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INTRODUCTION

1.1 HISTORY OF TRAFFIC LIGHTS

The first illuminated traffic signal was installed in London, England, in 1868. It was manually turned and consisted of two gas lamps, one red and one green, with semaphore arms atop a pole. Shortly after its inauguration it blew up while the lamps were being lit and killed a policeman. The first electric traffic signal was installed in Cleveland, Ohio, in 1914. It consisted of a green and red light with a warning buzzer to indicate when the light was about to change. The first signal to use the familiar green, yellow,and red lights was installed in New York City in 1918.

Traffic lights consist normally of three signals, transmitting meaningful information to drivers and ridersthrough colours and symbols including arrows and bicycles. The regular traffic light colours are red, yellow and green, arranged vertically or horizontally in that order. Although this is internationally standardized, variations exist on national and local scales as to traffic light sequences and laws.

The method was first introduced in December 1868 on Parliament Square in London to reduce the need for police officers to control traffic. Since then, electricity and computerised control has advanced traffic light technology and increased intersection capacity. The system is also used for other purposes, for example to control pedestrian movements, variable lane control (such as tidal flow systems or smart motorways) and for railway level crossings.

In 1923, inventor Garrett Morgan is credited behind inventing the traffic signal based on his T-shaped design which was patented in that year and later sold to General Electric. However, the system installedin 1914 is regarded as the first electric traffic signal based on a design by James Hoge.

The control of traffic lights made a big turn with the rise of computers in America in the 1950s. One of the best historical examples of computerized control of lights was in Denver in 1952. In 1967, the city of Toronto was the first to use more advanced computers that were better at vehicle detection.[7] The computers maintained control over 159 signals in the cities through telephone lines.

A British railway manager, John Peake Knight, suggested adapting a railroad method for controlling traffic. So, the first traffic signal was invented by JP Knight, a railway signaling engineer. Railroads used a semaphore system with small arms extending from a pole to indicate whether a train could pass or not.

December 10, 1868 — The first gas-lit traffic lights were installed outside the Houses of Parliament in London. Proposed by British railway engineer J.P. Knight to control the traffic of horse carriages, gas lights were manually controlled by a police officer using semaphore arms.

1.2 COLOUR SPECIFICATIONS

Green: A green traffic light means you may proceed, but only if it is safe to do so. If turning right, priority should be given to oncoming traffic as usual. Filter arrows: Some junctions use filter arrows to give priority to road users traveling in a particular direction.

Red: The traffic light sequence is red, red and amber, green, amber and then red again.

Prepare for your theory test with our traffic lights guide. Traffic lights are one of those things that most learner drivers arefamiliar with before they even start preparing for their theory test or practical driving test.

2.TRAFFIC LIGHTS

2.1 TYPES OF TRAFFIC SIGNALS

Traffic signals are the control devices which alternately direct the traffic to stop and proceed at intersections using red and green traffic light signal automatically.

The signals are classified into the following types:

- Traffic Control Signals
- Fixed time signals
- Manually operated signals
- Traffic actuated (automatic) signals

1.TRAFFIC CONTROL SIGNALS

Traffic signal These are provided with three colored light glows facing each direction of traffic flow .Red light indicates STOP ,Yellow amber light indicates the clearance time for the vehicles which have enteredthe intersection area by the end of green signal Green light indicates GO

Traffic control signal are further classified into the following 3 types.

2.FIXED TIME SIGNALS

These signals are set to repeat regularly a cycle of red, amber yellow and green lights. Depending upon the traffic intensities, the timings of each phase of the cycle is predetermined. Fixed time signals are thesimplest type of automatic traffic signals which are electrically operated. Drawbacks of the signals: Thecycle of red, yellow and green goes on irrespective whether on any road, there is any traffic or not. Trafficin the heavy stream has to stop at end phase.

3.TRAFFIC ACTUATED SIGNALS

In these signals the timings of the phase and cycle are changed according to traffic demand. In semi- actuated signals, the normal green phase of a traffic stream may be extended upto a certain period of timefor allowing the vehicles to clear off the intersection. In fully-actuated signals, computers assign the right of way for the traffic movement on turn basis of traffic flow demand.

4.MANUALLY OPERATED SIGNALS

In these types of signals, the traffic police watches the traffic demand from a suitable

point during the peak hours at the intersection and varies the timings of these phases and cycle accordingly.

