

Lab 4

CSE 379 LLB - Introduction to Microprocessors

Partner Name: Yicheng Luo, Xudong Liu

Partner Username: yluo25, xliu243

Lab Section: R4

Date: 02/20/2024

Division of Work

Yicheng Luo (yluo25):

Writing read_tiva_push_button, read_from_push_btns, documentation.

Xiudong (xliu243):

Writing illuminate_LEDs, illuminate_RGB_LED, documentation.

Program Overview

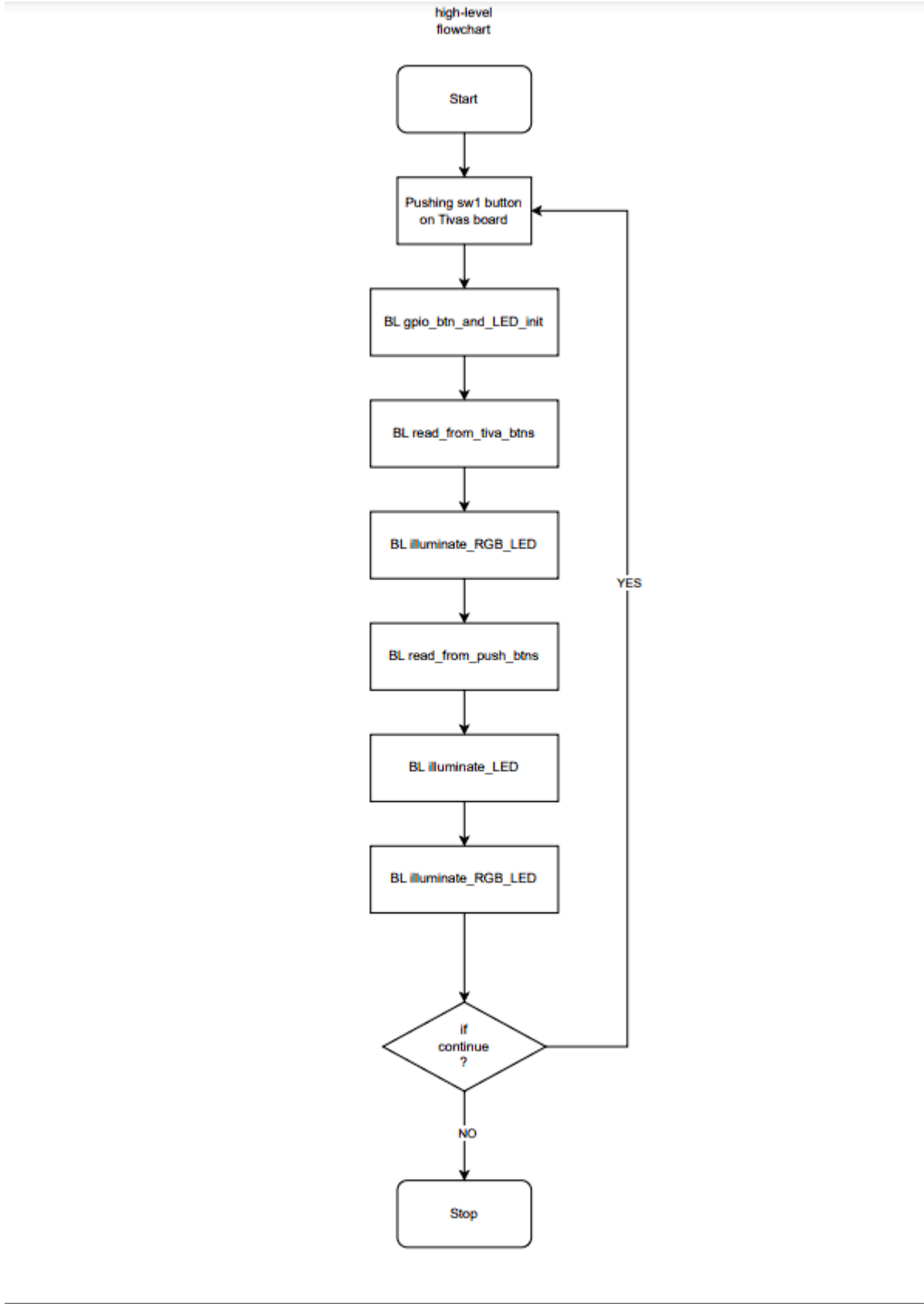
Program Overview:

1. Running the program
2. Connecting to PuTTY
3. Following the instruction shown on PuTTY to push the Tiva board and Alice EduBase board's buttons to light the LED on Tivas board
 - a. Press sw1 on Tiva board to light up RGB LEDs on Tiva board:
 - i. if the RGB LEDs on Tiva board lights up, press Enter key to enter the next test stage.
 - b. Next test stage: testing sw2, 3, 4, 5 on the Alice board:
 - i. press sw2 on Alice board to show green light on Tiva board LED
 - ii. press sw3 on Alice board to show blue light on Tiva board LED
 - iii. press sw4 on Alice board to show red light on Tiva board LED
 - iv. press sw5 on Alice board to show no light on Tiva board LED
 - v. press sw2&sw3 on Alice board to show cyan light on Tiva board LED
 - vi. press sw3&sw4 on Alice board to show purple light on Tiva board LED
 - vii. press sw2&sw4 on Alice board to show yellow light on Tiva board LED
 - viii. press sw2&sw3&sw4 on Alice board to show white light on Tiva board LED
 - ix. All the above buttons from sw 2 3 4 5 on the Alice board can light up the corresponding LED lights above sw 2 3 4 5.
4. According to the prompts of PuTTY, press space to restart this test, or press enter to exit the program.

Program Summary:

In this lab, we use general purpose I/O to interface hardware with the ARM processor, we utilize the four switches(sw2, sw3, sw4, sw5) on the Alice EduBase board and switch 1 (sw1) on the Tiva board to show different light on Tiva board by pressing different buttons shows in Program Overview section part 3&4.

High Level Flowchart:



Subroutine Descriptions

Describe Each Subroutine

`read_tiva_push_button`

What does it do: read if the sw1 button on the Tivas board is pressed or not.

Arguments: (the button), port B's digit

Return Values: 1(if button is pressed), 0(otherwise)

`read_from_push_btns`

What does it do: read if the sw2, 3, 4, 5 on Alice board is pressed or not.

Arguments: (the button), port B's digit

Return Values: 1(if button is pressed), 0(otherwise)

`illuminate_LEDs`

What does it do: Lighting the LEDs if the sw1 is pressed, otherwise, keep the original status.

Arguments: 0 or 1, depends on if the sw1 is pressed or not.

Return Values: LEDs lights or not.

`illuminate_RGB_LED`

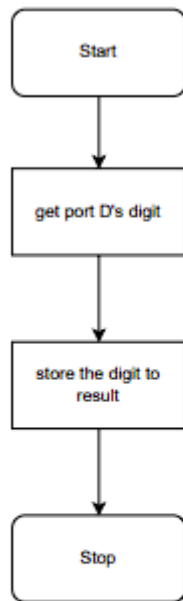
What does it do: Lighting the LEDs in different colors if the sw2, 3, 4, 5 is pressed, otherwise, keep the original status.

Arguments: 0 or 1, depends on if the sw2, 3, 4, 5 is pressed or not.

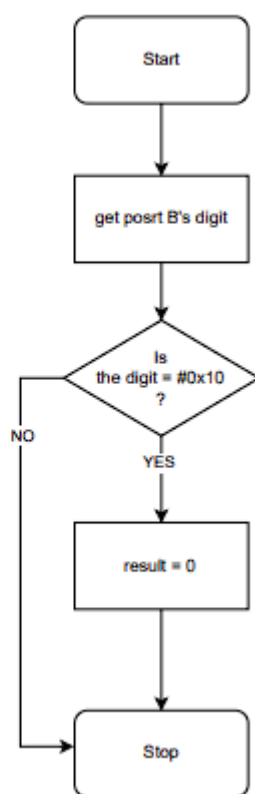
Return Values: different combinations of LEDs color shows or not

Subroutine Flowcharts

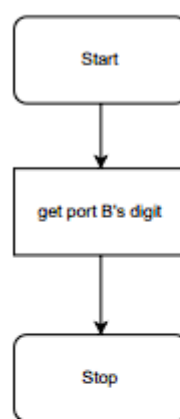
read_from_push_btms



read_fiva_push_button



illuminate_LEDS



illuminate_RGB_LED

