2- way traffic light controller using 555IC and PIR sensor

Objective of the Project:

The primary goal of this project is to design and implement a traffic light controller using 555timer for the generating delay and using PIR for paedestrian crossing,

- Ensure efficient traffic flow to prioritize emergency vehicles (ambulances, fire engines).
- Provide safe crossing opportunities for pedestrians.
- Adding proper signage, adequate lighting, and pedestrian-friendly infrastructure for improved safety.
- Reduced Response Time

Components Required:

- CD4017 IC : Decade counter is used here for glowing LED according to the need.
- 555 Timer IC : 555IC is used here to generate a clock pulse for a particular time continuously.
- Capacitor : Polaraised capacitor used for 555 to vary the time delay.
- Resistors : 22Kohm,330ohm,100ohm resistors are used for varying delay and reduce current flow for the devices.
- Diodes : Diodes are interconnected and connected to LED for the unidirectional flow of current.
- Potentiometer : This is a variable potentiometer so we can even adjust the delay time by varying this.
- LED : RED,YELLOW,GREEN colours are used for the efficient signals.
- Volatage source : 6V battery is used for the entire circuit.
- PIR sensor : For detecting peoples motion when they cross the lane so that the signals will change accordingly.

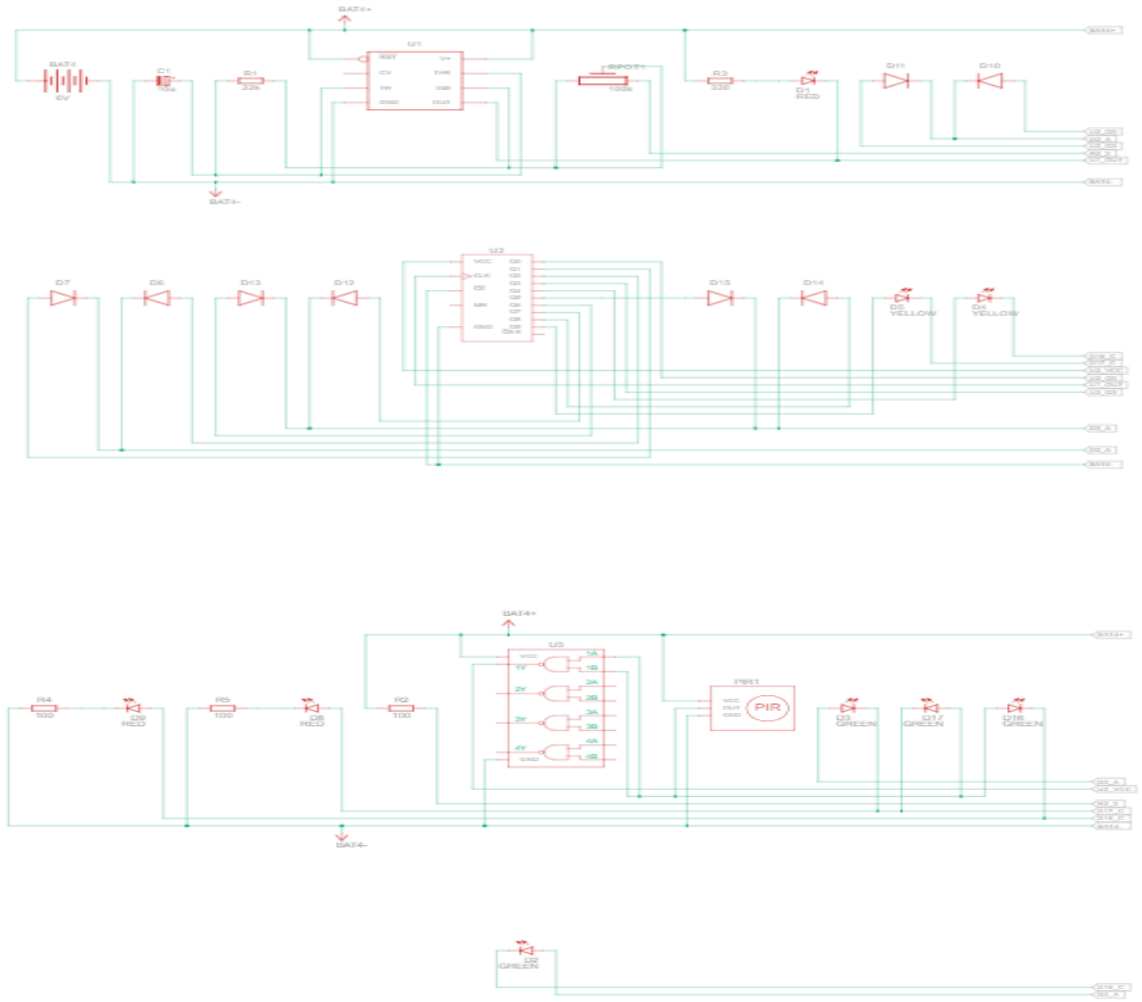
Circuit Diagram:

The circuit diagram includes:

- 555 Timer connected as a monostable multivibrator.

- Output from 555 Timer to CD4017 clock (pin 14).
- CD 4017 driving the LED.
- From pin 1 to pin 7,pin 9 to pin 11 of each CD 4017 is connected to the diode of the each LED.
- PIR output is connected to the green light and NAND gate input as well.

CIRCUIT DIAGRAM



Methodology in Detail:

Step 1:

Accroding,to the fixed values of resistors and capacitors there was a 0.06 seconds delay for the next clock pulse generation in 555ic so it gives output for every 0.06 seconds.

Step 2:

The CD 4017 starts counting the pulses and give output for the led through diodes.

Step 3:

The cycles are repeated until there is no other signal generation for the counter IC.

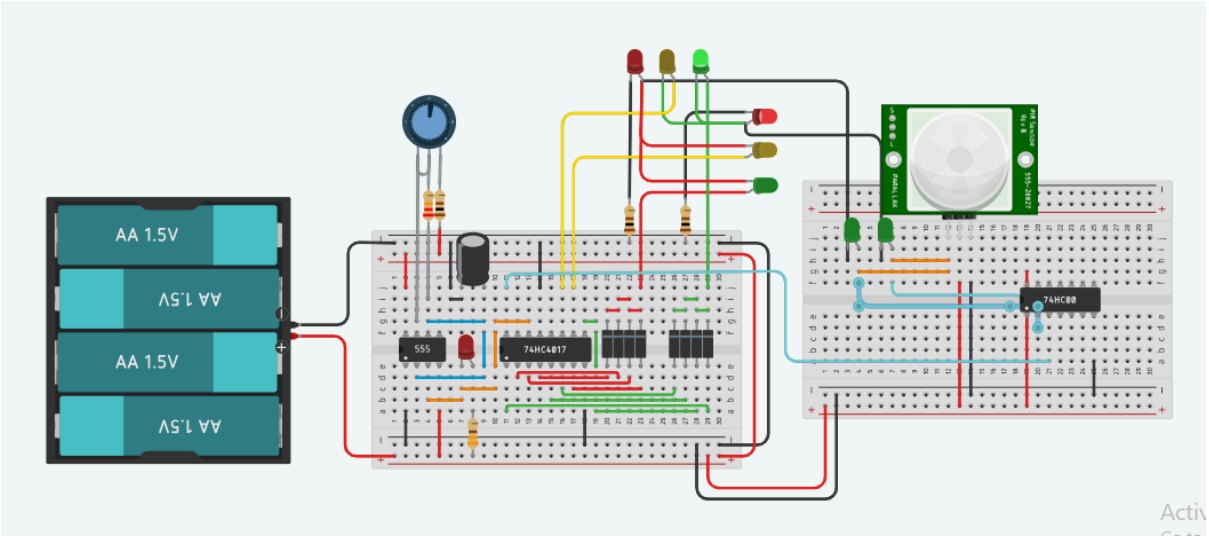
Step 4:

When the **PIR** detects the motion of peoples in cross lane it respond immediately and turns the signal into red to indicate the vehicles to stop before the arrival of vehicle so the clock signal is paused and this will generate the output for the counter.

Simulation Results:

After implementing the circuit in a simulation software using tinkercad,the signal system is working perfectly according to the need .

Snapshots of the working simulation can be included here to demonstrate the functionality.



Application:

This traffic light system can be used in:

- 2- way for reduced response time.
- Automatic sgnal switching for pedestrian walking.

Conclusion:

This project demonstrates a simple yet effective way to create a traffic light controller

system,efficient traffic systems and education for road users are critical for prioritizing emergency vehicles.Creating safe environments for pedestrians to cross roads is equally important.Coordinated traffic management ensures safety andefficiency for all road users.