SHANZEH BATOOL

19BAI10017

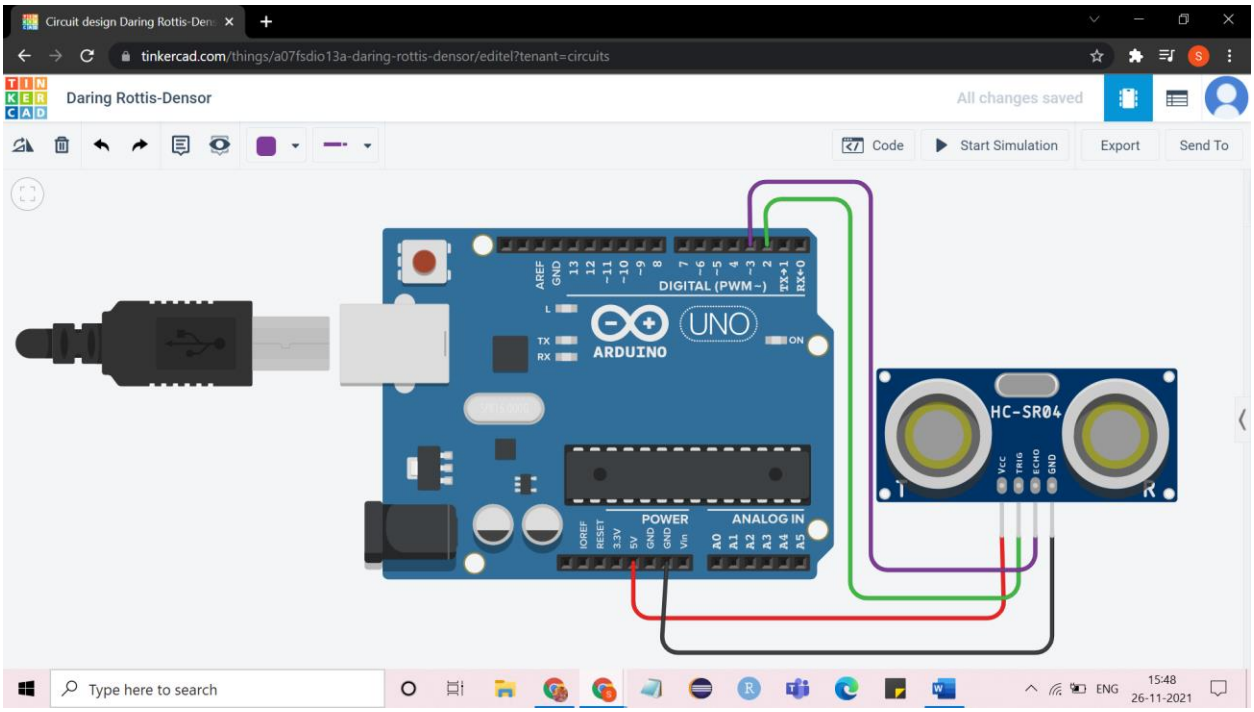
Assignment 2

Q. *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. Understand the Working of Ultrasonic Sensor.*

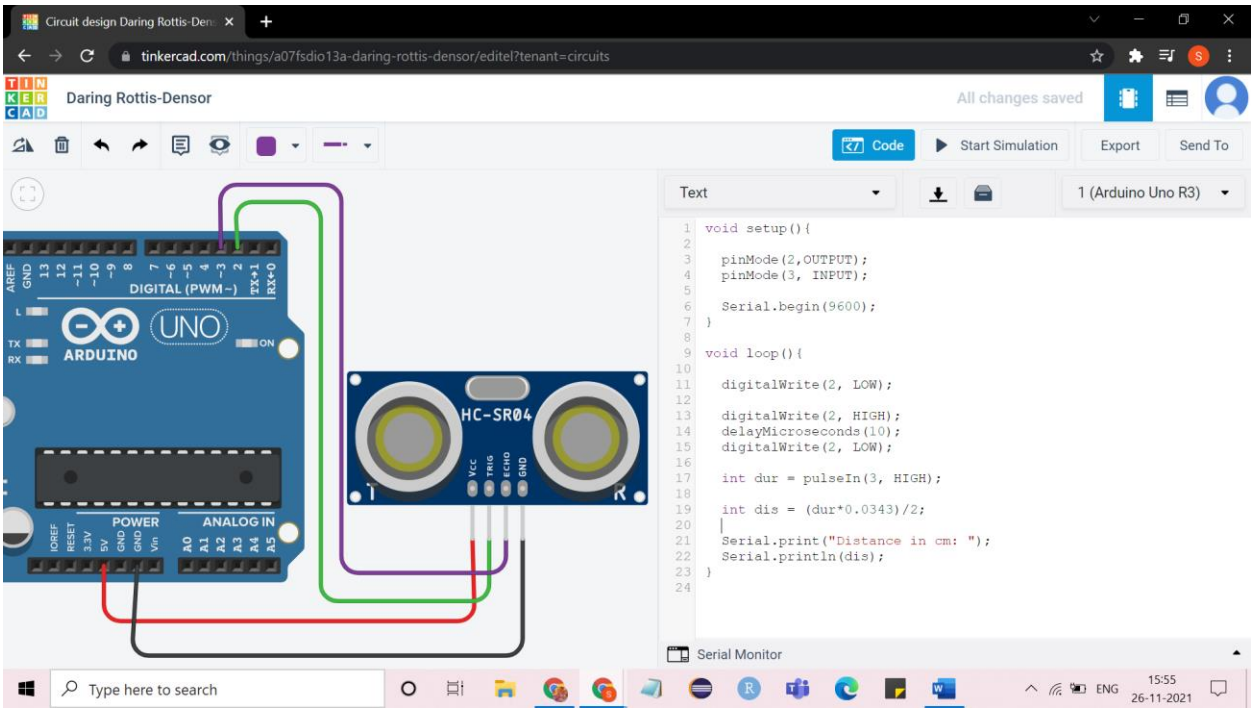
How the HC-SR04 Ultrasonic Sensor Works

It emits an ultrasound at 40,000 Hz which travels through the air and if there is an object or obstacle on its path It will bounce back to the module. Considering the travel time and the speed of the sound you can calculate the distance. The HC-SR04 Ultrasonic Module has 4 pins, Ground, VCC, Trig and Echo. The Ground and the VCC pins of the module needs to be connected to the Ground and the 5 volts pins on the Arduino Board respectively and the trig and echo pins to any Digital I/O pin on the Arduino Board.

