**CSCI 360-2/PE1 Assignment 2 – Binary, Hexadecimal and Absolute Addresses Fall 2020**

**60 points**

Do not use a calculator to complete this. You are required to *show your work*. It is important that you know how to do what is included in this exercise without a calculator as you will be asked to do these types of conversions and binary or hexadecimal arithmetic on quizzes and exams.

You may NOT work with someone else on this assignment! Do your own work!

To complete and submit this assignment, please use a text editor like Notepad++, Notepad or Wordpad and use a non-proportional font like Source Code Pro or Courier New. If you must, you may submit handwritten work but please write very carefully and clearly, lining up columns, and submit easy-to-read .jpg files or, better yet, submit your scanned handwritten work as .jpg files.

*Please type or put your name, CSCI 360, Fall 2020, and the due date (in that order and on four separate lines) in the top* ***right*** *corner of the first page of the text document you submit.*  Again, please type or write very clearly, lining up any columns necessary and be sure to indicate which question you are answering. If you can change the color of the font for just your answers to red, please do so.

Once again, you must SHOW your work! Each letter is worth 2 points.

1. Convert the following **unsigned binary** numbers to their decimal representations (8 points):

  a. 1001

b. 11110

c. 1011011

d. 11111

1. Convert the following **decimal** numbers to both their hexadecimal **and** binary representations (8 points):

a. 25

b. 345

c. 141

d. 4092 

1. Convert the following **unsigned hexadecimal** numbers to their decimal representations (8 points):

a. 1B

b. FE

c. BD9

d. B39

1. Do the following **unsigned binary** arithmetic giving the answer in binary (8 points):

a. 10111 + 10101

b. 11001 + 01101

c. 10101 - 00011

d. 11001 - 1011

1. Do the following **unsigned hexadecimal** arithmetic giving the answer in hexadecimal (8 points):

a. 827D + 1C72

b. E2D + B01

c. FC19 – 3A59

d. 1E2C – 3C1

1. Do the following arithmetic as if these were **five-bit signed binary representations** and indicate if overflow occurs and, if so, why. Note: Remember that you want to add. So, for signed subtraction, convert the subtrahend (the number being subtracted) to its 2's complement and add it. Do this whether the subtrahend is negative OR positive! (8 points)

a. 10110 + 01101

b. 10110 - 11011

c. 11011 + 01011

d. 11111 - 01111

1. Assume that

Register 0 contains 00000022  
Register 1 contains 00001028  
Register 7 contains EC0035D1  
Register 9 contains 00019CF2

If they are valid, calculate the absolute D(X,B) addresses for the representations below and, if they are not valid, explain why (12 points):

a. 492(1)

b. 51(7,0)

c. 16(9,1)

d. 12(0,2,7)

e. 231(7,1)

f. 112(,9)