# VIP Car Parking System

A Project Report

*Submitted by:*

Prajjwal Mathur

in

## Sensors and Actuators

Of

Second Year B.Tech (ECE)

**October-2021**

# INDEX

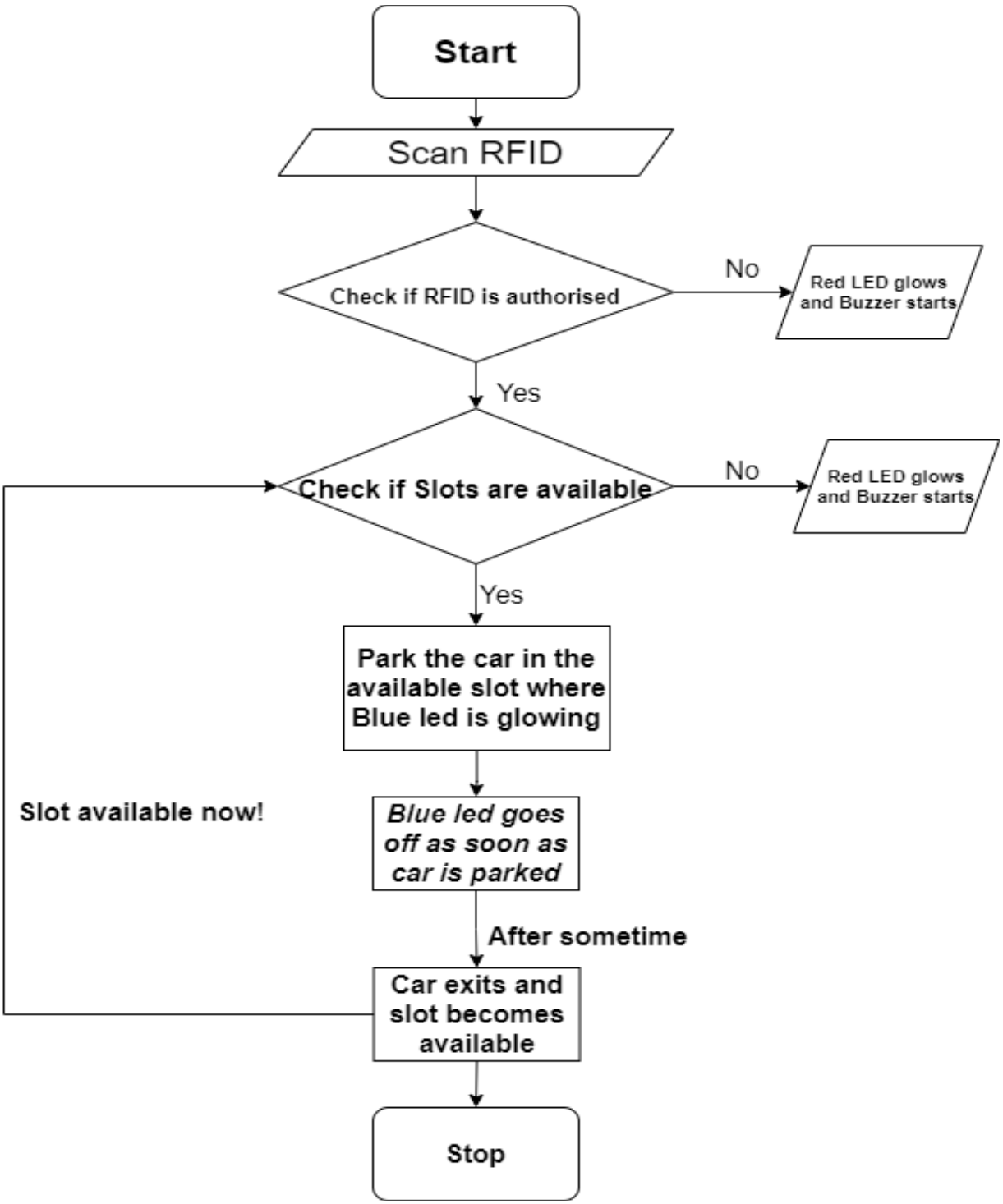
# INTRODUCTION

- In this project, we've implemented a "VIP Car parking system" using Infrared sensors and RFID authentication.
- This project focuses on automating the parking system at malls, hotels, and at wedding entry too.
- It restricts the entry of unauthorized person
- If the parking is full, it can restrict the entry of incoming guests.

