

On-demand Traffic light control

Documentation

1. System description

This system simulates on demand traffic light , this system regulates the crossing of cars and pedestrians; the system gives the priority for pedestrians to cross as soon as possible by adding on demand button for the pedestrians



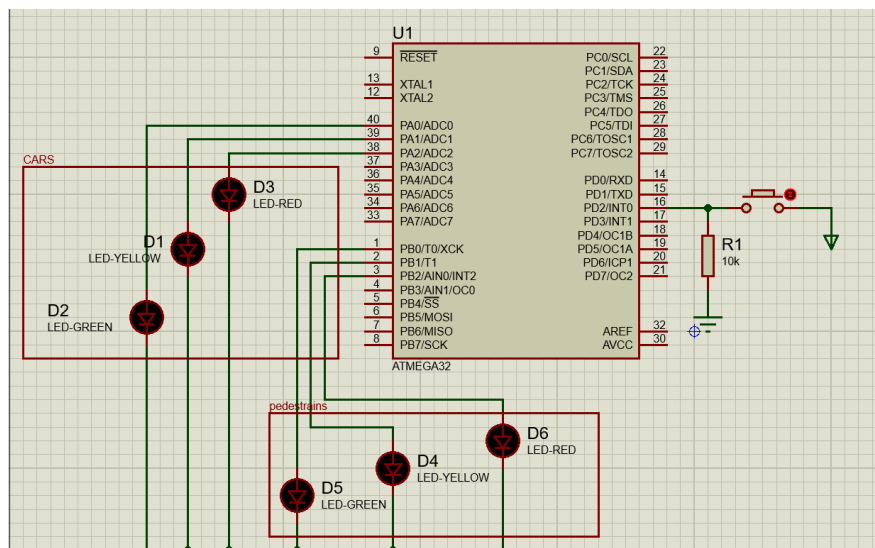
1. Image of traffic light

Source : www.innovationnewsnetwork.com

2. System design

a. Hardware design

the system simulate on demand traffic light, it has 6 LED lights; 3 of the LED lights are to guide the crossing cars when to move and when to stop while the other 3 LED lights are to guide the pedestrians when to stop and when to start crossing , the structure of the system is shown in figure 2.



2.system diagram on proteus
Generated on proteus software

The project has a button which help the pedestrians to wait less as if they pressed the button the system will immediately start to use yellow lights for crossing cars to prepare them to stop to allow the pedestrians to start crossing.

The whole project is controlled using ATMEGA 32 microcontroller with 8MHZ operating frequency .

