1. This program finds the largest factor of \( X \), less than \( X \), by counting down from \( X \) until it finds a factor. The loop ends when \( C \) changes from zero.

\[
X = \max \text{ integer } y \text{ such that } y \cdot \text{divisible by } X, y < X.
\]

2. \( \bar{X}(X + \bar{Y}) + \bar{Y}(Y + \bar{Z}) + \bar{Y} = XX + X\bar{Y} + YY + Y\bar{Z} + \bar{Y} = 0 + XY + \bar{Y} + \bar{Z} + \bar{Y} = \bar{Y}(X + 1 + \bar{Z}) = \bar{Y} \)

3. \( \bar{A} + AB + A\bar{B} = \bar{A} + A(B + \bar{B}) = \bar{A} + A = 1 \). The 1 denotes that the expression is always TRUE. All 4 possible inputs must be listed.

4. Working from the inside out:
   
   \[
   \begin{align*}
   \text{RSHIFT} &- 1 10100 = 01010 \\
   \text{LCIRC} &- 2 01010 = 01001 \\
   \text{LSHIFT} &- 2 01001 = 00100
   \end{align*}
   \]

5. Let \( X = abcde \). The equation becomes \( 00110 \text{ OR } abcde = 10110 \). Consider the equation bit by bit.
   
   0 OR a = 1 implies a = 1
   0 OR b = 0 implies b = 0
   1 OR c = 1 implies c can be either a 1 or a 0
   1 OR d = 1 implies c can be either a 1 or a 0
   0 OR e = 0 implies e = 0

(1, 0, *, *, 0) gives 4 possible solutions