

## Sample Quiz Questions for Coding Contest

### Computer Number Systems:

How many 1's are in the binary representation of 2,017 (Base 10)?

$$2FACE_{16} - 18ABE_{16} = ? \text{ (Base 16)}$$

$$77_8 * 1234_8 = X_8 \quad \text{Solve for } X_8.$$

$$2X_{10} + 1010_2 = FE_{16} \quad \text{Solve for } X_{10}.$$

Boolean Algebra:

A, B, and C are representing variables of a Boolean Data Type

Operations you will see (Listed in Order of Operations Format) below

- NOT  $A = \bar{A}$  (a bar will be placed over the expression to be NOT'ed)
- A AND B =  $A * B = AB$  (AND is represented with Multiplication)
- A XOR B =  $A \oplus B$  (Exclusive Or is represented with "Ring Sum")
- A OR B =  $A + B$  (OR is represented with Addition)

How Many Ordered Pairs of (A, B) will make the following Boolean Expression be TRUE?

$$A\bar{B} + \bar{A}(A + B)$$

Which Ordered Triples of (A, B, C) will make the following Boolean Expression be TRUE?

$$AB \oplus C + \bar{B}\bar{C}$$

Simplify the expression to the least number of operators

$$\overline{C(\overline{AB + B\bar{C}})\bar{B}}$$

Simplify the expression to the least number of operators

$$\overline{AB + \bar{A}\bar{C}}$$

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Trace the Algorithm.

What is the value of X when the algorithm is completed?

```
X = 0, A = 7, B = 6, C = 15
if (A + B < C) AND (B > C) then X = 1 else X = 2
if (C < B) AND (C > A) OR (B+C > A) then X = X + 20 else X = X + 20
```

What is the value of S when the algorithm is completed?

```
S = 0
for J = 1 to 9 stepping 3
  for K = J + 1 to 9 stepping 4
    for L = K + 1 to J stepping -3
      S = S + L
    NEXT L
  NEXT K
NEXT J
```

What is stored in the array/list when the algorithm is completed?

Be sure to label all your used index values in your final answer.

(sqrt → square root; int → largest integer without going over the argument.)

```
for J = 0 to 100 step 10
  a[j/10] = int(sqrt(j))
```