Name: Sangeetha .M

Roll no: 950421104040

Subject topics: Internet of Things

Date: 26/10/2023

Project submission:Phase 4 development part 2

SMART PARKING :

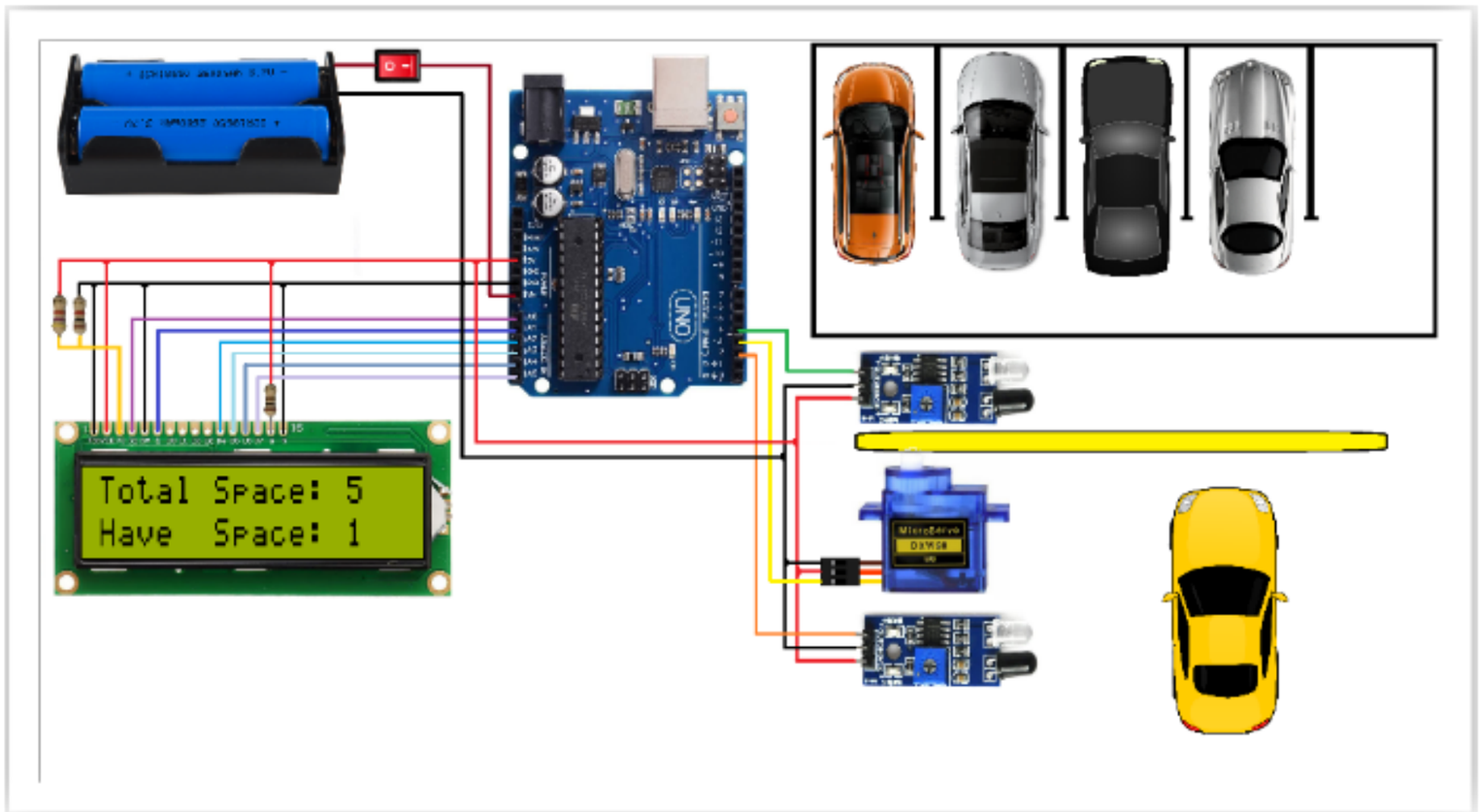
Introduction :

Hardware Required

- Arduino Uno
- 1602 LCD Display (optional)
- Power supply
- IR sensor
- Micro Servo motor
- Jumper cables

