

Assignment #1

Buttons and Serial Port

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In this assignment, you will write a simple Program and run it on the PicsimLab Simulator. You will use the TeraTerm Terminal to communicate with PicsimLab Simulator. You will use the Buttons at PORTD to turn ON/OFF the Heater, Cooler(Fan), Relay 1, and LEDs at PORTD. Similarly, you will use commands sent from the Terminal to turn ON/OFF the Heater, Cooler(Fan), Relay 1 and LEDs at PORTD.

Task 1: Download and Install the Necessary Tools:

1. First watch the Recorded Demo posted on MOODLE under Unit 6: Serial Port

The Zoom recorded demo explains how to download and install the tools. It also demonstrates how to create a project, compile it, and run it

The link for the recorded lecture is also provided here:

Recorded Demo- Demo_MPLABX_XC8_PICsimLab_COM0COM_Oct26_Fall2023

Link:

https://najah.zoom.us/rec/play/g_7sT6OpjKD-iJfR4od91qAXj_4wHsigvtsn6xaxS18FKO_oE0MYx7wFd5oVoGVpybHddqooBQmMGXi0.lwYOlisOvR8HdDbX

2. Install the following Software Tools:

- Download and Install MPLABX 4.15
- Download and Install the compiler XC8.
- Download and Install the PicimLab Simulator
- Download and Install com0com from MOODLE (watch the Demo Video with the Link above.
- Watch the Video with link above and create a new project as explained in the demo video.
- Use the project **ser_Fall2023.X** to help you use the serial port.

*You can find the project in the folder **Serial Port Examples and BaudRateExcel** under unit6*

3. Write a program and run on the Simulator to do the followings:

Your Program will be an infinite loop that controls the Heater, Fan(Cooler), Relay 1, Relay and LEDs on PORTD either by the Serial Port or by the Push Buttons at PORTB. Of course it is possible to use both controls at the Same time (Serial and Buttons).

Control by Push Buttons at PORTB

Read the Buttons RB0, RB1, RB2, RB3, RB4 and RB5; one by one. If a button is pressed, then you need to take the action as described in the following table.

Make sure that you **denounce** the button, you can do that by using a delay of 250ms or so if any button is pressed.

	Button	Action
1	RB0	Clear. Turn Everything OFF Heater. Fan, Relay1,Relay2, and all LEDs on PORTD
2	RB1	Turn Off Heater, and Turn ON Cooler
3	RB2	Turn ON Heater, and Turn OFF Cooler
4	RB3	Toggle PORTD LEDs 0,1 and 6, 7on PORTD
5	RB4	Toggle PORTD LEDs 2,3,4,5on PORTD
6	RB5	Toggle Relay1 and Relay 2 ON/OFF

Control by Serial Port

Use the TeraTerm Terminal to send and receive the commands. Use COM2 for the Terminal and COM1 for the Simulator. (or whatever you called your COM Ports)

You must use **non-blocking** read as I used in the Example **ser_Fall2023.X**

Each Command composed of a single Letter(Character)

1. Read Commands

	Command	Action
1	g	Read PORTD , display as hex and binary
2	G	Read Heater, Cooler(Fan), Relay1 and Relay 2

Examples:

if G is received, display:

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Heater: ON           // if the heater is ON
Fan: Off             //if the Cooler is OFF
Relay1:              // if Relay1 is ON
Relay2:              // if Relay2 is ON

```

if g is received, display : (Value depends on Status of leds)

Example: if LEDS 6,7 ON, 5,4 OFF, 3 OFF, 2 ON, 1 OFF, 0 ON

You Should Display :

LEDs Hex: 0xC5 // Display the status of PORTD leds in Hex

LEDs Bin: 11000101 // Display the status of PORTD leds in Binary

2. Write Commands

	Command	Action
1	h H	Turn Off Heater, and Turn ON Cooler Turn ON Heater, and Turn OFF Cooler
2	c C	Turn Relay1 OFF Turn Relay1 ON
3	r R	Turn Relay2 OFF Turn Relay2 ON
4	d D	Toggle PORTD LEDs 0,1 and 6, 7on PORTD Toggle PORTD LEDs 2,3,4,5on PORTD
	z	Turn Everything OFF

Important Notes:

- Work in Groups of 2 or 1. Groups of 3 are not allowed
- Your code should be executed on the PicSimLab
- Test You commands through the Cute COM terminal that comes with the Simulator.