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Homework 4

CS/ECE 252 Section-2 (MWF 11:00)

Assigned on October 5th
Due on Wednesday, October 14th by the beginning of class (11 AM)
Submit by hard copy. Neat and legible handwriting is preferred.

1. "There are 10 types of people in the world: those who understand binary and those who don't." What happened to the other 8 types of people? **(1)**

2. Convert the following decimal numbers to binary (unsigned) and hexadecimal. Use the minimum number of bits/symbols required. **(2)**
    a. 10
    b. 147

Decimal	**Unsigned Binary**	**Hexadecimal**
10		
147		

3. Convert the following binary (unsigned) numbers to hexadecimal and decimal. Use the minimum number of symbols required. **(2)**
    a. 101
    b. 1111011011

Unsigned Binary	**Hexadecimal**	**Decimal**
101		
1111011011		

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4. What is the largest integer, smallest (most negative) integer, and the number of integers you can represent with a nibble (4 bits), when using unsigned integer, signed magnitude, one's complement, and two's complement representation? The first row has been done for you.

(2)

Notation	**Largest Integer**	**Smallest Integer**	**Number of Integers**
Unsigned Binary	15	0	16
Signed Magnitude			
~~**One's Complement**~~	Removed	Removed	Removed
Two's Complement			

5. Removed

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6. What is the largest integer (Decimal value) that can be represented by a bit, a nibble, a byte, and a word? Assume all binary values are unsigned. Show how you came to your answer (Hint: take a look at the method for converting numbers in Chapter 4.3, using the question "How Many?").

(2)

Binary Width	**Largest Integer Value**
Bit	
Nibble	
Byte	
~~**Word**~~ Removed	Removed

7. a) Convert 101.101 from unsigned fixed point representation to decimal. **(1)**

b) Convert 72.375 from decimal to unsigned fixed point binary. **(1)**

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8. Assuming two's complement notation, perform the following : **(4)**
    a. 11000011 + 00100011
    b. 01000011 + 00100011
    c. 11000011 – 00100011
    d. 01111111 + 01111111

Assume your answer must also use only eight bits and are in two's complement notation. Do all the above operations produce the expected answer? If not, which ones have problems, and why?

9. What would the following result in? **(4)**
    a. 10010001 & 10011110
    b. 10010001 | 10011110
    c. ~10010001
    d. x ^ x (x is an 8-bit binary number)