

Introduction to Microcomputers

Lab1

The goal of this lab is to use the arithmetic and logical instructions of PIC16F877A to evaluate some simple expressions and display the final result on the LEDs connected to PORTD on PICSIM Simulator.

Assignment

In this lab you are asked to implement the following C code in PIC16F877A assembly:

```
uint8_t x, y, z;  
uint8_t r1, r2, r3, r4, r;  
  
x = 5;  
y = 6;  
z = 7;  
  
r1 = (5 * x - 2 * y + z - 3);  
r2 = (x + 5) * 4 - 3 * y + z;  
r3 = x / 2 + y / 2 + z / 4;  
r4 = (3 * x - y - 3 * z) * 2 - 30;  
r = 3 * r1 + 2 * r2 - r3 / 2 - r4;  
  
PORTD = r;    // Display the result on the LEDs
```

Here are some test cases and the expected result:

x	y	z	r (decimal)	r (hex)	r (binary)
5	6	7	160	0xA0	10100000
6	7	8	177	0xB1	10110001
7	8	9	195	0xC3	11000011
8	9	10	212	0xD4	11010100
9	10	11	230	0xE6	11100110
10	11	12	247	0xF7	11110111

When implementing this code in assembly, you may use any number of temporary variables in addition to the given variables.

Test your code with other x, y, z values and make sure that it works. The TAs will test your code with different x, y, z values in the Lab. If your code computes the correct result and displays it on the LEDs, then you will get the full-credit. If your result is incorrect, you will not get any credit at all. **No partial credits will be given.** So, make sure that your code works correctly.