Arduino Board with HC-SR04 Ultrasonic Sensor

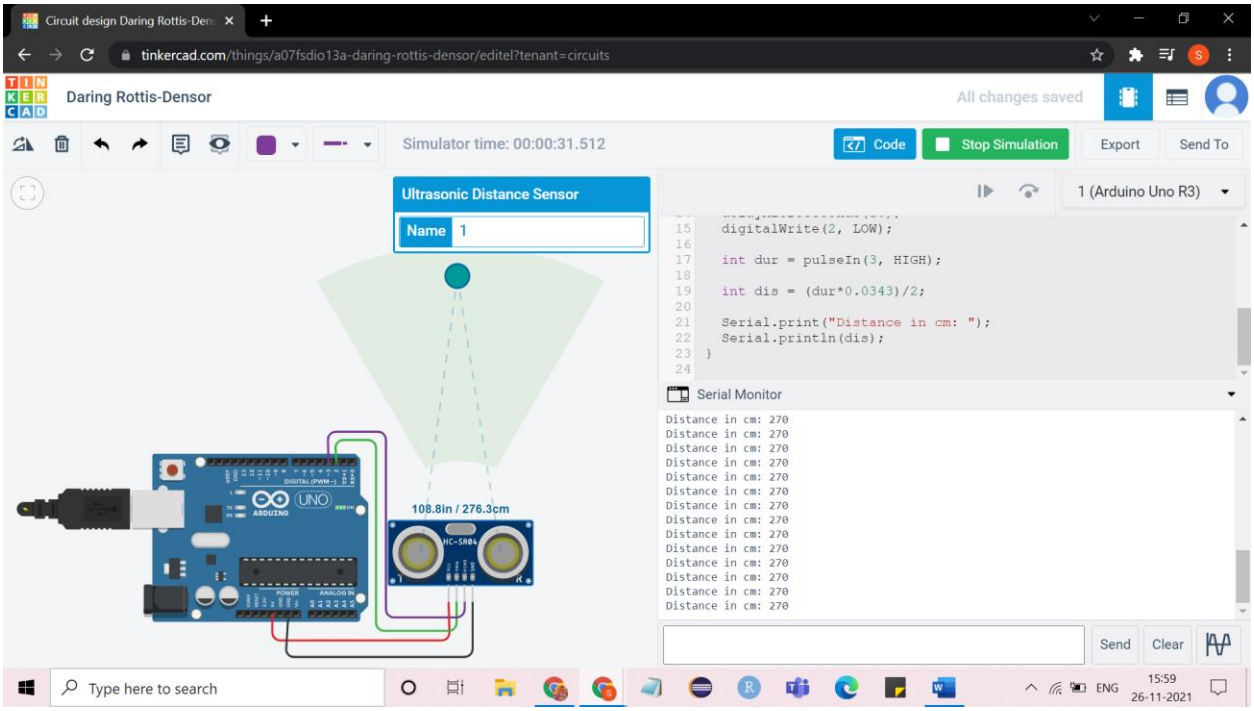


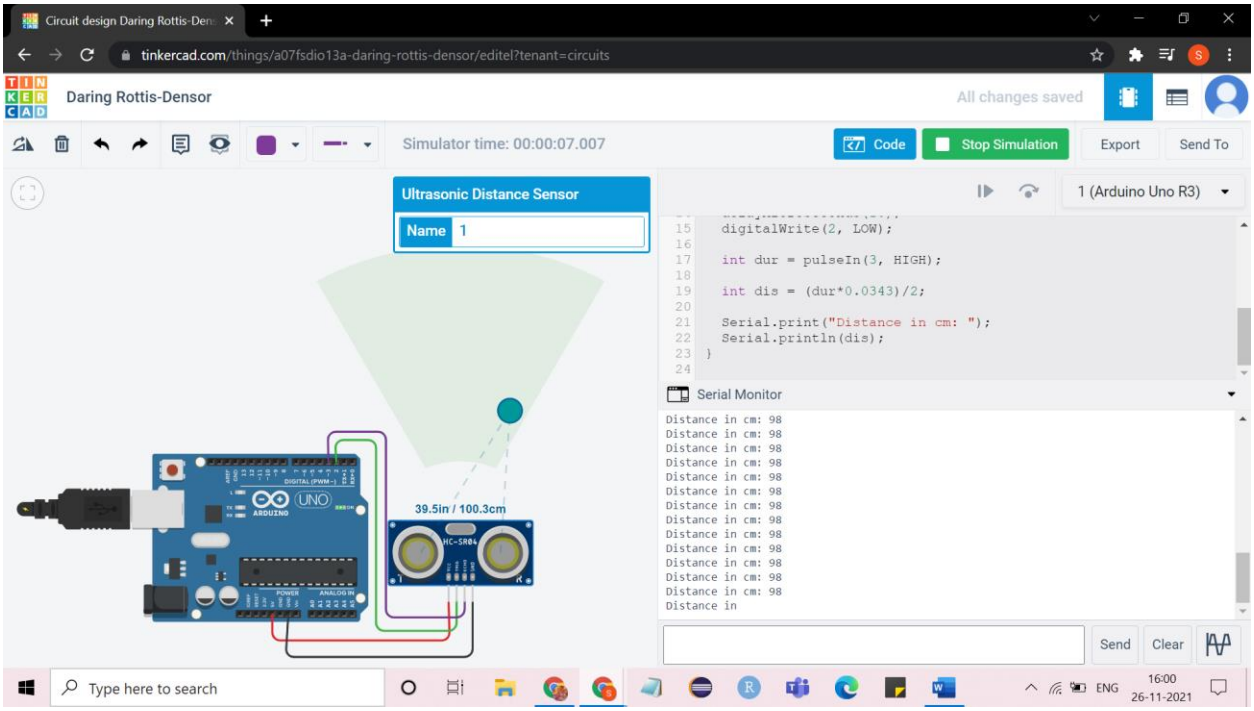
Arduino and HC-SR04 Ultrasonic Sensor Code

