

FLORIDA HIGH SCHOOLS COMPUTING COMPETITION '84
BASIC PROGRAM SOLUTIONS

```
'1.1
' This program will produce a table of Fahrenheit for Celcius.
'
PRINT "CELCIUS", "FAHRENHEIT"
FOR C = 50 TO 200 STEP 25
  PRINT C, INT(1.8 * C + 32 + .5)
NEXT C
```

```
'1.2
' This program will determine time a person slept in seconds.
'
INPUT "WHAT TIME DID YOU GO TO BED (H, M, S)"; H1, M1, S1
INPUT "WHAT TIME DID YOU GET UP (H, M, S)"; H2, M2, S2
T = (11 - H1) * 3600 + (59 - M1) * 60 + (60 - S1)
PRINT "YOU SLEPT FOR"; T + H2 * 3600 + M2 * 60 + S2; "SECONDS"
```

```
'1.3
'This program will display distance/height of a golf ball.
'
PRINT "T", "H", "V"
WHILE (V > 0) OR (T < 1)
  H = 120 * T: V = 120 * T - 16 * T * T
  PRINT T, H, V
  T = T + .5
WEND
```

```
'1.4
' This program will produce table of mice population and food.
'
PRINT "NUMBER OF YEARS", "POPULATION", "FOOD SUPPLY FOR"
Y = 0: P = 10: F = 100
PRINT Y, , P, F
WHILE P < F
  Y = Y + 1: P = P * 2: F = F + 40
  PRINT Y, , P, F
WEND
```

```
'1.5
' This program will determine time that a savings doubles.
'
INPUT "Enter amount, %"; N, P
X = N: Y = 0
WHILE X < 2 * N
  X = X * (1 + P / 100)
  Y = Y + 1
WEND
PRINT Y; "YEARS"
```

'1.6

' This program will determine name at beginning and end.

```
,  
MIN$ = "ZZZZZ": MAX$ = "AAAAAA"  
FOR I = 1 TO 5  
    INPUT NM$  
    IF NM$ < MIN$ THEN MIN$ = NM$  
    IF NM$ > MAX$ THEN MAX$ = NM$  
NEXT I  
PRINT "NAME CLOSEST TO BEGINNING: "; MIN$  
PRINT "NAME CLOSEST TO END: "; MAX$
```

'1.7

' This program will determine longest run of heads of tosses.

```
,  
RANDOMIZE TIMER  
INPUT "N: "; N: H = 0: MAX = 0  
FOR I = 1 TO N  
    X = RND(2): IF X < .5 THEN H = H + 1  
    IF X >= .5 THEN IF H > MAX THEN MAX = H: H = 0 ELSE H = 0  
NEXT I  
IF H > MAX THEN MAX = H  
PRINT MAX; "CONSECUTIVE HEADS"
```

'1.8

' This program will display numbers with 7s zapped.

```
,  
FOR I = 1 TO 100  
    T = INT(I / 10): O = I - T * 10: D7 = (I / 7 = INT(I / 7))  
    IF (T = 7 OR O = 7) AND D7 THEN  
        PRINT "ZAPZAP",  
    ELSEIF (T = 7 OR O = 7) THEN  
        PRINT "ZAP",  
    ELSE  
        PRINT I,  
    END IF  
NEXT I
```

'1.9

' This program will print the # of double letters.

```
,  
INPUT "Enter text: "; A$  
FOR I = 1 TO LEN(A$)  
    C$ = MID$(A$, I, 1)  
    IF C$ = LC$ THEN D = D + 1  
    LC$ = C$  
NEXT I  
PRINT D
```

```
'1.10
' This program will display sevens multiplication facts.
'
FOR I = 0 TO 9
  W = 0
  DO
    PRINT I; "X 7 = "; : INPUT ANS
    IF ANS <> I * 7 THEN
      IF W = 0 THEN
        W = 1
      ELSE
        PRINT I * 7: W = 2
      END IF
    END IF
  LOOP UNTIL (I * 7 = ANS) OR (W = 2)
NEXT I
```

'2.1

' This program will print number of vowels in text.

```
,  
INPUT "Enter text: "; A$  
FOR I = 1 TO LEN(A$)  
  C$ = MID$(A$, I, 1)  
  IF C$ = "A" OR C$ = "E" OR C$ = "I" OR C$ = "O" OR C$ = "U" THEN  
    V = V + 1  
  END IF  
NEXT I  
PRINT V; "VOWELS"
```

'2.2

' This program sorts rational numbers in increasing order.

```
,  
INPUT "Enter N, M: "; N, M  
WHILE N > 0 AND M > 0  
  S = S + 1: A$(S) = STR$(N) + "/" + STR$(M): V(S) = N / M  
  INPUT "Enter N, M: "; N, M  
WEND  
FOR I = 1 TO S - 1  
  FOR J = I + 1 TO S  
    IF V(I) > V(J) THEN SWAP V(I), V(J): SWAP A$(I), A$(J)  
  NEXT J  
NEXT I  
FOR I = 1 TO S: PRINT A$(I): NEXT I
```

