND0,-2,40,20:NEXT
  640  ENDPROC

```

FRANCIS DRAKE ADVENTURE GAME

```

  10    REM FRANCIS DRAKE ADVENTURE GAME
  20    REM COPYRIGHT (C) G.LUDINSKI 1983
  30    DIM M$(17)
  40    COLOUR129:COLOUR2
  50    AL=0
  60    GOTO130
  70    DEF FNB(N$)
  80    TF=0
  90    FOR L=0 TO 7
100    TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
110    NEXT L
120    =TF
130    VDU23,128,16,90,91,82,87,254,126,
62
  140    PROC_B
  150    SH$=CHR$(128)
  160    LA$=CHR$(136):RA$=CHR$(137):DA$=CH
R$(138):UA$=CHR$(139)
  170    M$(1)=" 9999993045000000799999999
99000 "
  180    M$(2)=" 999999300000000000079999999
95000 "
  190    M$(3)=" 999999300000000000009999517
30000 "
  200    M$(4)=" 999995000000000000007799000
30000 "
  210    M$(5)=" 79950000000000000000099000
00000 "
  220    M$(6)=" 09980030000000000000079290
00000 "
  230    M$(7)=" 0479000000000000000001192
00000 "
  240    M$(8)=" 04800002000000000000000007
02220 "
  250    M$(9)=" 08700600000000000000000000
19999 "
  260    M$(10)=" 07806902000000000000000000
04999 "
  270    M$(11)=" 00709903082200000000000000
69999 "
  280    M$(12)=" 00022000007981000000000000
49999 "
  290    M$(13)=" 00000001000000000000000000
09999 "
  300    M$(14)=" 00000000690800000000000000
04999 "
  310    M$(15)=" 00000069998900000000000000
EEEE "
  320    M$(16)=" 00000699999980000000000000

```

```

EEEEEE  "
330  FOR Y=1 TO 16
340    FOR X=2 TO 31
350      C$=MID$(M$(Y),X,1)
360      IF C$="9" THEN GOTO400
370      IF C$="0" THEN IS=INT(7*RND(1)
):PROC_INSERT:GOTO400
380      IF C$="E" THEN IS=4:PROC_INSERT
:GOTO400
390      IF (X > 4 AND X < 15 AND Y > 7
AND Y < 14) THEN IS=INT(2*RND(1)+7):PRO
C_INSERT ELSE IS=10:PROC_INSERT
400      NEXT:NEXT
410  CA=100:SU=100:CR=85:BA=100:DA=0:WK
=1
420  EN=0
430  X=29:Y=16:X1=29:Y1=16
440  IF WK=1 THEN COLOUR129:COLOUR3:PRI
NTTAB(X+4,Y);SH$;CHR$(8);
450  *FX 4,1
460  PRINTTAB(0,20)"Week Cargo Supplies
Crew Cannon Damage
balls"
470  PRINTTAB(0,23);STRING$(39," ");
480  IF X=1 AND Y=16 THEN PRINTTAB(0,25
)"You have survived the unknown, and now
know you are the first commander of a
fleet to sail around the world.":IF CA
>= 400 THEN PRINT"Arise Sir Francis":GO
TO 1390
490  IF X=1 AND Y=16 THEN EN=1
500  IF (X=17 AND Y=1) OR (X=18 AND Y=2
) OR (X=19 AND Y=4) THEN AL=1
510  IF X < 15 AND AL=0 THEN PROC_B:PRI
NTTAB(0,25)"Go back to New Albion"
520  IF SU <=0 THEN PROC_B:PRINTTAB(0,2
5)"Your supplies have been used up so yo
ur crew mutinies, and kills you.":SU=0:E
N=1
530  IF CR <=0 THEN PROC_B:PRINTTAB(0,2
5)"Your crew have all been killed in bat
tle or have died of scurvy, typhus or
dysentery. You're stranded without th
em.":CR=0:EN=1
540  IF DA > 10 THEN PROC_B:PRINTTAB(0,
25)"Your ship has filled with water and"
'"sunk.":EN=1
550  IF BA < 0 THEN BA=0
560  IF EN=1 THEN GOTO 1390
570  PRINTTAB(0,23);WK;TAB(6,23);CA;TAB
(12,23);SU;TAB(21,23);CR;TAB(26,23);CA;T
AB(33,23);DA
580  I$=GET$
590  PROC_B
600  IF (X=1 AND I$=LA$) OR (X=30 AND I
$=RA$) OR (Y=1 AND I$=UA$) OR (Y=16 AND
I$=DA$) THEN GOTO 580
610  IF I$=LA$ AND MID$(M$(Y),X-1,1) <>
"0" AND MID$(M$(Y),X-1,1) <> "9" AND MI
D$(M$(Y),X,1) <> "2" THEN X=X-1
620  IF I$=RA$ AND (MID$(M$(Y),X+1,1) <
> "2" AND MID$(M$(Y),X+1,1) <> "9" AND M
ID$(M$(Y),X,1) <> "0") THEN X=X+1
630  IF I$=DA$ AND (MID$(M$(Y+1),X,1) <
> "3" AND MID$(M$(Y+1),X,1) <> "9" AND M
ID$(M$(Y),X,1) <> "1") THEN Y=Y+1
640  IF I$=UA$ AND (MID$(M$(Y-1),X,1) <
> "1" AND MID$(M$(Y-1),X,1) <> "9" AND M
ID$(M$(Y),X,1) <> "3") THEN Y=Y-1
650  WK=WK+1

```

```

660 IF DA <> 0 THEN DA=DA+1
670 SU=SU-1
680 PRINTTAB(X1+4,Y1) ". ";
690 COLOUR3:PRINTTAB(X+4,Y);SH$;CHR$(8
);
700 IF X=X1 AND Y=Y1 AND WK <> 1 THEN
SOUND 0,-15,53,10:PROC_REEF:GOTO770
710 IF MID$(M$(Y),X,1)="A" AND DA <> 0
THEN DA=0:PROC_B:PRINTTAB(0,25) "You hav
e arrived at a port so you can now get
your ship repaired.":GOTO770
720 IF MID$(M$(Y),X,1)="4" THEN PROC_B
:GOTO770
730 IF MID$(M$(Y),X,1)="5" THEN PROC_N
AMSHIP
740 IF MID$(M$(Y),X,1)="6" THEN PROC_S
HIP
750 IF MID$(M$(Y),X,1)="7" THEN PROC_T
RADE
760 IF MID$(M$(Y),X,1)="8" THEN PROC_H
OSTILE
770 X1=X:Y1=Y
780 GOTO460
790 DEFPROC_REEF
800 W=INT(2*RND(1))
810 IF X < 15 THEN RR$="reef" ELSE RR$
="rock"
820 PROC_B
830 IF W=0 THEN PRINTTAB(0,25) "There i
s a ";RR$;" ahead. Turn around.":GOTO900
840 PRINTTAB(0,25) "You have run agroun
d on a ";RR$;" ". "Are you going to throw
cargo and guns overboard, or put out
an anchor to " "windward";
850 INPUT R$:IF INSTR(R$+" " " " "OVE
RBOARD") <> 0 OR INSTR(R$+" " " " "over
board") <> 0 THEN R$="OVERBOARD":GOTO880
860 IF INSTR(R$+" " " " "ANCHOR") <>
0 OR INSTR(R$+" " " " "anchor") <> 0 TH
EN R$="ANCHOR":GOTO880
870 VDU 11:GOTO850
880 IF R$="OVERBOARD" THEN CA=CA-RND(2
0):GOTO900
890 W2=INT(2*RND(1)):PROC_B:IF W2=0 TH
EN PRINTTAB(0,25) "You have broken free w
ithout any " " "significant damage." ELSE P
RINTTAB(0,25) "Your ship, the Golden Hind
, is holed. Return to dry land at once
or it will sink.":DA=DA+1
900 ENDPROC
910 DEFPROC_B
920 PRINTTAB(0,25) SPC(238)
930 ENDPROC
940 DEFPROC_NAMSHIP
950 PROC_B
960 IF RND(2)=1 THEN PRINTTAB(0,25) "Yo
u see a Spanish galleon, the Caca-" " "fue
go. Are you going to attack it or " " "ign
ore it";:GOTO980
970 PRINTTAB(0,25) "You see a Spanish g
alleon, the Espirito Santo. Are you goin
g to attack it or " " "ignore it";
980 INPUT R$:IF INSTR(R$+" " " " "ATT
ACK") <> 0 OR INSTR(R$+" " " " "attack"
) <> 0 THEN R$="ATTACK":GOTO1010
990 IF INSTR(R$+" " " " "IGNORE") <>
0 OR INSTR(R$+" " " " "ignore") <> 0 TH
EN R$="IGNORE":GOTO1010
1000 VDU11:GOTO980
1010 IF R$="ATTACK" AND CA <= 0 THEN PR

```

```

OC_B:PRINTTAB(0,25)"You draw alongside t
he galleon and then find you have no can
non balls left so the Spanish win the
battle and leave you to die.":EN=1:GOTO10
30
1020 IF R$="ATTACK" THEN PROC_B:PRINTTA
B(0,25)"You fight a fierce battle and fi
nally take command of the galleon and
transfer its cargo to the hold of the Gol
den"."Hind.":CA=CA+RND(20):BA=BA-RND(20)
:FORD=1TO100:NEXTD
1030 ENDPROC
1040 DEFPROC_SHIP
1050 PROC_B
1060 PRINTTAB(0,25)"You see a Spanish g
alleon. Are you going to attack it or ign
ore it";
1070 INPUT R$:IF INSTR(R$+"","ATT
ACK") <> 0 OR INSTR(R$+"","attack"
) <> 0 THEN R$="ATTACK":GOTO1100
1080 IF INSTR(R$+"","IGNORE") <>
0 OR INSTR(R$+"","ignore") <> 0 TH
EN R$="IGNORE":GOTO1100
1090 VDU11:GOTO1070
1100 IF R$="IGNORE" THEN ENDPROC
1110 PROC_B
1120 PRINTTAB(0,25)"Are you going to fi
re your cannons at the galleon, or set
fire to some old ships and let them
drift towards it, or sneak up alongside
it and board it?";
1130 INPUT R$:IF INSTR(R$+"","CANN
ON") <> 0 OR INSTR(R$+"","cannon")
<> 0 THEN R$="CANNONS":GOTO1170
1140 IF INSTR(R$+"","SET FIRE")
<> 0 OR INSTR(R$+"","set fire")
THEN R$="SET FIRE":GOTO1170
1150 IF INSTR(R$+"","SNEAK") <> 0
OR INSTR(R$+"","sneak") THEN R$="SN
EAK":GOTO1170
1160 VDU11:GOTO1130
1170 PROC_B
1180 IF R$ <> "CANNONS" THEN GOTO1210
1190 IF RND(2)=1 THEN PRINTTAB(0,25)"Yo
ur ship gets holed and some of your cr
ew are shot. Return to dry land at"."onc
e.":DA=DA+1:BA=BA-RND(20):CR=CR-RND(10):
GOTO1290
1200 PRINTTAB(0,25)"As your ship is sma
ller and lower than the galleon, you ma
nage to put it out of action and board it
without incurring any damage to your
ship.":CA=CA+RND(20):SU=SU+RND(20):BA=BA
+RND(20):GOTO1290
1210 IF R$ <> "SET FIRE" THEN GOTO 1250
1220 PROC_B
1230 IF RND(2)=1 THEN PRINTTAB(0,25)"Th
e wind changes direction and the""burni
ng ships drift towards the Golden Hind,
setting the mizzen mast alight. Retur
n to dry land at once.":DA=DA+1:GOTO1290
1240 PRINTTAB(0,25)"The burning ships d
rift towards the""galleon, setting it a
light. The captain surrenders and you tr
ansfer his cargo to your hold.":CA=CA+RND
(20):SU=SU+RND(20):BA=BA+RND(20):GOTO129
0
1250 IF R$ <> "SNEAK" THEN GOTO1290
1260 PROC_B
1270 IF RND(2)=1 THEN PRINTTAB(0,25)"Th

```

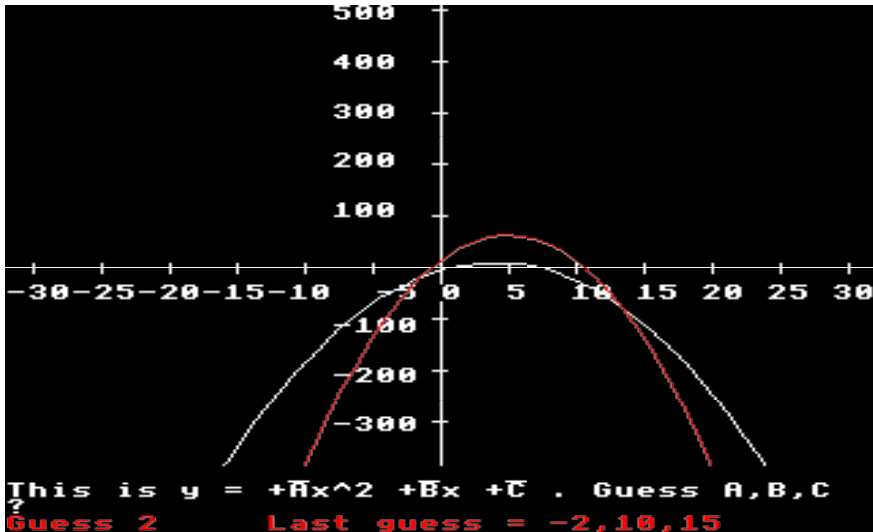


```

ey see you approaching and, realising yo
u are English, they open fire, shoot- in
g some of your crew and damaging your bo
at. Return to port at once.":BA=BA-RND(2
0):DA=DA+1:CR=CR-RND(10):GOTO1290
1280 PRINTTAB(0,25)"They assume you are
Spanish as English ships have never be
en this far before, so you manage to bo
ard the galleon and capture it and its
rich cargo.":CA=CA+RND(20):SU=SU+RND(20)
:BA=BA+RND(20)
1290 ENDPROC
1300 DEFPROC_TRADE
1310 PROC_B:PRINTTAB(0,25)"You buy clov
es cheaply from the islanders.":
CA=CA+RND(20):SU=SU+RND(20)
1320 ENDPROC
1330 DEFPROC_HOSTILE
1340 PROC_B:PRINTTAB(0,25)"Hostile isla
nders pelt you with stones.":CR=CR-RND(2
0)
1350 ENDPROC
1360 DEFPROC_INSERT
1370 IF IS <> 10 THEN M$(Y)=LEFT$(M$(Y)
,X-1)+STR$(IS)+RIGHT$(M$(Y),31-X) ELSE M
$(Y)=LEFT$(M$(Y),X-1)+"A"+RIGHT$(M$(Y),3
1-X)
1380 ENDPROC
1390 *FX4,0
1400 END

```

NAME THE GRAPH



This is a game of logic. You have an aim, to find the equation of the graph that is drawn on the screen. You key in numbers to represent an equation. You can see straight away whether you are getting closer to your goal as the graph of the equation you keyed in is drawn on the screen.

By making the three numbers required larger and smaller, positive and negative, you can see how it effects the graph and hopefully, you can watch your graph getting closer and closer to the target graph until you hit it.

If you give up you will be told the answer, but don't cheat.

How to play

All graphs drawn are of the type

$$Y = Ax^2 + Bx + C$$

Where A, B and C are constants (that is numbers that can be positive or negative). For example, the equation might be

$$Y = -2x^2 + 3x - 5$$

and in this case A would be equal to -2, B equal to 3 and C to -5.

You must key in three numbers all at once on the same line and separated by commas. Press RETURN only after you have keyed in all three numbers. In the example above you would key in

-2, 3, -5 then RETURN

Then the graph of this expression is drawn and you must make another guess. If you cannot guess the answer key in

WHAT, IS, IT then RETURN

(remember to put in the commas) and you will be given the answer and the program ends.

If you guess the answer correctly then press the escape key and a new graph will be drawn.

It is more fun if you find out how to do it by trial and error, but if you want a hint to get you started then this is it. (Skip the next paragraph if you do not want to know)

If the first number (A) is positive, the graph will point upwards (u shape), and if it is negative the graph will point downwards (n shape).

Programming hints

The graphs are plotted with the origin (zero, zero point) at the middle of the screen by using the VDU statement in line 50. This saves a lot of unnecessary maths.

You could make the programs easier by reducing the range of numbers allowed. Do this by reducing the 5 in line 280 or the 9 in line 290 or both. If you wanted to make it very easy you could allow only positive numbers. To do this delete line 300.

This program is written using MODE 1 to enable the guessed graphs to be displayed in red, and the target graph in white. If you have a BBC Model A Micro then you will not have MODE 1 but if you change line 40 to MODE 4 it will work exactly the same but without colour.