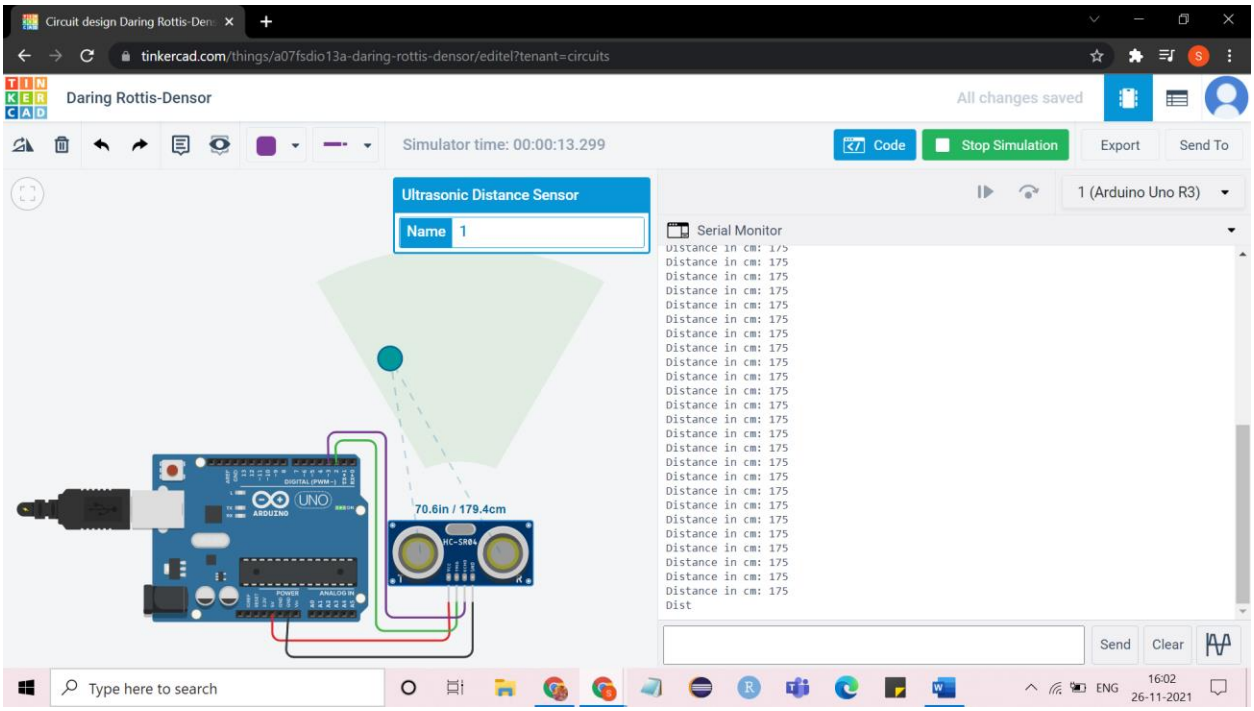



```
void setup(){
  pinMode(2,OUTPUT);    //sets TRIG pin as output
  pinMode(3, INPUT);    //sets ECHO pin as input
  Serial.begin(9600);   //start the serial communication for showing the results on the serial monitor
}
void loop(){
  digitalWrite(2, LOW);    // Clears the TRIG pin
  digitalWrite(2, HIGH);   //Sets the TRIG pin on HIGH state for 10 micro seconds
  delayMicroseconds(10);
  digitalWrite(2, LOW);
  int dur = pulseIn(3, HIGH);   //Reads the ECHO pin, returns the sound wave travel time in microseconds
  int dis = (dur*0.0343)/2;   //Calculating the distance
  Serial.print("Distance in cm: ");    //Prints the distance on the Serial Monitor
  Serial.println(dis);
}
```

Output


Circuit design Daring Rottis-Den
tinkercad.com/things/a07fsdio13a-daring-rottis-densor/editel?tenant=circuits
Daring Rottis-Densor
All changes saved
Simulator time: 00:00:31.512
Code
Stop Simulation
Export
Send To
Ultrasonic Distance Sensor
Name 1
108.8in / 276.3cm
1 (Arduino Uno R3)
digitalWrite(2, LOW);
int dur = pulseIn(3, HIGH);
int dis = (dur*0.0343)/2;
Serial.print("Distance in cm: ");
Serial.println(dis);
Serial Monitor
Distance in cm: 270
Send
Clear
Type here to search
ENG
15:59
26-11-2021


Circuit design Daring Rottis-Den
tinkercad.com/things/a07fsdio13a-daring-rottis-densor/editel?tenant=circuits
Daring Rottis-Densor
All changes saved
Simulator time: 00:00:07.007
Code
Stop Simulation
Export
Send To
Ultrasonic Distance Sensor
Name 1
39.5in / 100.3cm
1 (Arduino Uno R3)
digitalWrite(2, LOW);
int dur = pulseIn(3, HIGH);
int dis = (dur*0.0343)/2;
Serial.print("Distance in cm: ");
Serial.println(dis);
Serial Monitor
Distance in cm: 98
Distance in
Send
Clear
Type here to search
ENG
16:00
26-11-2021


Circuit design Daring Rottis-Den
tinkercad.com/things/a07fsdio13a-daring-rottis-densor/editel?tenant=circuits
Daring Rottis-Densor
All changes saved
Simulator time: 00:00:13.299
Code
Stop Simulation
Export
Send To
Ultrasonic Distance Sensor
Name 1
1 (Arduino Uno R3)
Serial Monitor
Distance in cm: 175
70.6in / 179.4cm
Send
Clear
Type here to search
ENG
16:02
26-11-2021