EE2361 Fall 2014, HW1 Due 9/19/2014 before midnight.

NOTE: Please submit your homework electronically in a file (either pdf, word, open office) through moodle. I expect all code to have been run and tested in the MPLABX IDE environment before submission.

1- Translate the following piece of code to assembly. List test cases that you used to test the correctness of your program.

```
outputVal is a 16-bit variable (presumably at address 0x800)
a, b, c are also 16-bit variables

outputVal = -1 ; the content of memory location 0x800 is -1
if (a+b < c ) AND (a >= 100) then
      outputVal = 1;
else outputVal = 0;
```

Paste your code here, including variable definitions:
How did you test your program? Be specific about what values you put for a, b, c and what the output of the program was.

2- Similar to the above problem, but this time the two conditions are ORed instead of AND:

```
outputVal = -1 ; the content of memory location 0x800 is -1
if (a+b < c ) OR (a >= 100) then
      outputVal = 1;
else outputVal = 0;
```

Paste your code here:
How did you test your program?

3- Write a program to perform a 48-bit addition. The first 48-bit number is at address 0x800-0x805 (least significant byte first), and the second 48-bit number is at 0x806-0x80A. The result should be stored at w10-w12.

Paste your code here:
How did you test your program (does your test correctly check for the carry bit to be correctly propagated?)

4- Consider the following assembly program.

a- Write program memory contents next to each line (do manual conversion using the prog ref manual, but OK to use MPLAB to verify).
b- Show calculations for the destination address in the bra and goto instruction.
c- Show what fields in the instruction opcode correspond to W5 and ++ and [] in the instruction addc w3, #22, [w5++]

```
L1: mov     #123, w2
L2: dec     w2
    addc    w3, #22, [w5++]
    bra     nz, L2
    goto    L1
```

5- An array of 10 unsigned 16-bit numbers is stored at address 0x810. Write a program that uses indirect addressing to find the smallest number in the list. Store the value of the smallest number at address 0x800.

Paste your code here:
How did you test your program?

6- A list of ten 16-bit numbers is stored at address 0x800. Write a program to calculate the sum of the absolute difference between consecutive numbers and store it as a 16-bit number in w5. For example, for a list of four numbers 5, 9, 2, 4, the sum is |5-9| + |9-2| + |2-4| = 4+7+2 = 13. Use indirect addressing.

Paste your code here:
How did you test your program?