ENGR 478

Lab 5: GPIOs; Switches and LED Interfaces
Develop Your First Project

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Preparation

- Review the content of lecture 7, 8, 9

References

- Getting Started with the Tiva TM4C123G LaunchPad Workshop Student Guide and Lab Manual (Chapter 1 and Chapter 3) (iLearn -> Reference Materials -> TM4C123G_LaunchPad_Workshop_Workbook.pdf)
- TivaWare Peripheral Driver Library User's Guide (iLearn-> Reference Materials -> SW-TM4C-DRL-UG-2.1.0.12573.pdf)
- Tiva TM4C123GH6PM Microcontroller Data Sheet (iLearn-> Reference Materials)

Purpose

The purpose of this lab is to familiarize you with the TM4C123 microcontroller, GPIO configuration, switch and LED interface, and software development procedure. You will develop a complete system which allows the microcontroller to interface with two LEDs and a switch on the LaunchPad and then implement the designed system in C program.

System Requirements

The system has one input switch (SW1) and two output LEDs (red and blue LEDs). Overall functionality of this system is described in the following rules.

1) The system starts with the blue LED ON and the red LED OFF.

2) If SW1 is pressed, then the blue LED will be turned off, and the red LED will be toggled about every half second

3) If SW1 is not pressed, then the red LED will be off, and the blue LED will be toggled about every half second

Basically you need to figure out which IO ports you need to configure, and how to configure them. You also need to know how to implement specific delay, looping, and if-then.

Demonstration and Submission

You will have one week to complete the lab. You can discuss with your group members and complete the lab work together. Every group will need to write and submit a lab report to iLearn->Labs->Lab5 report submission. The lab report should include

- The students' names, emails and IDs

- System specifications (based on the system requirement, which ports do you need to configure, how to configure them, any special actions needed? How to generate specific delay?)
- The flow chart of your design
- The C program listing with **detailed comments for each line of code**. You are allowed to use PinMux and TivaWare library defined functions in your implementation.
- The execution results of your program (how did you evaluate your implementation and verify your system correctness? your observations, any supplemental images).
- Discussion and suggestions: Through your lab experiments, what have you learned? Do you have any suggestions for future labs, lectures or improvement on the learning experiences?

If you finish the lab experiments during the lab time, please demonstrate your results to the instructor. The instructor may ask questions regarding your program. After the demonstration, you can leave. **The latest demonstration time will be the beginning of next lab. The lab report is due at 6pm on the day of your next lab.**

Again, you can work with your group members on all the lab activities, but make sure you understand all the materials.