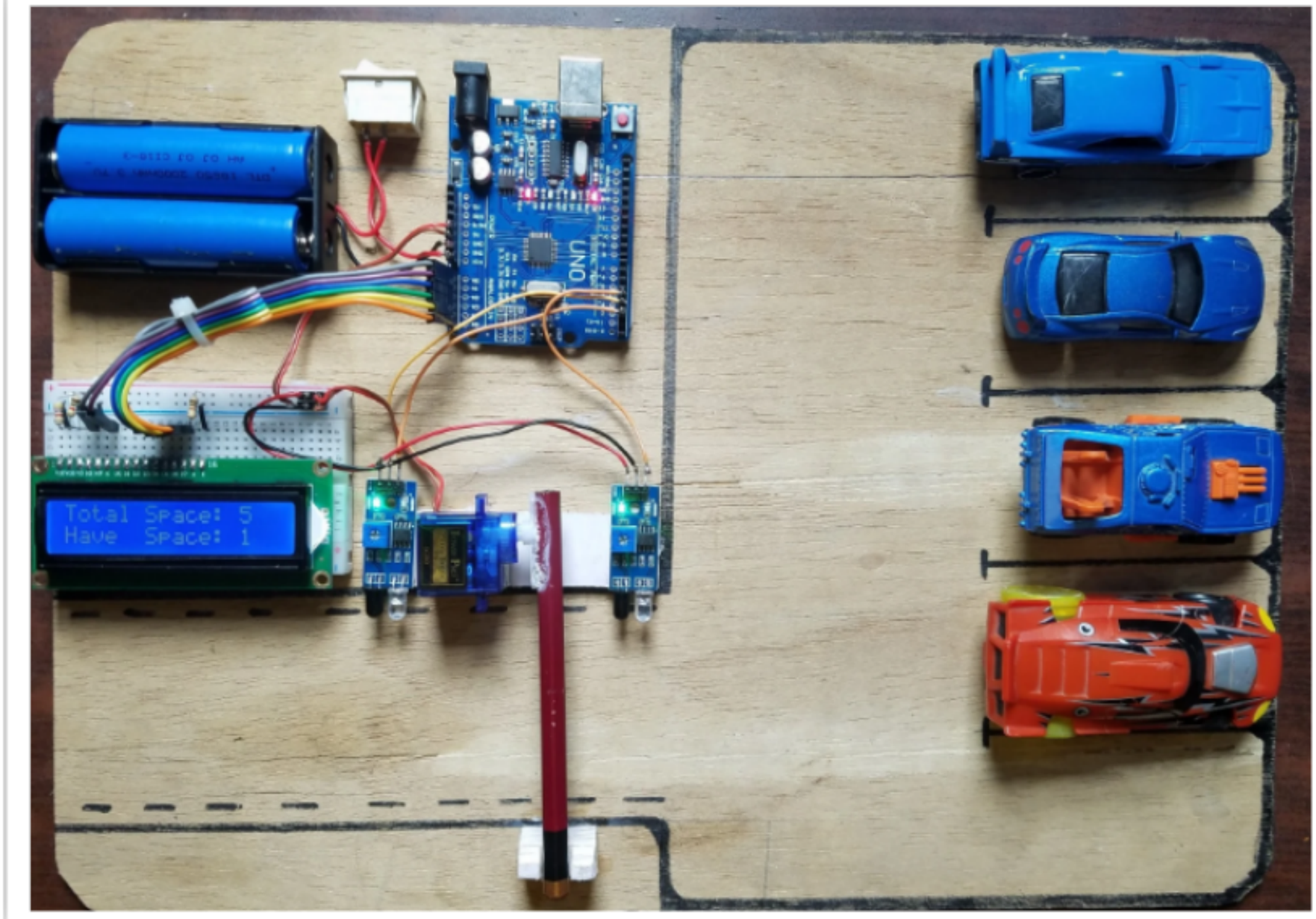
Software Required

- 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.