2.2 TRAFFIC SIGNAL RULES IN INDIA

The pedestrians and vehicles coming from the opposite direction have the right of way. Red arrow suggests that the traffic signal should stop until the green arrow is on. A left or right turn is not allowed. Flashing red light also means stop. Red light: Red light means stop. When the traffic signal turns red, the vehicles must stop. Yellow light: Yellow light suggests a transition time before the red light turns on Vehicles. Flashing red light: Flashing red light also means stop.

What are the important traffic rules?

- Rules to follow for safe driving
- Always wear a seatbelt.
- Avoid distractions.
- Do not cross the speed limits.
- Service your car regularly.
- Follow traffic signals.
- Maintain lane discipline.
- Be careful during bad weather.
- Maintain a safe distance.

2.3 APPLICATIONS OF TRAFFIC LIGHTS

- traffic lamps, signal lights and stop lights. Traffic lights display three lights of a standard color. Produced to overcome congestion. Conventional controller based on the 'time-of-the-day' scheme.Develop fuzzy logic based traffic junction light simulator system

- AI techniques used Application of fuzzy logic. Provide the attribute of intelligence to the system. Has the capability of mimicking the human intelligence for controlling the traffic flow. Contains a fuzzy logic signal time controller system and a fuzzy logic phase sequencer system

- AI techniques used A fuzzy logic controller is designed for an isolated 4Lane traffic intersection Controlled traffic light uses sensors that count cars instead of proximity sensors which only indicate the presence of cars. Determine the presence and absence of vehicles in road images. Extension of the green light if more vehicle is present. Signal the traffic light to go red if the roadis empty.

- Advantages of application Optimum control of fluctuating traffic volumes such as over saturated or unusual load conditions. Improve the vehicular throughput Maximises the traffic flow Controlthe time intervals of the traffic light. Decrease delays of vehicles and environmental effects Increase intersection capacity at same time.

- Advantages of application Reduces the number of accidents Reduces the average waiting time at red lights Reduces wastage of time by a green light an empty road. Better traffic flow leadingto greener environment.

3. PROBLEM ANALYSIS AND BLOCK DIAGRAM

3.1 PROBLEM ANALYSIS:

Testing the Traffic Light Controller with LPC2148. Give +3.3V power supply to LPC2148 Development Board; the LED is connected with LPC2148 Development Board.

For 5 seconds :

Time delay =((PR+1)MR0)/PCLK

PR=74 and MR0=1000000

For 10 seconds :

Time delay =((PR+1)MR0)/PCLK

PR=149 and MR0=1000000

Input : In The Program IOSET And IOCLR Register Is Set.

Output: Observe The ON And OFF Of Led's For The Duration Specified.

