Number Systems, Memory, and Circuits
Due: January 28, 2018

QUESTIONS

1. Given 8 random bits forming a byte, can you determine whether the byte represents an integer or a character? Why?

2. Assume we have CPU instructions that look like this:
   load register, address
   save register, address
   Where the instruction **load** saves the data pointed to by the address into the register, and the instruction **save** writes the data from the register into the location pointed to by address.

   Assume at address 52 is the beginning of a string "ABC" and at address 1 is the printer.

   Write pseudo-C code that uses the above CPU instructions to print the string to the printer (move each byte to address 1). You can use variables in place of register and address. You can assume the string ends with a NULL.

3. Perform the following conversion:
   a. 1023_{10} to Binary to Octal
   b. 10110110_2 to decimal to Hex

4. Perform the following binary operation assuming our resultant has a maximum of 8 bits:
   $00110110_2 + 01111001_2 - 00001100_2$
   Was there an overflow, a signed overflow, or no overflow?

5. Draw, on paper, the circuit for the following problem: Given a 3-bit absolute value integer number as input, the circuit has a single output wire that rings a bell when it is set to one. The output turns to one when the number is odd and greater than seven.

WHAT TO HAND IN

A PDF file with the answers to the above questions.

HOW IT WILL BE GRADED

Question 1: 5 points
Question 2: 5 points
Question 3: 8 points
Question 4 : 5 points
Question 5 : 7 points

Total points = 30

Each question is graded proportionally to how correct your solution is compared with the official solution.