Code for both Arduinos used in IoT term project: Smart Parking System

**1st ARDUINO (One with 3 ultrasonic sensors, 1 buzzer and 3 LEDs):**

#include <Wire.h>

long readUltrasonicDistance(int triggerPin, int echoPin

// function to set the pins of the ultrasonic sensor

{

pinMode(triggerPin, OUTPUT);

digitalWrite(triggerPin, LOW);

delayMicroseconds(2);

digitalWrite(triggerPin, HIGH);

delayMicroseconds(10);

digitalWrite(triggerPin, LOW);

pinMode(echoPin, INPUT);

return pulseIn(echoPin, HIGH);

}

void setup()

{ // basic setup of output pins

Wire.begin();

pinMode(10, OUTPUT);

pinMode(9, OUTPUT);

pinMode(8, OUTPUT);

pinMode(11, OUTPUT);

}

void loop()

{

Wire.beginTransmission(4); // begin transmission to 2nd Arduino (US Sensor readings)

delay(500);

if (0.01723 \* readUltrasonicDistance(5, 4) < 75) //1st US Sensor in RED LED zone

{

digitalWrite(10, HIGH);

digitalWrite(9, LOW);

digitalWrite(8, LOW);

tone(11, 523, 500);

delay(500);

}

else if (0.01723 \* readUltrasonicDistance(3, 2) < 75) //2nd US Sensor in RED LED zone

{

digitalWrite(10, HIGH);

digitalWrite(9, LOW);

digitalWrite(8, LOW);

tone(11, 523, 500);

Wire.write(2);

delay(500);

}

else if (0.01723 \* readUltrasonicDistance(13, 12) < 75) //3rd US Sensor in RED LED zone

{

digitalWrite(10, HIGH);

digitalWrite(9, LOW);

digitalWrite(8, LOW);

tone(11, 523, 500);

Wire.write(3);

delay(500);

}

else

{

if (0.01723 \* readUltrasonicDistance(5, 4) < 125) //1st US Sensor in yellow zone

{

digitalWrite(10, LOW);

digitalWrite(9, HIGH);

digitalWrite(8, LOW);

delay(1000);

}

else if (0.01723 \* readUltrasonicDistance(3, 2) < 125) //2nd US Sensor in yellow zone

{

digitalWrite(10, LOW);

digitalWrite(9, HIGH);

digitalWrite(8, LOW);

delay(1000);

}

else if (0.01723 \* readUltrasonicDistance(13, 12) < 125) // 3rd US Sensor in yellow zone

{

digitalWrite(10, LOW);

digitalWrite(9, HIGH);

digitalWrite(8, LOW);

delay(1000);

}

else //else if any of the US Sensors in green zone

{

noTone(11);

digitalWrite(10, LOW);

digitalWrite(9, LOW);

digitalWrite(8, HIGH);

Wire.write(7);

}

}

Wire.endTransmission(); // stop transmitting

}

**2nd Arduino (One with the LCD Screen and Micro Servo):**

#include <Servo.h>

#include<LiquidCrystal.h>

#include <Wire.h>

LiquidCrystal lcd(12,11,5,4,3,2);

Servo myservo;

//defining variables of components as per pin connections

#define ServoM 7

#define Exit 9

#define In 8

#define Pwr 6

#define Gnd 10

#define BarLow 90

#define BarUp 177

#define CAPACITY 3

void setup(){ // basic setup of input and output pins

Wire.begin(4); // begin communication with the other Arduino

Wire.onReceive(receiveEvent); // register event

Serial.begin(9600);

myservo.attach(ServoM);

lcd.begin(16,2);

lcd.print("Parking is OPEN!");

delay(1000);

pinMode(Gnd, OUTPUT);

pinMode(Pwr, OUTPUT);

pinMode(Exit, INPUT);

pinMode(In, INPUT);

digitalWrite(Gnd, LOW);

digitalWrite(Pwr, HIGH);

myservo.write(BarLow);

}

int Available= 3; // Number of places available.

//================================================================

void loop(){

if (Available == 1){ //When space is left for only 1 car

lcd.clear();

lcd.setCursor(1,0);

lcd.print("Space left for");

lcd.setCursor(0,1);

lcd.print(Available);

lcd.print(" car");

}

else{

if (Available >= 1){ //When space left for more than 1 cars

lcd.clear();

lcd.setCursor(1,0);

lcd.print("Space left for");

lcd.setCursor(0,1);

lcd.print(Available);

lcd.print(" cars");

}

else{ //0 space remaining

lcd.clear();

lcd.setCursor(1,0);

lcd.print("Sorry!");

lcd.setCursor(0,1);

lcd.print("No place left!");

}

}

if(digitalRead(In)==1) //When the button for entry is pressed

{

if(Available != 0){ //only when space is available gate (servo) will open

myservo.write(BarUp);

delay(1000);

myservo.write(BarLow);

}

}

if(digitalRead(Exit)==1) // When button of exit is pressed

{

if(Available != CAPACITY){ //only when there are cars inside gate(servo) will open

myservo.write(BarUp);

delay(1000);

myservo.write(BarLow);

}

}

delay(20);

}

void receiveEvent(int howMany)

{

int x = Wire.read(); // receive byte as an integer

Serial.println(x);

if(x==1) //if 1st slot filled (RED LED zone)

{

Available--;

}

else if(x==2) //if 2nd slot filled (RED LED zone)

{

Available--;

}

else if(x==3) //if 3rd slot filled (RED LED zone)

{

Available--;

}

else if(x==7 && Available<3) //increase no. of slots available when car leaves parking spot

{

Available++;

}

}