

## Machine Organization and Assembly Language Programming

**Problem Set #1**

Due: Wednesday April 9th

1. By the due date, you should have read Chapter 1, Chapter 4 (Sections 4.1 to 4.3) and Chapter 3 (Sections 3.1 to 3.5)
2. At the same time as you read the MIPS ISA description, you should look at the Sloop ISA (Sloop will be the machine we will “implement” later on). As you will see Sloop has some commonality, and is less complex, than MIPS. See links from the Software page in the CSE378 home page or go directly to:  
<http://www.cs.washington.edu/homes/zahorjan/homepage/Tools/SMOK/SloopRef/sloop-spec.txt>
3. Later on this week or early next week, we’ll give you an assignment that you won’t have to turn-in on “Getting familiar with Spim”. Please do it!
4. Convert 511 into a 32-bit two’s complement binary number. Give the answer in hexadecimal.
5. Convert -1024 into a 32-bit two’s complement binary number. Give the answer in hexadecimal
6. What decimal number does this two’s complement binary number represent  
1111 1111 1111 1111 1111 1111 1010 0111
7. Chapter 4 Ex. 4.6 (you can use an expression of the form  $2^x + y$  for the decimal number if you find it convenient)
8. Chapter 4 Ex. 4.7 (you can use an expression of the form  $2^x + y$  for the decimal number if you find it convenient)
9. Chapter 4 Ex. 4.11
10. Assume a 8-bit register and a 2’s complement representation of integers.
  - What are the largest positive number and the smallest negative number that you can represent (give representations in 2’s complement and their values in decimal).
  - Give examples of adding two positive numbers with and without overflow and of subtracting a negative number from a positive number with and without overflow. Show the 2’s complement representation of the operands and the result in a manner similar to what is done in the book pp 220-221.