Lab 06: Requirement Description

- **Link**
 - Video
  - Slide
  - Sample code

- **Basic (70%)**

  Requirement 1. (35 %)
  - **Description**: Due to mechanical reasons, a push-button (which has a spring inside) typically generates a bouncing signal when pressed or released. Please write a program to meet the following requirements and show a bouncing problem.
    1. Connect a button at the RB0 port with a pull-up or pull-down resistor.
    2. Connect three LEDs at the RA0 ~ RA2 port.
    3. Press the button to change the blinking pattern of the LEDs, as shown in the figure below. (with a bouncing problem)
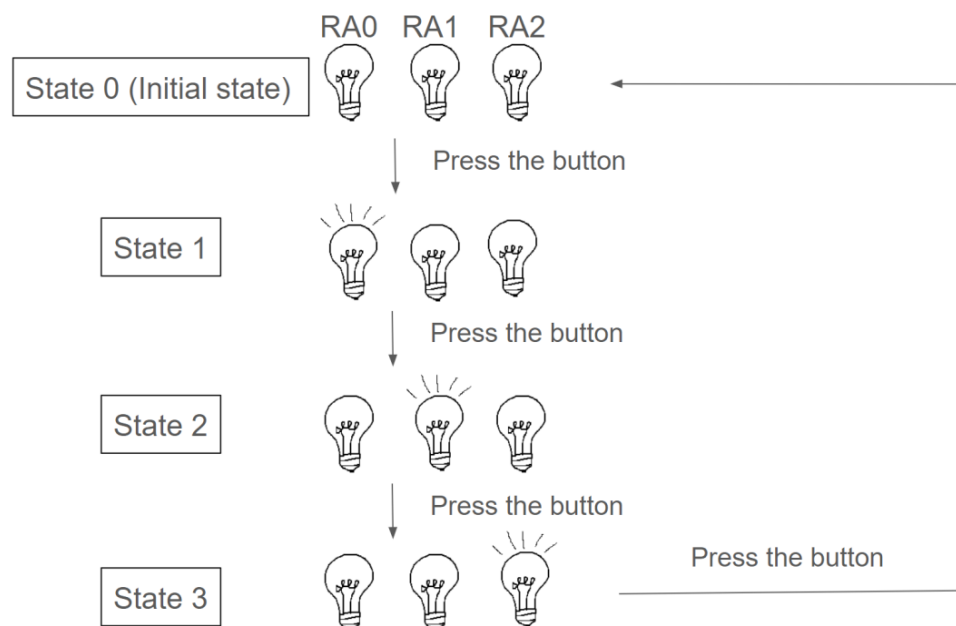
  - **Standard of Grading**:
    1. Connect all the LEDs and a button to the proper ports.
    2. To be able to observe the bouncing problem.

  Requirement 2. (35 %)
  - **Description**: Use the same settings as above. Please add a delay macro to solve the bouncing problem.
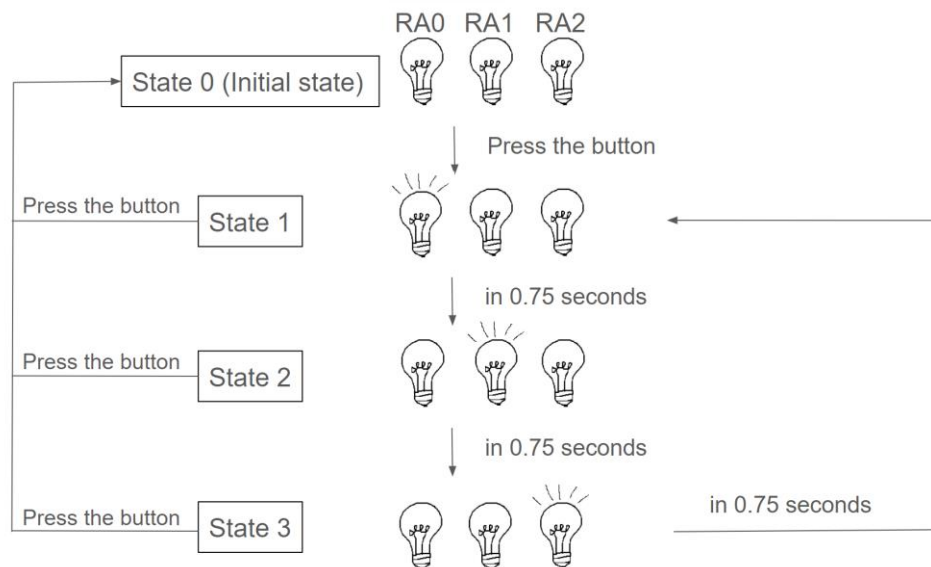
■ **Standard of Grading**:
1. There is indeed no bouncing problem.
2. The LEDs must work as shown in the figure above.

