LED sequence V1.0

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SYSTEM REQUIREMENTS

PROJECT DESCRIPTION

The LED lighting sequence system is designed to control the lighting of four LEDs (LED0, LED1, LED2, LED3) using a single button (BUTTON0).

The system starts with all LEDs being turned off. Once BUTTON0 is pressed, LED0 is turned on, and subsequent button presses turn on the next LED in the sequence.

After the fifth press, LED0 is turned off, and subsequent button presses turn off the next LED in the sequence. The sequence is repeated indefinitely.

HARDWARE REQUIREMENTS

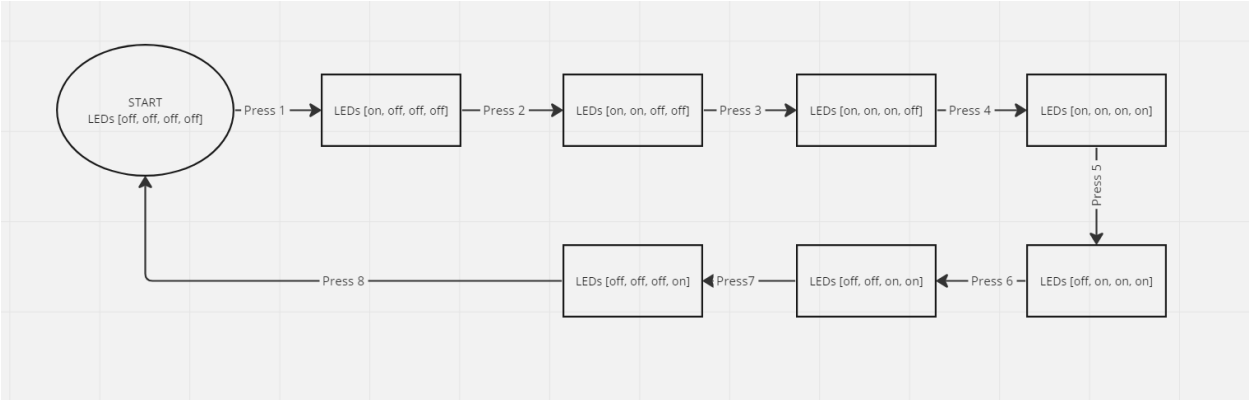
1. Four LEDs (LED0, LED1, LED2, LED3)
2. One button (BUTTON0)

SOFTWARE REQUIREMENTS

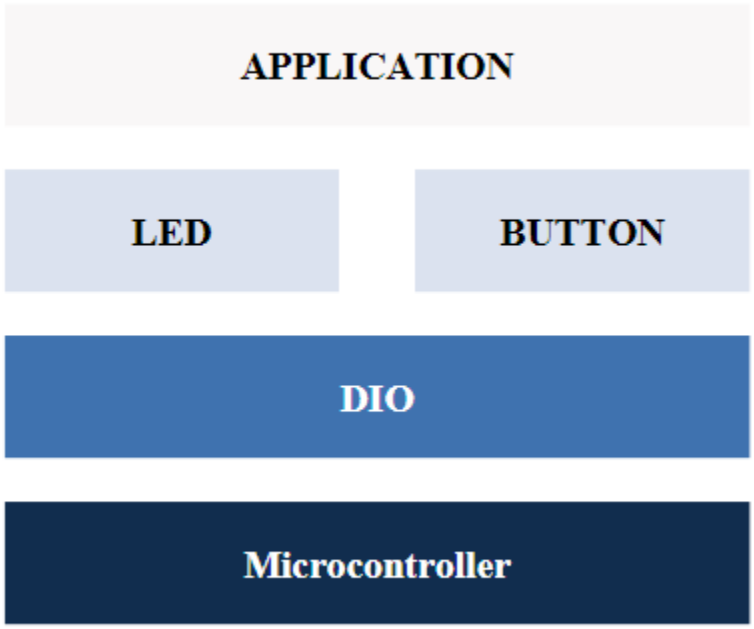
1. Initially, all LEDs are OFF
2. Once BUTTON0 is pressed, LED0 will be ON
3. Each press further will make another LED is ON
4. At the fifth press, LED0 will changed to be OFF
5. Each press further will make only one LED is OFF
6. This will be repeated forever
7. The sequence is described below
    a. Initially (OFF, OFF, OFF, OFF)
    b. Press 1 (ON, OFF, OFF, OFF)
    c. Press 2 (ON, ON, OFF, OFF)
    d. Press 3 (ON, ON, ON, OFF)
    e. Press 4 (ON, ON, ON, ON)
    f. Press 5 (OFF, ON, ON, ON)
    g. Press 6 (OFF, OFF, ON, ON)
    h. Press 7 (OFF, OFF, OFF, ON)
    i. Press 8 (OFF, OFF, OFF, OFF)
    j. Press 9 (ON, OFF, OFF, OFF)

SYSTEM DESIGN

STATE MACHINE



LAYERED ARCHITECTURE



MODULES

DIO:

- DIO_ErrorState_t DIO_init(uint8_t portNumber, uint8_t pinNumber, uint8_t direction);
- DIO_ErrorState_t DIO_write(uint8_t portNumber, uint8_t pinNumber, value);
- DIO_ErrorState_t DIO_read(uint8_t portNumber, uint8_t pinNumber, *value);
- DIO_ErrorState_t DIO_toggle(uint8_t portNumber, uint8_t pinNumber);

LED:

- LED_ErrorState_t LED_init(uint8_t ledPort, uint8_t ledPin);
- LED_ErrorState_t LED_on(uint8_t ledPort, uint8_t ledPin);
- LED_ErrorState_t LED_off(uint8_t ledPort, uint8_t ledPin);
- LED_ErrorState_t LED_toggle(uint8_t ledPort, uint8_t ledPin);
- LED_ErrorState_t LED_GetState(uint8_t ledPort, uint8_t ledPin, *value);

BUTTON:

- BUTTON_ErrorState_t BUTTON_init(uint8_t buttonPort, uint8_t buttonPin);
- BUTTON_ErrorState_t BUTTON_GetState(uint8_t buttonPort, uint8_t buttonPin, *value);

APP:

- APP_ErrorState_t APP_init(void);
- APP_ErrorState_t APP_start(void);