SmartBridge Externship

Name: Harshitha Munagala Registration number:19BEC0565

Assignment 2: Develop an "Automatic garage door opening system". Use an Ultrasonic sensor to detect if there is a vehicle in front of the garage. if any vehicle is detected open the garage door (rotate the servo motor) for some time and close it.

Arduino Code:

```
//Assume Garage opens when vehicle is in proximity of 125cm or less to it
//t=trigger, e=echo
int t= 3;
#define e 2
#include <Servo.h>
Servo myservo;
void setup()
{
  pinMode(t, OUTPUT);
  pinMode(e, INPUT);
  Serial.begin(9600);
  myservo.attach(9);
}

void loop()
{ //Code for Ultrasonic sensor to detect distance of vehicle from garage
  digitalWrite(t, LOW);
  digitalWrite(t, HIGH);
  delayMicroseconds(10);
  digitalWrite(t, LOW);
  float dur = pulseIn(e, HIGH);
  float dis = (dur * 0.0343)/2; //dis = distance of vehicle from garage
```

```
 Serial.print("Distance in cm: ");
 Serial.println(dis);

//Code for servo motor to rotate if vehicle approaches the garage
if (dis <= 125)
 {
  //Garage opens as vehicle is deteced within required proximity
  Serial.println("Vehicle deteced, Garage opening");
  for(int i=0;i<=180;i++)
   {
     myservo.write(i);
     delay(15);
   }
  delay(5000); //Wait 5 seconds for vehicle to enter garage
  //Close garage as vehicle has entered the garage
  Serial.println("Garage closing");
  for(int j=180;j>=0;j--)
   {
     myservo.write(j);