'2.3

' This program displays #s that sum of cubes of digits= #.

```
,  
FOR I = 1 TO 9  
  FOR J = 0 TO 9  
    FOR K = 0 TO 9  
      NUM = I * 100 + J * 10 + K  
      IF NUM = I * I * I + J * J * J + K * K * K THEN PRINT NUM  
    NEXT K  
  NEXT J  
NEXT I
```

'2.4

' This program will print a triangle of #s by an algorithm.

```

,
INPUT "Enter # of rows: "; N
FOR I = 1 TO N
  PRINT SPACE$(N - I);
  FOR J = I TO 2 * I - 1
    X = J - INT(J / 10) * 10
    PRINT MID$(STR$(X), 2);
  NEXT J
  IF I > 1 THEN
    FOR J = 2 * I - 2 TO I STEP -1
      X = J - INT(J / 10) * 10
      PRINT MID$(STR$(X), 2);
    NEXT J
  END IF
  PRINT
NEXT I

```

'2.5

' This program will display a page of multiplication drills.

```

,
RANDOMIZE TIMER: CLS
PRINT "      MULTIPLICATION DRILL"
FOR I = 1 TO 6
  H = INT((I - 1) / 3): V = I - H * 3: H = H * 20 + 1
  X = INT(RND(3) * 90 + 10): Y = INT(RND(3) * 9 + 1)
  LOCATE V * 5, H: PRINT MID$(STR$(I), 2); ". "; X
  LOCATE V * 5 + 1, H: PRINT "  X"; Y
  LOCATE V * 5 + 2, H: PRINT "  ----"
NEXT I

```

'2.6

' This program will simulate throwing darts.

```

,
RANDOMIZE TIMER: INPUT "Enter N: "; N
FOR I = 1 TO N
  X = INT(RND(3) * 5): Y = INT(RND(3) * 5)
  A(X, Y) = 1
NEXT I
FOR I = 0 TO 4
  FOR J = 0 TO 4
    IF A(I, J) THEN PRINT "* "; : S = S + 1 ELSE PRINT ". ";
  NEXT J: PRINT
NEXT I
PRINT "NUMBER OF THROWS ="; N
PRINT "NUMBER OF HITS ="; S

```

```
'2.7
' This program will determine if text is palindrome.
,
PRINT "Enter text: "; : A$ = ""
WHILE A$ <> CHR$(13)
  DO: A$ = INKEY$: LOOP UNTIL A$ <> ""
  PRINT A$; : IF A$ >= "A" AND A$ <= "Z" THEN S$ = S$ + A$
WEND
L = LEN(S$)
FOR I = 1 TO L / 2
  IF MID$(S$, I, 1) <> MID$(S$, L - I + 1, 1) THEN
    PRINT "NOT A PALINDROME": END
  END IF
NEXT I
PRINT "A PALINDROME"
```

```
'2.8
' This program will display the frequency of letters.
,
DIM A(26): INPUT "Enter sentence:"; A$: L = LEN(A$)
FOR I = 1 TO L
  C$ = MID$(A$, I, 1)
  IF C$ >= "A" AND C$ <= "Z" THEN
    X = ASC(C$) - ASC("A") + 1: A(X) = A(X) + 1: T = T + 1
  END IF
NEXT I
PRINT "LETTER", "FREQUENCY", "PERCENT"
FOR I = 1 TO 26
  IF A(I) > 0 THEN
    PRINT CHR$(I + 64), A(I), INT(A(I) / T * 100 + .5)
  END IF
NEXT I
PRINT "TOTAL"; T
```

```
'2.9
' This program will print longest word in sentence.
,
INPUT "Enter sentence:"; A$: A$ = A$ + " ": L = LEN(A$)
FOR I = 1 TO L
  C$ = MID$(A$, I, 1)
  IF C$ <> " " THEN
    W$ = W$ + C$
  ELSE
    IF LEN(W$) > LEN(MAX$) THEN MAX$ = W$
    W$ = ""
  END IF
NEXT I
PRINT MAX$
```

```
'2.10
' This program will play rock, scissors, and paper.
,
RANDOMIZE TIMER
INPUT "Enter R, S, P, or Q: "; A$
WHILE A$ <> "Q"
  X = INT(RND(3) * 3)
  IF X = 0 AND A$ = "R" THEN
    T = T + 1: PRINT "TIE"
  ELSEIF X = 1 AND A$ = "S" THEN T = T + 1: PRINT "TIE"
  ELSEIF X = 2 AND A$ = "P" THEN T = T + 1: PRINT "TIE"
  ELSEIF X = 0 AND A$ = "P" THEN W = W + 1: PRINT "YOU WIN"
  ELSEIF X = 1 AND A$ = "R" THEN W = W + 1: PRINT "YOU WIN"
  ELSEIF X = 2 AND A$ = "S" THEN W = W + 1: PRINT "YOU WIN"
  ELSE
    L = L + 1: PRINT "I WIN"
  END IF
  INPUT "Enter R, S, P, or Q: "; A$
WEND
PRINT T; "TIES"
PRINT W; "WINS (YOURS)"
PRINT L; "LOSSES (MINE)"
```

