ECE315 Introductory Microprocessor Laboratory

Lab 7

Embedded Software

1. Introduction

In Labs 1-6, you designed and assembled a fully custom PCB. Now you will write embedded firmware for the PSoC4 MCU to implement an arcade style game that tests the user's reflexes.

Your implementation of this game will be an individual assignment that will need to comply with the requirements found in this document.

2. Software Requirements

Lab 7 has been changed so that it is an individual assignment. You will create a game with the following requirements:

1. When the board is powered on, there will be a single LED enabled. This LED will be referred to as the Active LED.
2. The Active LED changes every 50mS.
3. The Active LED will rotate to the right (clockwise).
4. The user must press the button when the Active LED is located at one of the four green LEDs.
5. If the user presses the button while the Active LED is on a green LED
    i. Turn on the buzzer for 250mS with a 50% PWM signal that has a frequency of 2.5KHz
    ii. Delay for 1 Seconds
    iii. The game continues but the delay for moving the Active LED is decreased by 5 milliseconds.
6. If the user presses the button while the Active LED is on any non-Green LED, the game is over.
7. When the Game is over, ALL LEDs must flash On/Off at a rate of 1Hz.
8. The user can restart the game by pressing the button.

3. Software Development

After completing Lab6, you should have a project directory that will allow you to write software for your design.

If you are using a CAE PC, you will need to copy the project directory from the I: drive to the C: drive.

a. If you are using the CAE PCs, you will want to copy your project directory from the C: drive to the I: drive. CAE purges the C: drive every 48 hours.

```
cp -R /cygdrive/i/ece315 /cygdrive/c/Users/username/ece315
```

b. The provided starter code provides examples of how to control the LEDs, detect the button presses, and enable/disable the buzzer. You can also examine the PSoC4 HAL for additional information.

c. All of your code MUST be written in main.c

4. Saving Your Work

If you are using the CAE PCs, you will want to copy your project directory from the C: drive to the I: drive. CAE purges the C: drive every 48 hours.

```
cp -R /cygdrive/c/Users/username/ece315 /cygdrive/i/ece315
```

5. Demoing Your Software

You are required to attend the lab so that you can demo your implementation of the game to the ECE315 teaching staff. You will also turn in a copy of main.c into Canvas.