# Design Document

**Project Name:**

# LED Sequence V2.0

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# Project Description:-

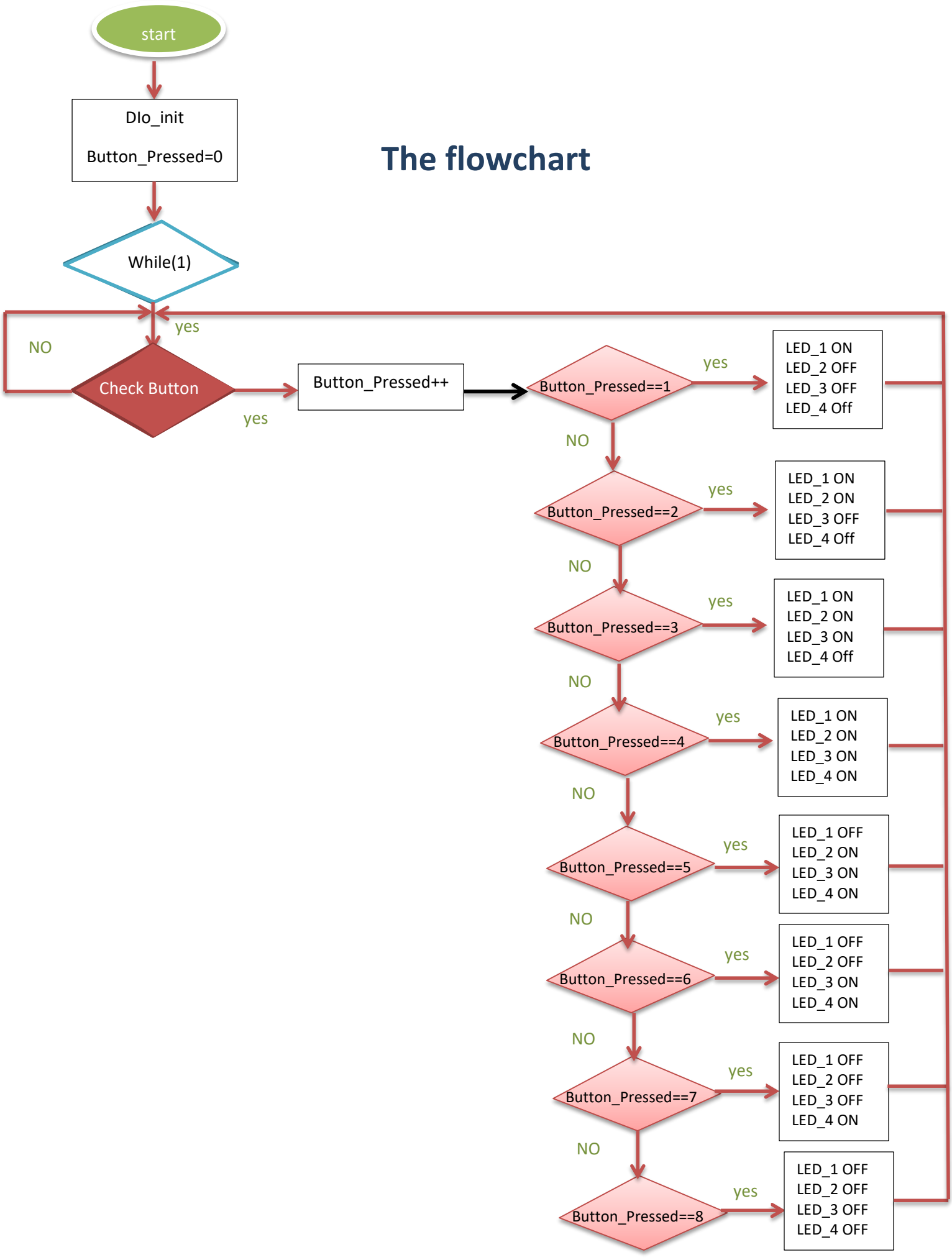
- **Hardware Requirements:**

1) Four LEDs (LED0, LED1, LED2, LED3)
2) One button (BUTTON1)

- **Software Requirements:**

1) Initially, all LEDs are OFF
2) Once BUTTON1 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:-
    1) Initially (OFF, OFF, OFF, OFF)
    2) Press 1 (ON, OFF, OFF, OFF)
    3) Press 2 (ON, ON, OFF, OFF)
    4) Press 3 (ON, ON, ON, OFF)
    5) Press 4 (ON, ON, ON, ON)
    6) Press 5 (OFF, ON, ON, ON)
    7) Press 6 (OFF, OFF, ON, ON)
    8) Press 7 (OFF, OFF, OFF, ON)
    9) Press 8 (OFF, OFF, OFF, OFF)
    10) Press 9 (ON, OFF, OFF, OFF)
8) Use External Interrupt