3.2 BLOCK DIAGRAM

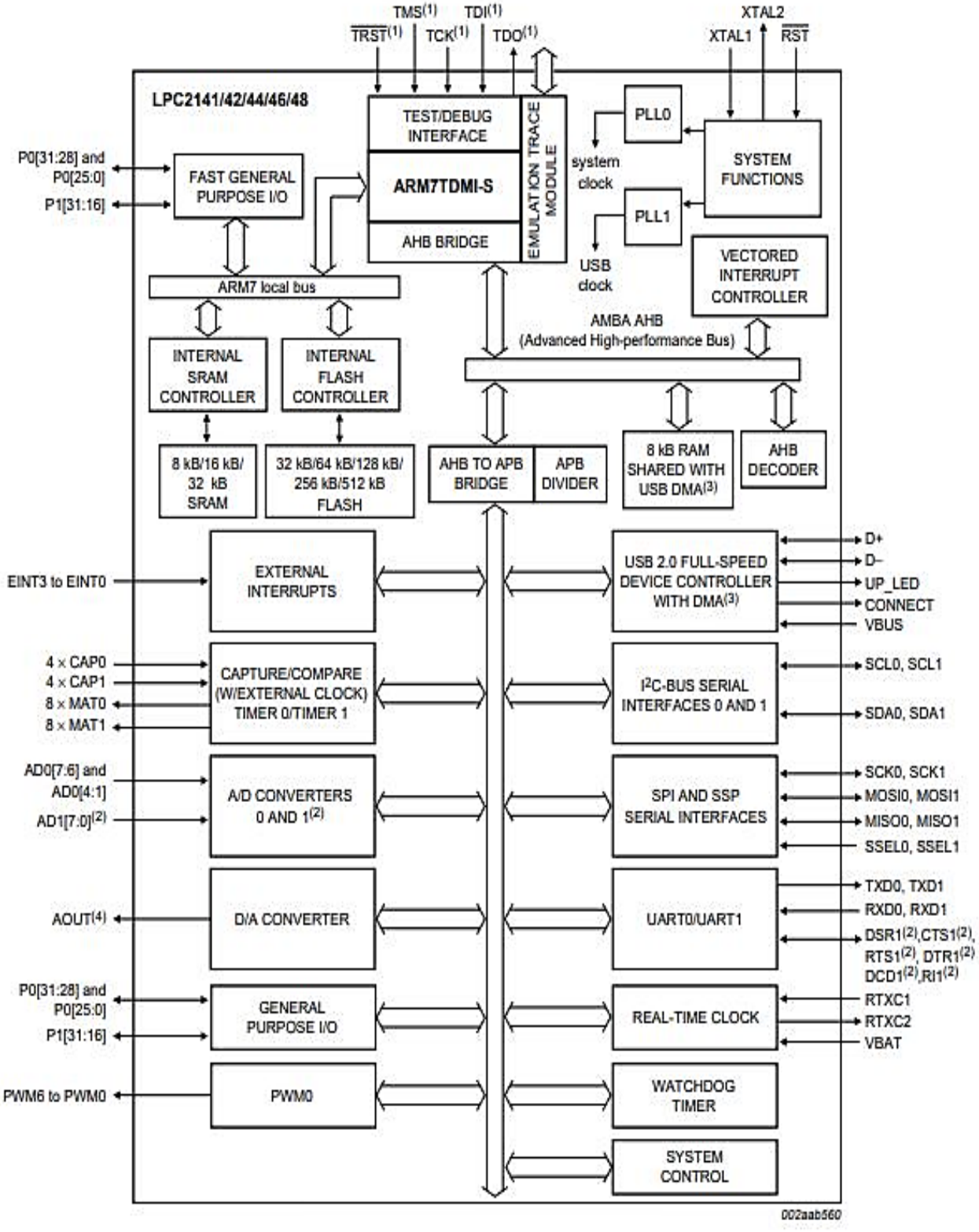


Fig.3.1 LPC2148 BLOCK DIAGRAM

4. IMPLEMENTATION AND INFERENCE

4.1 ALGORITHM :

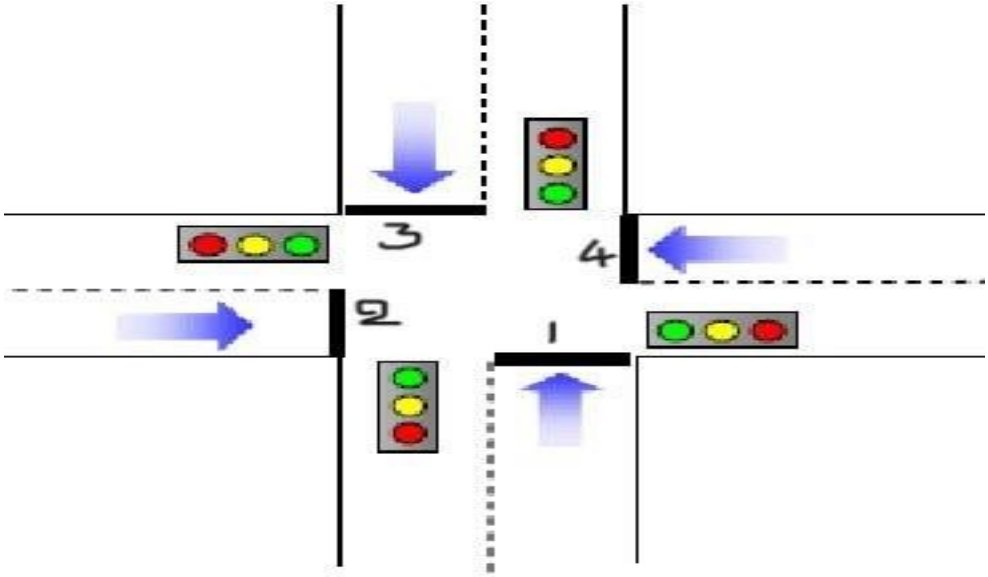
STEP 1: Start

STEP 2: Write a function to initialize the PLL0 and configure it to produce 60 MHz system
Clock(CCLK) and peripheral clock(PCLK).

