BBM 432 – Embedded Systems
Lab 2

Preparation

You will need a LaunchPad and access to TM4C123_LaunchPadUsersManual.pdf. In this lab, there will be no external circuitry.

Starter project

You can use the last week's lab file as the starter project.

Purpose

The purpose of this lab is to learn about the basic input/output architecture in your Launchpad. You will also use loops for time delaying and read inputs inside a loop.

System requirements

1) Make PF0 and PF4 inputs (switches) and PF1, PF2 and PF3 (leds) outputs. (Already done in Lab 1)
2) The system should start with the LEDs turning blue, red, green, blue, red, green and so on, staying for 0.5 second at blue, 1 second at red and 1.5 seconds at green. In this lab you are expected to measure time using loops. By decrementing a counter inside a loop, you wait a certain amount.
3) Each time the switch PF0 is pressed, the color order should reverse, i.e. to green, red, blue and so on. Staying times at for different colors should stay the same (1s at blue, 2s at red, 3s at green). Make sure that you do not sense the pressing of a switch multiple times.
4) In this lab, you are detecting the pressing of a button via polling. Do you think if it is a good practice? Are there any disadvantages? What is the alternative?
5) In this lab, you introduced delay via looping. Do you think if it is a good practice? Are there any disadvantages? What is the alternative?
6) How long does it take for a single iteration of the loop on the development board?

Simulation Mode

First run the lab in the simulator, as described in the last week's lab.

Measuring Time

Since you cannot easily estimate how long a loop takes, we expect you to adjust the time by using the built-in logic analyzer. You can measure time using the logic analyzer as described in the following video.

https://www.youtube.com/watch?v=zGX-3FEN5IY

You need to add PORTF.2 to watch the blue LED.

Launchpad

Next, you deploy it to the Launchpad as described in the last week's lab.