#include <MFRC522.h>

 int Gr SignalTime = 10000;

 int rfid SignalTime = 10000;

 char\* rfid id []={”270021BEBE06”,”270021BCFE44”};

 // Replace your RFID tags here

 int trafficSignal1PinOrg = 23;

 int trafficSignal1PinRed = 22;

 int trafficSignal1PinGr = 24;

 int trafficSignal2PinRed = 25;

 int trafficSignal2PinOrg = 26;

 int trafficSignal2PinGr = 27;

 int trafficSignal3PinRed = 28;

 int trafficSignal3PinOrg = 30;

 int trafficSignal3PinGr = 31;

 int trafficSignal4PinRed = 33;

 int trafficSignal4PinOrg = 34;

 int trafficSignal4PinGre = 37;

 int lane1aIRSensorPin = 1;

 // IR sensor pin for lane 1

 int lane2aIRSensorPin = 3;

 int lane1bIRSensorPin = 2;

 // IR sensor pin for lane 2

 int lane2bIRSensorPin = 4;

 int lane3aIRSensorPin = 11;

 // IR sensor pin for lane 3

 int lane3bIRSensorPin = 8;

 int lane4aIRSensorPin = 21;

 // IR sensor pin for lane 4

 int lane4bIRSensorPin = 10;

 int RFIDSSELPinL3 = ;

 // Slave Select (SS) pin for RFID RC522 module

 int RFIDResetPinL4 = ;

 // Reset pin for RFID RC522 module

 int RFIDSSELPinL4 = ;

 // Slave Select (SS) pin for RFID RC522 module

 void setup ()

 {

 Serial . Begin (9600);

 mfrc522 . PCD Init ();

 mfrc522 . PCD DumpVersionToSerial ();

 // IR sensors

 pinMode( lane1aIRSensorPin , INPUT);

 pinMode( lane1bIRSensorPin , INPUT);

 pinMode( lane2aIRSensorPin , INPUT);

 pinMode( lane2bIRSensorPin , INPUT);

 pinMode( lane3aIRSensorPin , INPUT);

 pinMode( lane3bIRSensorPin , INPUT);

 pinMode( lane4aIRSensorPin , INPUT);

 pinMode( lane4bIRSensorPin , INPUT);

 // RFID RC522 module

 RFID init (RFIDResetPinL1 , RFIDSSELPinL1);

 RFID init (RFIDResetPinL2 , RFIDSSELPinL2);

 RFID init (RFIDResetPinL3 , RFIDSSELPinL3);

 RFID init (RFIDResetPinL4 , RFIDSSELPinL4);

 // Initialize traffic signals (e.g. , LEDs)

 pinMode( trafficSignal1PinRed , OUTPUT);

 pinMode( trafficSignal1PinOrg , OUTPUT);

 pinMode( trafficSignal1PinGr , OUTPUT);

 pinMode( trafficSignal2PinRed , OUTPUT);

 pinMode( trafficSignal2PinOrg , OUTPUT);

 pinMode( trafficSignal2PinGr , OUTPUT);

 pinMode( trafficSignal3PinRed , OUTPUT);

 pinMode( trafficSignal3PinOrg , OUTPUT);

 pinMode( trafficSignal3PinGr , OUTPUT);

 pinMode( trafficSignal4PinRed , OUTPUT);

 pinMode( trafficSignal4PinOrg , OUTPUT);

 pinMode( trafficSignal4PinGr , OUTPUT);

 }

 void loop () {

 // Detect vehicle density using IR sensors

 int densityLane1a = readIRSensor ( lane1aIRSensorPin ,

 lane1bIRSensorPin ,1);

 int densityLane2a = readIRSensor ( lane2aIRSensorPin ,

 lane2bIRSensorPin ,2);

 int densityLane3a = readIRSensor ( lane3aIRSensorPin ,

 lane3bIRSensorPin ,3);

 int densityLane4a = readIRSensor ( lane4aIRSensorPin ,

 lane4bIRSensorPin ,4);

 // Find the lane with the lowest density

 int minDensity = min(min(densityLane1 ,

 densityLane2 ) ,

 min( densityLane3 , densityLane4 ));

 int RFIDResetPinL1 = 9;

 // Reset pin for RFID RC522 module

 int RFIDSSELPinL1 = ;

 // Slave Select (SS) pin for RFID RC522 module

 int RFIDResetPinL2 = ;

 // Reset pin for RFID RC522 module

 int RFIDSSELPinL2 = ;

 // Slave Select (SS) pin for RFID RC522 module

 int RFIDResetPinL3 = ;

