ON DEMAND TRAFFIC LIGHTS

Project Documentation

By: Michael Ezzat Tanyous

eFWD – Udacity
Embedded System Professional Track

content

- System Desccription
- System Design
- System Flow Chart
- System Constriants

System Desccription

- The system will help to regulate traffic on a road, using lighting and some sensors (we will represent them with a button) that are used to know if there is a pedestrian on the side of the road who wants to pass, so we make a certain decision according to the movement of the cars

System Design

- 1- Hardware design :
- AVR Atmega32
- 2 Green LEDs
- 2 Yellow LEDs
- 2 Red LEDs
- 6 (300) Ohm resistors
- 1 10k Ohm resistor
- 1 Push Button

- 2- Software design :

Designed using the Static Architecture to describe the sys. component and interfaces , following : **1-Modular Programming** to separate the project to small units called driver , **2-Layered Architecture** to represent the system as layers , each layer describe a part of the sys. , and **3-SOLID principle** to describe how will be every layer and driver and how and when every one can contact the other.

-> System Layers :

A-Microcontroller Abstraction Layer (MCAL) :

contains on-chip MCU peripherals , it's modules :

1.DIO driver 2.External Interrupt driver 3.Timer driver

B-Electronic Unit Abstraction Layer (ECUAL) :

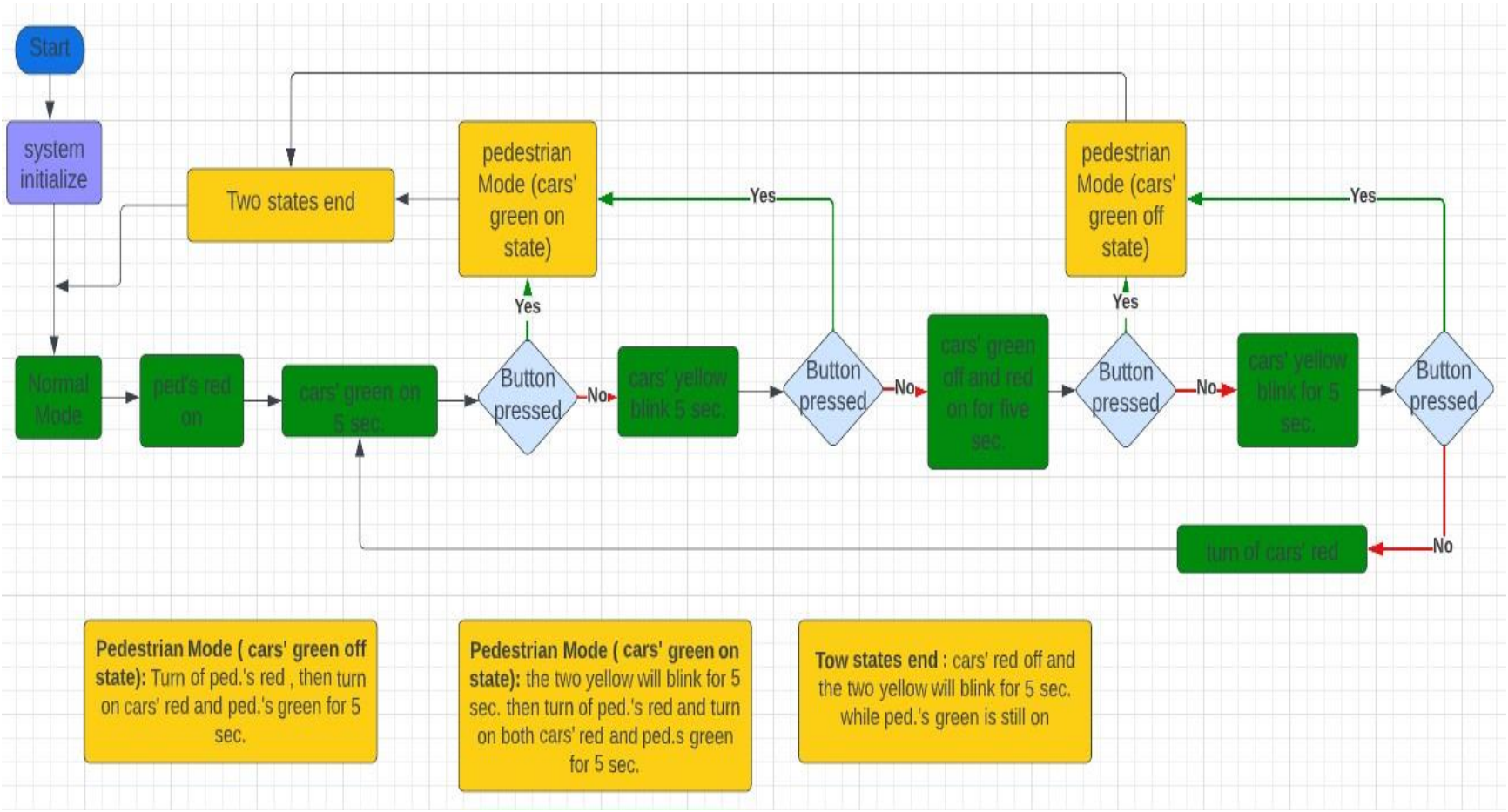
It allow the program to communicate with the electrical component , it's modules :

1.LEDs driver 2.Button Driver

C-Application Layer :

It contain our logics to achieve our project functionality

System Flow Chart



System Constriants

1-Long press :

The long press and the short press on the pedestrian’s button should have the same effect.

2-Double press:

If a pedestrian make a double press or more than one press on the button , only the first press will be enough to make the effect.

3-If pressed while the pedestrian mode

If any pedestrian pressed the button while the pedestrian mode , it should have no effect .