CPSC 2500
Computer Organization
Homework 2 (100 points)
Due: October 20, in class

NOTE: Please write/print your answers to the following questions and submit it in class on Oct 20 (Friday). Please **DO NOT** submit on Canvas or via email. This assignment is to be done individually; you can discuss the questions with your classmates, but you should write your answers independently.

Problems 1, 2: Complete the truth tables that corresponds to each of the combinational functions listed below.

1. (16 points) F(X, Y, Z) is true when exactly one of the following two conditions is true:

a. X is false
b. both Y and Z are false

X	*Y*	*Z*	*F*
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

2. (16 points) F(A, B, C, D) is true when there are two or less 1s among the four inputs and false otherwise.

A	*B*	*C*	*D*	*F*
0	0	0	0	
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	

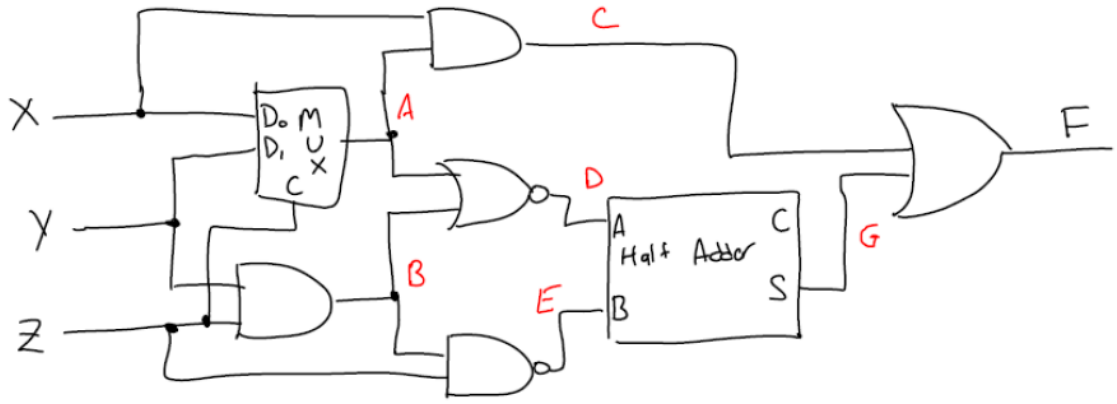
3. Convert the following real numbers into single precision IEEE floating point format. Give the final answer in hexadecimal and specify: the sign bit, exponent bits, and significand bits. Show your work. (6 +6)

A. 99.25
B. -100.75

4. Compute the decimal equivalent of the following IEEE single precision floating point numbers. Show your work. (6 + 6)

A. 0x40980000
B. 0x40f40000

5. Complete the truth table below for the following circuit. List the values in order, i.e., from 0 to the maximum number. (18 points)



X	*Y*	*Z*	*A*	*B*	*C*	*D*	*E*	*G*	*F*
0	0	0							
0	0	1							
0	1	0							
0	1	1							
1	0	0							
1	0	1							
1	1	0							
1	1	1							

6(a) Write a Boolean expression in sum of product form for the following truth table. (10 points)

A	B	C	Output
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

6(b) Simplify the expression in 6(a) using Boolean algebra properties. Show your work. (8 points)

6(c) Draw a simplified circuit diagram based on the simplified expression in 6(b). (8 points)