LS.V1 System Design

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Overview

You are supposed to have a system that controls some LEDs lighting sequence according to button pressing.

System design for LS_V1 in Sprint number 3.

Read System Requirements Specifications

1. *Description*
    1. *Hardware Requirements*
        1. *Four LEDs (LED0, LED1, LED2, LED3)*
        2. One button (BUTTON0)
    2. *Software Requirements*
        1. Initially, all LEDs are OFF
        2. Once BUTTON_0 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)

Layered architecture

It divides the system into a set of layers, each of which has a specific responsibility and interacts with other layers in a well-defined way.

The **MCAL** which contains the microcontroller drivers.

The **ECUAL** which contains the connected electronics components that will use the microcontroller drivers.

The **APP** Layer that will contain code application that performs the desired functionalities.

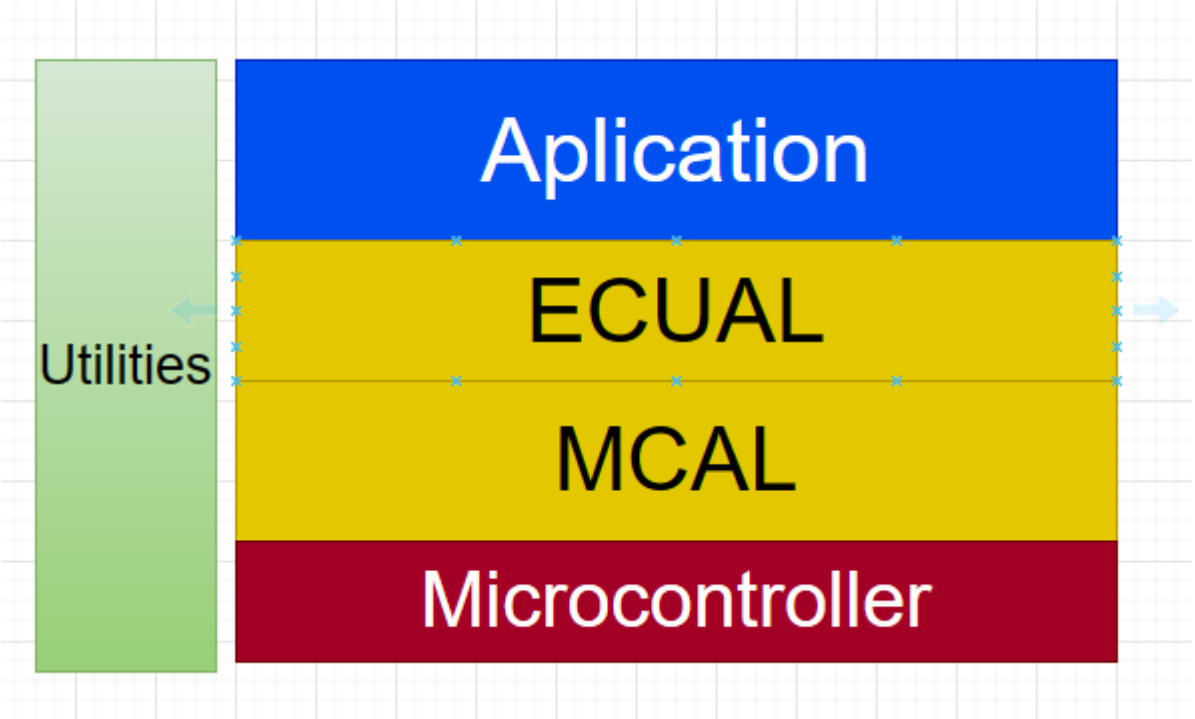


Figure 1: System Layered Architecture

System modules/drivers

It shows the different modules that will be used inside each layer.