STEP 3: Write a fuction to initialize Timer and pass the value . Set PR=74 and MR0=1000000
For 5 secs and PR=11 and MR0=1000000 for 10 secs

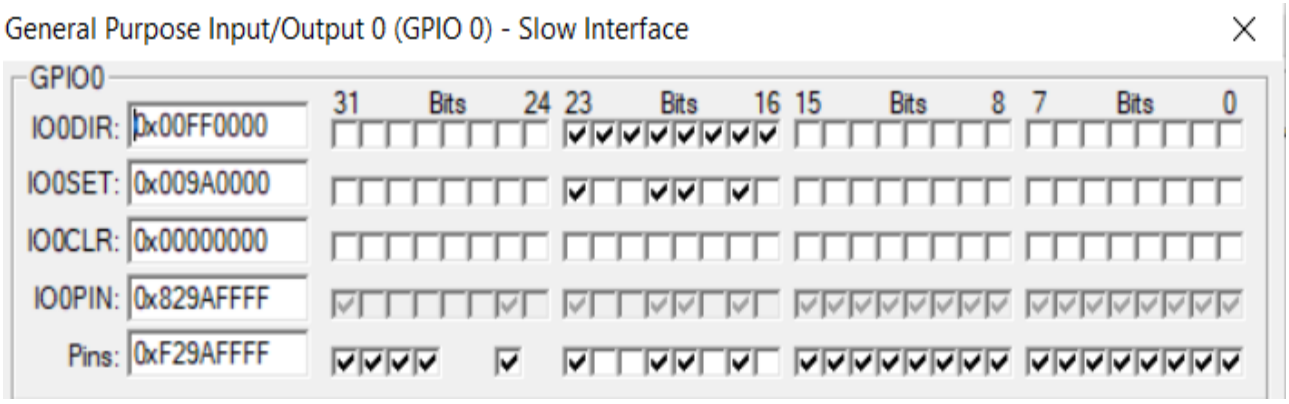
STEP 4: Set IOSET register to turn on and IOCLR register to turn off the LED's for the required time delay.