     delay(15);
   }
 }
 else
  {
   Serial.println("Vehicle not detected, Garage not opening");
  }
  delay(15);
}
```

Text

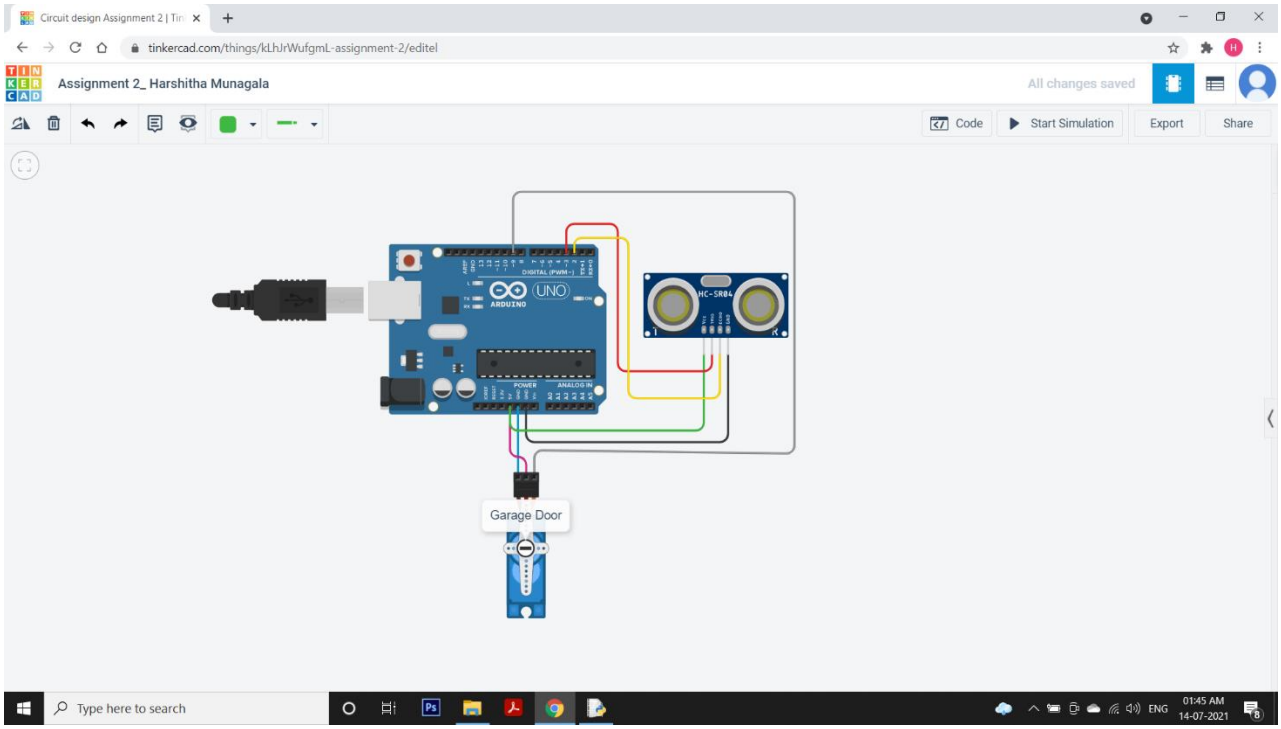
1 (Arduino Uno R3)

```
//Assume Garage opens when vehicle is in proximity of 125cm or less to it
//t=trigger, e=echo
int t= 3;
#define e 2
#include <Servo.h>

Servo myservo;
void setup()
{
  pinMode(t, OUTPUT);
  pinMode(e, INPUT);
  Serial.begin(9600);
  myservo.attach(9);
}

void loop()
{ //Code for Ultrasonic sensor to detect distance of vehicle from garage
  digitalWrite(t, LOW);
  digitalWrite(t, HIGH);
  delayMicroseconds(10);
  digitalWrite(t, LOW);
  float dur = pulseIn(e, HIGH);
  float dis = (dur * 0.0343)/2; //dis = distance of vehicle from garage
  Serial.print("Distance in cm: ");
  Serial.println(dis);

 //Code for servo motor to rotate if vehicle approaches the garage

 if (dis <= 125)
  {
    //Garage opens as vehicle is deteced within required proximity
    Serial.println("Vehicle deteced, Garage opening");
    for(int i=0;i<=180;i++)
      {
         myservo.write(i);
         delay(15);
      }
    delay(5000); //Wait 5 seconds for vehicle to enter garage
    //Close garage as vehicle has entered the garage
    Serial.println("Garage closing");
    for(int j=180;j>=0;j--)
      {
         myservo.write(j);
         delay(15);
      }
  }

  else
   {
    Serial.println("Vehicle not detected, Garage not opening");
   }

   delay(15);
}
```

