Traffic Light Project

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1 System Description

This project implement Traffic light system that contain Traffic light for cars and pedestrian light for peoples. Traffic light contain green, yellow, Red lights that blinking every five seconds. Light blinking sequence will be:

- Green blinking 5 Sec.
- Yellow blinking 5 Sec.
- Red blinking 5 Sec.
- Then Red, Yellow and Green.

pedestrian blinking sequence when pressing pedestrian button will be:

- If cars' Red LED is on, the pedestrian's Green LED and the cars' Red LEDs will be on for five seconds, this means that pedestrians can cross the street while the pedestrian's Green LED is on.
- If Green LED is on or the cars' Yellow LED is blinking, the pedestrian Red LED will be on then both Yellow LEDs start to blink for five seconds, then the cars' Red LED and pedestrian Green LEDs are on for five seconds, this means that pedestrian must wait until the Green LED is on.
- Traffic lights signals are going to the normal mode again

2 System Design

I divide my my architecture into 5 layers (see figure 1):

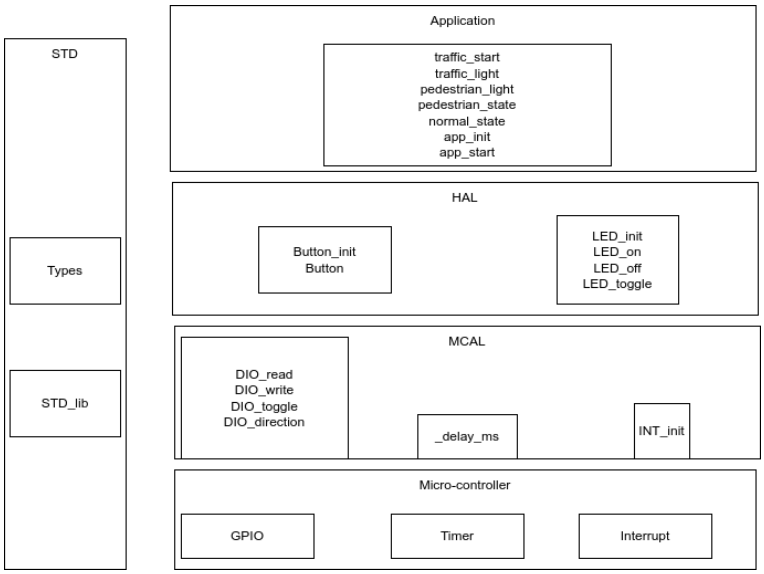

Figure 1: Architecture

- micro-controller: prephiral that used from micro-controller

- MCAL: drivers for prephirals
- HAL: drivers for Interfaces
- STD: shared library between all layers that have basic types and operations.
- Application: state machine of the traffic application

3 State Machine

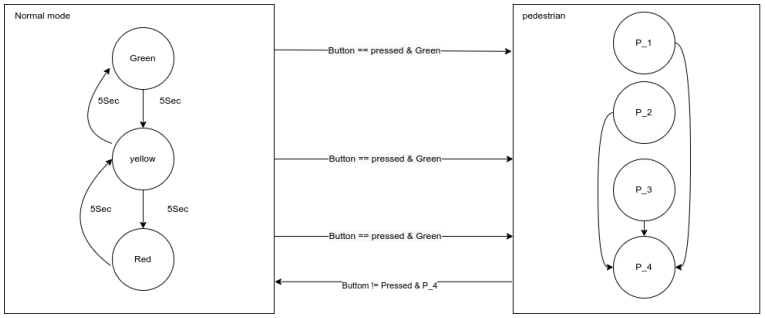

Figure 2: State Machine

According to the requirements, I divided the states into two super states:

- **Normal State**: normal state contains 3 states. Green state to blink green led and after five seconds will transition to Yellow state and after five second will transition to red state then vice versa
- **pedestrian State**: I will transition to this state if Button is pressed and the transition will differ that depending on the last state when I pressed the Button:
  - if button is pressed in the Green state, app will transit to P_2 state and by finishing the sequence will go to P_4 state to go to normal mode.
  - if button is pressed in the Red state, app will transit to P_1 state and by finishing the sequence will go to P_4 state to go to normal mode.
  - if button is pressed in the Yellow state, app will transit to P_3 state and by finishing the sequence will go to P_4 state to go to normal mode.