```

10  REM NAME THE GRAPH
20  REM COPYRIGHT (C) G.LUDINSKI 1983
30  ONERROR RUN
40  MODE 1:REM Put MODE 4 if you have
a BBC Model A Computer
50  VDU 29,640;512;
60  DEFFNY(XI)=(A*XI^2)/400+(A*D*XI)/1
0+C
70  MOVE-640,0:DRAW640,0:MOVE0,512:DRA
WO,-400
80  REM
90  REM DRAW AXES
100 REM
110 XA=-30:XX=0
120 FORI=-600 TO 600 STEP 100
130     MOVEI,10:DRAWI,-10
140     PRINTTAB(XX,17);XA
150     XX=XX+3:XA=XA+5
160     IF XA=-5 THEN XX=XX+2
170 NEXTI
180 YY=25:YA=-300

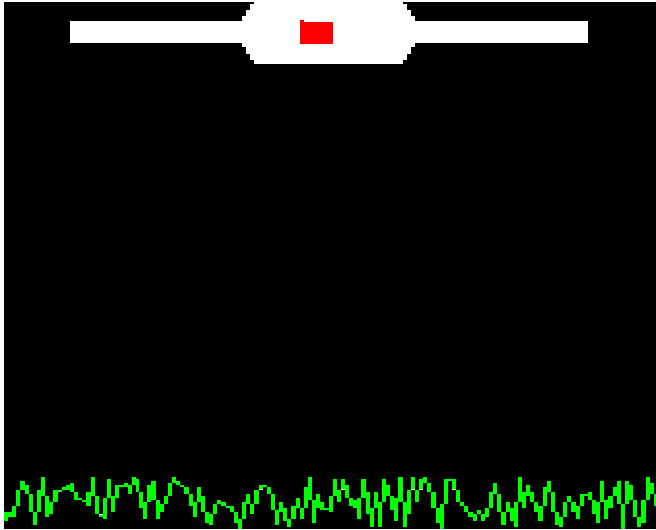
```

```

190  FOR I=-300 TO 500 STEP 100
200      MOVE-10,I: DRAW10,I
210      IF YA<>0 THEN PRINTTAB(15,YY);YA
220      IF YA=0 THEN YY=YY-1
230      YY=YY-3:YA=YA+100
240  NEXT I
250  REM
260  REM DRAW TARGET GRAPH
270  REM
280  A=INT(2*RND(1)+1):D=INT(5*RND(1)+2
)
290  C=RND(9)
300  A=A*((-1)^RND(2)):D=D*((-1)^RND(2)
):C=C*((-1)^RND(2))
310  A1=A:D1=D:C1=C:B1=2*A1*D1
320  COLOUR3:GCOL0,3
330  PROC_GRAPH(A,D,C)
340  REM
350  REM INPUT AND DRAW GUESSED GRAPH
360  REM
370  G=0
380  G=G+1:VDU28,0,31,39,28:CLS:VDU28,0
,31,39,0:PRINTTAB(0,28)"
-_"TAB(0,29)"This is y = +Ax^2 +Bx
+C. Guess A,B,C";:COLOUR1
390  PRINTTAB(0,31);STRING$(39,"");TAB
(0,31);"Guess ";G;:IF G<>1 THEN PRINT"
Last guess = ";A$;"",B$;"",C$;
400  COLOUR7:PRINTTAB(0,30);
410  VDU28,0,30,39,30:INPUTA$,B$,C$:VDU
28,0,31,39,0
420  IF A$="WHAT" AND B$="IS" AND C$="I
T" THEN PRINTTAB(0,28);STRING$(79,"");T
AB(0,29)"Answer = ";A1;"",B1;"",C1:END
430  GCOL0,1
440  PROC_GRAPH(VAL(A$),VAL(B$)/(2*A),V
AL(C$))
450  GOTO380
460  :
470  DEFPROC_GRAPH(A,D,C)
480  P=0
490  COLOUR128
500  FOR X=-600 TO 600 STEP 30
510      IF X=-600 THEN MOVE -640,FNY(-64
0)
520      IF FNY(X)<650 AND FNY(X)>-450 TH
EN DRAW X,FNY(X):P=1
530      IF P=1 AND (FNY(X)>650 OR FNY(X)
<-450) THEN GOTO550
540  NEXT
550  ENDPROC
560  END

```

CLOSE ENCOUNTERS OF THE FOURTH KIND



The aliens have sneaked into this book after all - but we believe they are friendly. It's up to you to find out.

Hovering above a field, lights rotating around it's outer edge, is a flying saucer. From the saucer comes a sequence of notes which may contain a message of peace. To find out you must repeat the notes in the same sequences as the aliens have transmitted them.

Every time you repeat the notes properly, the saucer will descend one level towards the ground. Try and bring them in carefully as the last time we succeeded the space vessel blew up after landing.

How to play

The number keys 0 to 9 represent a note in the octave starting with middle C.

Key in S to indicate the start of a tune.

You can either try guessing by starting with S or you can play with the keyboard until you have found the correct note.

The saucer will first emit one note and, if you copy correctly, descend slightly before sounding its next tone which will be a tune of two notes and so on. Each time you have guessed the sequence correctly the saucer will descend. Remember to start each guess with S.

If you can't find the correct note press G and RETURN and a new tune sequence will begin.

Programming hints

The sound buffer is flushed just before you key in a tune when S is pressed by using *X15,0 in line 780. This is to prevent the last few notes the player has just keyed in from being played before the tune he is about to key in. Commands commencing with an asterisk may not be including in a line of more than one statement. I have got around this by putting *FX15,0 in a procedure and calling the procedure.

You could increase the number of possible notes in the tunes by changing the maximum value of N(L) in line 220. Then add lines for larger values of NT after line 750.

```

10 REM CLOSE ENCOUNTERS OF THE FOURTH
KIND
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 5
40 DIM N(7)
50 CLS
60 REM
70 REM DRAW SPACE SHIP
80 REM
90 VDU 19,2,2,0,0,0
100 HT=964
110 PROC_SHIP(HT,3)
120 GCOL0,2
130 MOVE0,0
140 FORX=0 TO 1280 STEP 10
150 DRAWX,RND(100)
160 NEXTX
170 REM
180 REM GENERATE NOTES
190 REM
200 FORJ=1TO7
210 FORL=1TOJ
220 N(L)=INT(8*RND(1)+1)
230 IF L=1 THEN 250
240 IF N(L)=N(L-1) THEN 220
250 PROC_PLAY(N(L))
260 NEXTL
270 REM
280 REM PLAY NOTES
290 REM
300 EI=0
310 I=140
320 FORK=1TOJ
330 IS=INKEY$(0):IF IS<>"G" AND IS<>
"S" AND (IS=" " OR IS<"1" OR IS>"9") THEN
I=I+50:PROC_LIGHTS(HT):GOTO330
340 IF IS="G" THEN K=J:GOTO380
350 IF IS="S" THEN PROC_FLUSH:K=1:GOTO
330
360 PROC_PLAY(VAL(IS))
370 IF VAL(IS)<>N(K) THEN EI=1
380 NEXT K
390 IF IS="G" THEN GOTO 210
400 IF EI=0 THEN PROC_SHIP(HT,0):HT=HT
-120:PROC_SHIP(HT,3):PROC_ROTATE:GOTO420
410 GOTO300
420 NEXTJ
430 REM
440 REM EXPLOSION
450 REM
460 FORI=1TO100:VDU19,0,1,0,0,0,19,0,3
,0,0,0:NEXT I:GOTO 840
470 :
480 DEFPROC_SHIP(HT,CL)
490 GCOL 0,CL
500 PROC_BLOCK(140,HT-20,1000,40)
510 MOVE460,HT
520 MOVE500,HT-60:PLOT85,500,HT+60
530 MOVE 820,HT
540 MOVE780,HT-60:PLOT85,780,HT+60
550 PROC_BLOCK(500,HT-60,280,120)
560 ENDPROC
570 DEFPROC_BLOCK(X,Y,W,H)
580 MOVEX,Y:MOVEX+W,Y
590 PLOT85,X,Y+H
600 PLOT85,X+W,Y+H
610 ENDPROC
620 DEFPROC_LIGHTS(HT)
630 IF I>=1090 THEN GCOL0,3:PROC_BLOCK
(I,HT-20,50,40):I=140

```

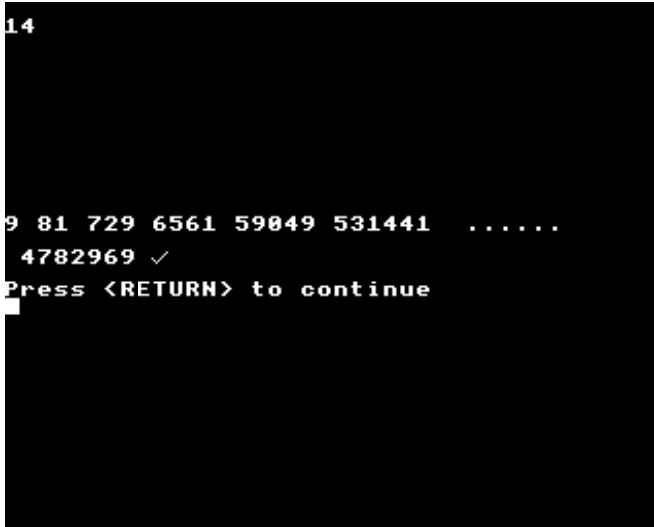


```

640 GCOL0,3:PROC_BLOCK(I,HT-20,50,40)
650 GCOL0,1:PROC_BLOCK(I+50,HT-20,50,4
0)
660 ENDPROC
670 DEFPROC_PLAY(NT)
680 IF NT=1 THEN SOUND 1,-15,53,10
690 IF NT=2 THEN SOUND 1,-15,61,10
700 IF NT=3 THEN SOUND 1,-15,69,10
710 IF NT=4 THEN SOUND 1,-15,73,10
720 IF NT=5 THEN SOUND 1,-15,81,10
730 IF NT=6 THEN SOUND 1,-15,89,10
740 IF NT=7 THEN SOUND 1,-15,97,10
750 IF NT=8 THEN SOUND 1,-15,101,10
760 ENDPROC
770 DEFPROC_ROTATE
780 *FX15 0
790 FORD=1 TO 50:I=I+50:PROC_LIGHTS(HT):
NEXTD
800 ENDPROC
810 DEFPROC_FLUSH
820 *FX15 0
830 ENDPROC
840 REM

```

SEQUENCE COUNTDOWN



SIX numbers, or letters will be displayed on the screen and it is up to you to provide the next logical item to complete the series.

How to play

When you have worked out your answer, type in your item and press RETURN.

If you cannot work out the correct answer, then move on as quickly as possible as you only have 200 seconds to complete as many answers as you can.

A wrong answer will bring you the correct result from your computer, and then you will be handed back to the next sequence. If you wish to PASS on a question then type P and RETURN and you will be taken on to the next question.

After 200 seconds your score sheet will be displayed showing the number of sequences tried, correct answers, your time and your IQ level for adaptability.

Programming hints

This program has a useful facility that enables the time to be constantly displayed in seconds. This actually only occurs while the program is waiting for the player to key in something, but as most of any program's time is taken up with waiting, this is all that is required. The lines 330 and 340 perform this function. In line 330 the time is printed out until the first character is keyed in. Then in line 340 subsequent characters are accepted until Return is pressed. The Return key has an ASCII value of 13, so is represented by CHR\$(13).

One change you could make is to add new sequences. To do this, allow W to have a larger maximum value in line 170. The sequence must then be defined after line 210. The sequence is held in S(2), S(3), S(4), S(5), S(6), S(7) and S(8). S(2) is defined in line 150 and is fixed for all sequences. IC is another random value which may be useful when defining a sequence. The message saying how the sequence is created is held in MS\$. If the last number in sequence S(8) is less than 26 then the sequence is converted to letters.

```

10 REM SEQUENCE COUNTDOWN
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 4
40 DIM S(8), IP$(255):CLS
50 CLS

```

```

60 VDU23,224,0,1,2,4,136,80,32,0
70 TE=0:CR=0:TIME=0
80 CLS
90 TE=TE+1
100 IF TE=11 OR TIME >= 20000 THEN 510
110 REM
120 REM Work Out Sequence
130 REM
140 S(1)=0
150 S(2)=INT(RND(1)*9+1)
160 IC=INT(RND(1)*9+1)
170 W=INT(RND(1)*3)
180 FOR I=3 TO 8
190 IF W=0 THEN S(I)=2*S(I-1)-S(I-2)
+IC:MS$="The interval increases by "+STR
$(IC)+" each time"
200 IF W=1 THEN S(I)=S(I-1)+S(I-2)+I
C:MS$="Each number is the sum of the pre
vious two plus "+STR$(IC)
210 IF W=2 THEN S(I)=S(2)^(I-1):MS$=
"Each number is "+STR$(S(2))+" to the po
wer of 1,2,3,4,5,6 and 7"
220 NEXT I
230 FOR I=1 TO 13:PRINT:NEXT I
240 REM
250 REM Display Sequence
260 REM
270 IF S(8) > 26 THEN PRINTSTR$(S(2));"
";STR$(S(3));" ";STR$(S(4));" ";STR$(S(
5));" ";STR$(S(6));" ";STR$(S(7));" ...
...";:LE=0
280 IF S(8) <= 26 THEN LE=1:PRINTCHR$(6
4+S(2));" ";CHR$(64+S(3));" ";CHR$(64+S(
4));" ";CHR$(64+S(5));" ";CHR$(64+S(6));
" ";CHR$(64+S(7));" ..... "
290 REM
300 REM Input Answer
310 REM
320 IX=1
330 IP$(IX)=INKEY$(10):IF IP$(IX)="" T
HEN PRINTTAB(0,1);INT(TIME/100):GOTO330
340 PRINTTAB(IX,15);IP$(IX);:IX=IX+1:I
P$(IX)=GET$:IF IP$(IX)<>CHR$(13) THEN GO
TO 340
350 I$="":FOR I=1 TO IX-1:I$=I$+IP$(I):NE
XT I
360 REM
370 REM Check Answer
380 REM
390 *FX 15,1
400 IF LE=0 AND ABS(VAL(I$) - S(8)) <=
LEN(I$)/2 THEN COLOUR1:PRINT" ";CHR$(12
8):CR=CR+1:COLOUR3:GOTO450
410 IF LE=1 AND (I$=CHR$(64+S(8)) OR I
$=CHR$(65+S(8))) THEN COLOUR1:PRINT" ";C
HR$(128):CR=CR+1:COLOUR3:GOTO450
420 PRINT'"No, the answer="";S(8)
430 IF LE=1 THEN PRINT'"Replace each l
etter by its position number eg. 1 f
or A, 2 for B, etc."
440 PRINT'MS$
450 PRINT'"Press <RETURN> to continue"
460 REPEATUNTILGET=13
470 GOTO80
480 REM
490 REM Score Sheet
500 REM
510 CLS
520 PRINT'"Number of sequences complet
ed = ";TE

```

```

530 PRINT "Number correct = "; CR
540 PRINT "Time taken = "; INT(TIME/100
); " seconds"
550 IQ=INT(CR*100/5.3)
560 PRINT "Your IQ level (adaptability
) = "; IQ
570 PRINT
580 IF CR >= 7 THEN PRINT "This is clas
sed as SUPERIOR (Upper 10%)":GOTO610
590 IF CR = 6 THEN PRINT "This is class
ed as GOOD (Upper 20%)":GOTO610
600 IF CR = 5 THEN PRINT "This is class
ed as FAIR (Upper 60%)"
610 REM

```

SPIRAL MAZES



Because you forgot to doff your cap to the local tyrant, you have been thrown into his dungeons.

On the floor, scratched by a previous resident, is a map so now is your chance to escape. Rather than rush headlong into the maze, however, it would be wise to trace your way through in advance. Try drawing a continuous line from where you are to the outside of the dungeons.

By the way, if you make it to the outside, don't forget about doffing the cap next time.

How to play

A maze will be drawn on the screen. At first glance it may

appear to be a simple spiral but it may be an optical illusion.

Your position, at the centre, is marked by a red line and you move by pressing the ARROW keys.

Like Dorothy, in the Wizard of Oz, your path will be shown as a yellow line.

When you have decided whether or not your escape is possible press Y for Yes and N for No.

Programming hints

If you wish to change the direction in which the spiral is wound, then you may change the initial values of XS and YS.

If you wish to make the end wall, which blocks off the outside of the maze, run at right angles, then you should change line 320 from PLOT 1,XC, YC to two alternative lines.

and PLOT 1, 0, YC: PLOT 1, XC, 0
 PLOT 1, XC, 0: PLOT 1, 0, YC

You will have to remember to separate the conditions in lines 280 to 310 to determine in which order the PLOT statements occur.

```

10  REM  SPIRAL  MAZES
20  REM  COPYRIGHT  (C)  G.LUDINSKI  1983
30  MODE  5
40  CLS
50  WH=INT(RND(1)*2)
60  PA=(2*INT(RND(1)*8))+8
70  L=30:W=30:X=600:Y=470
80  REM
90  REM  DRAW  MAZE
100 REM
110 FOR J=1 TO 2
120     XS=1:YS=-1

```

```

130      GCOLO,1:MOVE X-15,Y-15:PLOT 1,30
,0:GCOLO,3
140      IF J=1 THEN MOVE X,Y:SP=-1:XT=X:
YT=Y
150      IF J=2 THEN MOVE X,Y:PLOT 1,-W,0
:PLOT 1,0,W:SP=1
160      FOR I=1 TO PA
170          IF WH=1 AND J=2 AND I>=(PA-3)
THEN I=PA:GOTO220
180          IF I/2=INT(I/2) THEN YP=YS*(L+
(2*INT((I+SP)/2))*W):PLOT1,0,YP:YS=-YS
190          IF I/2=INT(I/2) AND J=1 THEN Y
T=YT+YP
200          IF I/2<>INT(I/2) THEN XP=(L+(2
*INT((I+SP)/2))*W)*XS:PLOT1,XP,0:XS=-XS
210          IF I/2<>INT(I/2) AND J=1 THEN
XT=XT+XP
220      NEXT I
230      NEXT J
240      REM
250      REM BLOCK OFF END OF MAZE
260      REM
270      XC=0:YC=0
280      IF (WH=0 AND XT>X) OR (WH=1 AND XT
<X) THEN XC=-W
290      IF (WH=0 AND XT<X) OR (WH=1 AND XT
>X) THEN XC=W
300      IF (WH=0 AND YT>Y) OR (WH=1 AND YT
<Y) THEN YC=-W
310      IF (WH=0 AND YT<Y) OR (WH=1 AND YT
>Y) THEN YC=W
320      PLOT1,XC,YC
330      PRINTTAB(0,1)"Can you escape (Y/N)
"
340      REM
350      REM DRAW PATH THROUGH MAZE
360      REM
370      PROC_ARROW
380      REM
390      REM CHECK ANSWER
400      REM
410      PRINTTU$:*FX 21
420      IF (TU$="Y" AND WH=0) OR (TU$="N"
AND WH=1) THEN PRINT"You're right.":GOTO
440
430      PRINT"You're wrong.":FORG=1TO500:N
EXTG:OSCLI("FX 21")
440      PRINT"More (Y/N)";:I=GET
450      IF I=78OR I=110 THEN MODE6:OSCLI("FX
4 0"):OSCLI("FX 11 12"):END ELSE CLS:GO
TO50
460      REM
470      DEFPROC_ARROW
480      MOVE X-20,Y-15
490      GCOLO,2
500      *FX 4 1
510      TU$=GET$
520      IF TU$="Y" OR TU$="N" THEN 610
530      X0=0:Y0=0
540      IF TU$<CHR$(136) OR TU$>CHR$(139)
THEN GOTO510
550      IF TU$=CHR$(136) THEN X0=-5
560      IF TU$=CHR$(137) THEN X0=5
570      IF TU$=CHR$(138) THEN Y0=-5
580      IF TU$=CHR$(139) THEN Y0=5
590      PLOT1,X0,Y0
600      GOTO510
610      GCOLO,3
620      ENDPROC
780      REM

```


WHAT'S YOURS



Do you know that awful feeling when you have been put in charge of the drinks purchase at your friend's wedding?

You can be sure that you will get a soft drink for the big fellow in the corner or, even worse, a double whisky with pint chaser for someone's grandmother.

Anyway, it's your turn to buy the drinks and the order is on the bar. If you remember to get everyone the correct drink you will receive a whisky from each of them as they will be so pleased with your effort. If you get the total round correct, they will all pitch in and pay for the drinks themselves.

All the drinks are £1 each, so everytime you get the round right you make £1 per drink for yourself.

Oh, we almost forgot, everytime you get it right someone else joins your circle of friends.

How to play

Five different types of drinks can be ordered as follows:-

Beer	Red Mug	B
Lager	Yellow Mug	L
Red Wine	Red Glass	R
White Wine	White Glass	W
Whisky	Yellow Glass	-

Look at the order details on the bar and key in your copy. As you key in your order, the drinks will appear on the screen. When you finish the first round, a second will appear in a different order and, if the last round was correct, an additional member will be added to your group.

When the drink runs out, you can go home - by taxi.

Programming hints

This program is a good example of the use of user-defined graphics. Just two shapes are defined, a glass and a mug shape, but as they are displayed in many different colours there appears to be a large number of shapes. Remember to use `COLOUR` and not `GCOL` for user-defined graphics, as they are handled in the same way as text.

You may wish to add some more drinks in the appropriate shaped glass or mug. For example, a white beer mug could represent lemonade, or you could define a brandy or sherry glass shape. If you add more drinks you must allow W in line 320 to have a larger maximum value. Check for the letter that represents the new drinks in line 480. Display the new drinks after line 250.

