

FLORIDA HIGH SCHOOLS COMPUTING COMPETITION '83
BASIC PROGRAM SOLUTIONS

'1.1

' This program will round a number to nearest whole number.

,

INPUT "Enter number: "; N
PRINT INT(N + .5)

'1.2

' This program will display 5 numbers in descending order.

,

FOR I = 1 TO 5
 INPUT "Enter number: "; A(I)
NEXT I
FOR I = 1 TO 4
 FOR J = I + 1 TO 5
 IF A(I) < A(J) THEN SWAP A(I), A(J)
 NEXT J
NEXT I
FOR I = 1 TO 5: PRINT A(I): NEXT I

'1.3

' This program will print the factors of a given number.

,

INPUT "Enter number: "; N
FOR I = 1 TO N
 IF N MOD I = 0 THEN PRINT I
NEXT I

'1.4

' This program will produce a birthday card w/name centered.

,

INPUT "Enter name: "; N\$
FOR I = 1 TO 5
 PRINT
 IF I = 1 OR I = 5 THEN FOR J = 1 TO 12: PRINT "*"; : NEXT J
 IF I = 2 THEN PRINT "* HAPPY *";
 IF I = 3 THEN PRINT "* BIRTHDAY *";
 IF I = 4 THEN
 PRINT "*"; : L = LEN(N\$)
 SP = INT((10 - L) / 2 + .5)
 PRINT SPACE\$(SP); N\$; SPACE\$(10 - L - SP); "*";
 END IF
NEXT I

```
'1.5
' This program will print a ? in random locations.
,
CLS : RANDOMIZE TIMER
FOR I = 1 TO 6
  C = INT(RND(3) * 80) + 1: R = INT(RND(3) * 23) + 1
  LOCATE R, C: PRINT "?";
  FOR J = 1 TO 3000 * 5: NEXT J
NEXT I

'1.6
' This program will print a B for a, C for B, ... Z for A.
,
INPUT "Enter character: "; CH$
IF CH$ < "Z" THEN PRINT CHR$(ASC(CH$) + 1) ELSE PRINT "A"

'1.7
' This program will print 4 distinct rectangles in corners.
,
CLS
R = 1: C = 1: GOSUB DrawRec
R = 1: C = 65: GOSUB DrawRec
R = 19: C = 1: GOSUB DrawRec
R = 19: C = 65: GOSUB DrawRec
END
DrawRec:
  FOR I = R TO R + 3
    IF I <> R + 1 AND I <> R + 2 THEN
      LOCATE I, C
      FOR J = 1 TO 10: PRINT "*"; : NEXT J
    END IF
    LOCATE I, C: PRINT "*"
    LOCATE I, C + 9: PRINT "*"
  NEXT I
RETURN

'1.8
' This program will count the number of E's in a sentence.
,
INPUT "Enter sentence: "; S$
FOR I = 1 TO LEN(S$)
  C$ = MID$(S$, I, 1)
  IF C$ = "E" THEN E = E + 1
NEXT I
PRINT E
```

'1.9

' This program will calculate the average score for a person.

,

DATA JOHN,20,70,32

DATA BILL,71,40,30

DATA MARY,80,42,73

INPUT "Enter name: "; N\$

FOR I = 1 TO 3

 READ B\$, A, B, C

 IF B\$ = N\$ THEN PRINT (A + B + C) / 3

NEXT I

'1.10

' This program will reverse the digits of a 4 digit number.

,

INPUT "Enter number: "; N\$

FOR I = 4 TO 1 STEP -1

 PRINT MID\$(N\$, I, 1);

