Microprocessor System Lab1 Check List

- **Date: 2022/9/27**
- **Please follow the instructions, and report to TAs after finishing check points(1.1~3.4).**
- **If you have any questions or troubles during the experiment, please feel free to ask TAs or the teacher, discussion with classmates is also encouraged.**
- **Please refer to the content from class slides, you can also use the resources from the internet.**

Part I. Question

Please refer to the class content and answer the following questions.

1.1: In the experiment, how do we realize switching debouncing?

1.2: What's the benefit of arranging buttons in the form of a matrix and using the method mentioned in class to realize keyboard scanning?

Part II. Lab1 Experiment

In this experiment, you need to control LEDs with four buttons. Only one LED will light up at a time, and use two LEDs to shift right and shift left (one move for one press). Using the other two LEDs to switch between two modes: move one step and two steps at a time.

Source code is in the folder, you can try to write the code yourself or implement the source code directly and see the result. And **don't forget to put makefile to the right location**.

2.1 : Please demonstrate to the TAs how to make project , how to clean the compiled file and make sure the compilation is correct.

2.2 : Run the program, and realize only one LED lights up at a time and be able to shift left and right.

2.3 : Run the program, and realize two modes: make LEDs shift left or right one step and two steps at a time.

Part III. Practice

Please refer to the class content and Lab1 Experiment source code and complete the Practice.

Description :

Please use the buttons to realize a 3x3 Keyboard and use LEDs to show the results. The functions of each button are described in Table 1. You need to use the following pins: P0_2, P0_3, P0_4, P0_5, P0_6, P0_7, LED. Picture of the keyboard circuit is provided below (see Figure 1.).

Hint :

About code structure. You may need to implement a function that check which button is pressed periodically, then return some value to main function to tell it what function should be executed. Note that you may need to check if buttons work fine before implement all functions.

Short press : left shift 1 Long press : no any shift	Light up LED P1.0	Light up LED P1.1
Light up LED P1.2	Short press : right shift 1 Long press : right shift persistently	Light up LED P1.4
Light up LED P1.5	Light up LED P1.6	Short press : left shift 1 Long press : left shift 2 Fast double press: left shift 3

Table 1. Function table with 3x3 keyboard

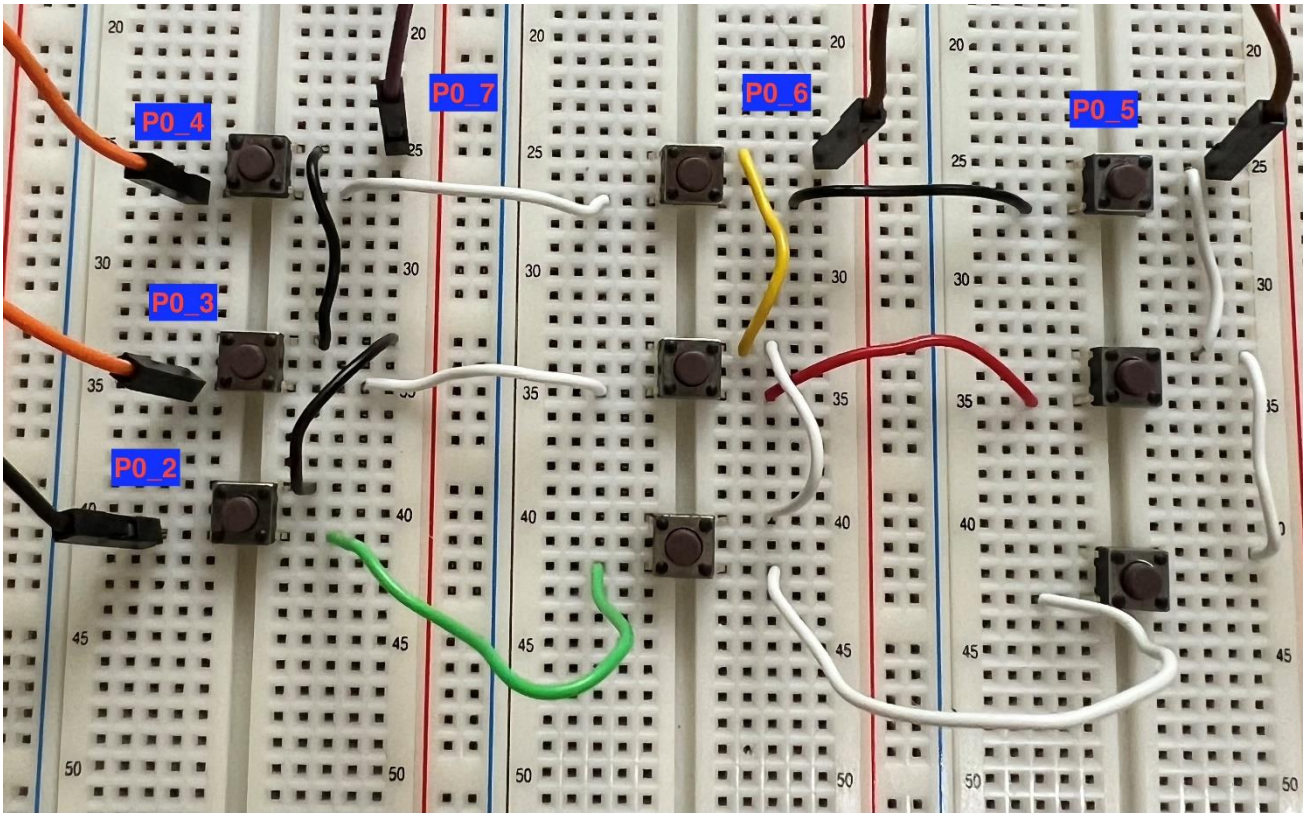

Figure 1. Keyboard circuit

3.1 : Finish the circuit connection correctly.
3.2 : Functions when short and long press are correct.
3.3 : Function when fast double press is correct.
3.4 : All functions are correct.