

**COMP 122/L
Summer 2023**

More Number Representation (Answers)

1.) In decimal, how much is a 4 in position 3 worth? Write out a formula expressing this value.

$$4 * 10^3$$

2.) In binary, how much is a 1 in position 2 worth? Write out a formula expressing this value.

$$1 * 2^2$$

3.) In hexadecimal, how much is a B in position 4 worth? Write out a formula expressing this value.

$$11 * 16^4$$

4.) Convert decimal 56 to hexadecimal. You could either follow the conversion algorithm, or convert to binary, and then convert the binary to hexadecimal.

$$56 \% 16 = 8$$

$$56 / 16 = 3$$

$$3 \% 16 = 3$$

$$3 / 16 = 0$$

0x38

5.) Convert hexadecimal $0x2AC$ to binary. As a hint, using the table will probably be easiest.

0010 1010 1100

6.) Shift 0000 1100 one position to the left, forming an 8-bit result. What effect did this have on the number's value?

0001 1000. Multiplication by 2.

7.) Shift 0000 1100 one position to the right, forming an 8-bit result. What effect did this have on the number's value?

0000 0110. Division by 2.

8.) What is -4 in a binary two's complement representation? Express your answer in 8-bit binary. Show all steps.

0000 0100 => (flip bits)
1111 1011 => (add one)
1111 1100

9.) What is -13 in a binary two's complement representation? Express your answer in 8-bit binary. Show all steps.

0000 1101 => (flip bits)
1111 0010 => (add one)
1111 0011