Homework #1 – Pre Test

1. Convert the following fixed point numbers to binary fixed point. Give both the actual values, and normalize the values so that they have a binary 1 as the value for the left of the decimal point.

    a) 7.25
    b) 13.5
    c) 0.5625
    d) 0.125
    e) 127.625
    f) 51,025.025
    g) 7.1
    h) 5.2

2. What does the result of 127.625 tell you about 16 bit fixed point numbers.

3. What do the result of values 7.1 and 5.2 tell you about decimal fixed point number and binary fixed point numbers in general.

4. What is a signed magnitude number? Specifically, define ***in your own words*** *a magnitude.* Do ***not*** put a definition from the web. Anyone can copy text from a web site. Not everyone understands a signed magnitude number.

5. Convert the following from decimal to excess 127 format. Write your answers as hexadecimal digits.

    a) -4
    b) 4
    c) -127
    d) 7
    e) -7

6. Convert the following numbers from decimal to excess 1023 format. Give the answers as hexadecimal numbers (3 bits, 4 bits, 4 bits)

    a) -4
    b) 4
    c) -7
    d) 7

7. Why would you use excess 127 format rather than two's complement?

8. Single precision floating point numbers have 7 digit decimal precision and double floating point numbers have 15 digit precision. Explain how these precision values are arrived at, and what they mean.

9. Convert the following numbers to IEEE 754 single precision numbers. Give your answers as hexadecimal numbers (do not give me binary, I cannot read it accurately. I WILL misread it and you WILL lose points).

    a) 7.25
    b) 13.5
    c) 0.5625
    d) 0.125
    e) 127.625
    f) 51025.025

10. For each of the following truth tables:

    a) Give the DNF equation for the table.
    b) Give the minimal equation.
    c) Using Boolean algebra show the two Boolean equations are equivalent.
    d) Draw the circuit in Logisim. Be prepared to draw the circuit by hand.

A	B	C	f(A,B,C)
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

A	B	C	f(A,B,C)
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

A	B	C	f(A,B,C)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1