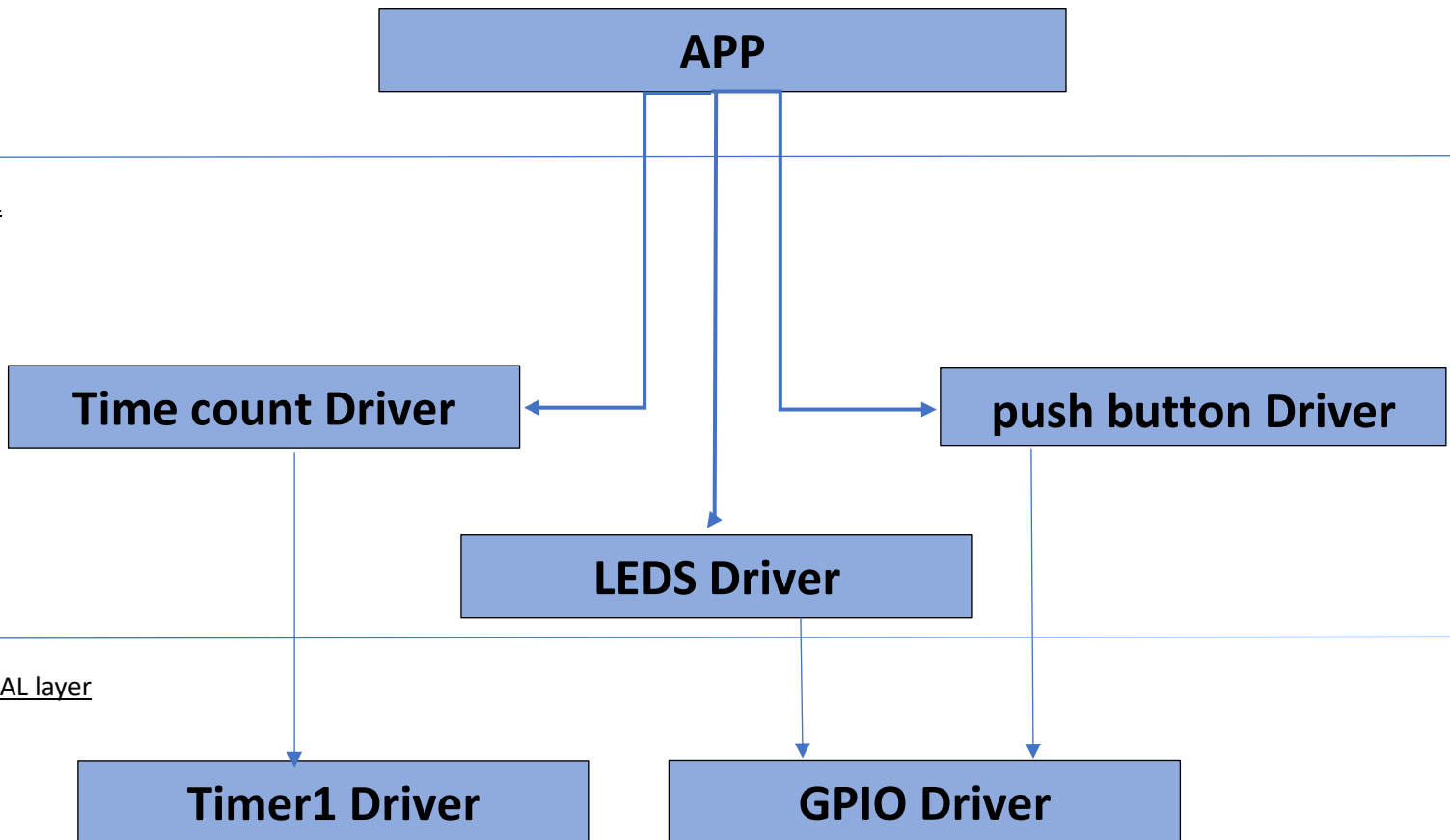
b. Software design

This project software is designed using layered model in coding , figure 3 shows the structure of the used layered model in the project

Application Layer

HAL

MCAL layer



3.layerd model diagram

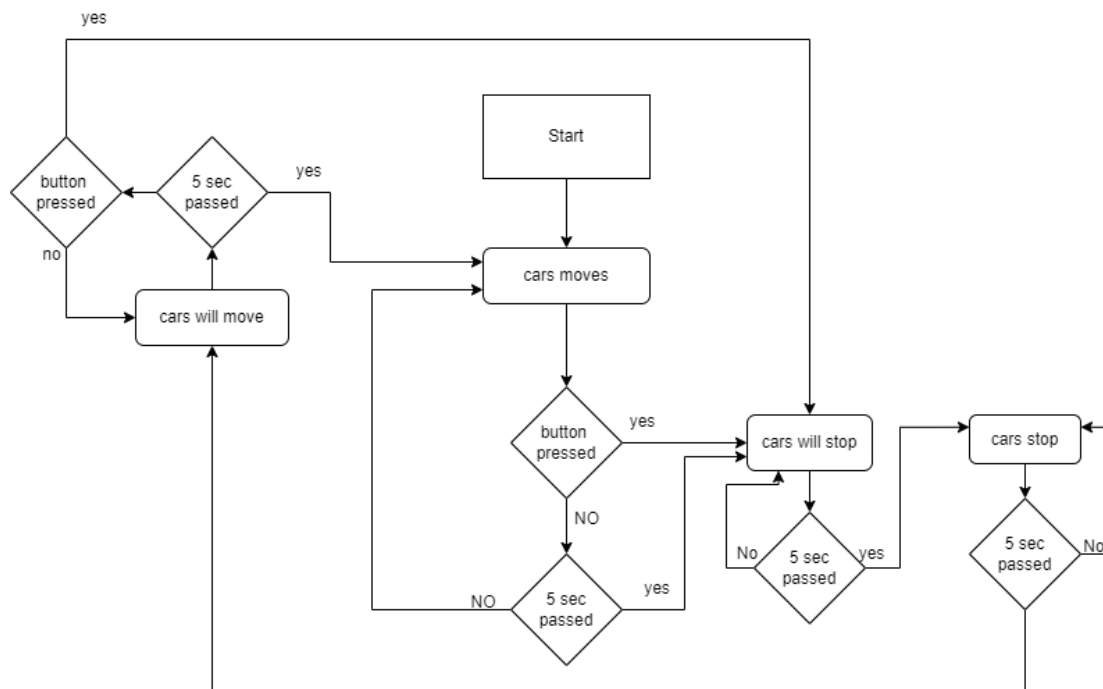
pushbutton response is triggered using INT0 as shown in figure 2 , also delays are managed using timer1 interrupts

3. system flow chart

the system is divided into 4 different states

1. cars move : in this state green light is turned on for the cars to move while pedestrians is waiting as their red light is turned on
2. cars will stop : this is a transitional state as it prepare the cars to stop by flashing yellow lights for the cars and also flashing yellow lights for the pedestrians to prepare themselves to start moving
3. cars stop : in this state red lights in turned on for the cars to stop while pedestrians are crossing as their green light is turned on
4. Cars will move : this is a transitional state as it prepare the cars to move by flashing yellow lights for the cars and also flashing yellow lights for the pedestrians to prepare themselves to stop moving

The following flowchart (figure 4) shows the flowchart that shows how system moves from one state to another



4.flowchart of the code

4. system constraints

- it has a constrain of which the time is limited to timer upper boundary X tick timer upper boundary
- microcontroller working environment constraints such operating temperature and humidity
- interrupt may slightly delay system response if it is repeated a lot every second