TRAFFIC SIGNAL CONTROL

TEAM MEMBERS

1.RAMACHANDRAN C
2.SUBIKSHA T
3.PRABA SHREE S

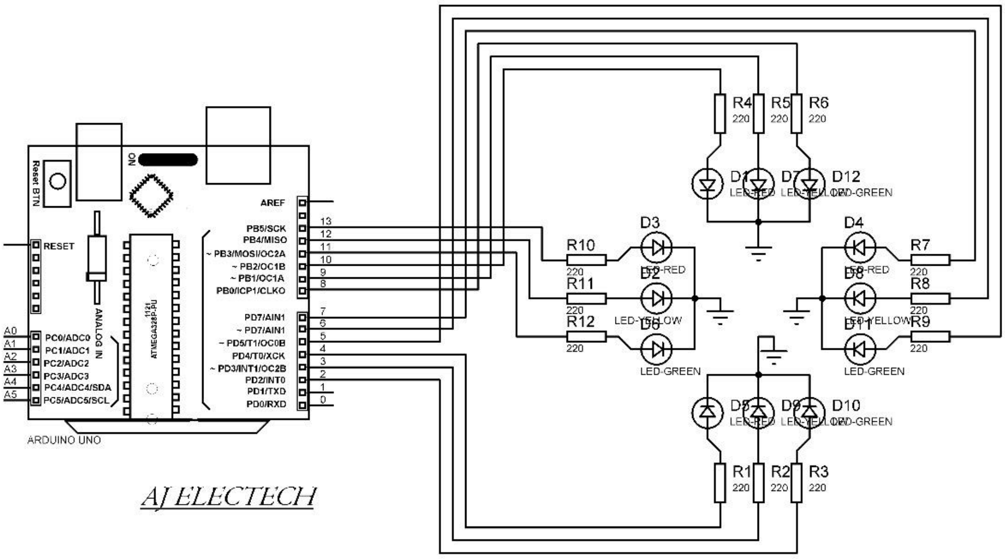
INTRODUCTION:

In this project, we will develop a traffic signal system using an Arduino board, LEDs, resistors, and sensors. The Arduino will be programmed to control the LEDs, simulating the typical red, yellow, and green lights found at traffic intersections. Sensors will be incorporated to detect the presence of vehicles, adding an element of automation and real-time response to the system.

CODING:

```
// Define pin numbers for the traffic lights
int road1[] = {13, 12, 11}; // Lane 1: Red, Yellow, Green
int road2[] = {10, 9, 8};   // Lane 2: Red, Yellow, Green
int road3[] = {7, 6, 5};    // Lane 3: Red, Yellow, Green
int road4[] = {4, 3, 2};    // Lane 4: Red, Yellow, Green

void setup() {
  // Initialize all pins as OUTPUT
  for (int i = 0; i < 3; i++) {
    pinMode(road1[i], OUTPUT);
    pinMode(road2[i], OUTPUT);
    pinMode(road3[i], OUTPUT);
    pinMode(road4[i], OUTPUT);
  }

  // Initially turn off all the lights
  for (int i = 0; i < 3; i++) {
    digitalWrite(road1[i], LOW);
    digitalWrite(road2[i], LOW);
    digitalWrite(road3[i], LOW);
    digitalWrite(road4[i], LOW);
  }
}

void loop() {
  // Lane 1 Green, Lanes 2, 3, 4 Red
  digitalWrite(road1[2], HIGH); // Lane 1 Green ON
  digitalWrite(road2[0], HIGH); // Lane 2 Red ON
  digitalWrite(road3[0], HIGH); // Lane 3 Red ON
  digitalWrite(road4[0], HIGH); // Lane 4 Red ON
  delay(7000); // Keep the lights in this state for 7 seconds

  // Lane 1 Yellow, Lanes 2, 3, 4 Red
  digitalWrite(road1[2], LOW);  // Lane 1 Green OFF
  digitalWrite(road1[1], HIGH); // Lane 1 Yellow ON
  delay(3000); // Keep the lights in this state for 3 seconds

  // Lane 1 Red, Lane 3 Green, Lanes 2, 4 Red
  digitalWrite(road1[1], LOW);  // Lane 1 Yellow OFF
  digitalWrite(road1[0], HIGH); // Lane 1 Red ON
  digitalWrite(road3[0], LOW);  // Lane 3 Red OFF
  digitalWrite(road3[2], HIGH); // Lane 3 Green ON
  delay(7000); // Keep the lights in this state for 7 seconds

  // Lane 1 Red, Lane 3 Yellow, Lanes 2, 4 Red
  digitalWrite(road3[2], LOW);  // Lane 3 Green OFF
  digitalWrite(road3[1], HIGH); // Lane 3 Yellow ON
  delay(3000); // Keep the lights in this state for 3 seconds
  // Repeat this process for Lane 2 and Lane 4
  // Lane 2 Green, Lanes 1, 3, 4 Red
  digitalWrite(road3[1], LOW);  // Lane 3 Yellow OFF
  digitalWrite(road3[0], HIGH); // Lane 3 Red ON
  digitalWrite(road2[0], LOW);  // Lane 2 Red OFF
  digitalWrite(road2[2], HIGH); // Lane 2 Green ON
  delay(7000); // Keep the lights in this state for 7 seconds

  // Lane 2 Yellow, Lanes 1, 3, 4 Red
  digitalWrite(road2[2], LOW);  // Lane 2 Green OFF
  digitalWrite(road2[1], HIGH); // Lane 2 Yellow ON
  delay(3000); // Keep the lights in this state for 3 seconds

  // Lane 2 Red, Lane 4 Green, Lanes 1, 3 Red
  digitalWrite(road2[1], LOW);  // Lane 2 Yellow OFF
  digitalWrite(road2[0], HIGH); // Lane 2 Red ON
  digitalWrite(road4[0], LOW);  // Lane 4 Red OFF
  digitalWrite(road4[2], HIGH); // Lane 4 Green ON
  delay(7000); // Keep the lights in this state for 7 seconds

  // Lane 2 Red, Lane 4 Yellow, Lanes 1, 3 Red
  digitalWrite(road4[2], LOW);  // Lane 4 Green OFF
  digitalWrite(road4[1], HIGH); // Lane 4 Yellow ON
  delay(3000); // Keep the lights in this state for 3 seconds
}
```

CIRCUIT DIAGRAM:



WORKING:

LED Control:

The Arduino controls the LEDs by turning them on and off based on the traffic signal sequence.

The typical sequence is Red → Green → Yellow → Red, where each light is turned on for a specific duration.

Timing:

The Arduino code defines the timing for each light. For example:

Red light: 10 seconds

Green light: 10 seconds

Yellow light: 2 seconds

The timing can be adjusted based on traffic conditions or sensor inputs.

CONCLUSION:

This week, we completed the full code and developed the circuit diagram for our traffic signal control project. We successfully integrated the sensors, LEDs, and other components into the circuit. After finalizing the design, we tested the functionality and debugged any issues to ensure everything works as expected. The system is now operational, and we're ready to proceed with further testing or enhancements.