NEXT I

```
'2.1
' This program will calculate the area of a regular hexagon.
'
INPUT "Enter perimeter: "; P
S = P / 6
PRINT SQR(3) * S / 2 * S / 2 * 6
```

```
'2.2
' This program will convert a base 8 num to a base 2 num.
'
INPUT "Enter number: "; N$: L = LEN(N$)
FOR I = 1 TO L
  N = VAL(MID$(N$, I, 1))
  FOR J = 2 TO 0 STEP -1
    X = INT(N / 2 ^ J): PRINT USING "#"; X;
    N = N - X * 2 ^ J
  NEXT J
NEXT I: PRINT
```

```
'2.3
' This program will add several items with tax (5%).
'
INPUT "Enter item: "; IT
WHILE IT <> -999
  T = T + IT
  INPUT "Enter item: "; IT
WEND
PRINT "SUBTOTAL = $"; T
TAX = INT((T * .05) * 100 + .5) / 100
PRINT "TAX      = $ "; TAX
PRINT "TOTAL    = $"; T + TAX
```

```
'2.4
' This program will divide the screen into 4 rectangles.
'
INPUT "Enter character: "; N$
CLS
FOR I = 1 TO 24
  IF I <> 12 THEN PRINT SPACE$(39); N$
  IF I = 12 THEN FOR J = 1 TO 79: PRINT N$; : NEXT J
NEXT I
```

```
'2.5
' This program will print the greatest and least in a set.
,
MAX = -900: MIN = 900
INPUT "Enter number: "; NUM
WHILE NUM <> -999
  IF NUM < MIN THEN MIN = NUM
  IF NUM > MAX THEN MAX = NUM
  INPUT "Enter number: "; NUM
WEND
PRINT "GREATEST = "; MAX
PRINT "LEAST = "; MIN

'2.6
' This program will print the sum, mean, median.
,
FOR I = 1 TO 10
  INPUT "Enter number: "; A(I): S = S + A(I)
NEXT I
FOR I = 1 TO 9
  FOR J = I + 1 TO 10
    IF A(I) > A(J) THEN SWAP A(J), A(I)
  NEXT J
NEXT I
PRINT "SUM ="; S
PRINT "MEAN ="; S / 10
PRINT "MEDIAN ="; (A(5) + A(6)) / 2

'2.7
' This program will reverse the words in a sentence.
' Assume 1 space between each word.
,
INPUT "Enter sentence: "; A$: NUM = 1
FOR I = 1 TO LEN(A$)
  C$ = MID$(A$, I, 1)
  IF C$ <> " " THEN W$(NUM) = W$(NUM) + C$ ELSE NUM = NUM + 1
NEXT I
FOR I = NUM TO 1 STEP -1: PRINT W$(I); " "; : NEXT I

'2.8
' This program will convert cubic feet to cubic meters.
,
INPUT "Enter cubic feet: "; CF
C3 = CF * (12 * 2.54) ^ 3
CM = C3 / 100 / 100 / 100
PRINT USING "###.### CUBIC METERS"; CM
```

'2.9

' This program will find sum of Ys and Xs for $Y=2(X+5)$.

,

```
INPUT "Enter a, b: "; A, B
```

```
FOR X = A TO B: S = S + 2 * (X + 5): NEXT X
```

```
PRINT "SUM ="; S
```

'2.10

' This program will print 1 char. for 10 sec, 2 for 10 sec...

,

```
INPUT "Enter character: "; A$: CLS
```

```
FOR I = 1 TO 10
```

```
  FOR J = 1 TO I: PRINT A$; : NEXT J
```

```
  FOR J = 1 TO 2500 * 10: NEXT J
```

```
  CLS
```

```
NEXT I
```

'3.1

' This program converts a number from one base to another.

```
'  
INPUT "NUMBER"; N$  
INPUT "BASE"; B  
INPUT "CONVERT TO BASE"; C  
L = LEN(N$)  
FOR I = 1 TO L  
  X = VAL(MID$(N$, I, 1))  
  S = S + X * B ^ (L - I)  
NEXT I  
J = INT(LOG(S) / LOG(C))  
FOR I = J TO 0 STEP -1  
  Y = INT(C ^ I + .1)  
  X = INT(S / Y): NUM = NUM + X * 10 ^ I  
  S = S - X * Y  
NEXT I  
PRINT NUM
```

'3.2

' This program will determine what triangle is made w/3 points.

```
'  
INPUT "Enter X1, Y1: "; X1, Y1  
INPUT "Enter X2, Y2: "; X2, Y2  
INPUT "Enter X3, Y3: "; X3, Y3  
D1 = SQR((X1 - X2) * (X1 - X2) + (Y1 - Y2) * (Y1 - Y2))  
D2 = SQR((X2 - X3) * (X2 - X3) + (Y2 - Y3) * (Y2 - Y3))  
D3 = SQR((X3 - X1) * (X3 - X1) + (Y3 - Y1) * (Y3 - Y1))  
IF (D1 + D2 = D3) OR (D1 + D3 = D2) OR (D2 + D3 = D1) THEN  
  PRINT "NOT A TRIANGLE": END  
END IF  
IF (D1 = D2) AND (D2 = D3) THEN PRINT "EQUILATERAL": END  
IF (D1 = D2) OR (D2 = D3) OR (D1 = D3) THEN  
  PRINT "ISOSCELES"  
ELSE  
  PRINT "SCALENE"  
END IF
```