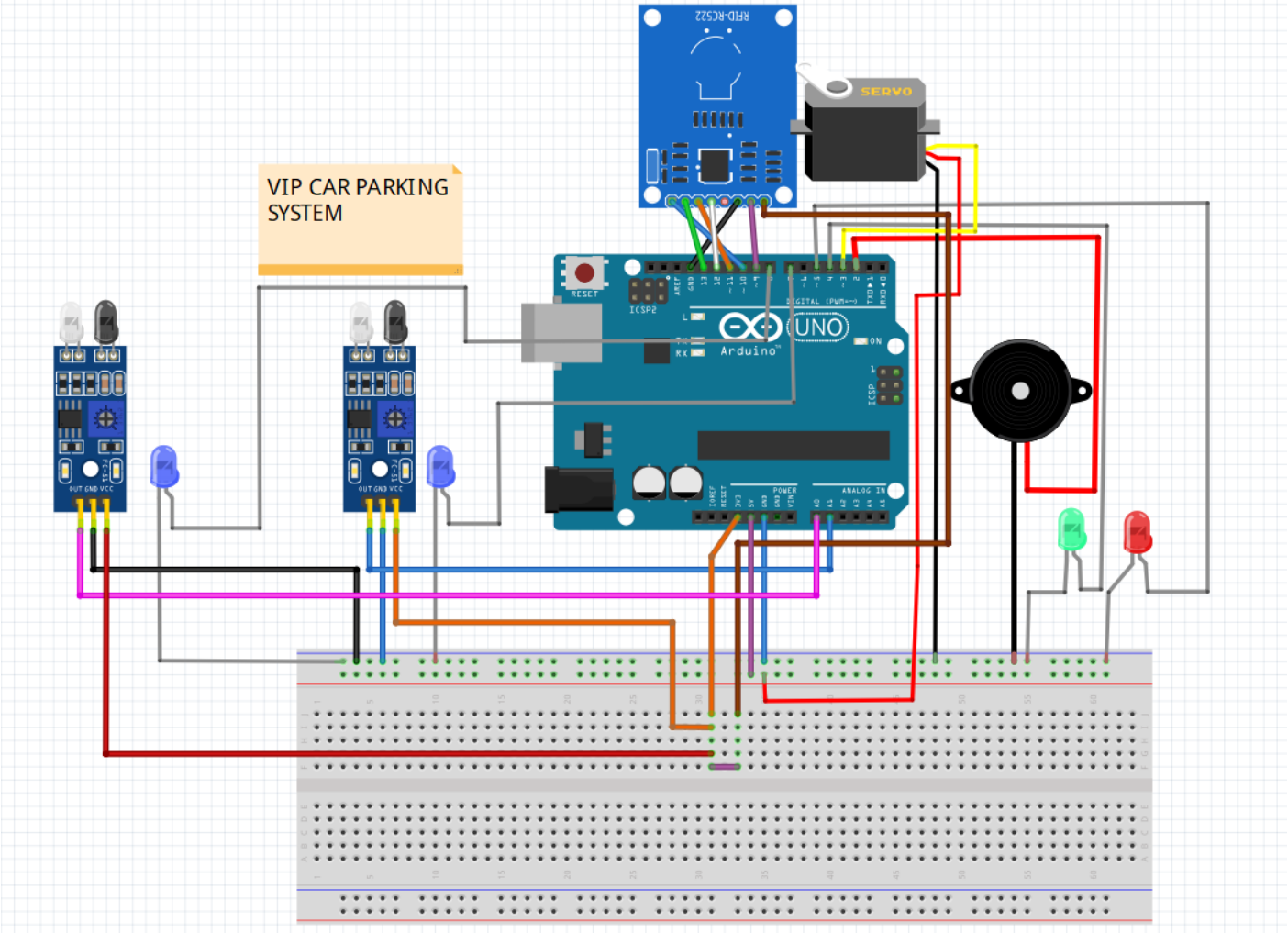
# LITERATURE REVIEW

- We came up with this idea of making it easier for people to park their car in the parking lot whether it's during daytime or at night.
- First, we made the circuit design via Fritzing and about how it should work.
- Next, we implemented the circuit but came upon an idea of making it easier for people to find an empty parking space.
- So, we installed a light that glows if the space is available.
- This project made us intrigued about the working of Arduino and IR sensors along with RFID module

