University of Maryland Baltimore County
Department of Computer Science and Electrical Engineering

CMPE 212, Principles of Digital Design

Assignment #1 Due: Wed 2/10/2016

Question 1: *(20 Points)*

Convert each of the following decimal numbers to binary, octal, and hexadecimal numbers (You MUST show the conversion steps).

(a) 0.1875
(b) 915
(c) 7250.8
(d) 0.65
(e) 174.25

Question 2: *(20 Points)*

Convert each of the following unsigned binary numbers to octal, hexadecimal, and decimal numbers using the most appropriate conversion method (You MUST show the conversion steps).

(a) 0.1011
(b) 111100
(c) 110100.1001
(d) 0.01001
(e) 11001.101

Question 3: *(12 Points)*

Find the 8-bit two's complement representation of each of the following decimal numbers.

(a) -138
(b) 89
(c) 0
(d) -59
(e) 127
(f) -213

Question 4: *(24 Points)*

The following pairs of numbers A and B are in **2's** complement representation with the left most bit indicating the sign. Calculate (A + B), (A – B), (- A + B), and (– A – B) for each pair using 8-bit **2's** complement binary arithmetic. Check your results by decimal arithmetic. Explain any unusual results if there are any.

(a) 10000000, 01111111
(b) 11101010, 101011
(c) 1010101, 1000
(d) 1101011, 0111010

Question 5: *(24 Points)*

The following pairs of numbers A and B are in **one's** complement representation with the left most bit indicating the sign. Calculate (A + B), (A – B), (- A + B), and (– A – B) for each pair using 8-bit **one's** complement binary arithmetic. Check your results by decimal arithmetic. Explain any unusual results if there are any.

(a) 11101010, 100111
(b) 10111010, 11010
(c) 1110101, 0101010
(d) 10000000, 01111111