'3.3

' This program randomly selects an X, Y in 10 x 10 grid. User
' guesses numbers; if guess is wrong, a direction is given.

```
RANDOMIZE TIMER
X = INT(RND(4) * 9) + 1: Y = INT(RND(4) * 9) + 1
WHILE (A <> X) OR (B <> Y)
  INPUT "Enter X, Y:"; A, B
  IF A = X AND B < Y THEN PRINT "UP"
  IF A = X AND B > Y THEN PRINT "DOWN"
  IF A > X AND B = Y THEN PRINT "LEFT"
  IF A < X AND B = Y THEN PRINT "RIGHT"
  IF A < X AND B < Y THEN PRINT "UP AND RIGHT"
  IF A < X AND B > Y THEN PRINT "DOWN AND RIGHT"
  IF A > X AND B < Y THEN PRINT "UP AND LEFT"
  IF A > X AND B > Y THEN PRINT "DOWN AND LEFT"
WEND
```

'3.4

' This program will divide 1st number by 2nd out to N places.

```
INPUT "FIRST NUMBER"; N
INPUT "SECOND NUMBER"; D
INPUT "NUMBER OF DECIMAL PLACES"; P
X = INT(N / D): PRINT USING "#."; X;
N = N - X * D
FOR I = 1 TO P
  N = N * 10: X = INT(N / D): PRINT USING "#"; X;
  N = N - X * D
NEXT I: PRINT
```

```

'3.5
' This program will display numbers 1-8 and a blank in a
' 3 x 3 array.  When a digit is pressed, it moves into the
' blank (if possible).
'
RANDOMIZE TIMER
' Assign numbers in array sequentially then scramble them
FOR I = 1 TO 3
  FOR J = 1 TO 3
    A(I, J) = (I - 1) * 3 + J - 1
  NEXT J
NEXT I
FOR I = 1 TO 3
  FOR J = 1 TO 3
    R1 = INT(RND(3) * 3) + 1: R2 = INT(RND(3) * 3) + 1
    X = A(I, J): A(I, J) = A(R1, R2): A(R1, R2) = X
  NEXT J
NEXT I
'
WHILE (DIG <> 9)
'   Display Array
  CLS
  FOR I = 1 TO 3
    FOR J = 1 TO 3
      IF A(I, J) > 0 THEN PRINT A(I, J); " ";
      IF A(I, J) = 0 THEN PRINT "    "; : BX = I: BY = J
    NEXT J: PRINT
  NEXT I
'   Accept valid digit or 9 (to end)
  VALID = 0
  WHILE (VALID = 0) AND (DIG <> 9)
    A$ = "": WHILE A$ = "": A$ = INKEY$: WEND
    DIG = VAL(A$)
    FOR I = 1 TO 3
      FOR J = 1 TO 3
        IF DIG = A(I, J) THEN IX = I: IY = J
      NEXT J
    NEXT I
    IF ABS(BX - IX) + ABS(BY - IY) = 1 THEN VALID = 1
  WEND
'
  IF VALID THEN
'   Move digit into blank space
    X = A(IX, IY): A(IX, IY) = A(BX, BY): A(BX, BY) = X
  END IF
WEND

```

'3.6

' This program will store a list of words and provide options.