'3.1

' This program will display a random trail of asterisks.
' The program description is poorly worded and ambiguous.
' The judging criteria is also described poorly.
'
'

RANDOMIZE TIMER

DIM A(24, 80)

DO

CLS : FOR I = 1 TO 24: FOR J = 1 TO 80: A(I, J) = 0: NEXT J, I

V = 12: H = 40: A(V, H) = 1

LOCATE V, H: PRINT "S": SAMERUN = -1

WHILE SAMERUN

DO

X = INT(RND(3) * 4)

LOOP UNTIL (X - 2 <> Y) AND (Y - 2 <> X)

H = H + (X = 0) - (X = 2)

V = V + (X = 1) - (X = 3)

IF A(V, H) OR V = 0 OR V = 23 OR H = 0 OR H = 80 THEN

LOCATE 22, 1: PRINT "THE MAXIMUM DISTANCE FROM START = ";

PRINT ABS(40 - H) + ABS(12 - V)

DO: A\$ = INKEY\$: LOOP UNTIL A\$ <> ""

SAMERUN = 0

ELSE

A(V, H) = 1: LOCATE V, H: PRINT "*": Y = X

END IF

WEND

LOOP UNTIL A\$ = "Q"


```

'3.2
' This program will decode a message with frequent letters.
'
DIM A$(32), A(32), B$(32)
B$ = "ETAOINSHRDLU"
INPUT "Message: "; A$: L = LEN(A$)
FOR I = 1 TO L: A$(I) = MID$(A$, I, 1): NEXT I
FOR I = 1 TO L
  K = 0
  WHILE (A$(K) <> A$(I)) AND (K <= I - 1)
    K = K + 1
  WEND
  ' Found 1st occurrence of a letter, count occurrences after it
  IF K = I THEN
    FOR J = I TO L
      IF A$(I) = A$(J) THEN A(I) = A(I) + 1
    NEXT J
    IF A(I) > G THEN G = A(I)
  END IF
NEXT I
' Replace letters in message
FOR I = G TO 1 STEP -1
  J = 1
  WHILE (A(J) <> I) AND (J <= L)
    J = J + 1
  WEND
  IF J <= L THEN
    S = S + 1
    FOR K = J TO L
      IF A$(K) = A$(J) THEN B$(K) = MID$(B$, S, 1)
    NEXT K
  END IF
NEXT I
FOR I = 1 TO L: PRINT B$(I); : NEXT I

```

```

'3.3
' This program will produce the digital product root.
'
INPUT "ORIGINAL VALUE (1 TO 7 DIGITS): "; N
PRINT N
WHILE N > 9
  A$ = MID$(STR$(N), 2): L = LEN(A$): N = 1
  FOR I = 1 TO L
    X = VAL(MID$(A$, I, 1))
    IF X > 0 THEN N = N * X
  NEXT I
  PRINT N
WEND

```

'3.4
' This program will display twin primes.
,

```
INPUT "Enter N: "; N
PRINT "TWIN PRIMES NOT GREATER THAN"; N
FOR I = 3 TO N - 2
  FOR J = 2 TO SQR(I)
    IF I MOD J = 0 THEN GOTO NextPrime
  NEXT J
  T = I + 2
  FOR J = 2 TO SQR(T)
    IF T MOD J = 0 THEN GOTO NextPrime
  NEXT J: PRINT I, T
NextPrime: NEXT I
```

'3.5
' This program will print subsets of m people.
,

```
DIM A(26), A$(26): INPUT "INPUT NUMBER, CAPACITY"; L, M
FOR I = 1 TO M: A(I) = M - I + 1: NEXT I
FOR I = 1 TO L: A$(I) = CHR$(64 + I): NEXT I
N = 1: A(1) = A(1) - 1
WHILE N <= M
  A(N) = A(N) + 1
  IF N > 1 THEN
    FOR I = N - 1 TO 1 STEP -1: A(I) = A(I + 1) + 1: NEXT I
  END IF
  IF A(N) <= L - N + 1 THEN
    FOR I = M TO 1 STEP -1: PRINT A$(A(I)); : NEXT I: PRINT ,
    S = S + 1: N = 0
  END IF
  N = N + 1
WEND
PRINT : PRINT "THERE ARE"; S; "SUBSETS"
```

