Lab 3

Numbers, Instructions, Logical Operations
CS 350: Computer Organization & Assembler Language Programming
Due Sat Feb 16, 11:59 pm

Problems [50 points total]

1. [6 = 2 * 3 points]
   1a. Exercise 2.8 (translate hexadecimal to decimal)
   1b. What is the hexadecimal representation of 1010 0111 1100 0011 1101 1001 0110 1110 ?

2. [12 = 4 * 3 points] (translate MIPS code to C) Translate each line of MIPS code below into C, line by line. Use the same assumptions about registers as in Exercise 2.9 and write your answers using variables f, ..., A, and B.

   \[
   \begin{align*}
   \text{addi} & \quad \$s1, \$s0, 4 && \# \text{ ???} \leftarrow \text{you fill in} \\
   \text{lw} & \quad \$s2, 8(\$s6) && \# \text{ ???} \leftarrow \text{you fill in} \\
   \text{add} & \quad \$t0, \$s2, \$s1 && \# \text{ ???} \leftarrow \text{you fill in} \\
   \text{sw} & \quad \$t0, 12(\$s7) && \# \text{ ???} \leftarrow \text{you fill in}
   \end{align*}
   \]

3. [12 = 6 * 2 points] Exercise 2.9 (translate C code to MIPS)

4a-d. [8 = 4 * 2 points] Exercises 2.12.1 – 4 (overflow)

5. [3 points] (Numeric vs assembler representations of instructions) Exercise 2.14

6a-c. [9 = 3 * 3 points] Exercises 2.19.1 – 3 (Bit shifting and logical operations)
For Exercise 2.19.1, use an s11 of 8 bits instead of 44 bits.