



# ON-DEMAND TRAFFIC LIGHT CONTROL

Udacity Embedded system course

## ABSTRACT

**It is a static design for our  
project On-demand Traffic light  
control**

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## Static design

### 1. system description

on-demand traffic light control project, this project will allow pedestrians to cross the street depending on their demand we will use a push button at the beginning of the street so when a pedestrian push the button the system will prepare the traffic lights of the cars to allow the pedestrian to walk and cross the street safely.

### 2. System design

Now we are going to discuss the layered architecture and show which component belongs to any layer.

Our layered architecture will be as the following table:

Application layer
ECUAL layer
MCAL layer
Microcontroller layer

I will not use service layer because our project is quite simple.

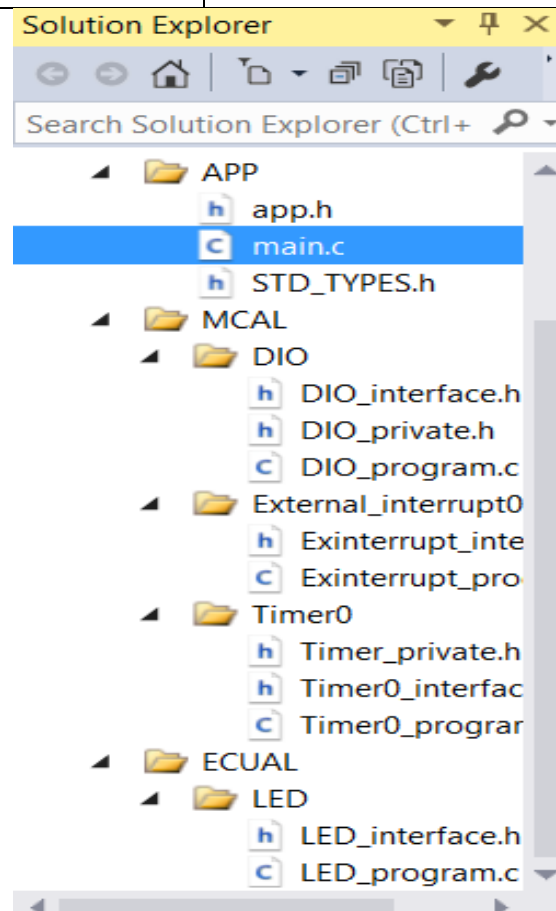
## Hardware Components:

Six LEDs -> three are an indication for cars and three are an indication for pedestrians.

One push button -> to notify the system that there is a pedestrian want to cross the street.

Atmega 32 Microcontroller -> to control our system.

Application layer	Simple code
ECUAL layer	Push button – LEDs
MCAL layer	(DIO-Timer0-external interrupt) peripherals
Microcontroller layer	Atmega 32



## System drivers or modules:

### 1-Digital input/output driver (DIO)

It's a driver we will create in MCAL layer to control input & output pins (PORTA-PORTB-PORTC-PORTD)

Header file of this module will have 3 important functions:

- set pin direction
- set pin value
- read pin value

### 2-Timer driver

It's a module to control the timing in our system because we need to make Some delays and organize the system.

Header file of this module will have 2 important functions:

- Timer initialization function
- Delay function

### 3-External interrupt driver

to do the right instructions when the user push the button instantaneously and handle timer interrupt

Header file of this module will have 2 important functions:

- Enable the interrupt
- Handle ISR

### 4-LED driver

Header file of this module will have 2 important functions:

- LED on
- LED off

## 5-push button driver

Header file of this module will have a function:

- Button state

### 3. flow chart