,

```
WHILE OP <= 3
  PRINT
  PRINT "1. ADD A WORD TO THE LIST"
  PRINT "2. DELETE A WORD FROM THE LIST"
  PRINT "3. DISPLAY THE ENTIRE LIST"
  INPUT OP
  IF OP = 1 THEN
    NUM = NUM + 1: INPUT "Enter word: "; W$(NUM)
  ELSEIF OP = 2 THEN
    INPUT "Enter word: "; DEL$: I = 1
    WHILE (I <= NUM) AND (W$(I) <> DEL$)
      I = I + 1
    WEND
    FOR J = I TO NUM - 1: W$(J) = W$(J + 1): NEXT J
    NUM = NUM - 1
  ELSEIF OP = 3 THEN
    FOR I = 1 TO NUM: PRINT W$(I): NEXT I
  END IF
WEND
```

```

'3.7
' This program will solve crytorithms with two 2-letter addends
' and a 3-letter sum, using only the letters A, B, C, D, and E.
'
INPUT "Enter first addend: "; S1$
INPUT "Enter second addend: "; S2$
INPUT "Enter sum: "; S3$
L$ = S1$ + S2$ + S3$
' Store in FL() the index of the first occurence
FOR I = 1 TO 7
  CH$ = MID$(L$, I, 1)
  J = 1: WHILE MID$(L$, J, 1) <> CH$: J = J + 1: WEND
  FL(I) = J
  IF J = I THEN NL = NL + 1: UL(NL) = I 'A new letter
NEXT I
'
FOR N1 = 10 TO 98 'N1 must be 2 digits, >9
  FOR N2 = 100 - N1 TO 98 'N2 must be 2 digits, >9
    SUM = N1 + N2 'Sum must be 3 digits >99
    N1$ = MID$(STR$(N1), 2)
    N2$ = MID$(STR$(N2), 2)
    SUM$ = MID$(STR$(SUM), 2)
    NS$ = N1$ + N2$ + SUM$
    I = 1: SOL = 1
    ' Check if similar letters correspond to similar #s
    WHILE (I <= 7) AND (SOL = 1)
      CH$ = MID$(NS$, I, 1)
      IF CH$ <> MID$(NS$, FL(I), 1) THEN SOL = 0
      I = I + 1
    WEND
    ' Check if unique letters correspond to unique digits
    FOR I = 1 TO NL - 1
      FOR J = I + 1 TO NL
        C1$ = MID$(NS$, UL(I), 1)
        C2$ = MID$(NS$, UL(J), 1)
        IF C1$ = C2$ THEN SOL = 0
      NEXT J
    NEXT I
    ' Display Solution
    IF SOL > 0 THEN
      FOR I = 1 TO NL
        PRINT MID$(L$, UL(I), 1); " = "; MID$(NS$, UL(I), 1),
      NEXT I
      PRINT : TOT = TOT + 1: END
    END IF
  NEXT N2
NEXT N1
IF TOT = 0 THEN PRINT "NO SOLUTION POSSIBLE"

```

'3.8

' This program will simulate random frog jumps on nine pads.

,

RANDOMIZE TIMER

CLS

FOR I = 1 TO 10

LOCATE 1, 1: PRINT SPACE\$(40);

LOCATE 2, 1: PRINT "- - - - -"

F = 5

LOCATE 1, F * 2 - 1: PRINT "F": NUM = 0

WHILE (F > 1) AND (F < 9)

IF INT(RND(3) * 2) = 1 THEN F = F + 1 ELSE F = F - 1

LOCATE 1, 1: PRINT SPACE\$(40);

LOCATE 1, F * 2 - 1: PRINT "F"

FOR J = 1 TO 25: NEXT J

NUM = NUM + 1

WEND

LOCATE 5, I * 3: PRINT NUM

NEXT I

'3.9

' This program will allow a user to position a cursor under a

' sentence using the L and R keys. Space bar deletes letter.

,

CLS : INPUT "Enter sentence:"; S\$: COL = 18

WHILE (CH\$ <> CHR\$(27)) AND (LEN(S\$) > 1)

LOCATE 2, COL, 1

DO: CH\$ = INKEY\$: LOOP UNTIL CH\$ > ""

IF CH\$ = "R" THEN COL = COL + 1

IF CH\$ = "L" THEN COL = COL - 1

IF CH\$ = " " THEN

L = LEN(S\$)

S\$ = LEFT\$(S\$, COL - 18) + RIGHT\$(S\$, L - (COL - 17))

END IF

LOCATE 1, 18: PRINT S\$; " "

WEND

'3.10

' This program will simulate the movement of a pool ball on a
' rectangular pool table. It moves in a 45 degree angle.
,

```
INPUT "Enter Width, Length: "; W, L
CLS : SCREEN 1
WI = 8: LI = 8
FOR I = 0 TO W: LINE (0, I * WI)-(L * LI, I * WI): NEXT I
FOR I = 0 TO L: LINE (I * LI, 0)-(I * LI, W * WI): NEXT I
X = 0: Y = W * WI: XD = 1: YD = -1
WHILE FI = 0
  PSET (X, Y), 0
  X = X + XD: Y = Y + YD
  PSET (X, Y), 1
  IF X = 0 OR X = L * LI THEN XD = -1 * XD
  IF Y = 0 OR Y = W * WI THEN YD = -1 * YD
  FINISHED = 1: LOCATE 20, 1
  IF X = 0 AND Y = 0 THEN PRINT "LEFT-TOP":          FI = 1
  IF X = 0 AND Y = W * WI THEN PRINT "LEFT-BOTTOM":  FI = 1
  IF X = L * LI AND Y = 0 THEN PRINT "RIGHT-TOP":    FI = 1
  IF X = L * LI AND Y = W * WI THEN PRINT "RIGHT-BOTTOM": FI = 1
WEND
DO: A$ = INKEY$: LOOP UNTIL A$ <> ""
SCREEN 0: WIDTH 80: CLS
```