Cosc 2P12
Assignment 1

(Due date for assignment is Thursday October 4th,4:00 p.m. ., Late date Tuesday October. 9th, 4:00 p.m.)

You must show your rough work for each question to obtain full marks. Normally an answer without the necessary work showing how that answer was obtained will result in a minimal mark.

1). Convert the following using any method available.

a) 630 base 10 to base 2
b) 630 base 7 to base 2
c) 630 base 6 to base 2
d) 10101000100010010 base 2 to base 4 , 8, 16, 32
e) 0xF02C to base 2

2). Using long division convert 0001010111000110 to base 10.

3. Using long division convert 100100111 to base 5.

4. Using 10's complement arithmetic, perform the following operations.

a) 223 - 146
b) 146 - 150

5. Use 2's complement arithmetic on the following signed integers to obtain the result

a) 001010 + 000111
b) 001010 – 000111
c) 000111 – 001010
d) 000111 – 101010

6. Convert the following floating point number -426.552 base 10 to a normalized binary floating point number, and then to IEEE FPS standard form.

7. Given the following, use Boolean Algebra to reduce them to their simplified form. For each line of the production, state what law you are using to attain the result.

a) C +(BC)'
b) (A + C)(AB + AB') + AC + C

8. For each part in the above question, implement the original and reduced form in Logic Circuit, both should use the same input, but have their own output. If you have reduced the equation correctly, the output should match between the reduced and non-reduced form.

9. In Logic Circuit implement a 2 to 4 decoder, then package this decoder with proper inputs and outputs defined. For marking purpose, print the unpackaged circuit.

10. Using, the above decoder package as a component, create a package creating a 3 to 8 decoder. For marking purpose, print the unpackaged circuit, exception being the component from question 9.

11. Using the above 3 to 8 decoder package, create an 8 to 1 multiplexer, package it up. For marking purpose, print the unpackaged circuit, exception being the component from question 10.

12. Using the multiplexer package from question 11, implement the majority function from Lab 1. Hint: tie inputs to the Mux high or low as appropriate. For marking purpose, print the unpackaged circuit, exception being the component from question 11.

13. Below is a truth table, Use a Karnaugh Map to find the reduced form.

D	C	B	A	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

Submission

This submission will be physically submitted due to the nature of the material. Thus, it will be your responsibility to ensure that it is printed and submitted in due course prior to the due date as listed above.

A portion of this assignment may be hand written/drawn as appropriate. Please remember, that the marker must be able to read your writing, so it is important things be done neatly. If you would rather type it out, then so much the better. Make the marker happy!!!

- Your submission should be contained in a large (8.5 inch x 11 inch) envelope.

- **Cover Sheet** completely filled out, available from: "http://www.cosc.brocku.ca/forms/cover" **Note**: your assignment will not be marked unless one is submitted with the assignment on the assignment due date. This should be stapled to the outside of the envelope.
- Printout of your logic circuit diagrams, with proper identification on each circuit printout. See lab 1.
- Neatly written/printed/typed assignment material. Labelled, page numbered; stapled together.

The End