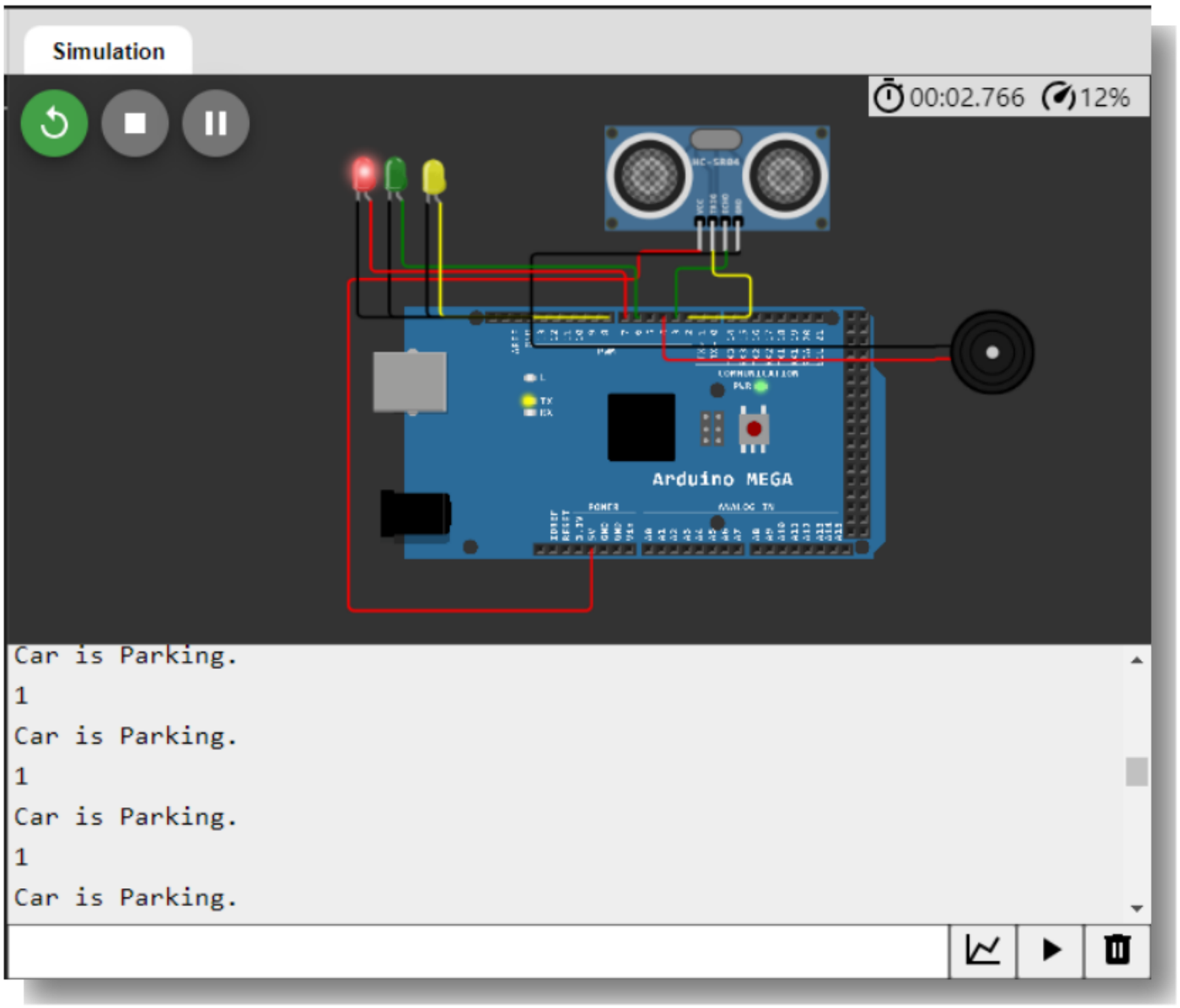
Working Principle

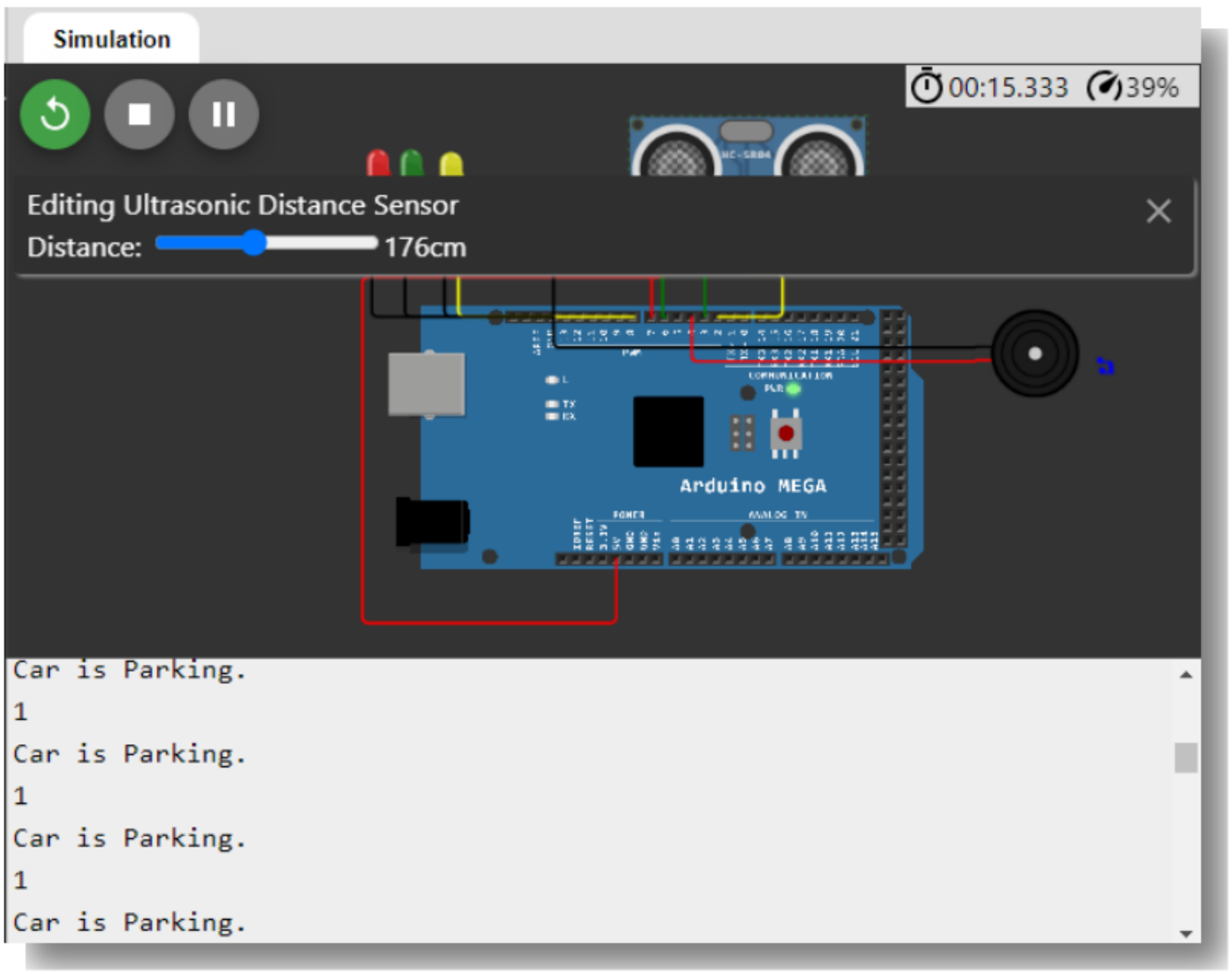


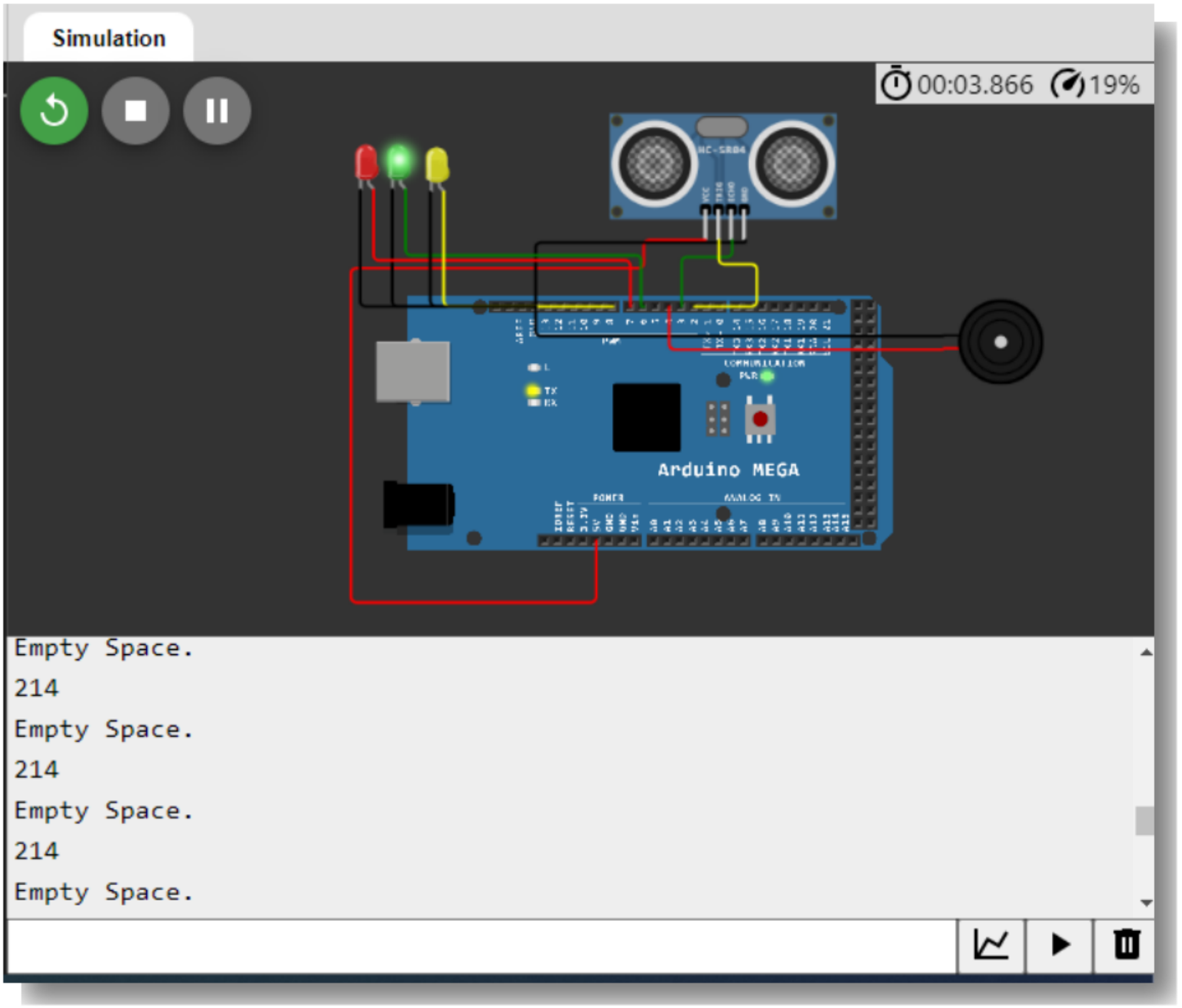
- The working concept of this involves 4 components: IR Sensor, Arduino board, Servo motors, and the LCD Display.
- The IR sensors are continuously scanning both sides of the crossing for cars so they can give an alert when the car is either coming or leaving.
- As soon as the car approaches a crossing 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

```
    pinMode(LED_EMPTY, OUTPUT);
    pinMode(LED_FULL, OUTPUT);
    pinMode(LED_PENDING, OUTPUT);
    pinMode(BUZZER, OUTPUT);
  }

void loop() {
    ULT();
    Serial.println(distance);  //show distance

    /*vacant, out green light*/
