# **Lab-4**

**I/O port programming of PIC microcontroller using assembly language**

**Objective:**

In this lab students will learn

* How to configure pins of PIC as Input/output?
* How to address bits individually?
* Creating square waves of different duty cycles

**Theory**

Three types of registers are available in PIC microcontroller that are used for programming the ports. These are PORTx, TRISx, LATx. PORTx refers to any specific port. It can be A,B,C,D, and E. TRISx decides either we want to configure a particular port as input or output port. If we clear the contents of TRISx register, then the port acts as output port. If the contents of TRIS are set, then it will act as an input port. Upon reset all the ports act input ports. All ports do not have same number of pins. For example, PORTA has 7 pins. While PORTB,PORTC, PORTD are of 8 pins. PORTE has only 3 pins in 18 series microcontroller.

**Lab Exercise**

Write down a program for toggling all the pins of PORTB continuously with a certain delay. Take three different approaches to do the task.

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 Write a program for a PIC18F4550 chip to toggle all bits of PORTC and PORTD every ¼ of a second. Assume the crystal frequency of 4MHz. Show the detail of calculating the delay. Show the simulation results on PROTEUS.

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Write a program for creating a square wave of 50% and 75% duty cycle. Show the simulations on PROTEUS as well.

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A switch is connected to pin RB0 and an LED to pin RB7. Write a program to get a status of SW and send it to LED. Show the simulations on PROTEUS as well.

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Write a program to monitor the RB5 pin. When it is high, make a low-to-high-to-low pulse on RB3.

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