STEP 5: Stop

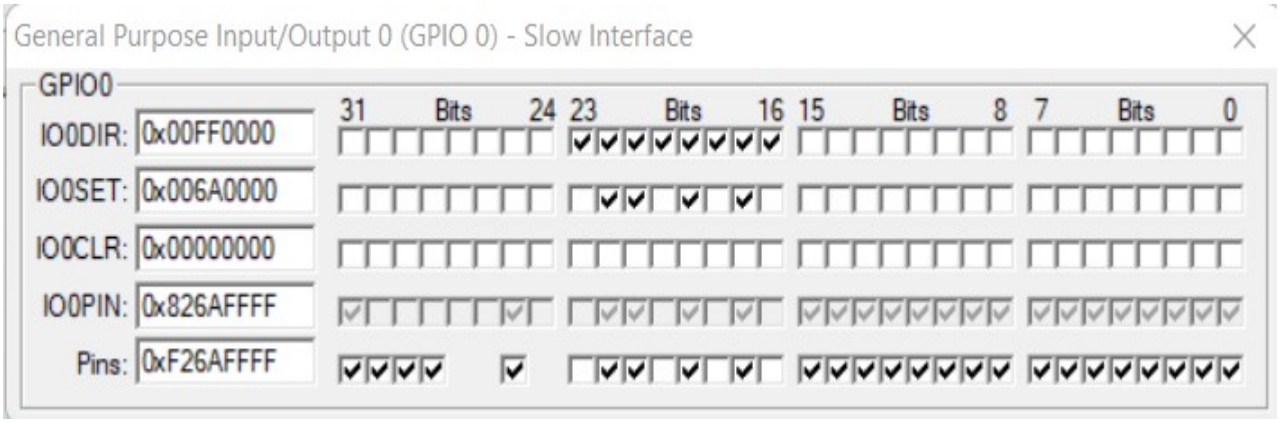


REFERENCE DIAGRAM
Fig 4.1

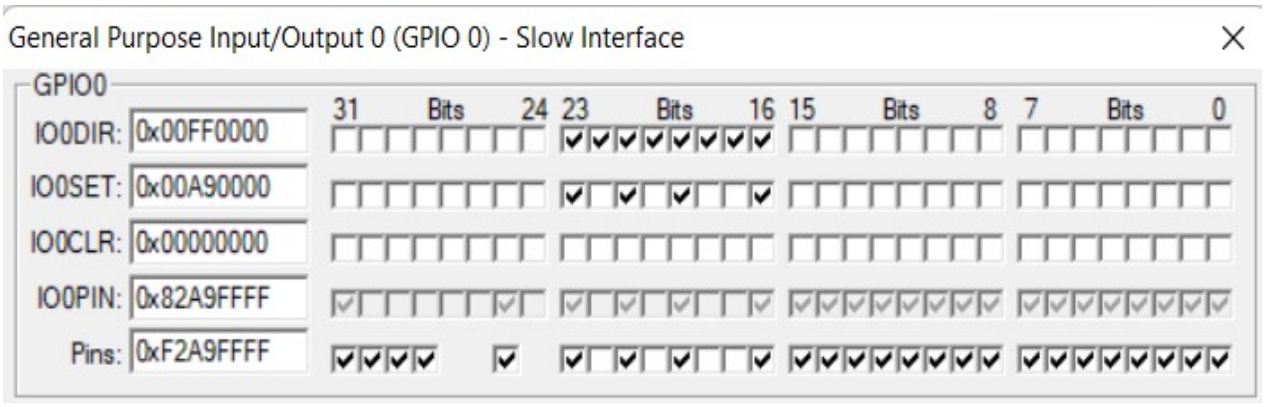
4.2 OUTCOMES



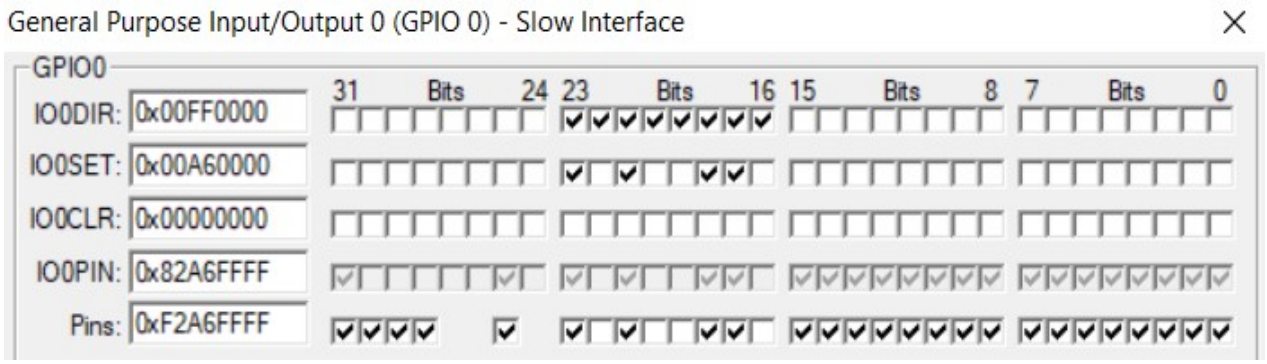
DIRECTION NO.3 IS GREEN AND 2,1,4 ARE RED
Fig 4.2



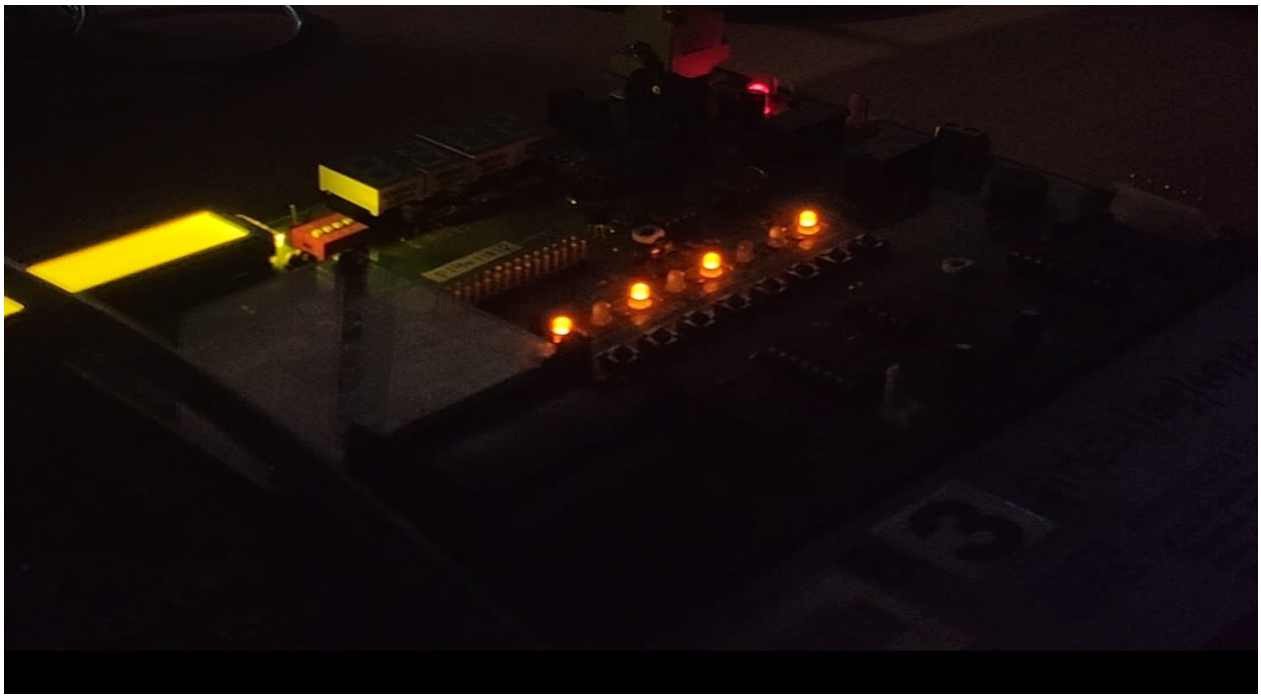
DIRECTION NO.1 IS GREEN AND 2,3,4 ARE RED
Fig 4.3



