EMTR-2011: Microcontrollers and Digital Logic
Assignment 1

Due date: 1:00PM, Wednesday, Sept 25

Question 1

Do the following conversions:

(1) 11101101_2 to decimal.

(2) 101011010111 to hex.

(3) 32BH to binary.

(4) The following hexadecimal numbers to decimal.

(a) 6B2H;

(b) 9F2EH

(5) The following decimal numbers to hex:

(a) 75;

(b) 938;

(c) 2048

Question 2

Use 2's complement method to do the following subtractions:

(a) 11011 - 10101

(b) 110010 – 111001

Question 3

Verify the following functions

(a) $\overline{x \cdot y} = \bar{x} + \bar{y}$ (De Morgan's law)

(b) $x \cdot y + y \cdot z + \bar{x} \cdot z = x \cdot y + \bar{x} \cdot z$ (Consensus)

Question 4

(a) Design a logic circuit with two inputs, x_1 and x_2, with required behavior shown in the truth table.

x_1	x_2	f
0	0	1
0	1	0
1	0	1
1	1	1

(b) Use the Karnaugh map to derive the circuit output.

Question 5

Construction the Karnaugh maps based on the following truth tables and derive the circuit outputs.

(a)

x_1	x_2	x_3	f
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

(b)

x_1	x_2	x_3	f
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1