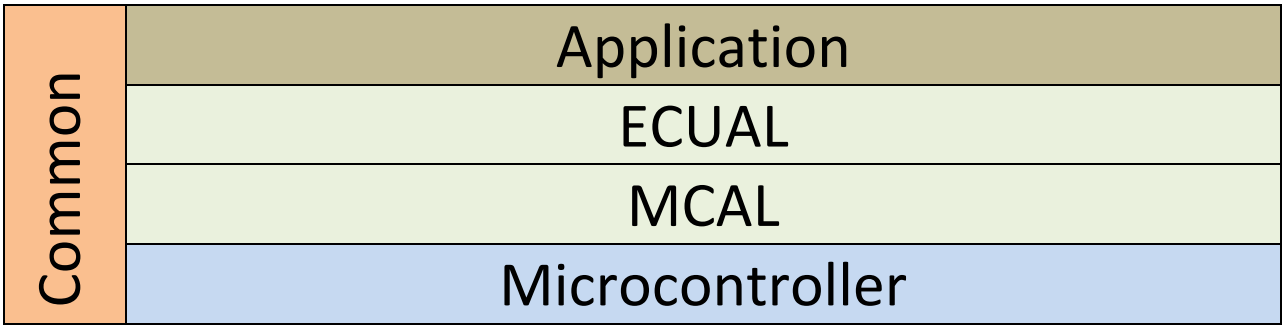
# The flowchart



# Layered architecture

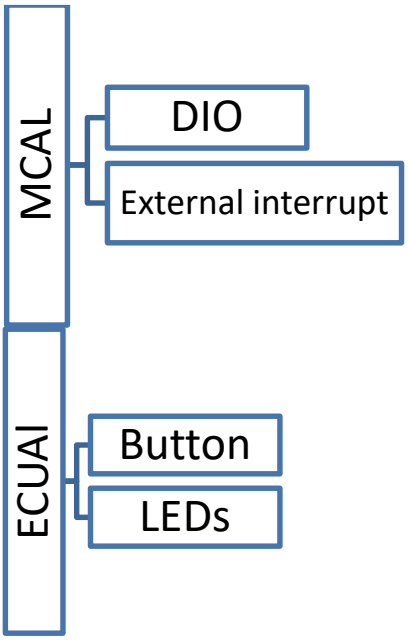
**The system may be divided to 4 layers:-**

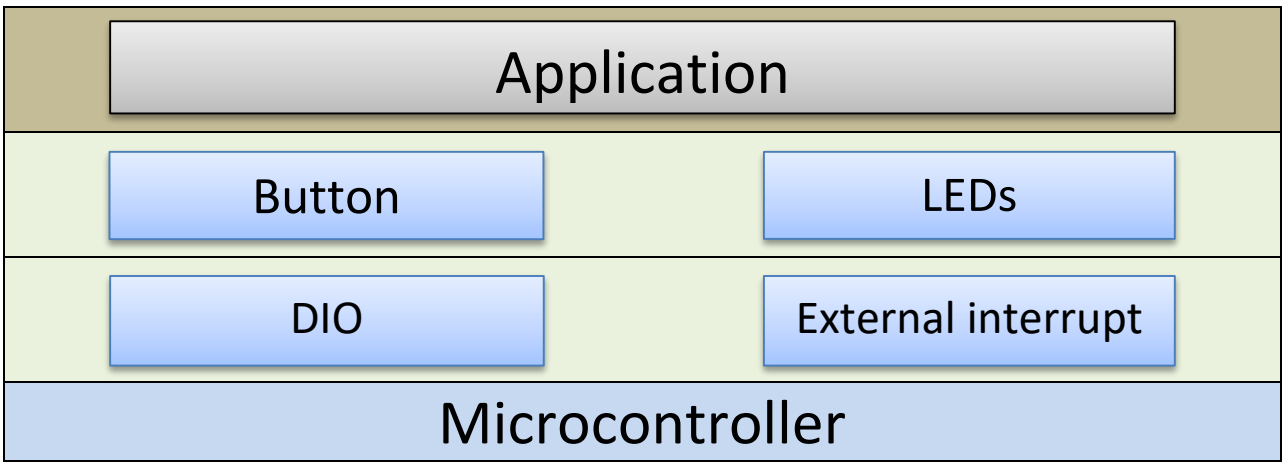
- **Microcontroller**
- **MCAL**
- **ECUAl**
- **Application**