'3.6

' This program will display histogram of letter frequency.

```

'
DIM A(256): CLS
DATA "THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG."
DATA "THIS IS AN EXAMPLE OF HOW"
DATA "TO TEST YOUR HISTOGRAM PROGRAM. YOU"
DATA "CAN USE THIS EXAMPLE."
DATA "*END*"
READ A$
WHILE A$ <> "*END*"
  FOR I = 1 TO LEN(A$)
    X = ASC(MID$(A$, I, 1))
    IF X >= 65 AND X <= 90 THEN A(X) = A(X) + 1
    IF A(X) > G THEN G = A(X)
  NEXT I
  READ A$
WEND
FOR I = G TO 1 STEP -1
  FOR J = 65 TO 90
    IF A(J) >= I THEN
      LOCATE G - I + 1, J - 64: PRINT "*";
    END IF
  NEXT J: PRINT
NEXT I
FOR I = 65 TO 90: PRINT CHR$(I); : NEXT I

```

'3.7

' This program will display a repeating decimal.

```

'
DIM R(100)
INPUT "Enter N, D: "; N, D
PRINT N; "/"; D; "= "; : X = INT(N / D)
IF X > 0 THEN PRINT MID$(STR$(X), 2);
PRINT ".";
DO
  I = I + 1: R = N - D * X
  IF R = 0 THEN PRINT A$: END
  R(I) = R: N = R * 10: X = INT(N / D)
  ' Display decimal if remainder repeats itself
  FOR J = 1 TO I - 1
    IF R(J) = R THEN
      PRINT LEFT$(A$, J - 1); "("; RIGHT$(A$, I - J); ")": END
    END IF
  NEXT J
  A$ = A$ + MID$(STR$(X), 2)
LOOP

```

'3.8

' This program will print # of round numbers less than N.

'

```

INPUT "INPUT NUMBER"; N
FOR I = 2 TO N
  M = I: S = 0: K = INT(LOG(M) / LOG(2))
  FOR J = K TO 0 STEP -1
    X = INT(M / 2 ^ J)
    S = S + X: M = M - X * 2 ^ J
  NEXT J
  IF S + S = K + 1 THEN T = T + 1
NEXT I
PRINT "THERE ARE"; T; "ROUND NUMBERS LESS THAN OR EQUAL TO"; N

```

'3.9

' This program will provide automated price increases.

'

```

INPUT "Enter %"; P: P = P / 100
READ A$
WHILE A$ <> "*END*"
  L = LEN(A$): I = 0
  DO
    WHILE (I < L) AND (X$ <> "$")
      I = I + 1: X$ = MID$(A$, I, 1): PRINT X$;
    WEND
    IF X$ <> "$" THEN
      PRINT
    ELSE
      J = I: X = 50
    END IF
    WHILE (J < L) AND (X$ = "." OR (X > 47 AND X < 58)) AND PER < 2
      J = J + 1: X$ = MID$(A$, J, 1): X = ASC(X$)
      IF X$ = "." THEN PER = PER + 1
    WEND
    T = VAL(MID$(A$, I + 1, J - I))
    T = T + T * P: T = INT(T * 100 + .5) / 100
    PRINT MID$(STR$(T), 2);
    I = J - 1: PER = 0
  END IF
  LOOP UNTIL I >= L
  READ A$
WEND
DATA "THE CURRENT COST OF BUCKLES IS"
DATA "3 FOR $2.50, OR $10.00 A DOZEN."
DATA "*END*"

```

```
'3.10
' This program will simulate tennis sets between 2 players.
,
RANDOMIZE TIMER
INPUT "NUMBER OF SETS ="; N
INPUT "% CHANCE A WINS A POINT="; P
DO
  IF RND(2) < P / 100 THEN A = A + 1 ELSE B = B + 1
  IF A > 3 AND A > B + 1 THEN
    PRINT "A"; : AG = AG + 1: A = 0: B = 0
  END IF
  IF B > 3 AND B > A + 1 THEN
    PRINT "B"; : BG = BG + 1: A = 0: B = 0
  END IF
  IF AG > 5 AND AG > BG + 1 THEN
    PRINT " (A)": W = W + 1: AG = 0: BG = 0
  END IF
  IF BG > 5 AND BG > AG + 1 THEN
    PRINT " (B)": L = L + 1: AG = 0: BG = 0
  END IF
LOOP UNTIL W + L = N
IF W > L THEN PRINT "PLAYER 'A' WON"; W; "SETS OUT OF"; N: END
PRINT "PLAYER 'B' WON"; L; "SETS OUT OF"; N
```