Driver Project 1: GPIO Control with MPLAB Simulator (Individual Project) – 10 Points

Due on D2L on 23 Sept 2022

Assignment:

Using the PIC 24F16KA101, design a state machine to display your UCID on an array of 9 LEDs connected to output pins based on user inputs supplied into Digital input pins. 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. Clocks will be covered in a subsequent lecture.

User input(s)	Output(s)	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 consecutive 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 consecutive 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.

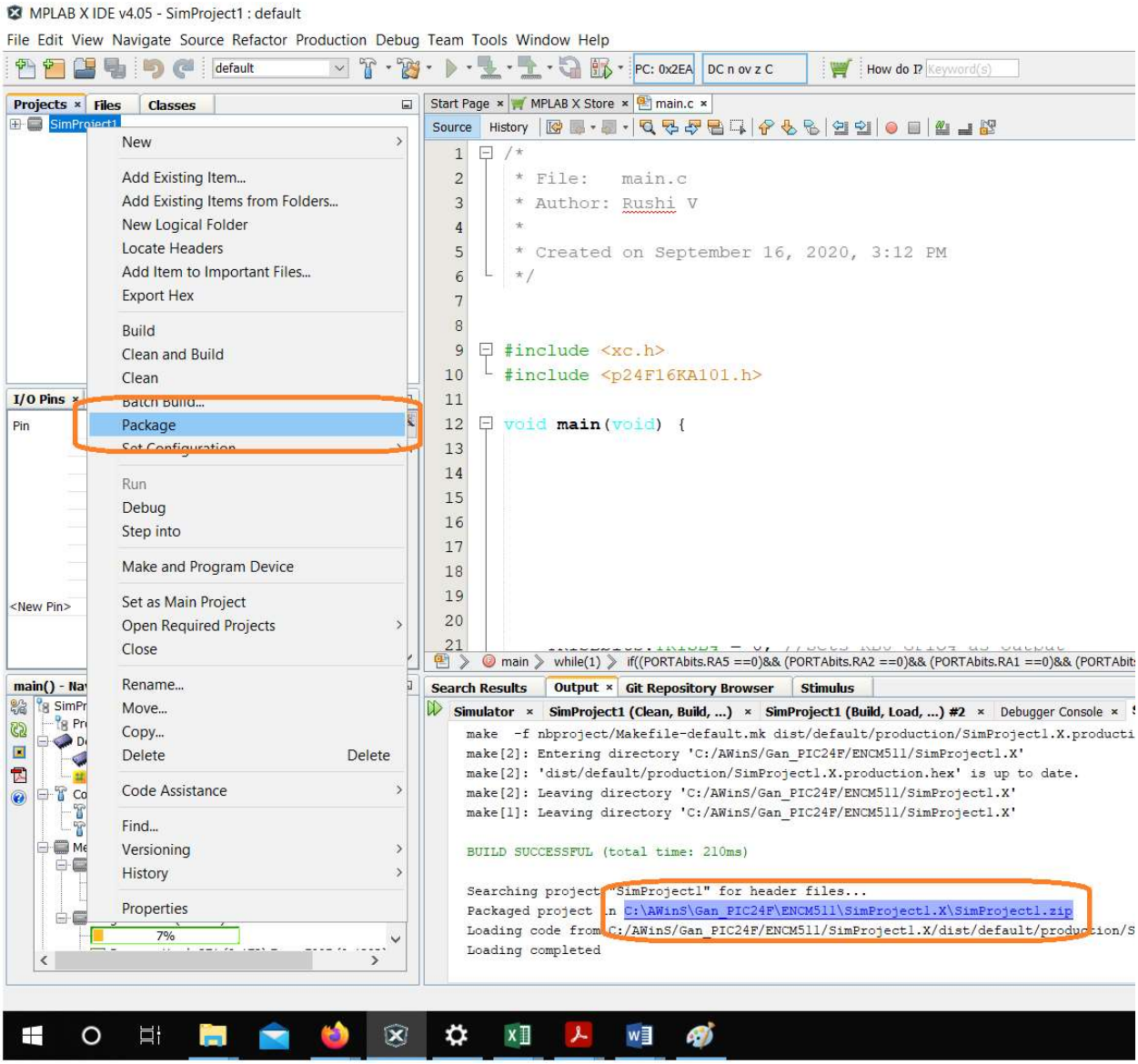
Deliverables:

This is an individual project. Each student should upload the following onto their respective D2L-Dropbox folder created for you.

1. A video demo no longer than 10 mins long showing the following:
    a. UCID card placed in front of the computer with MPLAB running
    b. In 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 states shown in the table above

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.



Grading rubric: (Total = 10 points)

IO port setup = 2 points
Proper code working = 6 points
Proper video and code upload format including proper code commenting = 2 points