Driver Project 1: GPIO Control with MPLAB Simulator (Individual Project)

Due Date: As per D2L. Submit via D2L-Dropbox

Overview:

The aim of this lab is to become familiar with the MPLAB IDE, MPLAB's Simulator and writing basic C code to control the I/Os available on the PIC24F microcontroller in this class.

Assignment:

Using the PIC24F16KA101 (in simulation), implement a program that repeatedly reads the value of a set of digital input pins (i.e., it polls a set of input pins) and outputs the corresponding digit of your UCID number on a set of output pins (which we will imagine are connected to LEDs in the MPLAB simulator). You can use any IO ports in port A and port B for implementing the inputs and outputs in this project. However, note that ports multiplexed with external clock inputs (e.g., RA3) will not work as inputs by default unless the external clocks have been turned off, so you should avoid these. Clocks will be covered in a subsequent lecture.

You must explicitly configure and set the value for all nine outputs ("LEDs") even if the largest digit you have in your UCID is less than 9.

User input(s)	Output(s)	Example explanation
0000	Display nothing	No LEDs should be on
0001	Display 1st number in your UCID (Most significant number)	e.g., if this UCID number is 8, 8 LEDS should be on
0010	Display 2nd number in your UCID	e.g., if this UCID number is 0, no LEDS should be on
0011	Display 3rd number in your UCID	e.g., if this UCID number is 9, 9 LEDS should be on
0100	Display 4th number in your UCID	"
0101	Display 5th number in your UCID	"
0110	Display 6th number in your UCID	"
0111	Display 7th number in your UCID	"
1000	Display 8th number in your UCID	"
1001	Display 9th number in your UCID (Least significant number)	"
1010 – 1111	Display nothing	No LEDs should be on

Use the Stimulus feature in MPLAB Simulator to trigger user inputs. Use the IO pin feature in MPLAB Simulator to emulate the LEDs and display the output.

Deliverables:

This is an individual project. Each student should upload the :

1. A link to a video demo no longer than 5 mins long showing the following:
    a. UCID card placed in front of the computer with MPLAB running
    b. In a clear voice, narrate your UCID number and state the GPIOs used as inputs and outputs
    c. MPLAB window clearly setup showing the Code editor, Stimulus and IO pin tabs open together
    d. Demo of the code operation showing the following:
        i. LEDs under the IO Pin tab turning on and off for different inputs triggered/fired using the stimulus tab while the user is stepping through the code in simulator
        ii. Code working for all 11 situations as shown in the table above
    e. You can use YuJa, YouTube, or some other video hosting service, but it is your responsibility to ensure that this can be viewed by the teaching team
2. Zipped up file of the project. MPLAB projects can be zipped up by right clicking on the project and selecting package (See screenshot below). The zipped project is saved in the same project folder created by user.