```

10 REM WHAT'S YOURS?
20 REM COPYRIGHT (C) G. LUDINSKI 1983
30 MODE 5
40 DIM W(20)
50 GOTO 160
60 DEF FNB(N$)
70 TF=0
80 FOR L=0 TO 7
90 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
100 =TF
110 CLS
120 REM
130 REM DEFINE GLASS AND BEER MUG SHAP
E
140 REM
150 VDU 23,224,FNB("00111110"),FNB("00
111110"),FNB("00111110"),FNB("000011100")
,FNB("00001000"),FNB("00001000"),FNB("00
001000"),FNB("00111110")
160 VDU 23,225,FNB("011111000"),FNB("01
111000"),FNB("01111110"),FNB("01111010")
,FNB("01111010"),FNB("01111010"),FNB("01
111110"),FNB("01111000")
170 MG$=CHR$(225):GL$=CHR$(224)
180 REM
190 REM DRAW BAR AND NOTEPADS
200 REM
210 CLS
220 GCOL0,1:PROC_BLOCK(0,520,1279,240)
230 GCOL0,3:PROC_BLOCK(250,0,255,280)
240 GCOL0,3:PROC_BLOCK(755,0,270,280)
250 COLOUR0:COLOUR131:PRINTTAB(4,24)"B
i11"TAB(12,24)"Back"TAB(4,26)"`"TAB(12,2
6)"`":COLOUR3:COLOUR128
260 REM
270 REM DRAW DRINKS ORDERED
280 REM
290 M=0:OW=0
300 FORJ=2TO20
310 FORI=1TOJ
320 W(I)=INT(RND(1)*4)
330 IFW(I)=0 THEN CL=1:C$=GL$
340 IFW(I)=1 THEN CL=1:C$=MG$
350 IFW(I)=2 THEN CL=2:C$=MG$
360 IFW(I)=3 THEN CL=3:C$=GL$
370 COLOUR CL:PRINTTAB(I-1,7);C$:P
RINTTAB(I-1,16)" ";
380 NEXTI
390 EI=0
400 COLOUR3:COLOUR128:PRINTTAB(0,18)
"What's your order? B=Beer L=Lager
R=Red & W=White Wine"
410 OW=OW+J:VDU19,1,1;0;19,2,3;0;19,
3,7;0;
420 REM

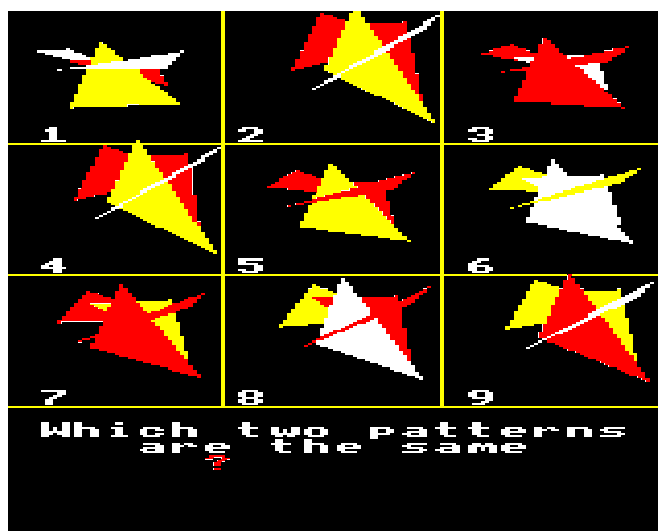
```

```

430      REM DRAW DRINKS BOUGHT
440      REM
450      FORK=1 TO J
460      I$=GET$
470      IFK=1 THEN PRINTTAB(0,7);STRIN
G$(20," ");
480      IFI$<>"B" AND I$<>"L" AND I$<>
"R" AND I$<>"W" THEN 460
490      IFI$="R" THEN COLOUR1:PRINTTAB
(K-1,7)GL$:IP=0
500      IFI$="W" THEN COLOUR3:PRINTTAB
(K-1,7)GL$:IP=3
510      IFI$="B" THEN COLOUR1:PRINTTAB
(K-1,7)MG$:IP=1
520      IFI$="L" THEN COLOUR2:PRINTTAB
(K-1,7)MG$:IP=2
530      IFIP=W(K) THEN COLOUR2:PRINTTA
B(K-1,16)GL$:M=M+1:GOTO550
540      EI=1
550      COLOUR0:COLOUR131:PRINTTAB(5,2
6);OW;TAB(13,26);M:COLOUR128
560      NEXTK
570      IF EI=0 THEN M=M+J:COLOUR0:COLOU
R131:PRINTTAB(13,26);M:COLOUR128
580      RB$=INKEY$(50*J)
590      *FX 15,1
600      IF EI=1 THEN GOTO 310
610      NEXTJ
620      PRINTTAB(0,16)"You did it! You
will need a real      drink after that ";
630      END
640      DEFPROC_BLOCK(X,Y,W,H)
650      MOVE X,Y:MOVEX+W,Y
660      PLOT 85,X,Y+H
670      PLOT 85,X+W,Y+H
680      ENDPROC

```

PATTERN PAIRS



If you have tried Odd One Out in this book, then you will find this following puzzle a little more difficult.

There are nine patterns displayed on the screen, in a range of colours, and you have only a few seconds to compare them and nominate the pair, you believe, are a match.

How to play

Identify your pair, note the numbers alongside and key in your answer. You don't have to key in your answer in strict chronological order. Just punch in your numbers and wait. Correct responses will be rewarded with a pleasant little high pitched tune, but wrong answers will

be faced with a low pitched little dirge.

To continue, press Y for Yes and to stop, press N for No, remembering to press RETURN after your response.

A score sheet will appear at the end showing your tries, results, time and average time.

Programming hints

Each of the patterns is slightly different except for the matching pair. This is done by adding a mixture of H1, H2 and H3 to the corners of the triangles in procedure PROC_PATTERN and H1, H2 and H3 will be different for each pattern except the two that are the same.

If you wish to increase the number of patterns which are the same, then a W3 should be assigned. W3 should be a random number between 1 and 9 inclusive and you should check that it is not equal to W1 or W2. Then change W\$ and W1\$ and assign four more values, say, W2\$, W3\$, W4\$ and W5\$ with the string of W1, W2 and W3 arranged in all possible different ways.

Then check for PT to be equal to W1, W2 or W3 in line 720 in procedure PROC_PATTERN to see whether the pattern to be drawn is one of the three identical ones.

Change the input lines 440 to 510 to allow a third number to be keyed in and then check for the six possible values W\$, W1\$ to W5\$.

```

10 REM PATTERN PAIRS
20 REM COPYRIGHT (C) G. LUDINSKI 1983
30 DIM X(4,3), Y(4,3), C(4)
40 MODE 5
50 NU=0:CR=0
60 TIME=0
70 CLS

```

```

80  NU=NU+1
90  PT=0:PC=0
100 REM
110 REM  DRAW  FRAMEWORK
120 REM
130 GCOL0,2:COLOUR3
140 MOVE426,255:DRAW426,1023
150 MOVE852,255:DRAW852,1023
160 MOVE0,255:DRAW1279,255
170 MOVE0,510:DRAW1279,510
180 MOVE0,765:DRAW1279,765
190 REM
200 REM  GENERATE  SHAPES
210 REM
220 W1=RND(9)
230 W2=RND(9):IF W2=W1 THEN 230
240 W$=STR$(W1)+STR$(W2)
250 W1$=STR$(W2)+STR$(W1)
260 FORI=1TO4
270   C(I)=INT(RND(1)*3+1)
280   FORJ=1TO3
290     X(I,J)=INT(RND(1)*320+30)
300     Y(I,J)=INT(RND(1)*160+30)
310   NEXTJ
320 NEXTI
330 REM
340 REM  DRAW  PATTERNS
350 REM
360 FORJ=765TO255STEP-255
370   FORI=0TO852STEP426
380     PROC_PATTERN(I,J)
390   NEXTI
400 NEXTJ
410 REM
420 REM  QUESTION
430 REM
440 PRINTTAB(1,25)"Which two patterns
   are the same":COLOUR1:PRINTTAB(6,27)
"?" ;VDU19,1,1;0;19,2,3;0;19,3,7;0;
450 I$="":I=0:IC=0
460 I1$=INKEY$(0):IF I1$="" OR I1$<"1"
OR I1$>"9" THEN 460
470 PRINTI1$;:IF IC=0 THEN PRINT" and
";
480 IF IC=0 THEN IC=IC+1:I$=I$+I1$:GOT
O460
490 I$=I$+I1$
500
510 IF I$=W$ OR I$=W1$ THEN COLOUR2:PR
INT'" Yes, you're right!":SOUND1,-15,10
1,30:CR=CR+1:GOTO530
520 PRINT:PRINT"No, ";LEFT$(W$,1);" an
d ";RIGHT$(W$,1);" are the same":SOUND1,
-15,73,10:SOUND1,-15,69,5
530 PRINT:PRINT"Do you want more (Y/N)
";
540 INPUT R$
550 IF R$ <> "N" THEN GOTO 70
560 REM
570 REM  SCORE  SHEET
580 REM
590 CLS
600 PRINT:PRINT"          Pattern Pairs"
610 FORI=1TO9:PRINT:NEXTI
620 PRINT:PRINT"Problems completed = "
;NU
630 TM=INT(TIME/100)
640 PRINT:PRINT"Problems correct = ";C
R
650 PRINT:PRINT"Time taken = ";TM:PRIN

```



```

T "secs"
660 IF CR<>0 THEN PRINT "Time/problem
= ";INT(TM/CR); " secs"
670 GOTO 800
680 :
690 DEFPROC_PATTERN(XD,YD)
700 PT=PT+1
710 PRINTTAB(( (20*XD)/1279)+1,31-(32*Y
D)/1023);PT
720 IF PT=VAL(RIGHT$(W$,1)) OR PT=VAL(
LEFT$(W$,1)) THEN H1=80:H2=80:H3=80:GOTO
740
730 PC=PC+1:H1=PC*10:H2=PC*10:H3=PC*10
740 FORL=1TO4
742 CL=RND(3):IF PT=VAL(RIGHT$(W$,1)
) OR PT=VAL(LEFT$(W$,1)) THEN CL=C(L)
750 GCOL0,CL
760 MOVE (X(L,1)+XD+H1),(Y(L,1)+YD+H
1)
770 MOVE (X(L,2)+XD+H2),(Y(L,2)+YD+H
1)
780 PLOT 85,(X(L,3)+XD+H3),(Y(L,3)+Y
D-INT(H1/2))
790 NEXTL
800 ENDPROC
810 REM END

```

CONCENTRATION TEST

	1										2										3															
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0						
A	4	1	2	2	8	7	5	0	9	2	2	7	7	8	5	5	4	9	2	2	9	3	7	8	6	9	8	2	7	8	2	5	7	9	A	
B	8	7	5	2	7	1	0	4	5	3	4	1	0	6	2	6	8	7	5	1	5	0	2	5	2	9	1	6	3	3	9	5	9	4	B	
C	2	9	0	6	0	9	5	1	9	0	9	5	9	9	6	1	0	9	9	5	4	3	1	3	1	2	8	4	0	5	0	9	4	7	C	
D	1	6	8	0	0	3	6	2	6	6	6	1	8	2	5	8	0	8	7	0	1	9	7	3	8	1	5	7	6	3	7	9	5	1	D	
E	0	1	8	8	5	1	3	3	9	7	7	2	2	3	1	3	5	0	8	8	2	2	7	1	6	9	2	1	1	3	6	0	2	2	E	
F	7	6	0	1	5	6	6	7	0	6	6	3	0	3	8	6	7	5	0	9	4	0	7	4	5	5	8	3	0	7	9	1	8	9	F	
G	8	5	2	1	6	1	4	6	1	7	9	5	5	5	6	4	4	1	1	5	8	2	2	7	1	9	2	6	6	2	8	2	4	3	1	G
H	2	3	5	0	9	4	1	9	2	6	4	7	0	8	3	9	3	8	5	1	0	9	6	9	7	8	5	7	5	8	0	8	1	9	0	H
I	4	4	1	9	2	9	6	0	5	4	8	3	5	3	5	9	4	2	9	9	7	5	8	1	6	1	2	8	5	6	9	7	5	0	9	I
J	9	6	0	1	3	7	0	6	9	8	7	3	3	3	9	7	3	3	7	4	1	7	7	1	4	1	6	2	0	3	1	3	5	5	4	J
K	7	3	2	0	4	5	2	3	5	2	2	9	8	8	0	2	6	9	7	8	4	3	3	1	9	6	2	0	7	4	8	4	6	0	2	K
L	4	5	6	1	5	1	9	4	3	0	3	5	0	9	9	2	8	4	4	1	1	7	4	5	8	1	2	0	6	3	7	5	3	5	4	L
M	6	8	8	3	8	2	8	3	8	3	1	7	9	5	6	6	9	4	6	8	8	3	2	4	5	2	4	0	1	8	4	2	6	1	3	M
N	3	6	7	9	0	7	5	3	3	1	7	8	6	5	1	0	6	2	9	1	4	8	1	6	3	7	6	7	2	0	1	7	8	7	5	N
O	7	4	2	2	6	0	5	0	1	5	0	1	5	2	5	4	1	8	6	3	5	8	1	9	0	7	6	1	2	2	9	9	0	5	9	O
P	1	4	3	6	8	6	7	6	8	2	1	5	5	3	4	2	3	2	0	1	0	5	4	0	3	5	9	9	0	7	1	0	4	4	0	P
Q	3	9	6	5	9	6	3	3	1	9	0	6	5	1	5	4	1	2	4	5	2	9	9	0	0	2	4	5	0	8	4	8	5	4	4	Q
R	8	5	6	8	8	4	8	0	1	6	8	3	0	4	9	2	6	0	2	5	0	6	7	6	6	9	8	9	3	4	3	1	3	5	4	R
S	6	4	9	1	3	0	5	0	2	7	9	6	0	3	7	3	4	9	5	9	1	9	4	8	5	9	8	4	0	8	6	2	3	8	6	S
T	6	2	7	5	4	1	6	6	1	1	9	7	6	3	5	4	7	5	9	3	7	5	2	4	5	2	6	2	7	1	5	4	1	9	7	T
U	7	2	8	7	9	3	7	1	5	1	9	9	7	7	6	0	5	2	2	3	9	2	4	5	3	1	0	0	3	9	0	0	0	5	U	
V	8	3	6	3	9	8	7	3	4	6	9	7	6	0	8	7	2	3	9	8	5	8	8	4	9	8	8	0	6	6	9	7	2	9	6	V
W	0	4	7	1	0	7	7	2	5	1	2	7	7	1	6	7	2	8	3	3	9	0	3	9	7	7	1	9	4	9	4	1	3	1	9	W

Type row col. comma row col. so X+Y=10
?

THIS time we have given you a little longer to work out your answer, because we think you'll need all the brainpower at your command.

On the screen will be displayed 23 rows of 35 numbers and you have eight minutes to find as many pairs of adjacent numbers, whose sum is 10, as possible.

These pairs must be in the same row.

How to play

When you have found the matching pairs, key in the row number followed by the column number of each, and then press RETURN. For example A3,A4. Always place a

comma between each entry. If your pair of numbers is correct they will displayed in the same colour on the screen.

You may key in the pairs in any order and, if you cannot find any more 'missing' pairs before your time is up, type in NO,MORE followed by RETURN. Again, there must be a comma between the words.

This ending of the game will cause your score sheet to be displayed. If you fail to complete in the allotted time, the score sheet will automatically appear.

Your score sheet will give a classification and an IQ rating on your powers of concentration.

Programming hints

LINES 100-230 draw out the matrix of numbers and the row and column labels. Note that the letters are displayed in a loop by referring to their ASCII values. As the letter A has ASCII value of 65, B has a value of 66 etc so CHR\$(64+J) where J is 1,2,3 etc. will display the letters A,B,C etc.

I would not advise any alterations as the scoring and IQ levels were determined by scientific testing, and any changes would make the scores and IQ level incorrect.

```

10 REM CONCENTRATION TESTER
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 *KEY 10 "OLD|M"
40 MODE 4
50 DIM A$(35,23)
60 CLS
70 NU=0
80 TIME=0
90 ER=0
100 REM
110 REM Draw Matrix
120 REM
130 PRINT
140 PRINT "
150 PRINT " 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
3"
```

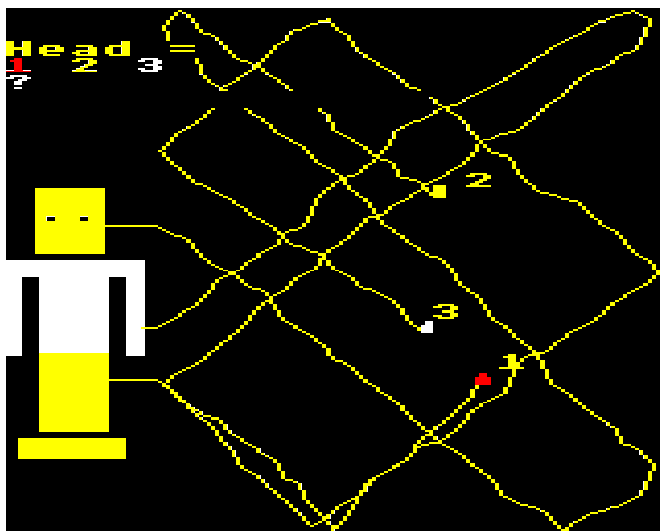
```

789012345"
160 FORJ=1TO23
170 PRINT:PRINTCHR$(64+J) " ";
180 FORI=1TO35
190 AS(I,J)=STR$(INT(RND(1)*10))
200 PRINTA$(I,J);
210 NEXTI
220 PRINT " ";CHR$(64+J);
230 NEXTJ
240 REM
250 REM Question
260 REM
270 PRINT
280 PRINTTAB(0,28)"Type row col. comma
row col. so X+Y=10 ";
290 PRINT:INPUT C$,D$
300 REM
310 REM Check Input
320 REM
330 IF TIME>=48000 THEN GOTO 490
340 IF C$="NO" AND D$="MORE" THEN 490
350 IF LEN(C$)<2 OR LEN(D$)<2 THEN PRO
C_ERROR:GOTO290
360 J=ASC(LEFT$(C$,1))-64
370 I=VAL(MID$(C$,2,LEN(C$)-1))
380 K=ASC(LEFT$(D$,1))-64
390 L=VAL(MID$(D$,2,LEN(D$)-1))
400 IF I<1 OR I>35 OR J<1 OR J>23 OR L
<1 OR L>35 OR K<1 OR K>23 THEN PROC_ERRO
R:GOTO290
410 IF J<>K THEN PROC_ERROR:GOTO290
420 IF VAL(AS(I,J))+VAL(AS(L,K)) <> 10
THEN ER=ER+1:PROC_ERROR:GOTO290
430 COLOUR129:COLOUR0:PRINTTAB(I+1,J+3
);AS(I,J);TAB(L+1,K+3);AS(L,K);:COLOUR12
8:COLOUR1
440 NU=NU+1
450 PRINTTAB(0,30) " " :VDU11,11,
11,11:GOTO280
460 REM
470 REM Score Sheet
480 REM
490 CLS:PRINT'"You found ";NU;" pairs
"' "Please wait - calculating score shee
t"
500 MAX=0
510 FORJ=1TO23
520 FORI=1TO34
530 IF VAL(AS(I,J))+VAL(AS(I+1,J))
=10 THEN MAX=MAX+1
540 NEXTI
550 NEXTJ
560 SCORE=MAX-NU+ER
570 PRINT:PRINT"Your score is ";SCORE:
PRINT
580 AV=MAX * 0.6:IQ=INT((NU/AV)*100)
590 IF IQ>150 THEN IQ=150
600 IF SCORE<0.6*SCORE THEN PRINT"You
are classed as SUPERIOR (Upper 10%):GOT
O640
610 IF SCORE<0.9*SCORE THEN PRINT"You
are classed as GOOD (Upper 30%):GOTO640
620 IF SCORE<1.1*SCORE THEN PRINT"You
are classed as FAIR (Upper 60%)"
630
640 PRINT'"Your IQ level (Concentratio
n) = ";IQ
650 PRINT'"More (Y/N)";
660 INPUT I$
670 IF I$<>"Y" AND I$<>"N" THEN VDU11:

```

