Name:_____

Homework #4 Computer Organization
Due: Oct. 11, 2011 (Tuesday) at 5 PM

1) Why do RAM memory chips use dynamic memory (capacitor based) instead of static memory (SR-latch based) eventhough dynamic memory has the drawback that it needs to be refreshed?

2) Why do RAM memory chips NOT use a register-file design for their implementation?

3) Write a MARIE assembly language program to solve the following problem.

For a set of numbers input by the user, calculate the sum of the positive numbers and the sum of the negative numbers. The program should output both sums. Scores should be input one at a time with a zero value (0) being used to signal the end of data (the zero value is acting as a "*sentinel*" value).

For examle, if you input the values: 10_{10} -5_{10} -30_{10} 15_{10} 20_{10} -1_{10} 0_{10}, then you program should output 45_{10} and -36.

Before you start writing MARIE assembly language, write a high-level language algorithm. THEN, translate it to MARIE assembly language.

You can download the MARIE simulator at: http://computerscience.jbpub.com/ecoa
Extract it (right-click on the .zip file and select "Extract All...") In the MARIE simulator folder, double-click on MarieSim (executable jar file) if you have Java installed (which you probably do for your web-browser).

In the MARIE folder, is a QuickGuide.doc file containing instructions on using the simulator. I have a more tailored/updated version at: http://www.cs.uni.edu/~fienup/cs1410f11/QuickGuide_UNI.pdf

You should turn in:
- Your answers to questions 1 and 2.
- a print-out of the listing of you program for question 3, e.g., hw4.lst. This file gets generated in the MARIE Assembler Code Editor when you select "Assemble | Assemble current file". You can print this listing directly from the MARIE Assembler Code Editor by select "Assemble | Show assembly listing" and clicking the "Print" botton. (You can also open the listing with WordPad and print it)
- a window capture of the MarieSim program after running your assembly language program with the input values: 10_{10} -5_{10} -30_{10} 15_{10} 20_{10} -1_{10} 0_{10} and the output showing 45_{10} and -36. You can capture this window by (1) right-clicking anywhere in the window to make it the "currently active" window, (2) while holding down the <Alt> key, press the <PrtScn> key to capture the window the Window's clipboard, and (3) open some word processor (Word, OpenOffice, etc.) and paste the image into the document. Add your name to this document before printing it.