 // Reset pin for RFID RC522 module

 // Turn green signal for the lane

 with the lowest density

 if ( RFID checkDetection () == NULL) {

 if (minDensity == densityLane1 )

 {

 }

 setTrafficSignals (1);

 else if (minDensity == densityLane2 )

 {

 }

 setTrafficSignals (2);

 12

else if (minDensity == densityLane3 )

 {

 }

 setTrafficSignals (3);

 else

 {

 }

 }

 s etTrafficSignals (4);

 // Check for RFID detection

 else if (RFID checkDetection ()!=NULL) {

 String detectedUID = RFID checkDetection ();

 i f (detectedUID != ””) {

 // If RFID detected , turn the

 corresponding lane green for RFID SIGNAL TIME

 i f (detectedUID == ”Lane1 UID”)

 {

 setTrafficSignals (1);

 delay ( rfid SignalTime );

 }

 else if (detectedUID == ”Lane2 UID”)

 {

 setTrafficSignals (2);

 delay ( rfid SignalTime );

 }

 else if (detectedUID == ”Lane3 UID”)

 {

 s etTrafficSignals (3);

 delay ( rfid SignalTime );

 }

 else if (detectedUID == ”Lane4 UID”)

 {

 setTrafficSignals (4);

 delay ( rfid SignalTime );

 }

 }

 delay ( Gr SignalTime );

 digitalWrite ( trafficSignal3PinGr ,HIGH);

 digitalWrite ( trafficSignal4PinRed ,HIGH);

 digitalWrite ( trafficSignal4PinGr ,LOW);

 delay (10000);

 break ;

 case 4:

 // Set lane 4 green and others red

 digitalWrite ( trafficSignal1PinRed ,HIGH);

 digitalWrite ( trafficSignal1PinGr ,LOW);

 digitalWrite ( trafficSignal2PinRed ,HIGH);

 digitalWrite ( trafficSignal2PinGr ,LOW);

 digitalWrite ( trafficSignal3PinRed ,HIGH);

 digitalWrite ( trafficSignal3PinGr ,LOW);

 digitalWrite ( trafficSignal4PinRed ,LOW);

 digitalWrite ( trafficSignal4PinGr ,HIGH);

 delay (10000);

 break ;

 default :

 break ;

 }

 }

 int readIRSensor ( int pin1 , int pin2 , int a)

 {

 }

 if ( digitalRead ( pin1 ) && digitalRead ( pin2 ))

 {

 }

 setTrafficSignals (a );

 delay ( Gr SignalTime );

 String RFID checkDetection ()

 {

 }

 if ( ! mfrc522.PICC IsNewCardPresent ()) {

 return ;

 }

 // Select one of the cards

 if ( ! mfrc522. PICC ReadCardSerial ()) {

 return ;

 }

 // Dump debug info about the card ;

 PICC HaltA() is automatically called

 mfrc522 . PICC DumpToSerial(&(mfrc522 . uid ));

 }

 }

 void setTrafficSignals ( int lane ) {

 switch ( lane ) {

 case 1:

 // Set lane 1 green and others red

 digitalWrite ( trafficSignal1PinRed ,LOW);

 digitalWrite ( trafficSignal1PinGr ,HIGH);

 digitalWrite ( trafficSignal2PinRed ,HIGH);

 digitalWrite ( trafficSignal2PinGr ,LOW);

 digitalWrite ( trafficSignal3PinRed ,HIGH);

 digitalWrite ( trafficSignal3PinGr ,LOW);

 digitalWrite ( trafficSignal4PinRed ,HIGH);

 digitalWrite ( trafficSignal4PinGr ,LOW);

 delay (10000);

 break ;

 case 2:

 // Set lane 2 green and others red

 digitalWrite ( trafficSignal1PinRed ,HIGH);

 digitalWrite ( trafficSignal1PinGr ,LOW);

 digitalWrite ( trafficSignal2PinRed ,LOW);

 digitalWrite ( trafficSignal2PinGr ,HIGH);

 digitalWrite ( trafficSignal3PinRed ,HIGH);

 digitalWrite ( trafficSignal3PinGr ,LOW);

 digitalWrite ( trafficSignal4PinRed ,HIGH);

 digitalWrite ( trafficSignal4PinGr ,LOW);

 delay (10000);

 break ;

 case 3:

 / / Set lane 3 green and others red

 digitalWrite ( trafficSignal1PinRed ,HIGH);

 digitalWrite ( trafficSignal1PinGr ,LOW);

 digitalWrite ( trafficSignal2PinRed ,HIGH);

 digitalWrite ( trafficSignal2PinGr ,LOW);

 digitalWrite ( trafficSignal3PinRed ,LOW);