```
GOTO 660
680 IF I$="Y" THEN 60
690 GOTO 740
700 REM
710 DEFPROC_ERROR
720 VDU 11, 11, 11: PRINT "Error: type row, c
ol. comma row col.so =10";
730 ENDPROC
740 REM END
```

WIRE MAZE



Well at last you have your own robot to cut the grass, clean the car, wash the windows and take the dog for a walk. There is one snag though.

Your robot has been wired up incorrectly. It must have been Friday afternoon when the other robots put your model together. At the moment, if you press the arm-control button, the robot's legs move. You, I'm afraid, are going to have to rewire your new family friend.

How to play

As the program begins, your robot will be drawn on the screen. When the robot shape is completed, the screen will go black and the wiring will be added along with the

control buttons. The robot, complete with wires and buttons will reappear and you will then have to trace the wiring.

Control buttons are:

Red	1
Yellow	2
White	3

At the top of the screen will appear the word "Head" and the three colour buttons. You must decide which of these buttons is connected to the head and press the corresponding number key and RETURN. One wrong try means you must try again, and a subsequent wrong guess will cause your computer to give you the correct answer. If you think about it, if you have guessed two wrong from three, you should know the answer by then anyway!

You continue for the arms and legs.

To play again, with a different maze, re-run the program.

Programming hints

The useful BLOCK procedure is used which draws a rectangle of a specified size at a specified place. The rectangle is created by drawing TWO right-angled triangles joined together. Each triangle is drawn by MOVEing to a point then drawing a line from this point to a third point. If PLOT 85 is used to draw this line from the second point then a filled in triangle is created. You could use this procedure in any of your own non-commercial programs. Copy in the procedure DEF PROC_BLOCK (X,Y,W,H) and call it with PROC_BLOCK (followed by the X and Y position of its bottom left hand corner followed

by its width and height all separated by commas.

The other thing about the program that you might find useful, is the way it draws the maze without you seeing it. This is done by using the VDU 19 command to change all red (1), yellow (2) and green (3) pictures to black (0). The maze is then drawn. Then another set of VDU 19 commands changes them all back to their original colours. The colour numbers are not the same as the second number is the logical colour number; the colour numbering system that is applicable to all modes.

You might find the wire maze too easy. It can be made more difficult by increasing the length of each wire by increasing the larger number in line 420.

```

10  REM  WIRE  MAZE
20  REM  COPYRIGHT  (C)  G.LUDINSKI  1983
30  DIM  XA(3)
40  DIM  YA(3)
50  DIM  W(3)
60  * KEY 10  "OLD|M"
70  MODE 5
80  CLS
90  REM
100 REM  Draw  Robot
110 REM
120 GCOL0,2
130 PROC_BLOCK(70,550,125,125)
140 GCOL0,3:PROC_BLOCK(0,500,275,35)
150 PROC_BLOCK(0,350,35,150)
160 PROC_BLOCK(240,350,39,150)
170 PROC_BLOCK(75,350,125,150)
180 GCOL0,2:PROC_BLOCK(75,200,125,150)
190 PROC_BLOCK(35,150,200,35)
200 COLOUR0:COLOUR130:PRINTTAB(1,12) ".
. ";:COLOUR2:COLOUR128
210 REM
220 REM  Decide  which  controls  connect
to which parts
230 REM
240 FOR I=1 TO 3
250   W(I)=INT(RND(1)*3+1)
260   IF (I=2 AND W(I)=W(1)) OR (I=3 AND
ND (W(I)=W(2) OR W(I)=W(1))) THEN 250
270 NEXT I
280 REM
290 REM  Draw  Wires
300 REM
310 GCOL0,2
320 XA(1)=300:YA(1)=600:MOVE200,600:DR
AW XA(1),YA(1)
330 XA(2)=300:YA(2)=400:MOVE275,400:DR
AW XA(2),YA(2)
340 XA(3)=300:YA(3)=300:MOVE200,300:DR
AW XA(3),YA(3)
350 VDU30

```



```

360 VDU 19,1,0,0,0,0
370 VDU 19,2,0,0,0,0
380 VDU 19,3,0,0,0,0
390 FORI=1TO3
400 XS=(-1)^I:YS=(-1)^I
410 MOVE XA(I),YA(I)
420 FORJ=1TO100
430 DX=XS*INT(RND(1)*30+10)
440 IF ((XA(I)+DX) <300 OR (XA(I)+
DX) >1278) THEN XS=-XS:GOTO430
450 XA(I)=XA(I)+DX
460 DY=YS*INT(RND(1)*20+10)
470 IF ((YA(I)+DY) <0 OR (YA(I)+DY
) >1020) THEN YS=-YS:GOTO460
480 YA(I)=YA(I)+DY
490 DRAW XA(I),YA(I)
500 NEXTJ
510 REM Draw Buttons
520 REM
530 REM
540 GCOL0,W(I):PROC_BLOCK(XA(I),YA(I
),20,10):PROC_BLOCK(XA(I)+5,YA(I)+10,10,
10):GCOL0,2
550 PRINTTAB(INT(XA(I)/64)+1,INT((10
23-YA(I))/32)-1);W(I);
560 NEXTI
570 REM
580 REM Turn Display Back On
590 REM
600 VDU 19,1,1,0,0,0
610 VDU 19,2,3,0,0,0
620 VDU 19,3,7,0,0,0
630 REM
640 REM Write Questions
650 REM
660 FORI=1TO3:PROC_QUESTION:NEXTI
670 END
680 DEFPROC_BLOCK(X,Y,W,H)
690 MOVE X,Y:MOVE X+W,Y
700 PLOT 85,X,Y+H
710 PLOT 85,X+W,Y+H
720 ENDPROC
730 DEFPROC_QUESTION
740 IF I=1 THEN PT$="Head"
750 IF I=2 THEN PT$="Arm"
760 IF I=3 THEN PT$="Leg"
770 PRINTTAB(0,2)PT$;"=":COLOUR1:PRIN
T"1 ";:COLOUR2:PRINT"2 ";:COLOUR3:PRINT"
3 "
780 PRINTTAB(0,4)" ":PRINT"
":VDU11,11
790 T=1
800 PRINTTAB(0,4);:INPUT AN$:IF AN$<>"
1" AND AN$<>"2" AND AN$<>"3" THEN PRINT"
No ";:VDU11:GOTO800
810 IF VAL(AN$)=W(I) THEN PRINT"Yes
":GOTO840
820 PRINT"No, try again":IF T=1 THEN V
DU11,11:T=2:GOTO800
830 IF T=2 THEN VDU11:PRINT"Answer = "
;W(I);" ":A$=INKEY$(500):GOTO840
840 ENDPROC
850 REM

```

PROFIT AND LOSS

```

13      Highest score 0      Score 1
      Quiz game 1 - Profit and Loss

Hello, what's your name ?GENEVIEVE
Here are some problems GENEVIEVE

If a shopkeeper buys chocolates for 26
pence and sells them for 30 pence, his
profit as a percentage of his cost price
= 15

Yes, congratulations

More? (Y/N)

```

How much do you know about profit and loss?

Do you know how much you would make if you sold your car, or even your bike?

How to play

You will be given five minutes to answer as many questions as possible, and you may press P and RETURN for pass if you cannot work out an answer.

You will not be penalised for 'passes'.

At the end of five minutes, or sooner if you enter N for NO in answer to the question "do you want any more", your score sheet showing tries, correct answers and

average time per answer will appear. If you wish to proceed, then press Y and RETURN and the program will continue to ask you questions.

You can have two tries at each question if you wish. After the first attempt, you will be given a hint as to the correct answer. If your second answer is wrong, you will be told the solution and how it was obtained.

If you cannot work out an answer then press ? and RETURN and your computer will turn into a calculator and you can then use the normal mathematical symbols on the keyboard. To clear the calculator from the screen press AC and RETURN. For the calculator's answer press = and RETURN. To return to the main game press ? and RETURN. Always remember to press RETURN after each required response.

Programming hints

This program includes a useful procedure that enables a programmer to fit a sentence, or string, of any length onto a screen of any size, without splitting a word between one screen line and another, i.e. wraparound. This procedure is called PROC_FITIN and is found on line 530.

Assign the string, or sentence in quotes, to variable FL\$. B holds the number of characters on the screen in the case of Mode 4 it is 40. On exit the field FL\$ contains the string, or sentence, re-formatting so no words are split between one 40 column line and another.

You may want to add some different types of problems on profit and loss. To do this, instead of W alternating between -1 and +1, it should be allowed to take a random

value between 0 and one more than the number of problem types you are going to add. The details of the problem must be put in the PROC_QUESTION procedure. Q\$ holds the question, H\$ the hint, A and A\$ the answer and L\$, M\$ and N\$ the answer and explanation.

```

10 REM QUIZ - PROFIT AND LOSS
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 4
40 DIM IP$(255)
50 S$=""
60 HC$=" Highest score ":HK$=" Sc
ore "
70 COLOUR1:COLOUR128:PRINT' ' ' " Q
uiz game 1 - Profit and Loss"
80 PRINT' '
90 INPUT"Hello, what's your name ",NA
M$:PRINT'"Here are some problems ";:IF N
AM$<>"NO SOUND" THEN PRINTNAM$ ELSE PRIN
T
100 TIME=0:P=0:MAX=0:C=0:W=1
110 T=1:I$=""
120 P=P+1
130 PROC_QUESTION
140 PRINT' '
150 PRINT:PRINTQ$;" = ";
160 PROC_KEYIN:PRINT
170 IF I$="?" THEN PROC_CALC
180 IF ABS(VAL(I$)-A)<=X AND I$<>" " T
HEN 200
190 GOTO220
200 PRINT"YES, congratulations":C=C+1
:PRINT:IF NAM$="NO SOUND" THEN GOTO250
210 SOUND 1,-10,12,10:SOUND1,-10,20,10
:SOUND1,-10,28,10:SOUND1,-10,32,20:SOUND
1,-10,14,20:GOTO250
220 IF T=1 THEN PRINT'"No, "H$", try a
gain.":T=2:RB$=INKEY$(3000):CLS:PRINT' ':
GOTO150
230 PRINT'"Sorry, the answer is = "'L
$' 'M$
240 PRINT'N$
250 IF TIME>= 30000 THEN PROC_SCORE
260 PRINT'"More? (Y/N)";:PROC_KEYIN:PR
INT
270 IF I$<>"Y" AND I$<>"N" AND I$<>" "
AND I$<>"YES" AND I$<>"NO" THEN 260
280 IF I$="Y" OR I$="YES" OR I$=" " THE
N T=1:CLS:GOTO110
290 PROC_SCORE
300 GOTO900
310 REM
320 DEFPROC_QUESTION
330 L$="":M$="":N$="":B=40:X=1
340 E=RND(9):F=INT(RND(1)*90+10):E$=ST
R$(E):F$=STR$(F)
350 W=-W
360 IF W=1 THEN 430
370 FL$="If a shopkeeper buys chocolat
es for "+F$+" pence and sells them for "
+STR$(E+F)+" pence, his profit as a perc
entage of his cost price"
380 PROC_FITIN:Q$=FL$
390 H$="Percentage profit ="

```

```

        ((sell - cost) / cost) x 100 %
        where sell = selling price
        and cost = cost price"
400 A=INT(E/F*100):A$=STR$(A)
410 L$=A$+" %"
420 M$="as (" +STR$(E+F)+" - "+F$+" ) / "
+F$+" x 100 % = "+STR$(INT(E/F*100))
430 IF W=-1 THEN 520
440 V=E*100:V$=STR$(V)
450 FL$="A dealer wishes to make a pro
fit of "+F$+"%. If the car cost him "+V
$+" then his selling price must be"
460 PROC_FITIN:Q$=FL$
470 H$="Find the profit in money terms
. Then add it to the cost price"
480 A=INT(V+(F*E)):A$=STR$(A):R1$=STR$
(INT(F*E))
490 L$=" "+A$
500 M$="as profit = (" +F$+" /100) x "+V
$+" = "+R1$
510 N$="so selling price = "+V$+" + "+
R1$+" = "+A$
520 ENDPROC
530 DEFPROC_FITIN
540 LF=LEN(FL$):IF LF<= B THEN 620
550 FORI=1TOINT(LF/40)
560 EL=B*I
570 IF MID$(FL$,EL,1)=" " THEN 610
580 IF MID$(FL$,EL+1,1)=" " THEN FL$
=LEFT$(FL$,EL)+RIGHT$(FL$,LF-EL-1):LF=LF
-1:GOTO610
590 FORK=1TO39:IF MID$(FL$,EL-K,1)="
" THEN FL$=LEFT$(FL$,EL-K)+LEFT$(S$,K)+
RIGHT$(FL$,LF-EL+K):LF=LF+K:GOTO610
600 NEXTK
610 NEXTI
620 ENDPROC
630 END
640 DEFPROC_CALC
650 VP=VPOS:PRINTTAB(0,22)" C
calculator Mode "TAB(0,22)
660 B$=""
670 I$=GET$:PRINTI$;:B$=B$+I$:IFI$<>"=
"ANDI$<>"?"ANDB$<>"AC"THEN670
680 IFB$=""?"ORI$=""?"THEN720
690 IFB$="AC" THEN PRINTTAB(0,23)S$;TA
B(0,22):B$="" :GOTO660
700 IFLEN(B$)<=1 THEN 660
710 PRINTEVAL LEFT$(B$,LEN(B$)-1);TAB(
0,22):GOTO660
720 PRINTTAB(0,22);S$;S$;TAB(0,VP-1):P
ROC_KEYIN:PRINT
730 ENDPROC
740 DEFPROC_KEYIN
750 IX=1:VP=VPOS:HP=POS
760 IP$(IX)=INKEY$(10):IF IP$(IX)=" " T
HEN COLOUR0:COLOUR129:PRINTTAB(0,1);INT(
TIME/100);" ";HC$;MAX;HK$;C:COLOUR1:
COLOUR128:GOTO760
770 PRINTTAB(IX+HP,VP);IP$(IX);:IX=IX+
1:IP$(IX)=GET$:IF IP$(IX)<>CHR$(13) THEN
770
780 I$="" :FORI=1TOIX-1:I$=I$+IP$(I):NE
XTI
790 ENDPROC
800 DEFPROC_SCORE
810 CLS
820 PRINT''
830 PRINT'"Number of problems complete
d = ";P

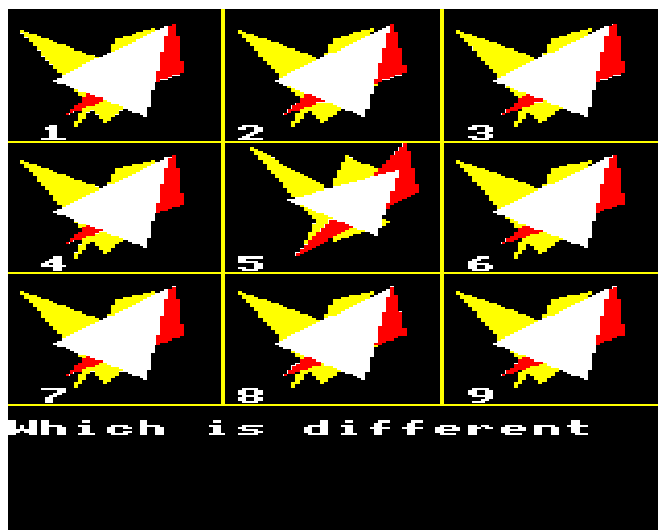
```

```

      840 PRINT'"Number correct = ";C
      850 TM=INT(TIME/100):PRINT'"Time taken
in seconds = ";TM
      860 IF C<>0 THEN PRINT'"Time per probl
em = ";INT(TM/C)
      870 IF C>MAX THEN MAX=C
      880 TIME=0:P=0:C=0
      890 ENDPROC
      900 REM

```


ODD ONE OUT



Nine patterns are displayed on the screen and you are given only a few seconds to compare them and identify the odd one out.

A score sheet will be displayed, showing the number of puzzles completed, number correct and the time and average time taken.

How to play

Each of the patterns on the screen will be identified by a number, and you must key in the appropriate number as your guess.

If you get the answer wrong, you will be told the correct

answer, to the accompaniment of a rather low pitched little tune. Get it right, however, and you will hear a pleasant little tune.

After each attempt you will be asked if you wish more (Y for Yes) or wish to stop (N for No).

Remember to press RETURN.

Programming hints

The filled triangles are drawn by MOVEing to one point, then MOVEing to another point, then drawing a line to a third point using PLOT 85, and this fills in the space between the first point and the line between the second and third points. This is done in the procedure PROC_PATTERN. The pattern is transferred across and down the screen by adding the appropriate XD or YD or both, depending on the position of the screen.

You could put some more triangles into each pattern by increasing the maximum value of VL in procedure PROC_PATTERN. You would also have to reDIMension arrays X, Y and C in line 30. Also the maximum value of I should be increased in line 230.