# BLOCK DIAGRAM



# INTERFACING DIAGRAM



# CODE

```
#include <SPI.h>
#include <MFRC522.h>
#include <Servo.h>

#define SS_PIN 10
#define RST_PIN 9
#define LED_G 4 //define green LED pin
#define LED_R 5 //define red LED
#define BUZZER 2 //buzzer pin
#define IR A1 //IR proximity sensor
#define LED_IR 7

MFRC522 mfrc522(SS_PIN, RST_PIN);   // Create MFRC522 instance.
Servo myServo; //define servo name

void setup()
{
  Serial.begin(9600);   // Initiate a serial communication
  SPI.begin();      // Initiate  SPI bus
  mfrc522.PCD_Init();   // Initiate MFRC522
  myServo.attach(3); //servo pin
  myServo.write(0); //servo start position
  pinMode(LED_G, OUTPUT);
  pinMode(LED_R, OUTPUT);
  pinMode(BUZZER, OUTPUT);
  noTone(BUZZER);
  pinMode(A1, INPUT);
  Serial.println("Put your card to the reader...");
  Serial.println();

}
void loop()
{
  delay(10);
  int slots=1;
  int ir_reading = analogRead(A1);
  Serial.println(ir_reading);
   if (ir_reading < 300)
    {
        digitalWrite(LED_IR, LOW);
        delay(10);
        slots--;
    }
    else
    {
        digitalWrite(LED_IR, HIGH);
        delay(10);
        slots++;
    }
  // Look for new cards
  if ( ! mfrc522.PICC_IsNewCardPresent())
  {
    return;
  }
  // Select one of the cards
  if ( ! mfrc522.PICC_ReadCardSerial())
  {
    return;
  }
  //Show UID on serial monitor
  Serial.print("UID tag :");
  String content= "";
  byte letter;
  for (byte i = 0; i < mfrc522.uid.size; i++)
  {
     Serial.print(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " ");
     Serial.print(mfrc522.uid.uidByte[i], HEX);
```

```
    content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));
    content.concat(String(mfrc522.uid.uidByte[i], HEX));
  }
  Serial.println();
  Serial.print("Message : ");
  content.toUpperCase();
  if(slots>0){
    if (content.substring(1) == "83 23 38 BB") //change here the UID of the card/cards that you want to give access
    {
      Serial.println("Authorized access");
      Serial.println();
      delay(500);
      digitalWrite(LED_G, HIGH);
      tone(BUZZER, 500);
      delay(300);
      noTone(BUZZER);
      myServo.write(180);
      delay(5000);
      myServo.write(0);
      digitalWrite(LED_G, LOW);
    }

    else   {
    Serial.println(" Access denied");
    digitalWrite(LED_R, HIGH);
    tone(BUZZER, 300);
    delay(1000);
    digitalWrite(LED_R, LOW);
    noTone(BUZZER);
    }
   }

  else{
      if (content.substring(1) == "83 23 38 BB"){
```

```
          Serial.println(" Access denied, parking full!");
              tone(BUZZER, 100);
              digitalWrite(LED_R, HIGH);
              delay(200);
              digitalWrite(LED_R, LOW);
              delay(200);
              digitalWrite(LED_R, HIGH);
              delay(200);
              digitalWrite(LED_R, LOW);
              delay(200);
              digitalWrite(LED_R, HIGH);
              delay(200);
              digitalWrite(LED_R, LOW);
              noTone(BUZZER);
              delay(200);
       }
     }
}
```

# HARDWARE SPECIFICATIONS

| Name of component | Price(As on October 2021) |
|---|---|
| 1. RFID Module | ₹132 |
| 2. Arduino Uno | ₹830 |
| 3. Servo Motor | ₹105 |
| 4. IR proximity sensor | ₹35*2 |
| 5. Buzzer 3v | ₹18 |
| 6. LED bulb | ₹21*4 |
| 7. Breadboard | ₹150 |
| | Total: ₹1390 |

# SOFTWARES USED

- Arduino IDE
- Fritzing
- Google Docs
- VS code

# RESULTS

When all the slots are empty and the RFID card is scanned via RFID scanner and if it recognizes it then it will allow the car to be parked.

If it's an invalid card or the parking is full, then it will sound the buzzer and will not allow the car to go inside and red led will blink.

# CONCLUSION

Hence we implemented the **VIP car parking system** using RFID and IR sensor via Arduino.

# Bibliography


- Official Arduino documentation
- www.youtube.com/carparkingusingArduino
- www.Google.com