1. **What Does This Program Do - Looping**

   When the following program is run with \( X = 20 \), what is the final value of \( C \)?

   ```
   10  C = 0
   20  D = X - 1
   30  IF X/D <> INT (X / D) THEN D = D - 1 ELSE C = D
   40  IF C = 0 THEN GOTO 30
   50  END
   ```

2. **Boolean Algebra**

   Simplify completely

   \[ \overline{X} (X + \overline{Y}) + \overline{Y} (\overline{Y} + \overline{Z}) + \overline{Y} \]

3. **Boolean Algebra**

   List all ordered pairs \((A, B)\) that make the following expression TRUE.

   \[ \overline{A} + AB + \overline{A}B \]

4. **Bit String Flicking**

   Evaluate

   \((\text{LSHIFT} - 2 (\text{LCIRC} - 2 (\text{RSHIFT} - 1 10100 ))))\)

5. **Bit String Flicking**

   How many different values of \( X \) (5 bits long) satisfy the following equation?

   \[ 00110 \text{ OR } X = 10110 \]
### 6. Computer Number Systems

Solve for $X_2$

$$X_2 = A1_{16} - 567_8$$

### 7. Boolean Algebra

Simplify completely

$$(X + Y)(X + Y)$$

### 8. Boolean Algebra

List all ordered triples (A,B,C) that make the following expression FALSE

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

### 9. Bit String Flicking

Evaluate

$$\text{RSHIFT} - 2 \ (\text{RCIRC} - 8 \ (\text{RSHIFT} - 2 \ (10011)))$$

### 10. Bit String Flicking

How many values of $X$ (5 bits long) satisfy the following equation?

$$(\text{RSHIFT} - 1 \ X) \ OR \ 10110 \ AND \ 00101 = 00101$$