● **Advance (30%)**
■ **Description**: Please write a program to meet the following requirements.
1. Connect a button at the RB0 port with a pull-up or pull-down resistor.
2. Connect three LEDs at the RA0 ~ RA2 port.
3. Press the button to change the blinking pattern of the LEDs, as shown in the figure below.

■ **Standard of Grading**:
1. Connect all the LEDs and a button to the proper ports.
2. The LEDs must work as shown in the figure above.
3. Use a "delay" macro to make the LEDs blink for 0.75 seconds and change states automatically.
4. Note that the states 1, 2, 3 must change immediately to state 0 when the button is pressed.
5. Make sure to properly handle the bouncing problem.

● **Bonus (20%)**
■ **Description**: Please write a program to meet the following requirements.
1. Connect a button at the RB0 port with a pull-up or pull-down resistor.
2. Connect three LEDs at the RA0 ~ RA2 port.
3. Press the button to change the blinking pattern of the LEDs, as shown in the figure below.

- **Explanation**:
    1. "flash" in state 2_3: In state 2_3, within one second, the bulb_2 needs to turn on-off-on-off-on, with each segment lasting 0.5 seconds.
    2. The bulbs operate in a continuous cycle in each state, as shown in the figure below, and change state when the button is pressed.
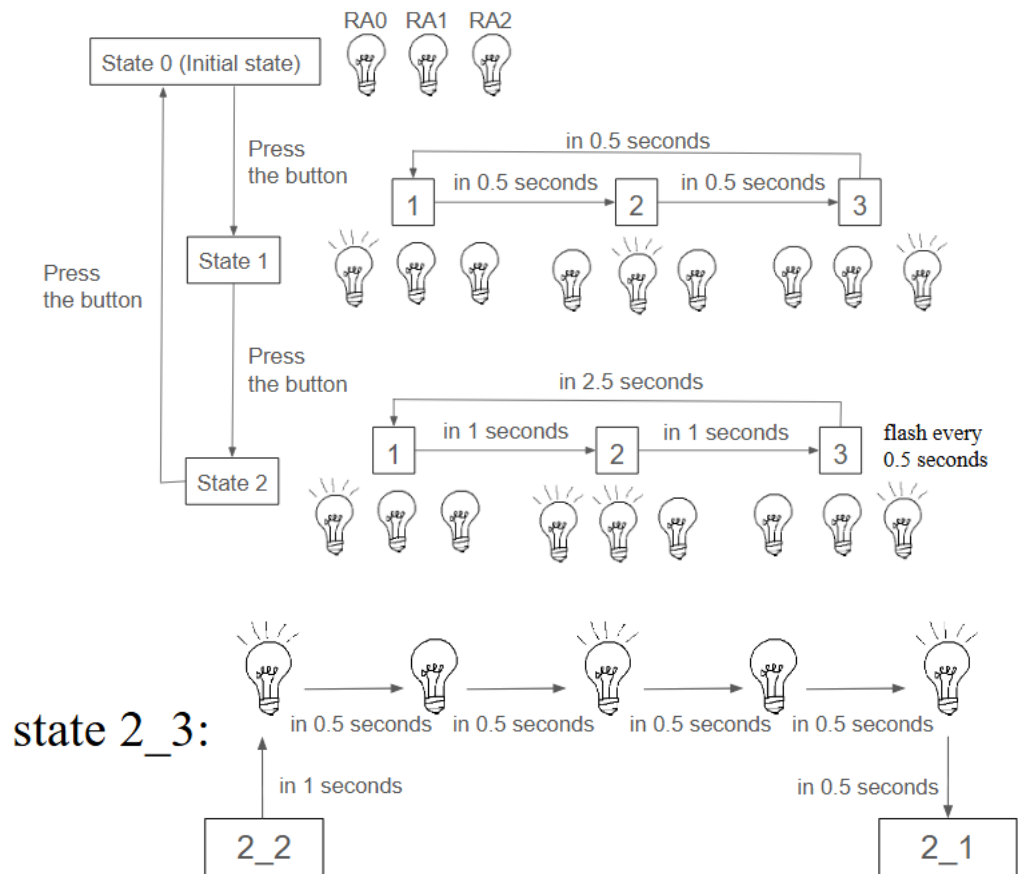
- **Standard of Grading**:
    1. Connect all the LEDs and a button to the proper ports.
    2. The LEDs must work as shown in the figure above.
    3. You need to set an approximately precise time.
    4. Note that the state must change to the next state immediately when the button is pressed.
    5. Make sure to properly handle the bouncing problem.