National Sun Yat-Sen University
ASSEMBLY LANGUAGE AND MICROCOMPUTER
Homework #1
Tested in 10/9/2014

1. Translate the following C-codes into the assembly codes based on the simple MU0 instruction set. In addition, translate the assembly code into the binary code. The instruction ***STP*** should be placed at the end of your program to terminate the running of the program. You should describe your assumption and the initial contents of the memory when your program starts running.

   (a) int a, b, c;

   a=2*a+b-c+20;

   (b) int a, b, c ;

   ```
   if (a >b)
         c = a - b;
   else
         c = b - a;
   ```

2. Find out the number of cycles it takes MU0 processor to run your code for Homework 1.

3. Suppose we add a new instruction "**ADDI**" to the original MU0 instruction set, this new instruction can add an immediate value to the ACC register. Please find out the number of cycle count required for this new instruction. Furthermore, show the data flow of this new instruction execution based on the MU0 organization that is shown in Fig. 1.6 of the textbook.

4. Verify the control output signals used in MU0 to execute **JGE** and **ADD** instructions shown in Table 1.2 of textbook.

5. Implement the following 4x6 memory module by providing the detailed logic gate diagram. For simplicity, you can assume the basic storage element inside the memory module is D-flipflop.