```

10  REM  ODD  ONE  OUT
20  REM  COPYRIGHT  (C)  G.LUDINSKI  1983
30  DIM  X(4,3),Y(4,3),C(4)
40  MODE 5
50  NU=0:CR=0
60  TIME=0
70  CLS
80  NU=NU+1
90  PT=0
100 REM
110 REM  DRAW  FRAMEWORK
120 REM
130 GCOL0,2:COLOUR3
140 MOVE426,255:DRAW426,1023
150 MOVE852,255:DRAW852,1023
160 MOVE0,255:DRAW1279,255
170 MOVE0,510:DRAW1279,510
180 MOVE0,765:DRAW1279,765
190 REM
200 REM  GENERATE  SHAPES
210 REM
220 W=INT(RND(1)*6+1)

```

```

2300 FORI=1TO4
2400 C(I)=INT(RND(1)*3+1)
2500 FORJ=1TO3
2600 X(I,J)=INT(RND(1)*370+30)
2700 Y(I,J)=INT(RND(1)*200+30)
2800 NEXTJ
2900 NEXTI
3000 REM
3100 REM DRAW PATTERNS
3200 REM
3300 FORJ=765TO255STEP-255
3400 FORI=0TO852STEP426
3500 PROC_PATTERN(I,J)
3600 NEXTI
3700 NEXTJ
3800 REM
3900 REM QUESTION
4000 REM
4100 PRINTTAB(0,25)"Which is different
";
4200 VDU19,1,1;0;19,2,3;0;19,3,7;0;:I$=
"";I=0
4300 I$=INKEY$(0):IFI$="" AND I<800 THE
N I=I+1:GOTO430
4400 IF I$<>" " AND (I$<STR$(1) OR I$>ST
R$(9)) THEN GOTO430
4500 IF VAL(I$)=W THEN PRINT'"Yes, you'
re right":SOUND1,-15,101,30:CR=CR+1:GOTO
4700
4600 PRINT'"No, ";W;" is different":SOU
ND1,-15,73,10:SOUND1,-15,69,5
4700 PRINT'"More (Y/N)";
4800 INPUTR$
4900 IF R$<>"N" THEN GOTO70
5000 REM
5100 REM SCORE SHEET
5200 REM
5300 CLS
5400 PRINT:PRINT" Odd one out"
5500 FOR I=1 TO 9:PRINT:NEXT I
5600 PRINT:PRINT"Problems completed = "
;NU
5700 TM=INT(TIME/100)
5800 PRINT:PRINT"Problems correct = ";C
R
5900 PRINT:PRINT"Time taken = ";TM:PRIN
T"secs"
6000 IF CR<>0 THEN PRINT'"Time/problem
= ";INT(TM/CR);"secs"
6100 GOTO 750
6200 REM
6300 DEFPROC_PATTERN(XD,YD)
6400 PT=PT+1
6500 PRINTTAB((20*XD)/1279)+1,31-(32*Y
D)/1023;PT
6600 H1=0:H2=0:H3=0
6700 IF PT=W THEN H1=INT(RND(1)*25+10):
H2=INT(RND(1)*25+10):H3=INT(RND(1)*25+10
)
6800 FORL=1TO4
6900 GCOL0,C(L)
7000 MOVE(X(L,1)+XD+H1),(Y(L,1)+YD+H1
)
7100 MOVE(X(L,2)+XD+H2),(Y(L,2)+YD+H1
)
7200 PLOT 85,(X(L,3)+XD+H3),(Y(L,3)+Y
D-H1)
7300 NEXTL
7400 ENDPROC
7500 REM END

```


DECISIVE HERO



The wicked Baron has captured your love, Loretta, and tied her to the railroad track. Only you can save her from a grisly fate, but you will have to think fast and act even quicker. Wherever the Baron has taken her, you can be sure that it will be in a town far away from you, and you must work out the three possibilities, key in your answer and stop the train.

How to play

The names of eight towns will be displayed on the screen with letters A to H. Against each of the letters you will be shown a combination of numbers.

You must decide which three series of numbers are highest, type them in and stop the train.

Example: from the screen shown above you will see that the correct answer is C, G and H. You don't have to key in your answers in alphabetical order, just key them in correctly and quickly. If you stop the train or, unfortunately for Loretta, the train reaches the end of the screen, you will be asked if you wish to continue or end the program.

Press C and RETURN to continue, or E and RETURN to end the game.

Skill rating

When the game ends, a score sheet will be displayed showing your total, giving a qualitative rating and an IQ level of your decisiveness. This is not a true IQ level as intelligence is made up of reasoning ability, memory etc. but this result will be an indication of your IQ decisiveness level.

Classifications below Fair are omitted, as I know that if you are using this book you are above average!

Programming hints

The number of carriages pulled by the engine can be increased by adding more sets of a space and CA\$ to line 250.

CA\$ is the shape for the carriage top.

You must also add the same number of sets of a space and CR\$ in line 260.

CR\$ is the shape for the carriage bottom.

Count the number of characters you have added and add the same number of spaces to A\$(1) in line 240.

Remember also to alter the TR\$ in line 960 as this effects the backspace characters required.

Before you decide to increase the number of carriages, remember that the more carriages there are, the closer the head of the train is to Loretta.

After thinking about this, you may decide to reduce the number of carriages and thereby increase your thinking time.

```

10 REM DECISIVE HERO
20 REM COPYRIGHT (C) G.LUDINSKI
30 MODE 4
40 DIM A$(3), X(12), Y(12), N(3, 8), S(8), T
$(8), TW(8):CLS
50 CLS
60 S$="
"
70 REM
80 REM Cursor Movement And Shape Defi
nitions
90 REM
100 VDU23,224,255,255,255,255,255,255,
255,255
110 VDU23,225,0,0,0,255,255,255,255,25
5
120 VDU23,226,0,0,0,255,255,0,0,0
130 VDU23,227,255,255,255,255,255,0,0,
0
140 VDU23,228,0,0,0,0,0,255,255,255
150 VDU23,229,240,240,240,240,240,255,
255,255
160 VDU 19,0,4,0,0,0
170 CB$=CHR$(8):CU$=CHR$(11)
180 GO$=CHR$(224):G1$=CHR$(225):G2$=CH
R$(226):G3$=CHR$(227):CA$=G1$+G2$+G1$:CR
$=GO$+G3$+GO$
190 D$=" "+CHR$(175)
200 REM
210 REM Store Town Names And Train Sha
pe
220 REM
230 RESTORE:FOR I=1 TO 8:READ T$(I):NE
XT I
240 A$(1)=LEFT$(S$,8)+CHR$(132)+CHR$(1
32)+"
"
250 A$(2)=" "+CA$+" "+CA$+" "+GO$+CHR$
(132)+CHR$(133)
260 A$(3)=" "+CR$+" "+CR$+" "+CR$
270 REM
280 REM Store Positions Of Smoke

```

```

290 REM
300 FOR I=1 TO 2
310   X(I)=12-I
320   Y(I)=2-I
330 NEXT I
340 FOR I=3 TO 12
350   Y(I)=2
360   X(I)=13-I
370 NEXT I
380 TE=0:ER=0:CR=0
390 REM
400 REM The Action Starts Here
410 REM
420 CLS
430 TE=TE+1
440 REM
450 REM Store Lists Of Numbers And The
i r Sums
460 REM
470 FOR K=1 TO 7: S(K)=0: NEXT K
480 FOR J=1 TO 8
490   FOR I=1 TO 3
500     N(I,J)=INT(RND(1)*9+1)
510     S(J)=S(J)+N(I,J)
520   NEXT I
530 NEXT J
540 FOR I=1 TO 8: TW(I)=I: NEXT I
550 REM
560 REM Bubble Sort Of The Sums Of Eac
h List
570 REM
580 FOR J=1 TO 6
590   FOR I=1 TO 7
600     IF S(I)<S(I+1) THEN TP=S(I):S(I+1)=S(I+1):S(I)=TP:TW(I+1)=TP
610   NEXT I
620 NEXT J
630 REM
640 REM Check For Any Duplicates
650 REM
660 TWN=3:FOR I=4 TO 8
670   IF S(I)=S(1) OR S(I)=S(2) OR S(I)=S(3) THEN TWN=I
680 NEXT I
690 REM
700 REM Display Problem
710 REM
720 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
T
730 PRINT "-----@-----"
740 PRINT "' ' '
750 PRINT:PRINT:PRINT
760 PRINT LEFT$(S$,10);LEFT$(T$(J),1)
; " ";RIGHT$(T$(J),9); " ";
770 FOR I=1 TO 3
780   PRINT STR$(N(I,J)); " ";
790 NEXT I
800 PRINT:PRINT
810 NEXT J
820 PRINT
830 CR1=0
840 VDU30:PROCTRAIN
850 SOUND1,-10,32,10:SOUND1,-10,14,10
860 *FX 15,1
870 PRINT TAB(0,28) "Press C to continue
or E to end program":INPUT C$
880 IF C$="C" THEN GOTO 420
890 GOTO 420

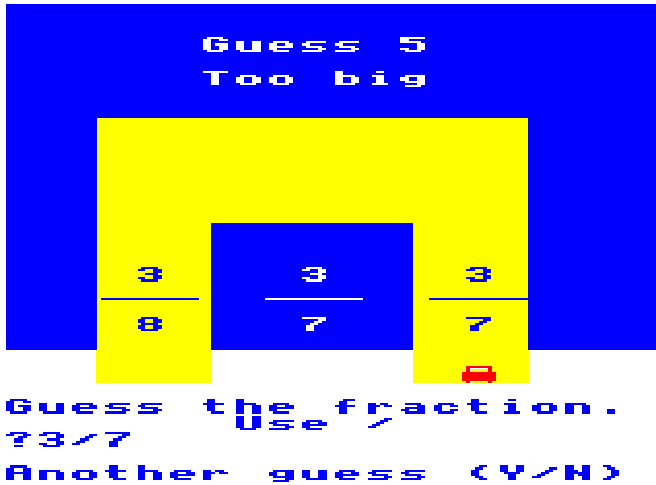
```

```

900 GOTO 1400
910 REM
920 DEFPROC SMOKE
930 PRINTTAB(X(I)+L,Y(I));G$
940 ENDPROC
950 DEFPROC TRAIN
960 TR$=A$(1)+CHR$(10)+STRING$(12,CHR$(
(8))+A$(2)+CHR$(10)+STRING$(12,CHR$(8))+
A$(3)
970 FOR L=1 TO 24
980 I$=INKEY$(0)
990 IF I$="" THEN 1040
1000 FOR J=1 TO TWN
1010 IF I$=CHR$(64+TW(J)) THEN CR1=
CR1+1: SOUND 1,-15,81,10: GOTO 1040
1020 NEXT J
1030 ER=ER+1
1040 IF CR1=3 THEN CR=CR+1: GOTO 1240
1050 PRINTTAB(L,3) " " TR$;
1060 SOUND 0,-15,100,2
1070 I=1
1080 G$=D$
1090 PROC SMOKE
1100 I=I+1
1110 G$=D$
1120 PROC SMOKE
1130 I=I-1
1140 PROC SMOKE
1150 I=I+1
1160 PROC SMOKE
1170 G$=D$
1180 IF I<12 THEN 1100
1190 G$=" "
1200 I=9
1210 PROC SMOKE
1220 G$=" "+CHR$(175)
1230 NEXT L
1240 ENDPROC
1250 DEFPROC IQ
1260 CLS
1270 PRINT:PRINT "Number of tests comple
ted = ";TE
1280 PRINT:PRINT "Number of tests correc
t = ";CR
1290 PRINT:PRINT "Number of incorrect an
swers = ";CR
1300 SC=INT(((ER*3)+((TE-CR)*10))/TE)
1310 PRINT
1320 IF SC<5 THEN PRINT "This is classed
as SUPERIOR (Upper 10%):GOTO 1350
1330 IF SC<7 THEN PRINT "This is classed
as GOOD (Upper 30%):GOTO 1350
1340 IF SC<9 THEN PRINT "This is classed
as FAIR (Upper 60%)"
1350 IF SC=0 THEN IQU=150:GOTO 1370
1360 IQU=INT(760/SC):IF IQU>150 THEN IQ
U=150
1370 PRINT "'Your I.Q. level (decisivene
ss) = ";IQU
1380 ENDPROC
1390 DATA "Aldershot ","Bracknell ","Ca
mberley ","Dorking ","Egham
nham ","Guildford ","Henley "
1400 REM END

```


FRACTION CAR CHASE



We might have named this program 'Duel' after the film of the same name as, like the hero of the film, you are being chased by a juggernaut driver.

As you turn right, the juggernaut turns right; turn left and it still follows you.

Coming up in the near distance is an archway. You must escape through the arch before the lumbering truck rolls over you.

Your only answer is to work out how far across the road the centre of the arch is. Guess wrongly and you hit the arch damaging your. Too many wrong guesses and your car will be immobilised leaving you the defenceless victim of the fast approaching juggernaut.

How to play

The computer will think of a number whose numerator (top half) and denominator (bottom half) are both ten or less. You must guess the correct fraction and enter it in using the / symbol (eg 2/3) and RETURN. If your guess is too big, or small, you will be told. The guess closest to the correct answer, will be displayed on the arch. The lower guess will be shown on the left hand pillar and the higher guess, closest to the correct answer, will be shown on the right hand pillar.

If your answer is displayed on the arch then you know that you are almost correct. You have nine lives.

This is more difficult than it sounds, after all do you know which is the larger, $\frac{3}{8}$ or $\frac{4}{9}$? You will be amazed at what you find out about fractions. A hint is that to make a fraction bigger, increase its numerator (top half) or reduce its denominator (bottom half) or both. Do the opposite to make a fraction smaller.

Programming hints

To make the game easier, reduce the range of fractions allowed. This is done by reducing the tens in line 230. To make it more difficult you may increase these numbers to maximum values of 99 each.

If you want to allow more guesses, increase the 9 in line 280.

```

10 REM FRACTION CAR CHASE
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 5
40 VDU 19,0,4,0,0,0
50 CLS
60 GOTO 130

```

```

70 DEF FNB(N$)
80 TF=0
90 FOR L=0 TO 7
100 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
110 NEXT L
120 =TF
130 VDU 23,224,FNB("011111110"),FNB("01
000010"),FNB("01000010"),255,255,255,255
,FNB("01000010")
140 COLOUR128:CLS:MAX=1:MIN=0:CA$=CHR$(
(128):M1$="0":M2$="":X1$="1":X2$=""
150 REM
160 REM DRAW ARCH
170 REM
180 GCOL 0,3:PROC_BLOCK(0,0,1280,350)
190 GCOL 0,2:PROC_BLOCK(190,290,210,51
0):PROC_BLOCK(800,290,220,510):PROC_BLOC
K(190,600,830,200)
200 REM
210 REM THINK OF FRACTION
220 REM
230 F=RND(10):G=RND(10)
240 PROC_REDUCE
250 IF F=G OR F/G=INT(F/G) OR G/F=INT(
G/F) THEN 230
260 IF G<F THEN H=G:G=F:F=H
270 COLOUR131:COLOUR1:PRINTTAB(9,23)CA
$
280 FORT=1TO9
290 COLOUR131:COLOUR0:PRINTTAB(0,24)
STRING$(120,"");
300 PRINTTAB(0,24)"Guess the fractio
n.
310 INPUTI$:IF I$="" THEN 310
320 REM
330 REM CHECK ENTRY
340 REM
350 FORI=1TOLEN(I$)
360 C$=MID$(I$,I,1)
370 IF(C$<"0" OR C$>"9") AND C$<>"
/" THEN GOTO 400
380 IF C$="/" AND I>1 AND LEN(I$)>
2 THEN NM$=LEFT$(I$,I-1):DN$=RIGHT$(I$,L
EN(I$)-I):GOTO410
390 NEXTI
400 VDU11:SOUND1,-15,50,10:GOTO310
410 IFLEN(NM$)>2 OR LEN(DN$)>2 THEN
GOTO 400
420 REM
430 REM DISPLAY FRACTION BETWEEN ARCH
440 REM
450 COLOUR128:COLOUR3:PRINTTAB(9,16)
;"":PRINTTAB(9,16);NM$:PRINTTAB(8,17
);"---":PRINTTAB(9,19);"":PRINTTAB(9
,19);DN$
460 COLOUR128:COLOUR3:PRINTTAB(6,2)"
Guess ";T
470 IF NM$=STR$(F) AND DN$=STR$(G) T
HEN PRINT""That's right":PROC_CAR("
",CA$,""):GOTO600
480 IF NM$="0" OR DN$="0" THEN 400
490 VI=EVAL(I$)
500 COLOUR131:PRINTTAB(9,23)"":COLO
UR128
510 IF VI < F/G THEN PRINTTAB(6,4)"T
oo small":PROC_CAR(CA$,"","")
520 IF VI > F/G THEN PRINTTAB(6,4)"T
oo big":PROC_CAR("","","",CA$)
530 IF VI < MAX AND VI > F/G THEN MA
X=VI:X1$=NM$:X2$=DN$

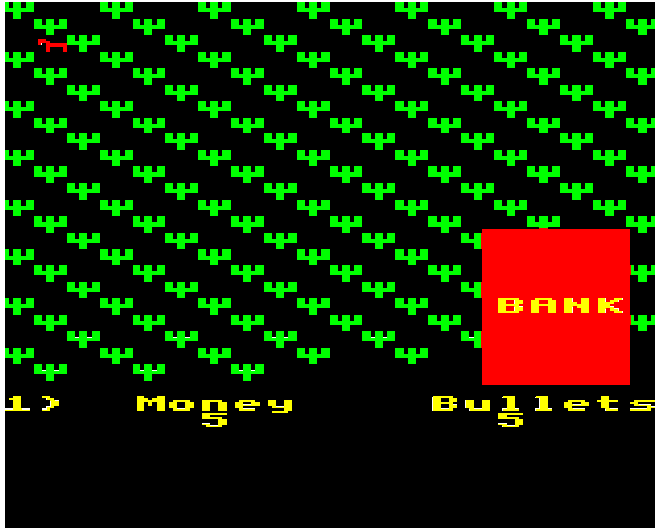
```

```

540 IF VI MIN AND VI < F/G THEN MIN=
VI:M1$=NM$:M2$=DN$
550 COLOUR0:COLOUR130:PRINTTAB(4,16)
" TAB(4,16)M1$
560 IF M2$<>" " THEN PRINTTAB(3,17)"
---TAB(4,19)" TAB(4,19)M2$
570 PRINTTAB(14,16)" TAB(14,16)X1$
580 IF X2$<>" " THEN PRINTTAB(13,17)
"---TAB(14,19)" TAB(14,19)X2$
590 GOTO610
600 COLOUR0:COLOUR131:PRINTTAB(0,24)
;STRING$(120," "):PRINTTAB(0,24)"You esc
aped - Phew!":GOTO700
610 COLOUR131:PRINTTAB(0,28)"Another
guess (Y/N) ";
620 INPUT R$
630 IF R$="N" THEN GOTO 710
640 NEXTT
650 REM
660 REM END OF GUESSES
670 REM
680 COLOUR0:COLOUR131:PRINTTAB(0,24);S
TRING$(120," "):PRINTTAB(0,24)"The judge
rnaut closes in"
690 PRINT'"The fraction is " ;F;" / "
;G
700 OSCLI("FX 21"):PRINT'"More (Y/N) ";
710 INPUT R$:IF R$ <> "N" THEN GOTO 14
0
720 GOTO 850
730 STOP
740 DEFPROC_BLOCK(X,Y,W,H)
750 MOVEX,Y:MOVEX+W,Y
760 PLOT 85,X,Y+H
770 PLOT 85,X+W,Y+H
780 ENDPROC
790 DEFPROC_CAR(P1$,P2$,P3$)
800 COLOUR130:COLOUR1:PRINTTAB(4,22)P1
$;TAB(14,22)P3$;:COLOUR131:PRINTTAB(9,22
)P2$
810 ENDPROC
820 DEFPROC_REDUCE
830 FORI=2TO9
840 IF F/I = INT(F/I) AND G/I = INT(
G/I) THEN F=F/I:G=G/I:GOTO820
850 NEXTI
860 ENDPROC
870 END

```

WESTERN ADVENTURE GAME



Your rough, tough and ready desparado colleagues have fled into the scrubland, dropping their guns and the loot.

Well we all know that a man, or a Calamity Jane, has got to do what ever it is. So, you are on your own outside the bank and you have to make it to the horses, which some idiot left on the outskirts of the town.

On the way you can collect money and guns with bullets and then decide, if you run into the Sheriff's posse, whether to bribe or blast your way to freedom. Obviously your aim is to reach the horses with some bullets and some money.

We are not advocating here that crime pays - that is up to you.

How to play

Use the ARROW keys to make your moves.

Your footsteps will appear on the screen as you move toward the horse in the top left hand corner of the screen.

Your progress will be recorded on the bottom of the screen, and you will, in your progress, be told that you have run into the posse, and you will then be asked if you intend to shoot or bribe your way out.

Key in SHOOT or BRIBE

Should you run out of bullets, I'm afraid that a lynching is your fate, as the posse were playing poker when you robbed the bank, and the Sheriff had a Royal Flush.

To exit from the game press the BREAK key.

Programming hints

You can increase the number of events in the adventure by allowing W on line 450, to be larger.

A procedure describing the event, and the effect of it, on the money and bullets can be written.

The new procedures can be listed after line 490.

Remember that

BU is number of bullets
 MO is money
 X is the random amount to increase/
 decrease