# System modules

## The system may be divided into drivers:-



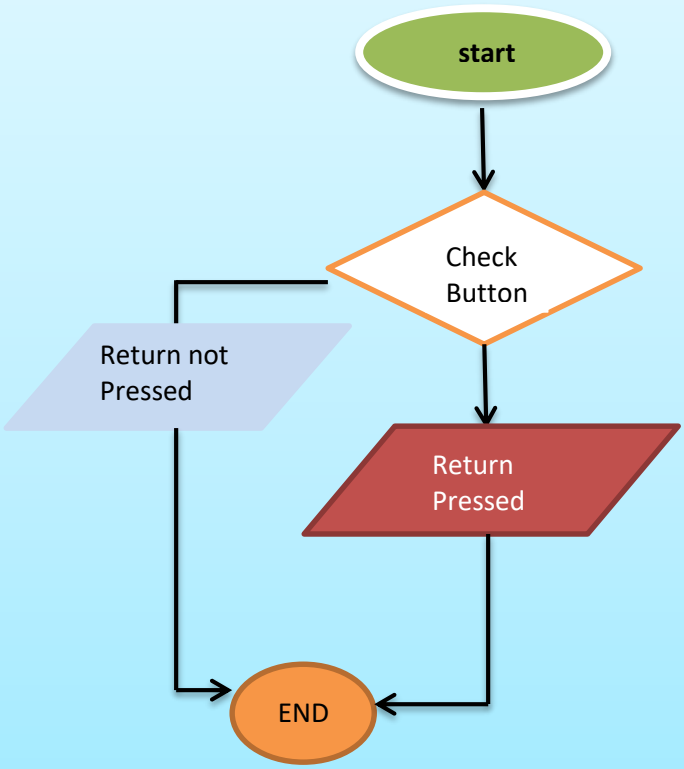



**DIO APIs**

```
void DIO_InitPin (PIn_name pin ,PIN_Status status );
void DIO_init (void);
void DIO_WRitePin (PIn_name pin ,Voltage_type s);
Voltage_type DIO_ReadPin(PIn_name pin);
void DIO_WritePort(PORT_Type Port,u8 data);
```

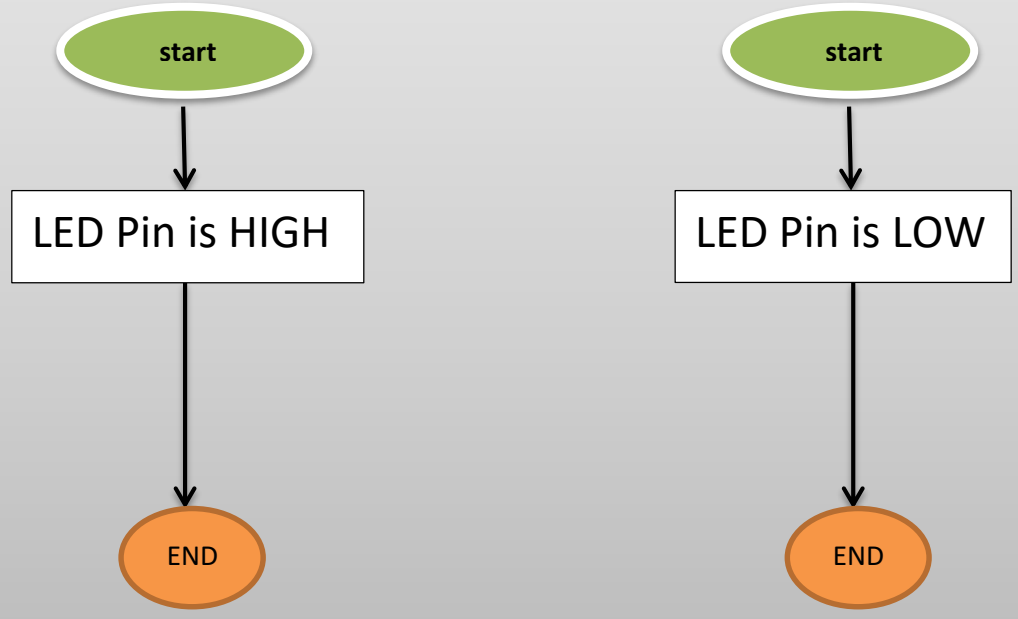
**Button APIs**

```
Button_status Button_check(u8 ButtonNo);
```



**LEDs APIs**

```
void LED_ON(u8 LEDno);
void LED_Off(u8 LEDno);
```




**External interrupt APIs**

```
void EXI_Enable (ExInterruptSource_type Interrupt);
void EXI_Disable (ExInterruptSource_type Interrupt);
void EXI_Trigger(ExInterruptSource_type Interrupt,TriggerEdge_type trigger);
void EXI_SetCallBack(ExInterruptSource_type Interrupt,void(*pf)(void));
```

**Application APIs**

```
void APP_Init(void);
void APP_Start(void);
```