

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 = (4 * x + 3 * y - 2 * z - 5);
r2 = (x + 3) * 4 - 2 * y - z;
r3 = x / 2 + y / 2 + z;
r4 = (x + 2 * y - z) * 2 + 10;
r = 3 * r1 + 4 * 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	73	0x49	01001001
6	7	8	87	0x57	01010111
7	8	9	101	0x65	01100101
8	9	10	115	0x73	01110011
9	10	11	129	0x81	10000001
10	11	12	143	0x8F	10001111

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.