컴퓨터구조 Homework-1 (Fall 2012)

1. 문제는 쓰지 말고 답만 쓸 것. 문제 쓰면 감점!

2. Hand-written only.

3. Later submission is not allowed for any reason.

1. Using a table similar to that shown in Figure 3.7, calculate the product of the unsigned 6-bit integers multiplicand=011010_{two} and multiplier=011101_{two} using the hardware described in Figure 3.6. You should show the contents of each register on each step.

2. Show the step-by-step result of multiplying multiplicand=001010_{two} and multiplier=101111_{two}, using Booth's algorithm. Assume multiplicand and multiplier are 6-bit two's-complement integers.

3. Using a table similar to that shown in Figure 3.11, calculate A=000000 111101_{two} divided by B=001000_{two} using the hardware described in Figure 3.12. You should show the contents of each register on each step.

4. Repeat Problem 3 using nonrestoring division algorithm.

5. In a Von Neumann architecture, groups of bits have no intrinsic meanings by themselves. What a bit pattern represents depends entirely on how it is used. X=$2B108000_{hex}$ is a bit pattern expressed in hexadecimal notation.
   (1) What decimal number does X represent if it is a two's-complement integer?
   (2) What decimal number does X represent if it is an unsigned integer?
   (3) If X is placed in the code segment, what MIPS instruction will be executed? Give the corresponding assembly instruction. [ref] MIPS manual, Volume II-A
   (4) What decimal number does the bit pattern represent if it is a floating point number? Use the IEEE 754 standard.

6. Write down the binary(or hexadecimal) representation of the decimal number -1024.125_{ten}, assuming the IEEE 754 single precision format.