

CSC 230 Lab1  
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3. There are 194 students registered in CSC 230, what is the minimum number of bits needed to represent this number in binary (assume it is an unsigned number)?

4. Convert the following numbers:  
a. 0b1001101 (unsigned) to decimal

b. 63 to binary and hexadecimal

5. Convert the following numbers:  
a. -63 to binary (using 2's complement notation) and then to Hex

b. 0b101011 (2's complement) to decimal

c. 0b001110 (2's complement) to decimal

6. What are the minimum and maximum values (in decimal) represented by a 4-bit binary number: a) as an unsigned number? b) as a signed number? How about 8 bits, 16 bits, k bits?

9. What is the mask to be used if we want to clear bits 2, 3, 5 and 7 of a byte?

$$\begin{aligned} 3. \quad 194/2 &= 97+0 \\ 97/2 &= 48+1 \\ 48/2 &= 24+0 \\ 24/2 &= 12+0 \\ 12/2 &= 6+0 \\ 6/2 &= 3+0 \\ 3/2 &= 1+1 \end{aligned}$$

0b1100010  
8 bits

$$\begin{aligned} 4b. \quad 63/2 &= 31+1 \\ 31/2 &= 15+1 \\ 15/2 &= 7+1 \\ 7/2 &= 3+1 \\ 3/2 &= 1+1 \end{aligned}$$

0b11111111  
0x3F

$$\begin{aligned} 4. a. \quad 1 \times 2^6 &+ 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^0 \\ &= 64 + 8 + 4 + 1 \\ &= 77 \end{aligned}$$

$$\begin{aligned} 5a. \quad 63 &= 0b0111111 \\ -63 &= 0b1000000 \end{aligned}$$

$$\begin{array}{r} + \quad 1 \\ \hline 0b1000001 \\ = 0xC1 \end{array}$$