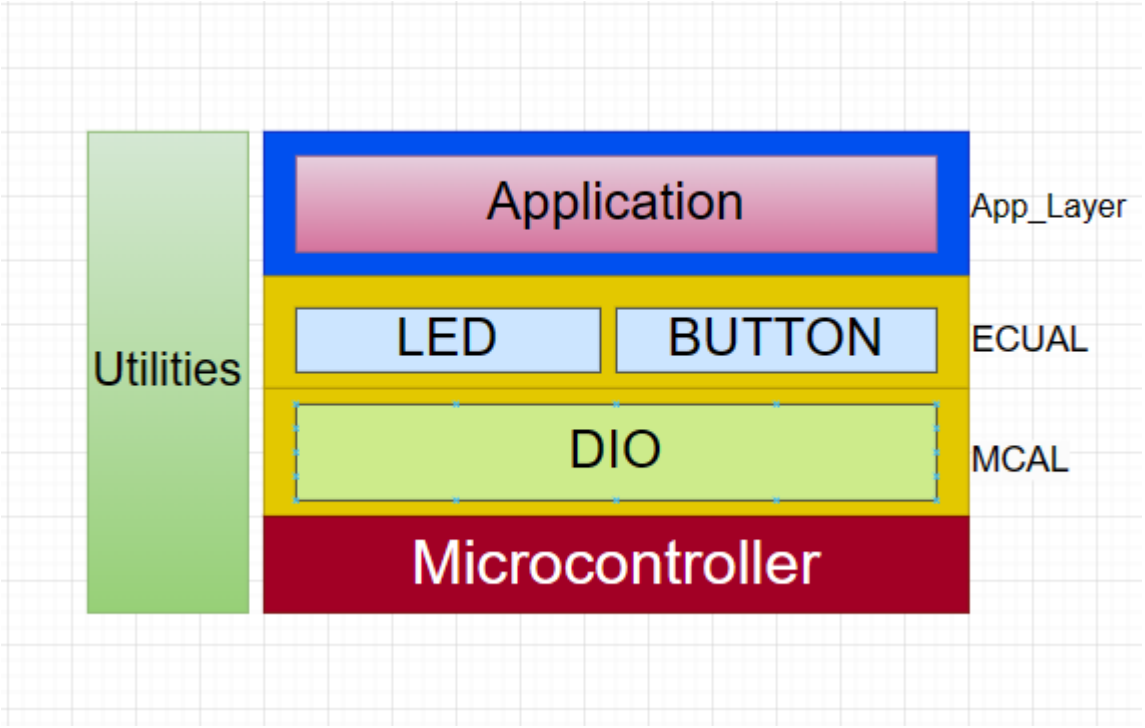


Figure 2: System Modules for each layer

APIs for each module

It defines the high level interface of each module/component.