DIRECTION NO.4 IS GREEN AND 1,2,3 ARE RED
Fig 4.4



DIRECTION NO.3 IS GREEN AND 1,2,4 ARE RED
Fig 4.5



Out put of LPC2148 microcontroller
Fig 4.6

4.3 RESULT ANALYSIS

For the implementation we use the pins from 0.16 to 0.23 which are inbuilt leds in LPC2148 microcontroler . Which have common anode connections so, CLEAR command will ON the leds and SET command will turn OFF the leds. For the 1st direction to go green we used pin 0.17 as on pin and pin no. 0.18,0.20,0.22 are used as red pins. For 2nd direction to go green we used pin 0.22 on and 0.17,0.19,0.21 are on and used as red lights. For 3rd direction to go green we used pin 0.23 on and 0.16,0.21,0.19 are on and used as red lights. For 4th direction to go green we used pin 0.17 on and 0.18,0.21,0.23 are on and used as red lights. Only one direction is on at time so that the vechicals can move to all three direction. If two opposite directios are turned on then moving right will become hard for the driver. We make the difference in time for all four signal based on the trafic on that direction.

5. CONCLUSION

Traffic jam is a serious issue in every big city that causes several problems for common people. It consumes so much of time and energy unnecessarily and hence the loss of the nation. The symbolism of a traffic light (and the meanings of the three primary colours used in traffic lights) are frequently found in many other contexts. Since they are often used as single spots of colour without the context of verticalposition, they are typically not comprehensible to up to one in ten males who are colour blind.

This project is based on very effective way of optimizaing traffic,with redefinition of values for a real time applications. This work to control traffic on four way roads according to traffic control barricades. This will help to reduce traffic jams and helps in easy and fast transportation which will help nation to grow in all secters.

REFERENCES

1. User manual of LPC2148 microcontroler
2. William Hols , 'ARM Assembly Language Fundamentals and Techniques'CRpress,2009
3. Steve Furber , 'ARM system-on-chip Architecture' LPE, Second edition

6.CODE OF EXECUTION:

```
#include<lpc21xx.h>

void pll()
{
PLL0CON=0X01;
PLL0CFG=0X24;
PLL0FEED=0XAA;
 PLL0FEED=0X55;
while((PLLSTAT&(1<<10))==0);
PLL0CON=0X03;
 PLL0FEED=0XAA;
PLL0FEED=0X55;
VPBDIV = 0X00;
}

void timer_delay (unsigned long int x)
{ T0PR=x;
T0MR0=1000000;
T0TC=0X0;
T0MCR=(1<<2);
T0TCR=0X01;
while(T0TC!=T0MR0);
T0TCR=0X02;
}
int main()
{
IO0DIR |= (0xff<<16);


while(1)
```

```
{
IO0CLR |= (0X56<<16);
timer_delay(74);
IO0SET |= (0X56<<16);
timer_delay(11);

IO0CLR |= (0X59<<16);
timer_delay(74);

IO0SET |= (0X59<<16);
timer_delay(11);

IO0CLR |= (0X65<<16);
timer_delay(74);

IO0SET |= (0X65<<16);
timer_delay(11);

IO0CLR |= (0X95<<16);
timer_delay(74);

IO0SET |= (0X95<<16);
timer_delay(11);

}
}
```

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