```

10 REM WESTERN ADVENTURE GAME
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 *KEY 10 "OLD|M"
40 MODE 5
50 XO=13:YO=22
60 VDU 19,3,2,0,0,0
70 COLOUR 128:COLOUR 2
80 CLS
90 GCOL 0,1
100 REM
110 REM BINARY TO DECIMAL CONVERSION F
OR USER DEFINED GRAPHICS
120 REM
130 DEF FNH(NS)=VAL(RIGHT$(NS,1))+2*VA
L(MID$(NS,7,1))+4*VAL(MID$(NS,6,1))+8*VA
L(MID$(NS,5,1))+16*VAL(MID$(NS,4,1))+32*
VAL(MID$(NS,3,1))+64*VAL(MID$(NS,2,1))+1
28*VAL(LEFT$(NS,1))
140 REM
150 REM CACTUS
160 REM
170 VDU 23,225,FNH("11011011"),FNH("11
011011"),FNH("11011011"),255,255,FNH("00
011000"),FNH("00011000"),FNH("00011000")
180 COLOUR3:FOR I=1 TO 150:PRINT CHR$(225)
;" ";:NEXT I:COLOUR 2
190 REM
200 REM DRAW BANK
210 REM
220 PROC_BLOCK(940,280,279,300)
230 COLOUR 129:PRINT TAB(15,18)"BANK":CO
LOUR 128
240 REM
250 REM HORSE
260 REM
270 VDU 23,224,0,0,FNH("01100000"),FNH(
"01110000"),FNH("01011111"),FNH("0001111
1"),FNH("00010001"),FNH("00010001")
280 COLOUR 1:PRINT TAB(1,2);CHR$(129):CO
LOUR 2
290 REM
300 REM WRITE MESSAGES
310 REM
320 BU=5:MO=5:DI=1
330 PROC_BLANK:PRINT TAB(0,24);DI;" ";
" Money      Bullets" TAB(6,25);MO;"
";BU
340 IF BU<=0 THEN PRINT "You are shot.
You have travelled ";DI;" yds":GOTO 78
0
350 X=INT(RND(1)*5+2)
360 *FX 4,1
370 TU$=GET$
380 IF TU$<CHR$(136) OR TU$>CHR$(139)
THEN 370
390 IF TU$=CHR$(136) THEN XO=XO-1
400 IF TU$=CHR$(137) THEN XO=XO+1
410 IF TU$=CHR$(138) THEN YO=YO+1
420 IF TU$=CHR$(139) THEN YO=YO-1

```

```

430 PRINTTAB(X0,Y0) "*" ;
440 DI=DI+1
450 W=INT(RND(1)*4+1)
460 COLOUR1
470 IF W=1 THEN PROC_POSSE
480 IF W=2 THEN PROC_BULLETS
490 IF W=3 THEN PROC_MONEY
500 COLOUR2
510 GOTO330
520 REM
530 DEFPROC_POSSE:PRINTTAB(0,26)"You meet one of the sheriff's posse. Do you shoot or bribe?"
540 INPUTI$
550 IF I$<>"SHOOT" AND I$<>"shoot" AND I$<>"BRIBE" AND I$<>"bribe" THEN VDU11:GOTO540
560 IF I$="SHOOT" OR I$="shoot" THEN BU=BU-X
570 IF I$="BRIBE" OR I$="bribe" THEN MO=MO-X
580 IF BU<0 THEN BU=0
590 IF MO<0 THEN MO=0
600 ENDPROC
610 DEFPROC_BULLETS:PRINTTAB(0,26)"You find ";X;" bullets that your gang left behind"
620 BU=BU+X
630 I$=GET$
640 ENDPROC
650 DEFPROC_MONEY:PRINTTAB(0,26)"You find ";X;" bags of money that your gang left behind"
660 MO=MO+X
670 I$=GET$
680 ENDPROC
690 DEFPROC_BLOCK(X,Y,W,H)
700 MOVE X,Y:MOVE X+W,Y
710 PLOT 85,X,Y+H
720 PLOT 85,X+W,Y+H
730 ENDPROC
740 DEFPROC_BLANK
750 PRINTTAB(1,24)SPC(140);
760 ENDPROC
770 END
780 REM END

```


DETECTIVE



Could you solve the cases and survive the perils of being a detective. Find out by playing this game.

Firstly you are briefed on the correct number-plates for the cars and trucks you are likely to see. Then you are stationed near a main road, watching cars and lorries travel past.

You are looking for a stolen vehicle whose plates have been changed. When you see a car or lorry you suspect, you must call up by radio the two squad cars in the area, and tell them to set up a road-block.

If you time it right, the suspected vehicle, which veers off the road when it sees you are interested, will be caught. If your suspected vehicle was stolen and you catch it, the

driver comes quietly and your score increases. If however you catch a vehicle which has not been stolen, the driver dresses you down, and your score decreases. If you do not catch the suspected vehicle, then you are told whether your suspicions were correct but your score is unchanged.

How to play

Press C when you have read which cars and lorries have which number plates. You will then see cars and lorries travel by with the number plates they have attached to them displayed below the road. When you see a vehicle which you suspect has got the wrong number plate, then press A to get the white car at the top of the screen to set up a road block, or Z to have the other white car set up a trap. You may do this continuously, by trying to set up the road block just as the suspected vehicle passes by.

If you catch the vehicle you will hear police-car sirens as the other squad cars approach. Then you are told the result. Press RETURN to play again.

Programming hints

The cars and lorries are made up of two user-defined characters next to each other. They are animated, or made to travel along the road, in line 450. They are animated by PRINTing them in successive positions along the road, preceded by a space to erase the back half of the previously drawn vehicle.

You can make the game more difficult by making the vehicles whizz past faster. To do this reduce the value of K in line 400.

```

10 REM DETECTIVE
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 5
40 DIM V$(6),C$(6),P$(6),VM$(6)
50 B=128:BL=0:RD=1:GR=2:WH=3:SC=0
60 VDU 19,GR,2,0,0,0
70 GOTO 200
80 REM
90 REM U.D.G. CALCULATOR
100 REM REM
110 DEF FNB(N$)
120 TF=0
130 FOR L=0 TO 7
140 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
150 NEXT L
160 =TF
170 REM
180 REM CAR AND LORRY SHAPES
190 REM
200 VDU 23,224,FNB("00001111"),FNB("00
001000"),FNB("00001000"),255,255,255,255
,FNB("00001100")
210 VDU 23,225,FNB("11110000"),FNB("00
010000"),FNB("00010000"),255,255,255,255
,FNB("0000110")
220 VDU 23,226,FNB("11000000"),FNB("11
111000"),FNB("11001000"),FNB("11001111")
,255,255,255,FNB("11001110")
230 VDU 23,227,255,255,255,255,255,255
,255,FNB("01110001")
240 CA$=CHR$(224)+CHR$(225):LO$=CHR$(2
27)+CHR$(226)
250 C(1)=WH:P$(1)=" "+CA$:C(2)=RD:P$(2
)=" "+CA$:C(3)=2:P$(3)=" "+CA$
260 FOR I=1 TO 3:C(I+3)=C(I):P$(I+3)=" "+
LO$:NEXT I
270 PROC_START
280 REM
290 REM DRAW FIELDS,ROAD,POLICE CARS
300 REM
310 COLOUR B+BL:COLOUR WH:CLS
320 GCOL 0,GR:PROC_BLOCK(0,300,1280,60
)
330 GCOL 0,BL:PROC_BLOCK(0,300,1280,60
)
340 PROC_MIX
350 COLOUR B+GR:COLOUR WH:PRINT TAB(0,
7);CA$;TAB(0,14);CA$:COLOUR BL:PRINT TAB
(0,30);CA$;TAB(10,30)"Score ";SC
360 COLOUR WH:PRINT TAB(0,27)"Call up
cars A or Z "
370 REM
380 REM LETS CARS TRAVEL ALONG ROAD
390 REM
400 COLOUR B+BL:K=20
410 J=RND(6)
420 FOR I=0 TO 17
430 IF I=0 THEN COLOUR C(J):PRINT TA
B(I,21);P$(J):COLOUR B+BL:COLOUR WH:PRIN
T TAB(6,24);VM$(J):FOR D=1 TO 5000:NEXT
D
440 COLOUR C(J)
450 I$=INKEY$(0):IF I$="" THEN PRINT
TAB(I,21);P$(J):GOTO 480
460 IF I$="H" THEN PROC_START:GOTO 31
0
470 GOTO 510
480 FOR D=1 TO K:NEXT D
490 NEXT I:COLOUR 0:PRINT TAB(17,21) " "
;

```

```

500 COLOUR WH:GOTO 410
510 PROC_CHASE
520 REM
530 REM FINAL MESSAGE & POLICE SIREN
540 REM
550 COLOUR BL
560 IF EN=1 AND (VN$=VM$(A) OR VN$=VM$(
(BB)) THEN SC=SC+1:PRINTTAB(0,27)"It's a
fair cop, guv.":GOTO 600
570 IF EN=1 THEN PRINTTAB(0,27)"I'll s
ue you, fool!":SC=SC-1:GOTO 600
580 IF VN$=VM$(A) OR VN$=VM$(BB) THEN
PRINTTAB(0,27)"Stolen car has gone ":GOT
O 600
590 PRINTTAB(0,27)"Chasing wrong car
"
600 *FX15,0
610 FOR I=1 TO 4:SOUND 1,-15,109,10:SO
UND 1,-15,101,10:NEXT
620 PRINTTAB(0,30)"Press RETURN
":INPUT RB$:GOTO 270
630 REM
640 DEFPROC_BLOCK(X,Y,W,H)
650 MOVEX,Y:MOVEX+W,Y
660 PLOT85,X,Y+H
670 PLOT85,X+W,Y+H
680 ENDPROC
690 DEFPROC_START
700 COLOUR B+BL:CLS
710 FORI=1 TO 6
720 V$(I)=CHR$(64+RND(26))+CHR$(64+R
ND(26))+CHR$(64+RND(26))+STR$(RND(10)-1)
+STR$(RND(10)-1)+STR$(RND(10)-1)+CHR$(64
+RND(26))
730 NEXT
740 FORI=1 TO 6 STEP 2
750 COLOURC(I):PRINTTAB(3,10+(4*INT(
(I-1)/2));P$(I);:COLOURC(I+1):PRINTTAB(
12,10+(4*INT((I-1)/2));P$(I+1)
760 COLOURC(I):PRINT'" ";V$(I);" "
;:COLOURC(I+1):PRINTV$(I+1):PRINT
770 NEXT I
780 COLOUR WH:PRINTTAB(0,27)"Press C t
o continue"
790 RB$=INKEY$(6000)
800 ENDPROC
810 DEFPROC_MIX
820 A=RND(6):BB=RND(6):IF BB=A THEN GO
TO 820
830 FOR I=1 TO 6
840 VM$(I)=V$(I)
850 NEXT I
860 WK$=VM$(A):VM$(A)=VM$(BB):VM$(BB)=
WK$
870 ENDPROC
880 DEFPROC_CHASE
890 COLOUR B+BL:PRINT TAB(0,21)SPC(19)
,"
900 COLOUR B+GR
910 CL=C(J):VT$=RIGHT$(P$(J),2):VN$=VM
$(J)
920 X=2:Y=19:GO=0:X1=X:Y1=Y:EN=0
930 COLOUR WH:PRINTTAB(0,7);CA$
940 PRINTTAB(0,14)CA$
950 I$=INKEY$(0)
960 IF I$="A" THEN PROC_ROAD(7)
970 IF I$="Z" THEN PROC_ROAD(14)
980 IF EN=1 THEN 1080
990 COLOUR CL:PRINT TAB(X,Y);VT$;
1000 PRINTTAB(X1,Y1)" ";

```

```

1010 Y1=Y:X1=X
1020 I$=INKEY$(0)
1030 IF I$="A" THEN PROC_ROAD(7)
1040 IF I$="Z" THEN PROC_ROAD(14)
1050 X=X+1:IF X>18 THEN X=2
1060 Y=Y-INT(2*RND(1)):IF Y<0 THEN Y=19
1070 GO=GO+1:IF GO<50 THEN GOTO 950
1080 ENDPROC
1090 DEFPROC_ROAD(L)
1100 COLOUR WH:PRINTTAB(0,L)CA$;"-----
-----"
1110 FOR D=1 TO 100:NEXT D
1120 PRINT TAB(0,L)CA$;SPC(18)
1130 IF Y=L THEN EN=1
1140 ENDPROC

```


ELEMENTARY STATISTICS


```

Here are some problems GORDON
29 Highest score 0 Score 0

Length of histogram rectangle of mark 3
where marks are 2,3,4,4,3,1,3,1,2 = 1
No, length is number of scores with mark
3, try again
Length of histogram rectangle of mark 3
where marks are 2,3,4,4,3,1,3,1,2 = 2
Sorry, the answer is =
3
as there are 3 scores of mark 3

More (Y/N)

```



Mark	Frequency
1	1
2	2
3	3
4	2

Could you draw a bar chart (histogram) of a given set of numbers?

Could you understand a bar chart which someone else had written? Here you can test your knowledge on bar charts and means by answering as many questions on these subjects as possible, in five minutes.

This program has an added feature which is that the bar chart will be drawn, by the computer, at the end of the problem. In addition an explanation will be provided.

How to play

You will be given five minutes to answer as many questions as possible, and you may press P and RETURN for pass if you cannot work out an answer.

You will not be penalised for 'passes'.

At the end of five minutes, or sooner, if you enter N for NO in answer to the question "do you want any more", your score sheet showing tries, correct answers and average time per answer will appear. If you wish to proceed then press Y and RETURN and the program will continue to ask you questions.

You can have two tries at each question if you wish. After the first attempt you will be given a hint as to the correct answer. If your second answer is wrong you will be told the solution and how it was obtained.

If you cannot work out an answer then press ? and RETURN and your computer will turn into a calculator and you can then use the normal mathematical symbols on the keyboard. To clear the calculator from the screen press AC and RETURN. For the calculator's answer press = and RETURN. To return to the main game press ? and RETURN. Always remember to press RETURN after each required response.

Programming hints

The box chart is drawn using solid squares. These are user defined characters with all pixels filled in and are created at the beginning of the program using VDU 23. The bar chart is held in N(0) and N(1). The number of each of the marks are held in the array F and the bar

chart is drawn from this.

You could increase the number of scores. To do this you must increase the maximum value of J in line 310. The array D would have to be reDIMensioned in line 30. Remember also, if more scores are used then the sum or the marks must divide by a number larger than 9 in line 430 to get the correct mean value.

The maximum number of any particular mark would also be greater than 9 so the maximum value of I in line 510 would have to be increased.

```

10 REM QUIZ - ELEMENTARY STA
TISTICS
20 REM Copyright (C) G.Ludinski 1983
30 DIM F(4),D(9),N$(1),IP$(255)
40 MODE 4
42 VDU 23,224,255,255,255,255,255
,255,255
50 S$="
"
52 HC$=" Highest score ":HK$=" Sc
ore "
60 COLOUR1:COLOUR128:PRINT''' Quiz
game 4 - Elementary Statistics"
70 PRINT'
80 INPUT"Hello, what's your name",NAM
$:PRINT'"Here are some problems ";:IF NA
M$ <> "NO SOUND" THEN PRINTNAM$ELSEPRINT
90 W=1:C=0:T=1:I$=" ":TIME=0:P=0:MAX=0
100 P=P+1
110 PROC_QUESTION
120 PRINT:PRINT
130 PRINT:PRINT" = ";:PROC_KEYIN:PRINT
140 IFI$="?" THEN PROC_CALC
142 IF A=0 AND I$<>"0" THEN GOTO 190
150 IF ABS(VAL(I$)-A)<= X AND I$<>" " T
HEN 170
160 GOTO190
170 PRINT'"Yes, congratulations":C=C+1
:PRINT:IFNAM$="NO SOUND"THEN220
180 SOUND1,-10,12,10:SOUND1,-10,20,10:
SOUND1,-10,28,10:SOUND1,-10,32,20:SOUND1
,-10,14,20:GOTO220
190 IF T=1 THEN PRINT'"No, "H$", try a
gain":T=2:GOTO130
200 PRINT'"Sorry, the answer is = "'
L$','M$
210 PRINT:PRINTN$(1),N$(0)
220 IF TIME >=30000 THEN PROC_SCORE
230 PRINT'"More (Y/N) ";:PROC_KEYIN:PRI
NT
240 IF I$<>"Y" AND I$<>"N" AND I$<>" "
AND I$<>"YES" AND I$<>"NO" THEN 230
250 IF I$="Y" OR I$="YES" OR I$=" " THE
N T=1:CLS:GOTO100
251 PROC_SCORE:GOTO 9999
252 DEFPROC_QUESTION

```

```

260 L$="":M$="":N$(0)="":N$(1)="":S=0:
F(1)=0:F(2)=0:F(3)=0:F(4)=0:G$="":FOR J=
1 TO 9
270 D(J)=RND(4):G$=G$+STR$(D(J))+", "
:S=S+D(J)
280 FOR K=1 TO 4:IF D(J)=K THEN F(K)
=F(K)+1
290 NEXT:NEXT:W=-W:G$=LEFT$(G$,17)
300 Z$=" where marks are "+G$
310 IF W=1 THEN X=0
320 IF (S/9)=INT(S/9) THEN 380
330 INC=9*INT(S/9)+9-S
340 D(9)=D(9)+INC
350 G$=LEFT$(G$,16)+STR$(D(9))
360 S=S+INC
370 Q$="Mean mark scored where marks a
re "+G$
380 H$="mean = total marks scored / nu
mber of scores":A=INT(S/9)
390 L$=STR$(A)+" as sum of (" +G$+" ) / 9
= "+STR$(A)
400 IF W=1 THEN M$="":GOTO510
410 X=0:P$=STR$(RND(4)):A=F(VAL(P$))
420 Q$="Length of histogram rectangle
of mark "+P$+Z$
430 H$="length is number of scores wit
h mark "+P$
440 L$=STR$(A):M$="as there are "+STR$(
A)+" scores of mark "+P$:IF A=1 THEN M$
="as there is 1 score of mark "+P$
450 N$(0)="":N$(1)=" "
460 FOR I=9 TO 1 STEP -1:FOR K=1 TO 4
470 IF F(K)>=I THEN N$(INT(I/5))=N$(
INT(I/5))+ " "+STRING$(9,CHR$(128))
480 IF F(K)<I THEN N$(INT(I/5))=N$(I
NT(I/5))+ " "
490 NEXTK:NEXTI
500 N$(0)=N$(0)+" 1 2
3 4 "
510 ENDPROC
520 DEFPROC_CALC
530 VP=VPOS:PRINTTAB(0,22)" Ca
lculator mode "TAB(0,22)
540 B$=" "
550 I$=GET$:PRINTI$;:B$=B$+I$:IF I$<>
"=AND I$<>"?" AND B$<>"AC"THEN550
560 IFB$="?"OR I$="?"THEN600
570 IFB$="AC"THENPRINTTAB(0,23)S$;TAB(
0,22):GOTO540
580 IFLEN(B$)<=1 THEN 540
590 PRINTEVAL LEFT$(B$,LEN(B$)-1);TAB(
0,22):GOTO540
600 PRINTTAB(0,22)S$;S$;TAB(0,VP-1):PR
OC_KEYIN:PRINT
610 ENDPROC
612 DEFPROC_KEYIN
620 IX=1:VP=VPOS:HP=POS
630 IP$(IX)=INKEY$(10):IF IP$(IX)=" " T
HEN COLOUR0:COLOUR129:PRINTTAB(0,1);INT(
TIME/100); " ";HC$;MAX;HK$;C:COLOUR1:C
OLOUR128:GOTO630
640 PRINTTAB(IX+HP,VP);IP$(IX);:IX=IX+
1:IP$(IX)=GET$:IF IP$(IX)<>CHR$(13) TH
EN 640
650 I$="":FORI=1 TO IX-1:I$=I$+IP$(I):
NEXTI
660 ENDPROC
670 DEFPROC_SCORE
680 CLS
690 PRINT:PRINT