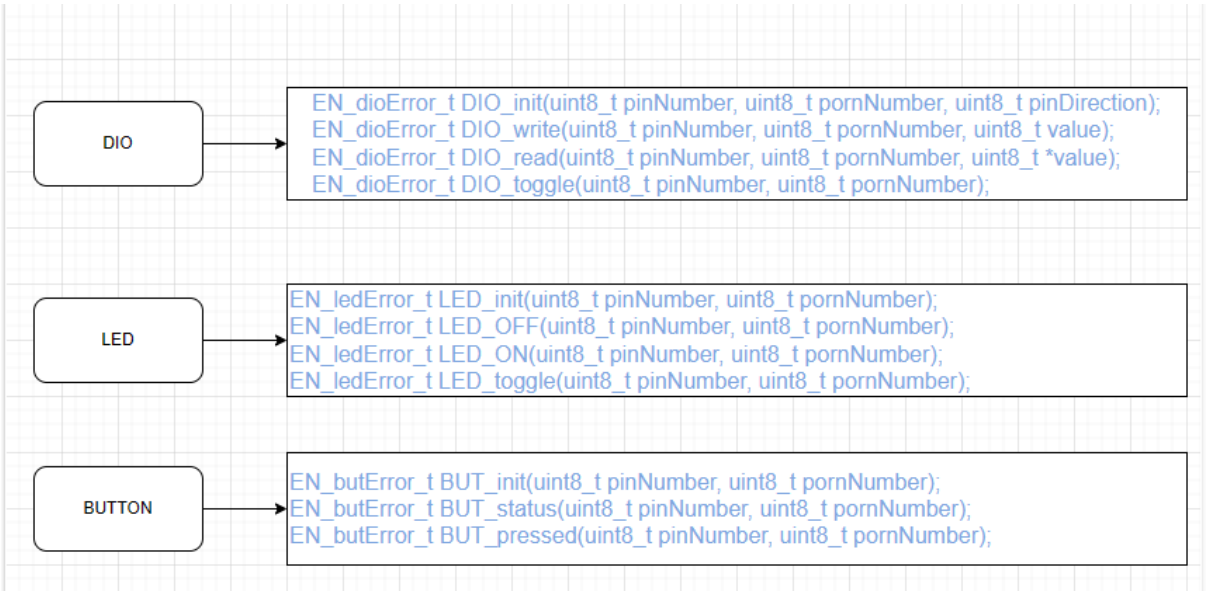
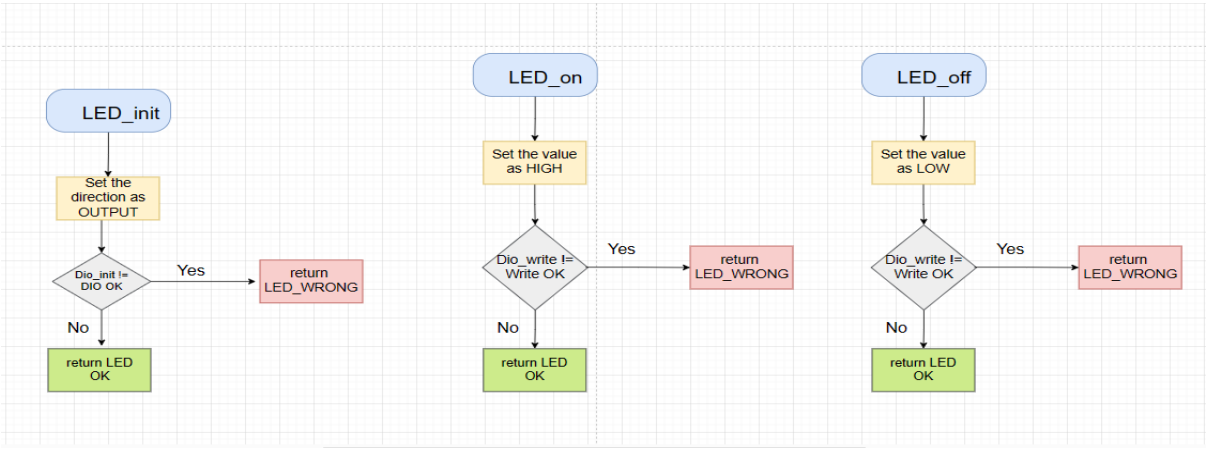
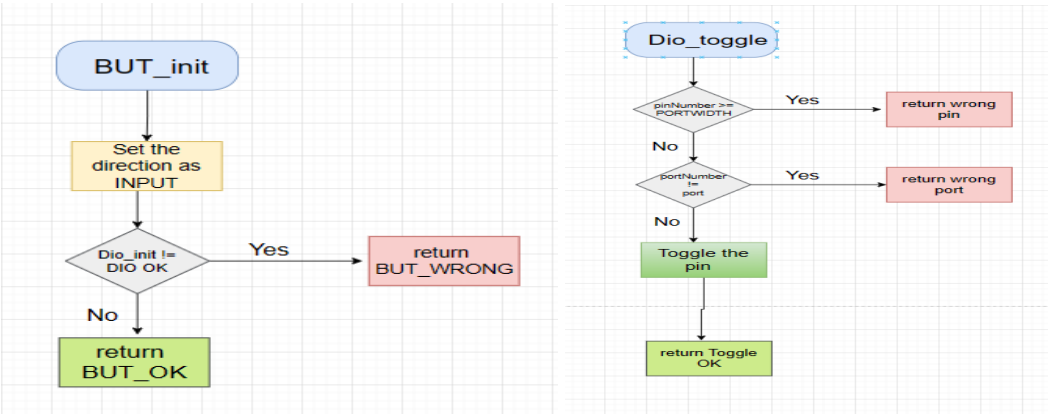


