

Homework #1: Number representation and C Program

(100 points)

Not a group assignment, you should work alone on this homework!

(Due on September 10, in Class)

1. Binary and Hexadecimal (10 points)

- a. What binary number does the following hexadecimal number represent?
0x 7FFFFFFA
- b. What hexadecimal number does the following binary number represent?
0b 1100 1010 1111 1110 1111 1010 1100 1110

2. Number Representation (64 points)

Assume we are dealing with 8 bit numbers for this problem. Fill in the following table according to the representation specified in the header of each column. If you are given a binary or hex number, convert it to decimal. If you are given a decimal value, please convert it to a hex. Put n/a if the number can not be converted.

	Unsigned	Sign and magnitude	One's complement	Two's complement
0b11111110				
0b00000001				
0X0F				
0xFF				
25				
-25				

128				
-128				

3. Programming in C (26 points)

Write a function, `invert(x,p,n)` that returns `x` with the `n` bits that begin at position `p` inverted, leaving the others unchanged. For example, if `x` is `0b1001`, `n = 1` and `p = 1`, `invert(x,p,n)` would return `"0b1011"`. We can see that 1 bit at position 1 was inverted. Another example, if `x` is `0b11001011`, `n=3` and `p=2`, `invert(x,p,n)` would return `"0b11010111"`.