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On-demand traffic light control

System documentation

# System Layers:

## The system may be divided into 4 layers:-

* Microcontroller
* ECUAL
* MCAL
* Application
* Others

# System Drivers:

## The drivers used in this project are:-

The MCAL Layer contains:

* Timer (PWM) Driver
* Button Driver
* LEDs Driver
* DIO Driver
* LIGHTS driver

ECUAL Layer contains the DIO Driver

There are essential files for the functionality of the project including Interrupts, Types and registers.

## Hardware requirements:

* 6 LEDs
* ATmega32
* 1 push button
* Jumper wires
* 1 10k ohm resistor
* 6 300 ohm resistors

## Software used:

* Microchip Studio
* SimulIDE

# System Functionality:

The On demand traffic light system operates in two modes: Normal mode and Pedestrian mode.

What happens in Normal mode is that the traffic light is always operating, green light as an initial condition is on for 5 seconds then shifts to the yellow light also for 5 seconds for the red light to finally turn on. Then the same cycle goes on in the opposite direction, red light waits for 5 seconds, yellow light is on for 5 seconds then the green light is on again and it keeps going on **unless** interrupted.

If a button is pressed, which acts as the system’s interrupt the normal mode is shifted to Pedestrian mode, since a pedestrian wants to cross said street. Street Red light and Pedestrian’s green light are lit simultaneously and wait for 5 seconds if pressed when the Red light is on. I

If the green or yellow lights are on when the button is pressed, the ped’s light is red then both lights will blink yellow for 5 seconds, ped will light green and car’s traffic light will turn red.

The rest is thoroughly mentioned in the rubric.

System constraints:

Since this is not a very complex system, Double presses and long presses on the button are to be avoided. And when done in pedestrian mode, are ignored (Like in the test cases)

# Flow chart: