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Subject topics: Internet of things   Date: 26/10/2023

college Name: DR. G. U. Pope College Of Engineering
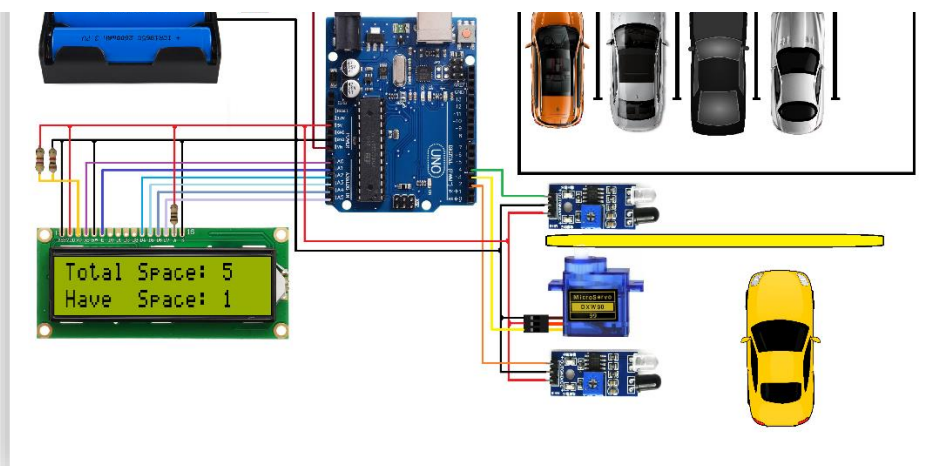
Project Submission Part 4.

SMART PARKING

Hardware Required

- Arduino Uno

- 1602 LCD Display (optional)

- Power supply

- IR sensor

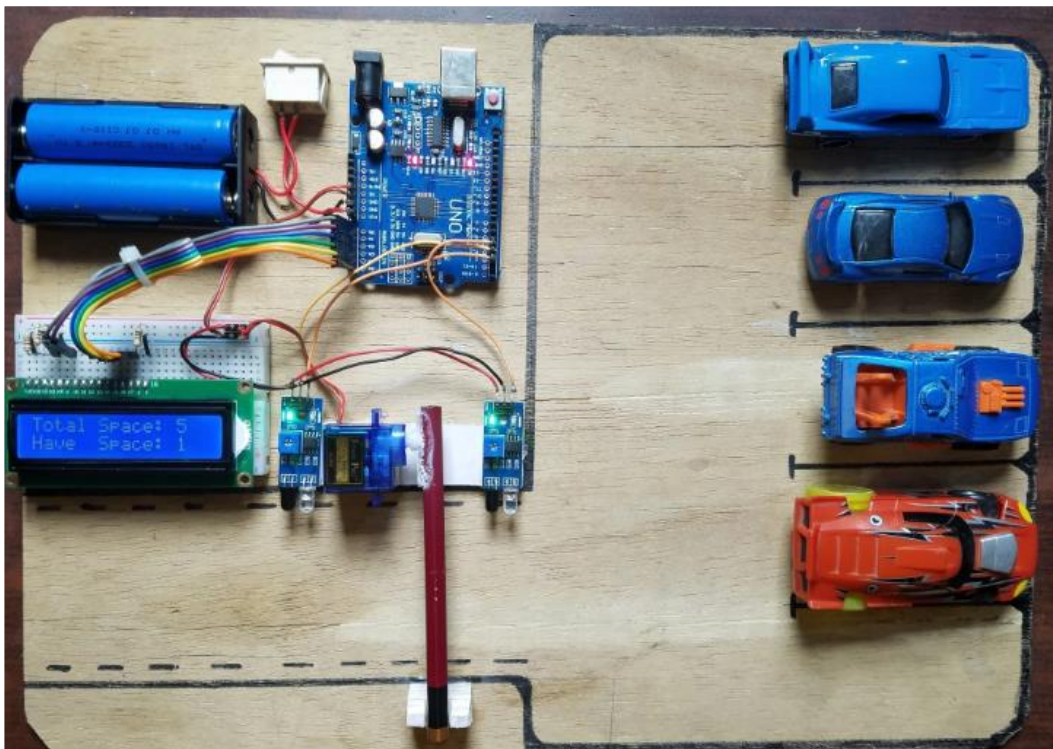- Micro Servo motor

- Jumper cables

Software Required

- Arduino IDE and WOKWI project simulation

- The Signal pins of both IR Sensors are connected to the Arduino Digital Pins 2 and 4.

- The Signal Pin of the Servo is connected to the digital pin 3.

- Connect the positive terminal of the power supply to VIN on the Arduino and the negative terminal to GND.

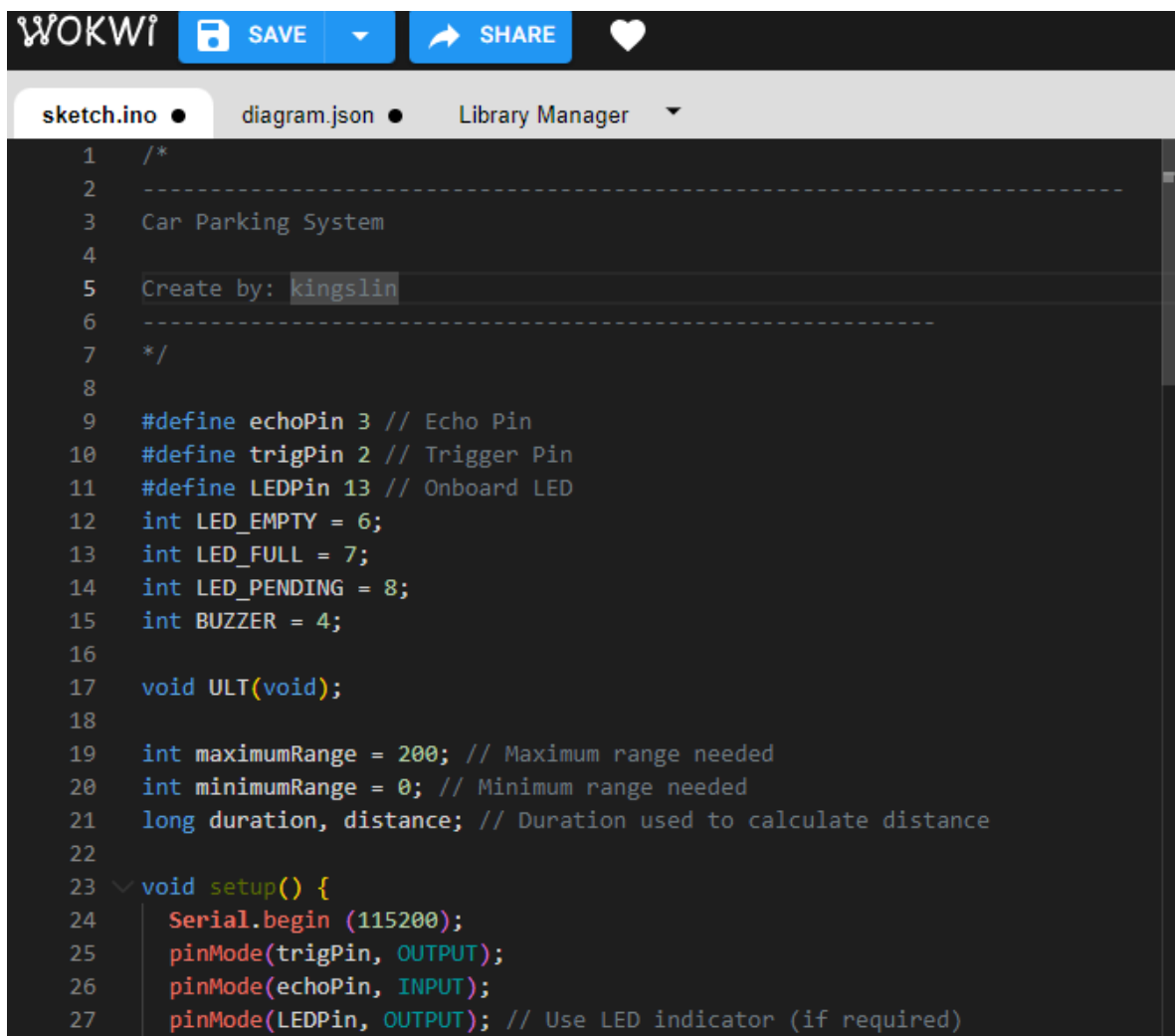- This completes the circuit diagram for the car parking system.

Working Principle

- The working concept of this involves 4 components: IR Sensor, Arduino board, Servo motors, and the LCD Display.

- The IR sensors are continuously scanning both sides of the crossing for cars so they can give an alert when the car is either coming or leaving.

- As soon as the car approaches a crossing from either side the command is sent to the Arduino board. The Arduino board upon receiving the command gives out the signal to the servo to open the crossing.

- The Arduino then gives out the command to LCD Display to either increase or decrease the number of empty spaces.

- The whole process gets started again. This completes the working concept of this project.

Arduino Code & Wokwi testing code


```
/*
-----------------------------------------------------------------
Car Parking System

Create by: kingslin
-----------------------------------------------------------------
*/

#define echoPin 3 // Echo Pin
#define trigPin 2 // Trigger Pin
#define LEDPin 13 // Onboard LED
int LED_EMPTY = 6;
int LED_FULL = 7;
int LED_PENDING = 8;
int BUZZER = 4;

void ULT(void);

int maximumRange = 200; // Maximum range needed
int minimumRange = 0; // Minimum range needed
long duration, distance; // Duration used to calculate distance

void setup() {
  Serial.begin (115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(LEDPin, OUTPUT); // Use LED indicator (if required)
```
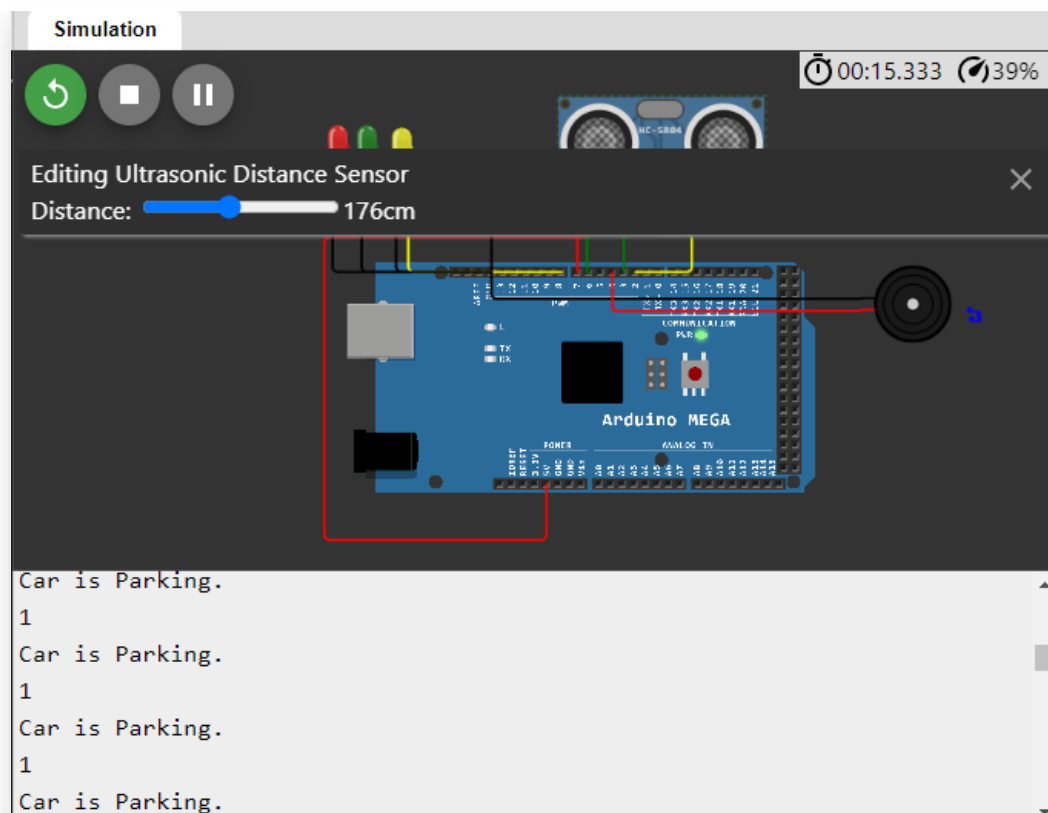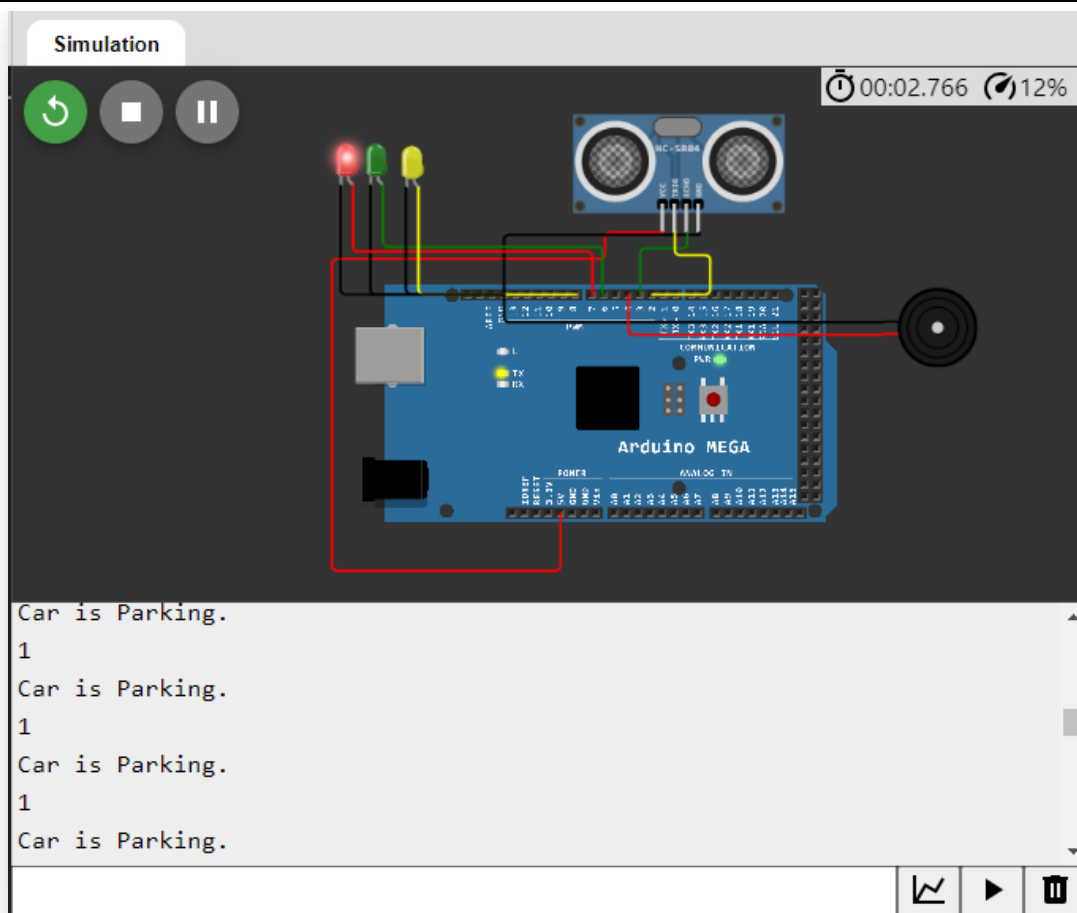
```arduino
28      pinMode(LED_EMPTY, OUTPUT);
29      pinMode(LED_FULL, OUTPUT);
30      pinMode(LED_PENDING, OUTPUT);
31      pinMode(BUZZER, OUTPUT);
32    }
33
34  v void loop() {
35      ULT();
36      Serial.println(distance);   //show distance
37
38      /*vacant, out green light*/
39  v   if(distance >= 200){
40        digitalWrite(LED_EMPTY,1);
41        digitalWrite(LED_PENDING,0);
42        digitalWrite(LED_FULL,0);
43        Serial.println("Empty Space.");
44      }
45
46      /*someone is parking, out yelow light*/
47  v   else if(distance < 200 && distance >= 50){
48        digitalWrite(LED_EMPTY,0);
49        digitalWrite(LED_PENDING,1);
50        digitalWrite(LED_FULL,0);
51        tone(BUZZER, 800);
52        delay(100);
53        digitalWrite(LED_EMPTY,0);
54        digitalWrite(LED_PENDING,0);
56        noTone(BUZZER);
57        delay(500);
58        Serial.println("Car is going to park here or going out.");
59      }
60
61      /*occupied, out red light*/
62      else{
63        digitalWrite(LED_EMPTY,0);
64        digitalWrite(LED_PENDING,0);
65        digitalWrite(LED_FULL,1);
66        Serial.println("Car is Parking.");
67      }
68    }
69
70    void ULT(){
71      digitalWrite(trigPin, LOW);
72      delayMicroseconds(2);
73      digitalWrite(trigPin, HIGH);
74      delayMicroseconds(10);
75      digitalWrite(trigPin, LOW);
76      duration = pulseIn(echoPin, HIGH);
77
78      //Calculate the distance (in cm) based on the speed of sound.
79      distance = duration / 58.2;
80    }
```
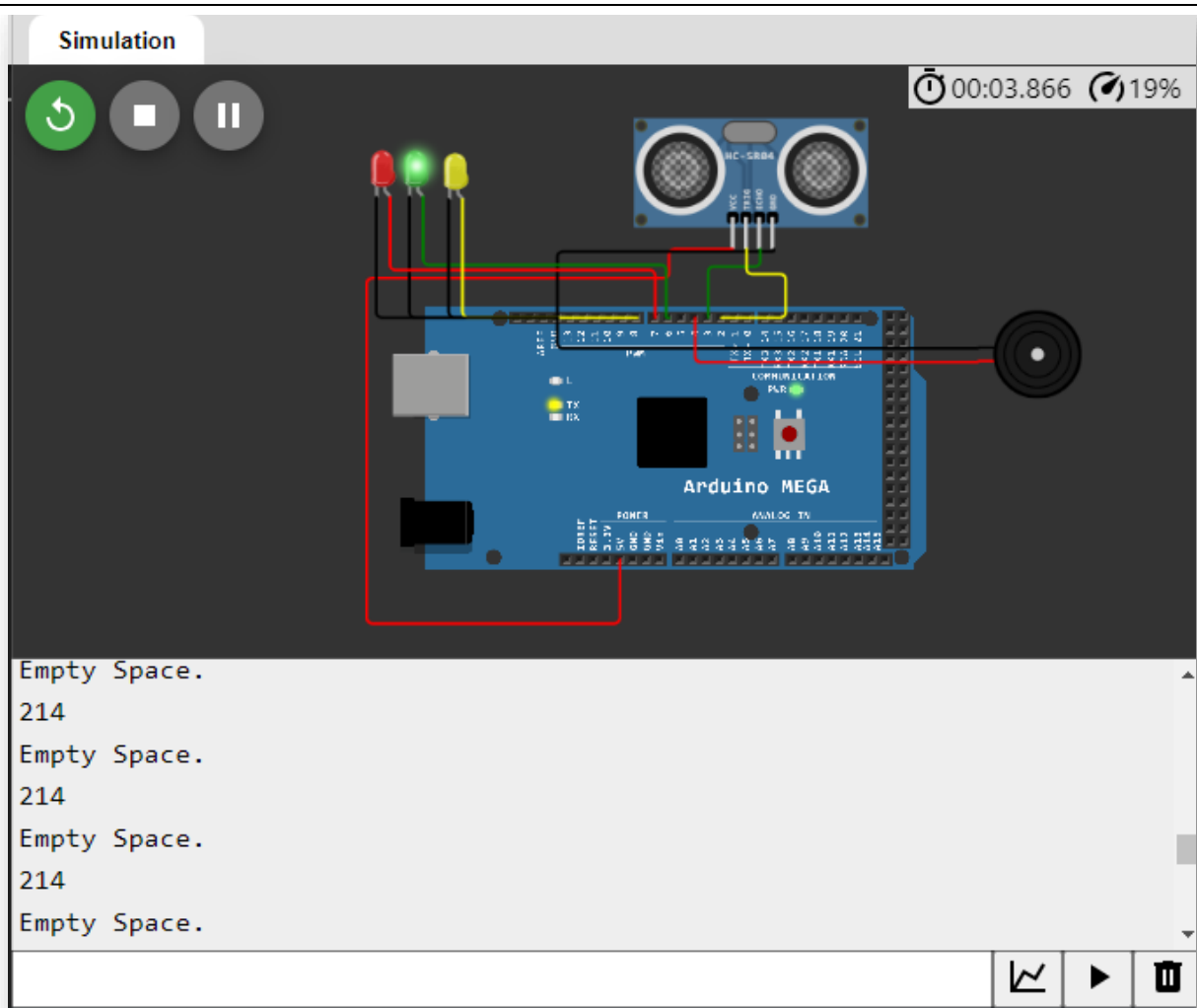
Simulation

⏱ 00:02.766 ⏲ 12%

Car is Parking.
1
Car is Parking.
1
Car is Parking.
1
Car is Parking.

Simulation

⏱ 00:15.333 ⏲ 39%

Editing Ultrasonic Distance Sensor   ✕
Distance: ▬▬▬●▬▬▬ 176cm

Arduino MEGA

Car is Parking.
1
Car is Parking.
1
Car is Parking.
1
Car is Parking.

Simulation

00:03.866 19%

Empty Space.
214
Empty Space.
214
Empty Space.
214
Empty Space.

CAR PARKING SYSTEM

The feature Benefits of Smart Parking Technology

- Optimized parking.

- Reduced traffic.

- Reduced pollution.

- Enhanced User Experience.

- Integrated Payments and POS.

- Increased Safety.

- Real-Time Data and Trend Insight.

- Decreased Management Costs.

THE PHASE 4 DEVELOPMENT PART 2

FOR IOT (SMART PARKING SYSTEM) SUCCESSFULLY

VISUALIZED & COMPLETED .