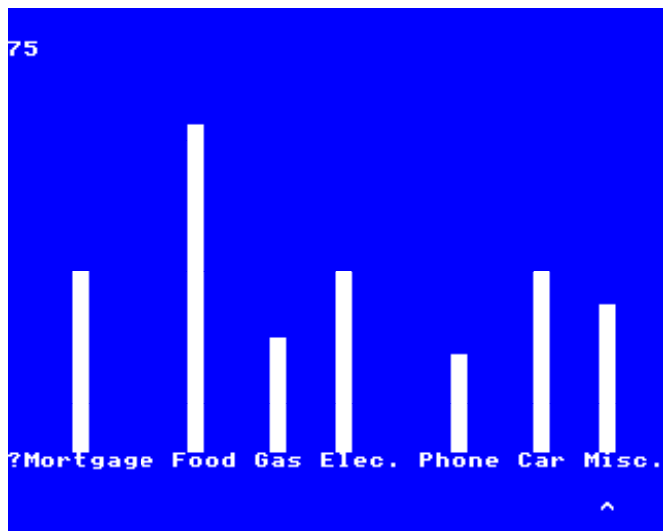
```

```

    700 PRINT:PRINT"Number of problems com
pleted = ";P
    710 PRINT:PRINT"Number correct
       = ";C
    720 TM=INT (TIME/100):PRINT'"Time taken
in seconds      = ";TM
    730 IF C<>0 THEN PRINT'"Time per probl
em              = ";INT(TM/C)
    740 IF C>MAX THEN MAX=C
    750 TIME=0:P=0:C=0
    760 ENDPROC
    9999 REM

```


BAR CHARTER



This is a versatile program that will enable you to record your expenses, club accounts or any collections you have. You could also use the printouts to impress the boss. It is easy to use and allows a maximum of 40 bars to be drawn of any height. As you key in the data you watch the bar chart grow. After you have done this, you have an option of printing out the bar chart on your printer. After this the height of each is displayed.

How to use it

First you are asked for the labels of the bars in the bar chart. There may be any number but all the labels must fit on one display line. When you have keyed in a line of labels press RETURN once. Then you use the left and

right ARROW keys to move a pointer at the bottom of the screen. When the pointer (triangle symbol) is positioned under the label you wish to point to, press the space bar and the bar above the label will increase in height. Each time you press the space bar, the number at the top left hand side of the screen increases by one.

If a bar gets so high that it would go off the screen, then the entire bar chart moves downwards so you are looking at the top half of the bar chart.

If you want to print out the bar chart onto a printer, if you have one, press P. The procedure PROC_DUMP supplied is for printing, using the BBC recommended printer, the Seikosha printer. If you have another one, then replace this with the appropriate screen dump routine. Your dealer, computer magazine or the maker should be able to help you.

If you want to miss out the print out and go straight to the next stage, press S. This section prints out the total for each item of the bar chart.

Programming hints

The program incorporates a scroll downwards. If you list a program, you will notice that if the program has more than around 30 lines the screen scrolls downwards by displaying something on the top screen line and then executing VDU 11 (cursor up). Everything on the screen will now move down one screen line.

This program has been written in MODE 4 because it requires a 40 column screen and yet it must run on a BBC Model A computer, as well as the Model B and Electron. However, MODE 4 only displays two colours. If

more colours are required and you have a Model B BBC Micro or an Electron, then you may change it to MODE 1. This will allow red and yellow to be used as well. The COLOUR 129 on line 380 is now red, and can be changed to COLOUR 130 for yellow, or COLOUR 131 for white, to allow red and yellow bars to be displayed as well. The easiest way would be to display bars in different colours, depending upon where on the screen they are displayed. The variable X is the column position of the bar.

```

10 REM BAR CHARTER
20 REM COPYRIGHT (C) G.LUDINSKI
30 MODE 4
40 DIM Y(40)
50 VDU 19,0,4,0,0,0
60 COLOUR128:COLOUR3
70 CLS
80 LA$=CHR$(136):RA$=CHR$(137)
90 REM
100 REM Input Labels
110 REM
120 PRINTTAB(10,26)"What are the label
s"
130 INPUT L$:IF L$="" THEN VDU11:GOTO1
30
140 IF LEN(L$) > 40 THEN VDU11,11:PRIN
TTAB(0,28);STRING$(40,"");:VDU11,11:GOT
O130
150 PRINTTAB(0,26);STRING$(40,"")
160 S=0:X=1:FORI=1TO40:Y(I)=26:NEXTI
170 *FX4,1
180 SC=0:DT=0
190 REM
200 REM Key In Data
210 REM
220 REPEAT S=S+1
230 I$=GET$:IF I$<>LA$ AND I$<>RA$ A
ND I$<>"S" AND I$<>" " AND I$<>"P" AND I
$<>"p" THEN 230
240 IF (I$=LA$ AND X=1) OR (I$=RA$ A
ND X=40) THEN 230
250 IF I$=" " THEN DT=DT+1:PRINTTAB(
0,2);DT
260 IF I$=LA$ THEN X=X-1
270 IF I$=RA$ THEN X=X+1
280 PRINTTAB(0,30);STRING$(39,"");T
AB(X,30)"^";
290 REM
300 REM Scroll Down If Chart Goes Too
High
310 REM
320 IF Y(X)+SC >=0 THEN GOTO370
330 COLOUR0:COLOUR128:PRINTTAB(0,0)"S"
;:VDU11:PRINTTAB(0,3)" "TAB(0,27);STRIN
G$(199,"");:COLOUR1:PRINTTAB(0,2);DT;TA
B(0,28);L$;:SC=SC+1
340 REM
350 REM Add More To Bar
360 REM

```

```

370 IF I$<>" " THEN 410
380 COLOUR0:COLOUR129
390 YT=Y(X)+SC:IF YT>26 THEN YT=26
400 PRINTTAB(X,YT) " ";:Y(X)=Y(X)-1:COL
OUR1:COLOUR128
410 UNTIL I$="S" OR I$="s" OR I$="P" O
R I$="p"
420 IF I$="P" OR I$="p" THEN PROC_DUMP
430 REM
440 REM Totals
450 REM
460 CLS
470 PRINTTAB(17,1)"Totals"TAB(17,2)"--
--",
480 FORI=1 TO 40
490 PRINTMID$(L$,I,1);" ";:IF 26-Y(I
)<>0 THEN PRINT26-Y(I);
500 PRINT
510 IF I=26 THEN PRINT"Press <RETURN
> to continue";:REPEATUNTILGET=13:CLS:PR
INT',
520 NEXTI
530 *FX4 0
540 GOTO 700
550 DEFPROC_DUMP
560 VDU2,1,8
570 FORY=1023 TO 0 STEP -28
580 FORX=0 TO 1279 STEP 4
590 CH=1
600 FOR D=27 TO 0 STEP -4
610 CH=CH*2
620 IF POINT(X,Y-D)>0 THEN CH=CH
+1
630 NEXT
640 VDU1,CH
650 NEXT
660 VDU1,10
670 NEXT
680 VDU1,15,3
690 ENDPROC
700 END

```


How to play

The questions are on the modes and medians of a given set of numbers. The mode of a set of numbers is the number occurring most frequently. The median of a set of numbers is the middle number. The numbers are arranged in ascending order. Just key in the answer without pressing RETURN.

If you're right you may move on to the next question by pressing RETURN. If you are wrong, or take too long to answer, the bird ends up by getting painted. After nine consecutive correct answers you find out where the accountants went wrong.

Programming hints

You can make the program easier by allowing more time to answer each question. To do this increase the 30 in line 370.

If you wish to use the graphics but to set different types of questions, replace procedures PROC_STAT, PROC_MODE and PROC_MEDIAN. Assign the question to Q\$, the answer to A\$ and the hint to H\$. Questions in this program must have answers one digit or letter long. This could be changed though by changing the input routine at line 370.

```

10 REM STATS PAINTER
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE5:VDU23;8202;0;0;0;
40 DIM D(15),C(5)
50 CLS
60 VDU 19,0,4,0,0,0,19,2,2,0,0,0
70 GOTO 200
80 REM
90 REM U.D.G. CALCULATOR
100 REM
110 DEF FNB(N$)
120 TF=0
130 FOR L=0 TO 7
140 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
150 NEXT L
160 =TF

```

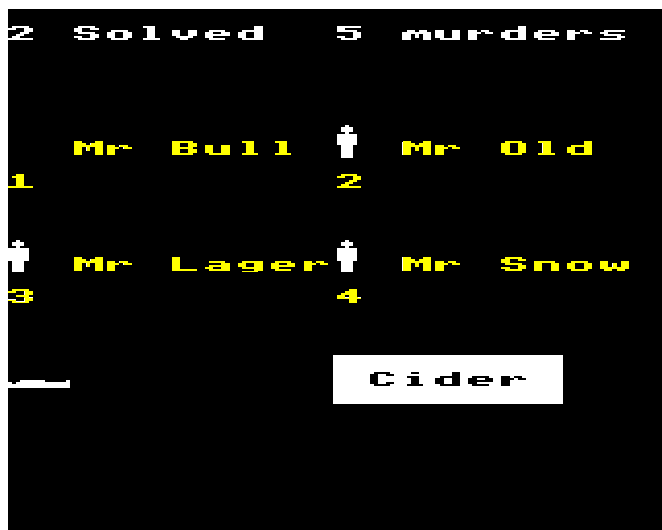
```

170 REM
180 REM BIRD SHAPE
190 REM
200 VDU 23,224,FNB("01100000"),FNB("11
100000"),FNB("00110000"),FNB("00111000")
,FNB("00111100"),FNB("00011110"),FNB("00
001011"),FNB("00001011")
210 REM
220 REM DRAW FENCE
230 REM
240 FOR J=1 TO 9
250 COLOUR128:CLS
260 GCOL 0,2:PROC_BLOCK(0,0,1280,450)
270 GCOL 0,3
280 FOR I=0 TO 1240 STEP 100
290 PROC_BLOCK(I,400,50,200)
300 NEXT I
310 PROC_BLOCK(0,420,1280,20):PROC_BLO
CK(0,550,1280,20)
320 COLOUR3:COLOUR128:PRINTTAB(19,12);
CHR$(224)
330 COLOUR3:COLOUR130
340 PROC_STAT
350 PRINTTAB(0,21);Q$
360 GCOL 0,1:I=-100:I$="":ID=0
370 I$=INKEY$(30):IF I$="" OR ID=1 THE
N I=I+100:PROC_BLOCK(I,400,50,200):IF I<
1140 THEN GOTO 370
380 IF I$=A$ AND ID=0 THEN PRINT'"Yes
, you're right":GOTO420
390 IF I<1000 THEN PRINT I$;:ID=1:GOTO
370
400 COLOUR1:COLOUR128:PRINTTAB(19,12);
CHR$(128):FOR I=1TO3:SOUND1,-15,250,4:SO
UND1,0,0,1:SOUND1,-15,250,4:SOUND1,0,0,2
:NEXT:COLOUR3:COLOUR130
410 PRINTTAB(0,26);"No,";H$
420 COLOUR3:PRINTTAB(0,30)"Hit Return
for more";:INPUT RB$
430 IF I$<>A$ THEN 250
440 NEXTJ
450 PRINTTAB(0,27)"Eureka! You found
it. Get on the phonequick!
";:GOTO810
460 REM
470 DEFPROC_BLOCK(X,Y,W,H)
480 MOVE X,Y:MOVE X+W,Y
490 PLOT 85,X,Y+H
500 PLOT 85,X+W,Y+H
510 ENDPROC
520 DEFPROC_STAT
530 MC=0:DN=1:MO=0:W=RND(2)
540 FOR I=1TO5
550 C(I)=INT(RND(1)*4):IF C(I)=MC TH
EN 550
560 IF C(I)>MC THEN MC=C(I):MO=I
570 IF C(I)=0 THEN 620
580 FOR JJ=DN TO DN+C(I)-1
590 D(JJ)=I
600 NEXTJJ
610 DN=DN+C(I)
620 NEXTI
630 IF DN/2=INT(DN/2) THEN DN=DN+1:D(D
N)=6
640 D$="":FOR I=1TODN:D$=D$+STR$(D(I))+
",":NEXT:D$=LEFT$(D$,(DN*2)-1)
650 TH$="th":MM=INT(DN/2)+1:IF MM=1 TH
EN TH$="st"
660 IF MM=2 THEN TH$="nd"
670 IF MM=3 THEN TH$="rd"

```

```
680 IF W=1 THEN PROC_MODE
690 IF W=2 THEN PROC_MEDIAN
700 ENDPROC
710 DEFPROC_MODE
720 Q$="What is the mode of "+D$
730 A=MO:A$=STR$(MO)
740 H$="there are more "+A$+"s"
750 ENDPROC
760 DEFPROC_MEDIAN
770 Q$="What is the median of "+D$
780 A=D(1+INT(DN/2)):A$=STR$(A)
790 H$=A$+" is middle no."
800 ENDPROC
810 END
```

WHO DUNNIT



Looking through the window you see him standing in his study. Then you hear a gun shot and he falls to the ground. You walk into the house and go into his study.

There are four men there. You know their names. You find a note which the victim must have written as he died. This is a clue to his murderer. You must decide which of the four men is the murderer before they slip out of the room.

How to play

The victim's note is by the man lying down. You must work out which of the names of the other men has some connection with this word. For example, in the screen show above, Mr Lager is the murderer as Lager and

Cider are both drinks. Alternatively words that are related may have the same or opposite meanings. For example, Big and Large, also Hot and Cold are related.

Key in the number below the suspected murderer before the fourth man disappears off the screen.

If you're right, you hear police sirens as their cars approach. If you're wrong or too late, you don't. The score is given on the top line. Press RETURN to play again.

Programming hints

This program illustrates how the ENVELOPE statement can be used to create sound effects. This allows the pitch of the amplitude (volume) of a note to be continuously varied in a short time or both. As a gun shot has a constant pitch the three pitch parameters of the ENVELOPE statement in line 410 are zero. As a gun shot has a sharp attack phase and a slower delay the volume initially shoots up to a maximum 126 before going down more slowly. This is the 126 after the 10. ENVELOPE statements are quite tricky but you can find the ENVELOPE statement you require with limited knowledge by trial and error.

If you want to add more words to the game, add some more DATA statements at the end of the program. Put in sets of three words that are related. Read the other words in lines 740 and 760 for ideas. Make sure that each set is not related to the other words in those lines. When you have added the extra words, count up the total number of sets of words from line 740 and assign it to TT in line 310.

```

10 REM WHODUNNIT
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 5
40 DIM WD$(30,3),N(5),X(4),Y(4),P1$(2
),P2$(2)
50 X(1)=0:Y(1)=7:X(2)=10:Y(2)=7:X(3)=
0:Y(3)=14:X(4)=10:Y(4)=14
60 SC=0:TU=0
70 GOTO 200
80 REM
90 REM U.D.G. CALCULATOR
100 REM
110 DEF FNB(N$)
120 TF=0
130 FOR L=0 TO 7
140 TF=TF+(2^L)*VAL(MID$(N$,8-L,1))
150 NEXT L
160 =TF
170 REM
180 REM SHAPES OF MEN
190 REM
200 BD=FNB("001111100"):LG=FNB("001110
00")
210 VDU 23,224,FNB("00010000"),FNB("00
111000"),FNB("00111000"),FNB("00010000")
,BD,BD,BD,BD
220 VDU 23,225,BD,BD,LG,LG,LG,LG,LG,LG
230 VDU 23,226,0,0,0,0,FNB("00001111")
,FNB("01011111"),255,255
240 VDU 23,227,0,0,0,0,FNB("11000001")
,255,255,255
250 M$=CHR$(224)+CHR$(10)+CHR$(8)+CHR$
(225):V$=CHR$(226)+CHR$(227)
260 B=128:BL=0:RD=1:YE=2:WH=3
270 COLOUR B+BL:COLOUR WH
280 REM
290 REM READ WORDS
300 REM
310 TT=25
320 FOR II=1 TO TT
330 READ WD$(II,1),WD$(II,2),WD$(II,
3)
340 NEXT II
350 TIME=0
360 REM
370 REM UPRIGHT MAN AND GUN SHOT
380 REM
390 CLS:COLOUR B+BL:COLOUR WH:PRINT TA
B(0,20);M$
400 *FX15,0
410 ENVELOPE1,1,0,0,0,100,20,10,126,-5
0,-1,-76,126,126:SOUND0,1,6,255
420 FOR I=1TO4
430 N(I)=RND(TT)
440 NEXT I
450 IF N(1)=N(2) OR N(1)=N(3) OR N(1)=
N(4) OR N(2)=N(3) OR N(2)=N(4) OR N(3)=N
(4) THEN GOTO390
460 REM
470 REM DRAW PEOPLE AND NAMES
480 REM
490 TU=TU+1
500 SN=RND(4)
510 FOR I=1TO2
520 P1$(I)=WD$(N((2*I)-1),RND(3)):P2
$(I)=WD$(N(2*I),RND(3))
530 COLOUR WH:PRINTTAB(0,7*I);M$;;CO
LOUR YE:PRINT" Mr ";P1$(I);:COLOUR WH:PR
INTTAB(10,7*I);M$;;COLOUR YE:PRINT" Mr "
;P2$(I)

```