Figure 3: APIs_with_documentation_1

APIs flowcharts





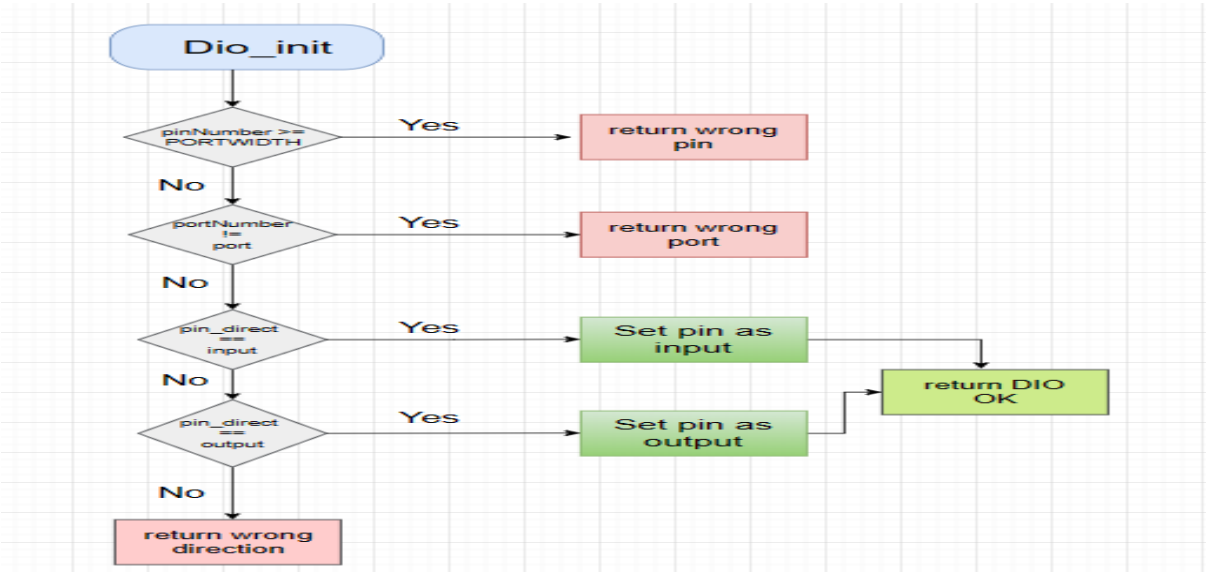


Figure 4: APIs_Flowcharts

Project State Machine

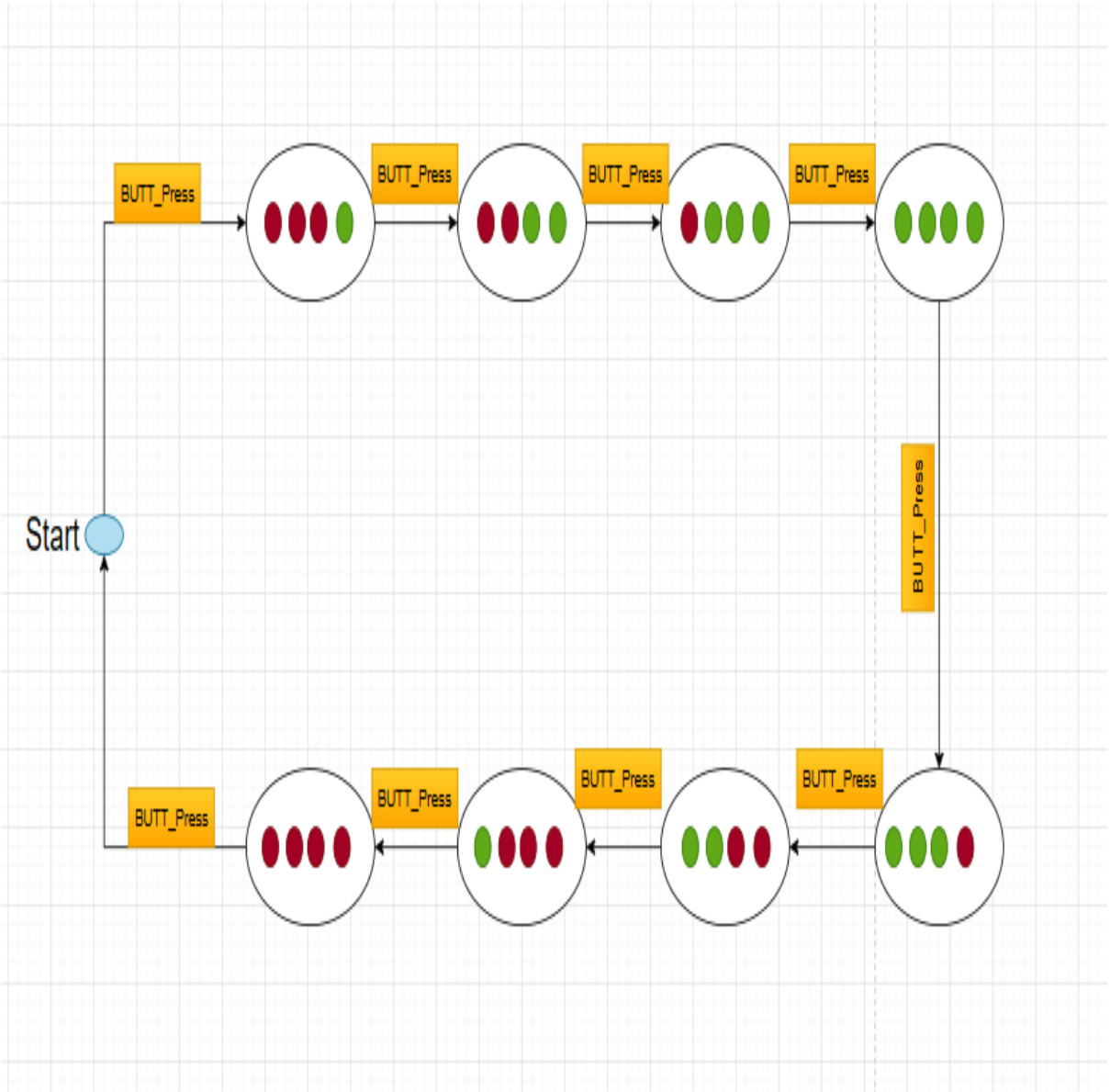


Figure 5: LS_V.1_State_Machine