

2. What is the two's complement representation of 68 in 8-bit, 16-bit, 32-bit and 64-bit notations?

a) to binary

$$\begin{array}{r}
 68 \div 2 \\
 0 \quad 34 \div 2 \\
 \quad 0 \quad 17 \div 2 \\
 \quad \quad 1 \quad 8 \div 2 \\
 \quad \quad \quad 0 \quad 4 \div 2 \\
 \quad \quad \quad \quad 0 \quad 2 \div 2 \\
 \quad \quad \quad \quad \quad 0 \quad 1
 \end{array}$$

$$1000100_2$$

b) Flip the bits

$$\begin{array}{r}
 1000100 \\
 0111011
 \end{array}$$

c) Add one

$$\begin{array}{r}
 0111011 \\
 +1 \\
 \hline
 0111100
 \end{array}$$

$$8\text{-bit} - 00111100$$

$$16\text{-bit} - 0000000000111100$$

$$32\text{-bit} - 00000000000000000000000000111100$$

$$64\text{-bit} - 0000000000000000000000000000000000000000111100$$