```

540 PRINTTAB(0,(7*I)+3);2*I-1;TAB(10
,(7*I)+3);2*I
550 NEXT I
560 VC$=WD$(N(SN),RND(3)):IF VC$=P1$(1
) OR VC$=P2$(1) OR VC$=P1$(2) OR VC$=P2$(
2) THEN 560
570 MU$=" "+VC$+" "
580 PRINTTAB(0,21)" "
590 COLOUR WH:PRINTTAB(0,21);V$;:COLOU
R B+WH:COLOUR WH:PRINT TAB(10,20);MU$;:C
OLOUR RD:PRINT TAB(10,21);MU$;:COLOUR WH
:PRINT TAB(10,22);MU$:COLOUR B+BL
600 K=1
610 I$=INKEY$(100):IF I$="" AND K<5 TH
EN PRINTTAB(X(K),Y(K))" "TAB(X(K),Y(K)+1
)" " :K=K+1:GOTO610
620 REM
630 REM POLICE SIREN
640 REM
650 IF VAL(I$)=SN THEN FOR K=1 TO 4:SO
UND 1,-15,109,10:SOUND 1,-15,101,10:NEXT
:SC=SC+1
660 REM
670 REM SCORE
680 REM
690 COLOUR WH:PRINTTAB(0,1);SC;" solve
d"TAB(10,1);TU;:IF TU > 1 THEN PRINT " m
urders" ELSE PRINT " murder "
700 COLOUR WH:PRINT TAB(0,28)"Press Re
turn":INPUT RG$:GOTO 390
710 REM
720 REM DATA
730 REM
740 DATA Big,Small,Large,Fat,Thin,Plum
p,Quiet,Loud,Noisy,Wet,Dry,Damp
750 DATA Hot,Cold,Warm,A,Z,Alpha,Good,
Bad,Nice,Mad,Crazy,Sane,Dull,Shiny,Matt,
See,Hear,Feel,Old,Young,Aged,Laugh,Cry,W
eep,Kid,Child,Adult,Am,Pm,Noon,Bird,Fowl
,Beast,Snow,Ice,Sleet,Beer,Lager,Cider
760 DATA King,Queen,Jack,Give,Take,Gra
sp,BBC,ITV,Ch. 4,Ill,Well,Sick,Gym,PT,PE
,Red,Amber,Green,Load,Save,Chain,Eye,I,A
ye

```


WORD SEARCH



This is a brainteaser you have probably come across in puzzle magazines, but that doesn't make it any easier.

The words which are hidden in the screen spaghetti are all four letter - related to food or drink.

How to play

When you have found one of the twenty words on the screen, key it in and press RETURN.

If your guess is correct your word will be ticked, if wrong it will be crossed. Your score will be displayed to the right of the word keyed in by yourself. After five seconds the word will be erased and your next word must be entered.

The words you have found to date will be blanked out on the screen, which should make it easier for you to spot the others.

To change the screen key in NEXT and press RETURN.

Programming hints

Two methods are used to reduce the memory required in this program. First, all the numerical arrays are integer arrays, this is shown by putting a % sign after the variable names. Secondly the possible words are stored one after another in a string, instead of an array.

Another change that you could make is to alter the words that can be found. There are 57 of them in order to make the puzzles as random as possible. These words are stored in the variable W\$ on line 70. If you can think of other four-letters to do with food or drink, then just replace some of the words with those you have chosen. If you want to put in words on a different subject, then think of a subject and replace the words in W\$ with your words all joined together. Remember there must be 57 of them, and they must all have four letters.

If you wish to use longer or shorter words, all words must still be of the same length as each other. Change the word in W\$ so the total number of letters is still the same. Then change ID in line 240 so 4 is replaced by the number of letters in each word, and 57 is replaced by the maximum number of words in W\$. The minimum value of ID must be 1 so 3 should be changed accordingly. The 4 in line 280 should also be changed. If the word length is increased more elements of array L\$ must be checked to be empty and then assigned a letter in lines 290 to 310. Also the 80 (which is 20 words of 4 letters) and 4 in line

520 should be changed. The 4 in line 530, and the 3 and 4 in line 570 should also be changed.

Special feature

If you wish to have a collection of word search puzzles to be completed away from the computer, and you have a 40 column printer, then press CNTRL B then RUN the program and the puzzles will be printed out for you. Press CNTRL C after you have finished.

```

10 REM Word Search
20 REM Copyright (C) G.Ludinski 1983
30 MODE 4
40 DIM L$(24,18),CH%(20,14),P%(20)
50 VDU 23,224,0,1,2,4,8,16,160,64
60 VDU 23,225,255,255,255,255,255,255
,255,255
70 W$="FISHMEATCAKESOUPEASSALTCHOPCO
RNWINEBEERLIMEBRANBEANVEALROLLHAKEPIKERO
CKSPAMMALTROLMINTLAMBPOPKBEEFTARTCANENU
TSTUNARICESAKEISAGOLOAFGAMEHERBPEARMLKL
ARDCHIPCTEWOATSPATESAGEMACECRABMASHCOLAP
ITHPEELSOYALEEKDUCKDILLYOLKBALMSUETSODA"
80 P%(0)=240
90 REM
100 REM GENERATE LETTERS
110 REM
120 CLS
130 WC$=" ":CR=0
140 FOR I=1 TO 14
150   FOR J=1 TO 20
160     L$(J,I)=" "
170     CH%(J,I)=0
180   NEXT J
190 NEXT I
200 FOR I=1 TO 20
210   D=RND(3)
220   R=RND(10):IF D=2 THEN R=RND(14)
230   C=RND(16):IF D=1 THEN C=RND(20)
240   ID=4*RND(57)-3
250   FOR Q=0 TO I-1:IF ID=P%(Q) THEN
240
260     NEXT Q
270     P%(I)=ID
280     WD$=MID$(W$,ID,4)
290     IF D=1 AND L$(C,R)=" " AND L$(C,
+1)=" " AND L$(C,R+2)=" " AND L$(C,R+3)=" "
THEN FOR K=0 TO 3:L$(C,R+K)=MID$(WD$,K+
1,1):CH%(C,R+K)=I:NEXTK:GOTO330
300     IF D=2 AND L$(C,R)=" " AND L$(C+1
,R)=" " AND L$(C+2,R)=" " AND L$(C+3,R)=" "
THEN FOR K=0 TO 3:L$(C+K,R)=MID$(WD$,K+
1,1):CH%(C+K,R)=I:NEXTK:GOTO330
310     IF D=3 AND L$(C,R)=" " AND L$(C+1
,R+1)=" " AND L$(C+2,R+2)=" " AND L$(C+3,R
+3)=" " THEN FOR K=0 TO 3:L$(C+K,R+K)=MID
$(WD$,K+1,1):CH%(C+K,R+K)=I:NEXTK:GOTO33

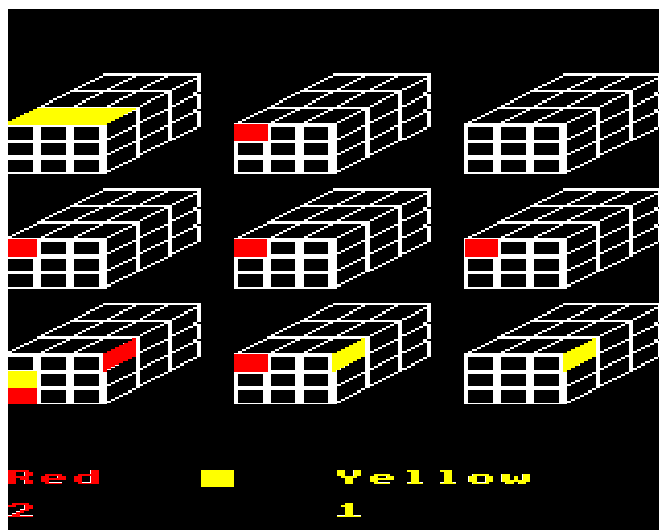
```

```

0
320      GOTO210
330      WC$=WC$+WD$
340      NEXTI
350      REM
360      REM  DISPLAY  LETTERS
370      REM
380      FOR  I=1  TO  14
390          FOR  J=1  TO  20
400              IF  L$(J,I)=" " THEN PRINTTAB(2*
J-2,I*2-1);CHR$(64+RND(26));" ";:GOTO420
410              PRINTTAB(2*J-2,I*2-1);L$(J,I);
" ";
420          NEXT  J
430      NEXT  I
440      REM
450      REM  CHECK  ANSWER
460      REM
470      FOR  N=1  TO  20
480          PRINT  TAB(0,29)"What  food  and  dr
ink  words  can  you  find  ";
490          VDU  11
500          INPUTI$
510          IF  I$="NEXT" THEN GOTO120
520          FOR  M=1  TO  80  STEP  4
530              IF  I$<>MID$(WC$,M,4) THEN 610
540              PRINTTAB(8,30)CHR$(224);:CR=CR
+1:PRINTTAB(35,30);CR;
550              FOR  I=1  TO  14
560                  FOR  J=1  TO  20
570                      IF  CH%(J,I)=(M+3)/4 THEN P
RINTTAB(2*J-2,I*2-1);CHR$(225);
580                      NEXTJ
590                  NEXTI
600              GOTO630
610              NEXTM
620              PRINTTAB(8,30);"  X";:RB$=INKEY$
(500):GOTO480
630          NEXT  N

```

3D BRAINSTORM



If you feel like some brainstorming, how about this three-dimensional game for two players. It is like three-dimensional noughts and crosses, except it has the advantage that all faces can be seen at a glance.

Nine cubes are displayed on the screen and each face of each cube is divided into nine squares. Your aim is to colour in a row or column of squares in which you have coloured in the same square. For example, in the screen show above, the red player has coloured in a row of squares on the top left hand cube. Also the yellow player has coloured in all the top left-hand squares on the faces on the front of the central cube, so he has both a row and column of squares coloured in.

How to play

Players should take turns to colour in a square. The first player will colour in red, and the second in yellow. Squares are coloured in by moving the cursor (flashing underline symbol) to point to the correct square using the arrow keys.

If the square is on the front or top face of a cube, it is pointed to by putting the cursor under the square. If it is on the side of a cube it is pointed to by putting the cursor in the centre of the square. When the correct square has been selected, the space bar must be pressed and the appropriate square will be coloured in.

The score is shown at the bottom of the screen. The colour of the square between the titles indicates whose turn it is to play.

If you complete a row or column the computer makes an arcade-like warbling sound. If you try to colour in a square that does not exist a low constant note sounds.

Programming notes

The logic for a game like this is more complicated than you would expect because of the number of possible moves. The program is made more comprehensible and the program length reduced by using functions. These functions, however, do not deal with numbers but with logical operators. For example, in line 160 FNX will be true if XX is less than 0 or greater than 20. This is a check that regularly has to be done to see if the X-coordinate of the object would fit on the screen.

You could make this into a one player game by allowing

the computer to make random guesses. You would do this by putting IF T=-1 THEN in front of line 520. You may also add the extra line IF T=1 THEN PS=RND(21)-1 : VP=RND(24)

```

10 REM 3D BRAINSTORM
20 REM COPYRIGHT (C) G.LUDINSKI 1983
30 MODE 5
40 DIM L%(20,24),M%(20,24),SC(2),R(6,
2)
50 REM
60 REM LOGICAL FUNCTIONS
70 REM
80 DEFFNL1(I)=(PS=0+I OR PS=1+I OR PS
=2+I OR PS=7+I OR PS=8+I OR PS=9+I OR PS
=14+I OR PS=15+I OR PS=16+I)
90 DEFFNL2(I)=(VP=7+I OR VP=8+I OR VP
=9+I OR VP=14+I OR VP=15+I OR VP=16+I OR
VP=21+I OR VP=22+I OR VP=23+I)
100 DEFFNL7(P,I)=(P=I OR P=I+7 OR P=I+
14)
110 DEFFNLP(I,J)=(IF PS=I AND VP=J)
120 DEFFNF=(FNL1(0) AND FNL2(0))
130 DEFFNT=((FNL1(0) AND (VP=6 OR VP=1
3 OR VP=20)) OR (FNL1(1) AND (VP=5 OR VP
=12 OR VP=19)) OR (FNL1(2) AND (VP=4 OR
VP=11 OR VP=18)))
140 DEFFNE=(FNL7(PS,6) OR FNL7(VP,10) O
R (FNL7(PS,0) AND (FNL7(VP,4) OR FNL7(VP,5)
)) OR (FNL7(PS,1) AND FNL7(VP,4)) OR (PS<0
OR PS>20 OR VP<4 OR VP>24))
150 DEFFNE2=((FNL7(PS,3) OR FNL7(PS,4
) OR FNL7(PS,5)) AND FNL7(VP,9)) OR ((FN
L7(PS,4) OR FNL7(PS,5)) AND FNL7(VP,9))
OR ((FNL7(PS,4) OR FNL7(PS,5)) AND FNL7(
VP,8)) OR (FNL7(PS,5) AND FNL7(VP,7)))
160 DEFFNX(XX)=(XX<0 OR XX>20)
170 DEFFNY(YY)=(YY<4 OR YY>24)
180 DATA 1,2,1,-1,-1,-2,7,14,7,-7,-7,-1
4
190 FOR I=1 TO 6:READ R(I,1):READ R(I,2):
NEXT
200 REM
210 REM SHAPE DEFINITIONS
220 REM
230 VDU23,224,&01,&02,&04,&08,&10,&20,
&40,&FF:REM /
240 VDU23,225,&01,&02,&04,&08,&10,&20,
&40,&80:REM /
250 VDU23,226,&FF,0,0,0,0,0,0,0:REM -
260 VDU23,227,&81,&82,&84,&88,&90,&A0,
&C0,&80:REM 1/
270 VDU23,228,&80,&80,&80,&80,&80,&80,
&80,&80
280 VDU23,229,&FF,&81,&81,&81,&81,&81,
&81,&FF:REM LI
290 VDU23,230,&01,&03,&05,&09,&11,&21,
&41,&81:REM /1
300 VDU23,231,&82,&83,&85,&89,&91,&A1,
&C1,&81:REM 1/1
310 VDU23,232,&FF,&FE,&FC,&F8,&F0,&E0,
&C0,&80:REM TOP DIAG
320 VDU23,233,&01,&03,&07,&0F,&1F,&3F,
&7F,&FF:REM LOWER DIAG
330 VDU23,234,&FF,&FF,&FF,&FF,&FF,&FF,
&FF,&FF:REM FILLED IN

```

```

340 L$=CHR$(224):D$=CHR$(225):T$=CHR$(
226):V$=CHR$(227):U$=CHR$(228):S$=CHR$(2
29)
350 DU$=CHR$(230):VU$=CHR$(231):D1$=CH
R$(232):D2$=CHR$(233):F$=CHR$(234)
360 FORJ=4TO24:FORI=0TO20:L%(I,J)=0:M%
(I,J)=0:NEXT:NEXT
380 REM
390 REM DRAW CUBES
400 REM
410 COLOUR BL+B:COLOUR WH:CLS
420 FORY0=3 TO 17 STEP 7
430 FOR X0=0 TO 14 STEP 7
440 PROC_CUBE(X0,Y0)
450 NEXTX0
460 NEXTY0
470 VDU30
480 T=1:SC(0)=0:SC(2)=0
485 COLOUR1:PRINTTAB(0,28)"Red"TM"
;:COLOUR2:PRINT"Yellow":COLOUR1:PRINTTAB
(0,30)"0";:COLOUR2:PRINT"0"
490 REM
500 REM MAIN CYCLE
510 REM
520 I$=GET$:PS=POS:VP=VPOS
530 IF FNE OR FNE2 THEN SOUND1,-15,50,
10:GOTO520
540 IF ABS(M%(PS,VP))=1 THEN SOUND1,-1
5,50,10:GOTO520
550 T=-T:IF T=-1 THEN COLOUR1 ELSE COL
OUR2
560 IF FNF THEN PROC_PUT(PS,VP,F$):GOT
O590
570 IF FNT THEN PROC_PUT(PS,VP,D2$):PR
OC_PUT(PS+1,VP,D1$):GOTO590
580 PROC_PUT(PS,VP,D2$):PROC_PUT(PS,VP
+1,D1$)
590 M%(PS,VP)=T:VDU30
600 PROC_TEST:COLOUR1+(-T+1)/2:PRINTTA
B(6,28);F$
610 COLOUR1:PRINTTAB(0,28)"Red":COLOUR
2:PRINTTAB(10,28)"Yellow"
620 COLOUR1:PRINTTAB(0,30);SC(0);:COLO
UR2:PRINTTAB(10,30);SC(2)
630 GOTO520
640 REM
650 DEFPROC_CUBE(X0,Y0)
660 PRINTTAB(X0,Y0)"---"
670 PRINTTAB(X0,Y0+1)" ";L$;L$;L$;DU$
680 PRINTTAB(X0,Y0+2)" ";L$;L$;L$;D$;V
U$
$ 690 PRINTTAB(X0,Y0+3)L$;L$;L$;D$;V$;VU
$
700 PRINTTAB(X0,Y0+4)S$;S$;S$;V$;V$;V$
710 PRINTTAB(X0,Y0+5)S$;S$;S$;V$;V$
720 PRINTTAB(X0,Y0+6)S$;S$;S$;V$;
730 ENDPROC
740 DEFPROC_PUT(PX,PY,C$)
750 IF L%(PX,PY)=0 THEN COLOUR 128 ELS
E COLOUR 129+(L%(PX,PY)+1)/2
760 PRINTTAB(PX,PY)C$;
770 IF L%(PX,PY)=0 THEN L%(PX,PY)=T
780 COLOUR128
790 ENDPROC
800 DEFPROC_TEST
810 FOR J=4 TO 6
820 PROC_CHECKX:PROC_CHECKY
830 NEXTJ
840 IF NOT FNF THEN 880
850 FOR J=1 TO 3

```



```

860      PROC_CHECKX:PROC_CHECKY
870  NEXTJ
880  IF NOT FNT THEN 930
890  FOR J=1 TO 3
900      PROC_CHECKXY
910      PROC_CHECKX
920  NEXTJ
930  IF FNF OR FNT OR FNE OR FNE2 THEN
980
940  FOR J=1 TO 3
950      PROC_CHECKXY
960      PROC_CHECKY
970  NEXTJ
980  ENDPROC
990  DEFPROC_CHECKX
1000 IF FNX (PS+R (J, 1)) OR FNX (PS+R (J, 2)
) THEN 1020
1010 IF M% (PS+R (J, 1), VP)=M% (PS+R (J, 2), V
P) AND M% (PS+R (J, 2), VP)=T THEN SC (T+1)=S
C (T+1)+1:PROC_SOUND
1020 ENDPROC
1030 DEFPROC_CHECKY
1040 IF FNY (VP+R (J, 1)) OR FNY (VP+R (J, 2)
) THEN 1060
1050 IF M% (PS, VP+R (J, 1))=M% (PS, VP+R (J, 2)
) AND M% (PS, VP+R (J, 2))=T THEN SC (T+1)=S
C (T+1)+1:PROC_SOUND
1060 ENDPROC
1070 DEFPROC_CHECKXY
1080 IF FNX (PS+R (J, 1)) OR FNY (VP-R (J, 1)
) OR FNX (PS+R (J, 2)) OR FNY (VP-R (J, 2)) TH
EN 1100
1090 IF M% (PS+R (J, 1), VP-R (J, 1))=M% (PS+R
(J, 2), VP-R (J, 2)) AND M% (PS+R (J, 2), VP-R (J
, 2))=T THEN SC (T+1)=SC (T+1)+1:PROC_SOUND
1100 ENDPROC
1110 DEFPROC_SOUND
1120 ENVELOPE1, 1, -26, -36, -45, 255, 255, 25
5, 127, 0, 0, -127, 126, 0
1130 SOUND1, 1, 100, 50
1140 ENDPROC

```