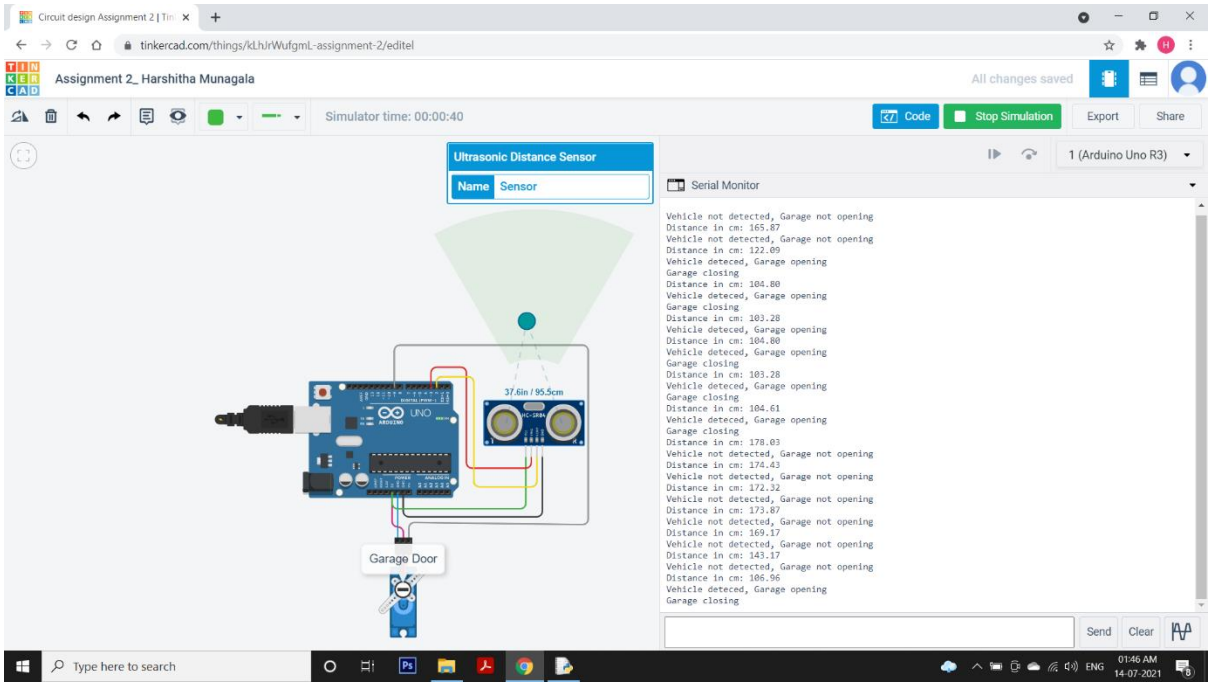
Serial Monitor

ENG 01:37 AM 19-07-2021

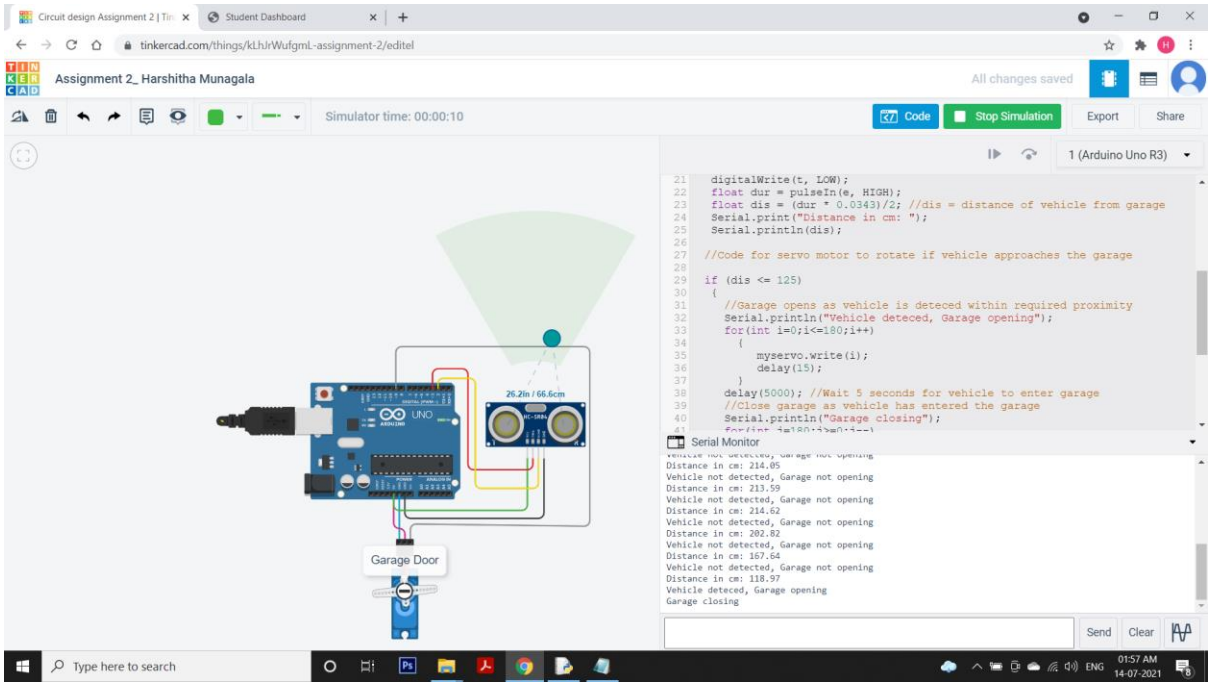
Arduino code screenshot in Tinkercad website



Circuit Diagram in Tinkercad software



Readings1



Readings2

Working:

I've considered 125cm as the trigger distance for the ultrasonic sensor to detect a vehicle, i.e., whenever a vehicle comes into the proximity range of less than or equal to 125cm of the ultrasonic sensor, it in turn rotates the servomotor which is attached to the garage door and opens it.

In the code, the output displays the distance measured by the ultrasonic sensor and if it is less than or equal to 125 cm, it prints "Vehicle detected, Garage opening", waits for 5 seconds for vehicle to enter and then prints "Garage closing".

If ultrasonic sensor picks up distance greater than 125 cm, it prints "Vehicle not detected, Garage not opening".