    if(distance >= 200){
      digitalWrite(LED_EMPTY,1);
      digitalWrite(LED_PENDING,0);
      digitalWrite(LED_FULL,0);
      Serial.println("Empty Space.");
    }

    /*someone is parking, out yelow light*/
    else if(distance < 200 && distance >= 50){
      digitalWrite(LED_EMPTY,0);
      digitalWrite(LED_PENDING,1);
      digitalWrite(LED_FULL,0);
      tone(BUZZER, 800);
      delay(100);
      digitalWrite(LED_EMPTY,0);
      digitalWrite(LED_PENDING,0);
      noTone(BUZZER);
      delay(500);
      Serial.println("Car is going to park here or going out.");
    }

    /*occupied, out red light*/
      else{
      digitalWrite(LED_EMPTY,0);
      digitalWrite(LED_PENDING,0);
      digitalWrite(LED_FULL,1);
      Serial.println("Car is Parking.");
    }
  }

  void ULT(){
    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);
    duration = pulseIn(echoPin, HIGH);

    //Calculate the distance (in cm) based on the speed of sound.
    distance = duration / 58.2;
  }
```


Simulation
00:02.766
12%
HC-SR04
Arduino MEGA
Car is Parking.
1
Car is Parking.
1
Car is Parking.
1
Car is Parking.


Simulation
00:15.333
39%
HC-SR04
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%
HC-SR04
Arduino MEGA
Empty Space.
214
Empty Space.
214
Empty Space.
214
Empty Space.


CAR PARKING SYSTEM
GJ01RS0742

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 part2(Smart Parking)succesfulsfully visualized &

completed.