Binary and C Intro Assignment (Learning)

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Due Date: Wednesday, February 2nd at 10:00 am.

1. (12 points) **Converting Bases.** Convert the following numbers to the specified base.
   (a) (2 points) Convert 209_{10} to binary.

   $$209_{10} \rightarrow 11010001_2$$

   (b) (2 points) Convert 192_{10} to hexadecimal.

   $$192_{10} \rightarrow 11000000_2 \rightarrow C0_{16}$$

   (c) (2 points) Convert 10110001_2 to decimal.

   $$10110001_2 \rightarrow 177_{10}$$

   (d) (2 points) Convert 1001101_2 to hexadecimal.

   $$01001101_2 \rightarrow 4D_{16}$$

   (e) (2 points) Convert $D3A7_{16}$ to decimal.

   $$D3A7_{16} \rightarrow 54183_{10}$$

   (f) (2 points) Convert $83EF_{16}$ to binary.

   $$83EF_{16} \rightarrow 1000001111101111_{16}$$

2. (4 points) **Binary Addition.** Show how to add 10001111_2 and 01100101_2 using binary arithmetic.

$$\begin{array}{r} 1111 \\ 10001111 \\ +01100101 \\ \hline 11110100 \end{array}$$

3. (4 points) **Binary Multiplication.** Show how to multiply 100110 and 11001 using binary arithmetic.

$$\begin{array}{r} 100110 \\ +\ 11001 \\ \hline 100110 \\ 0000000 \\ 00000000 \\ 100110000 \\ +1001100000 \\ \hline 1110110110 \end{array}$$

4. (4 points) **Circuits.** Create the truth table for the following circuit:

$$\bar{X}\bar{Y}Z + \bar{X}YZ + X\bar{Y}$$

X	Y	Z	Out
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

5. (16 points) **C.** Write C code that generates a list of random integers and computes the mean (as a real number). Your program should take as input two parameters, the length of the list, and a seed to generate the random numbers. It should print out the list of integers and the calculated mean. Submit your code, as well as the makefile you used to compile it.

My code can be found here
`https://github.com/BeccaLuff/Binary-and-C-Intro-Assignment`