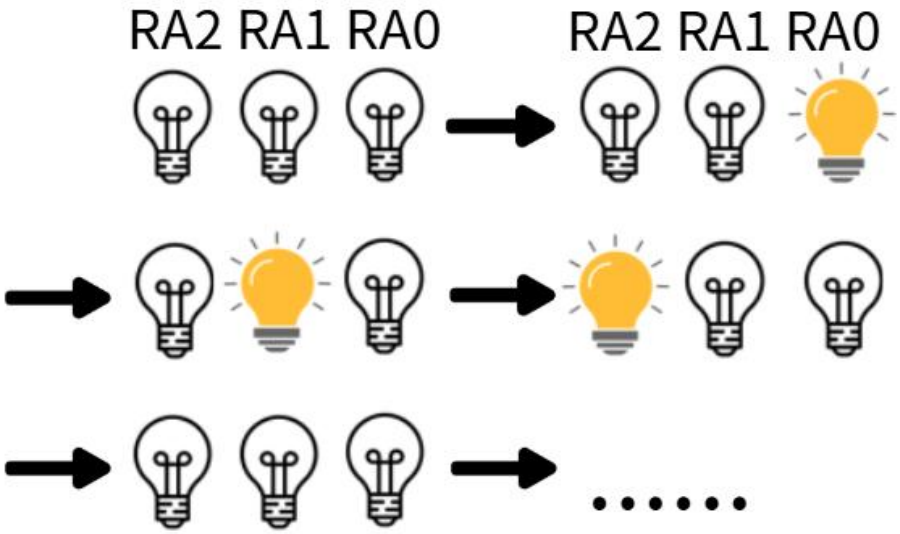
Lab 6 : Digital I/O

- Link
  - Document
  - Video
  - Sample code

- **Basic** (50%)
  - **Description**
    Connect a push-button to port RB0 using either a pull-up or pull-down resistor. Connect three LEDs to ports RA0 through RA2. Each time the button is pressed, the blinking pattern of the LEDs should change, following the sequence shown in the figure below.

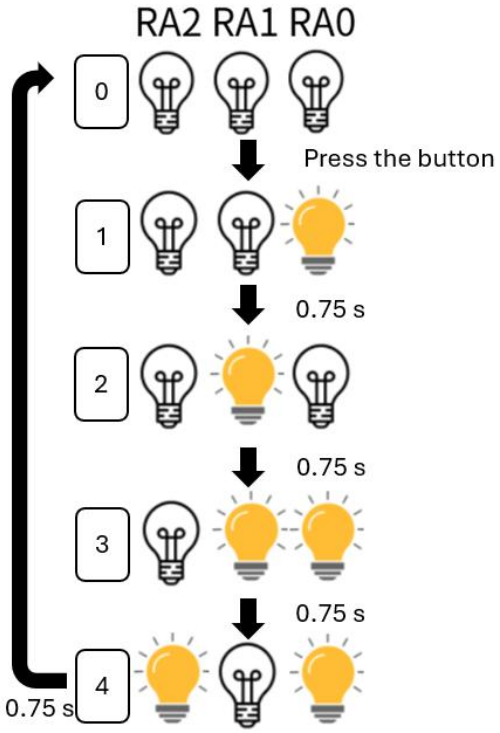
  - **Example**



  - **Standard of grading**
    1. All LEDs and the button must be connected to the correct ports.
    2. The design must eliminate button bouncing.
    3. The initial state should have all LEDs turned off.
    4. Point deductions will apply for any violations of the above criteria.

- **Advance** (30%)
  - **Description**
    Connect a push-button to port RB0 using either a pull-up or pull-down resistor. Connect three LEDs to ports RA0 through RA2. Pressing the button should cycle through different LED blinking patterns, as illustrated in the figure below.

  - **Example**

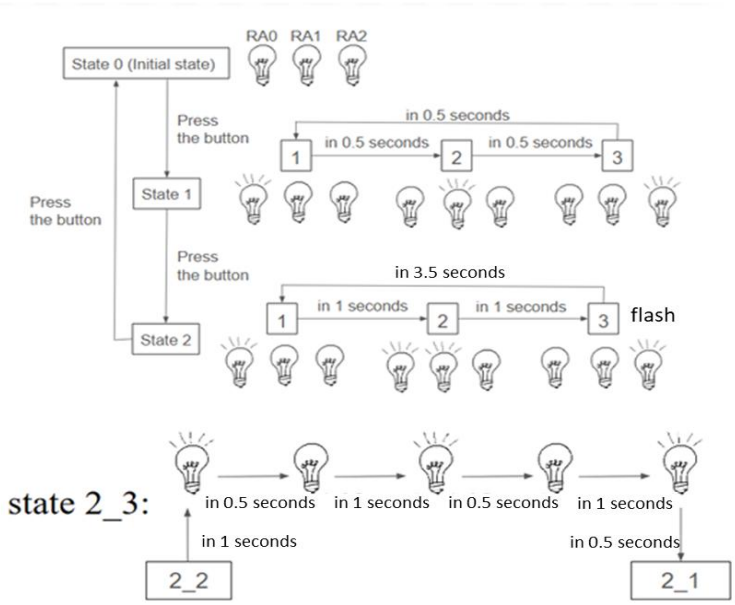


- **Standard of grading**
  1. All LEDs and the button must be connected to the correct ports.
  2. Implement a macro named delay that introduces a 0.75-second delay for the blinking effect.
  3. The blinking patterns must exactly follow the sequence shown in the figure.
  4. Point deductions will apply for any violations of the above criteria..

- **Hard** (20%)
  - **Description**

    Connect a push-button to port RB0 using either a pull-up or pull-down resistor. Connect three LEDs to ports RA0 through RA2. Pressing the button should cycle the LEDs through the blinking patterns illustrated below.

  - **Example**



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. All LEDs and the button must be connected to the correct ports.
2. Implement a macro named delay to produce a 0.5-second delay.
3. The LED behavior must strictly match the patterns shown in the provided figure.
4. Point deductions will apply for any violations of the above criteria.