CS 367 - HW #3

Section 001: Due Wed(9/21) Before Class

Section 003: Due Thu(9/22) Before Class

This is a paper-and-pencil assignment. Please **submit a hard copy to the instructor before class**, You may work on this **alone or with a partner** and turn in one copy with both names and G numbers.

1. (40 pts) Converting between representations
   Fill in the tables below. If it is not possible to represent a value, explain why. Use 8 bits for Binary. Use twos complement for signed numbers.

Decimal	Unsigned		Signed	
	Binary	Hex	Binary	Hex
-155				
-50				
124				
208				

Binary	Decimal if Unsigned	Decimal if Signed
0110 0001		
0101 1111		
1001 1011		
1101 0111		

2. (20 pts) Integer Addition
   Give the 8 bit binary result for each addition of two 8 bit numbers. Considering both signed (twos complement) and unsigned arithmetic, is the result a legal number? Characterize each as:
   1. Correct for both signed and unsigned representations
   2. Correct for signed and incorrect for unsigned representations
   3. Correct for unsigned and incorrect for signed representations
   4. Incorrect for both signed and unsigned representations

   - 10011010 + 10100111 =
   - 11111101 + 00011001 =
   - 01100101 + 00101101 =
   - 00110001 + 00100010 =
   - 01011011 + 00111010 =

3. (40 pts) Floating Point
   Assume a 12 bit floating point representation which uses the first bit as a sign bit, the next 6 for the exponent and the last 5 for the fraction. The bias is 31. Fill in the table below.

Bit representation	s	exp	E	frac	M	Value
0 011000 01011				11/32		
1 100111 10010						
0 000000 11110		0				
	0		4		48/32	

						52.0
						11/64

What is the bit sequence and value for the largest possible normalized value?

What is the bit sequence and value for the smallest possible (non-zero) positive normalized value?

What is the bit sequence and value for the largest possible de-normalized value?

What is the bit sequence and value for the smallest possible (non-zero) positive de-normalized value?