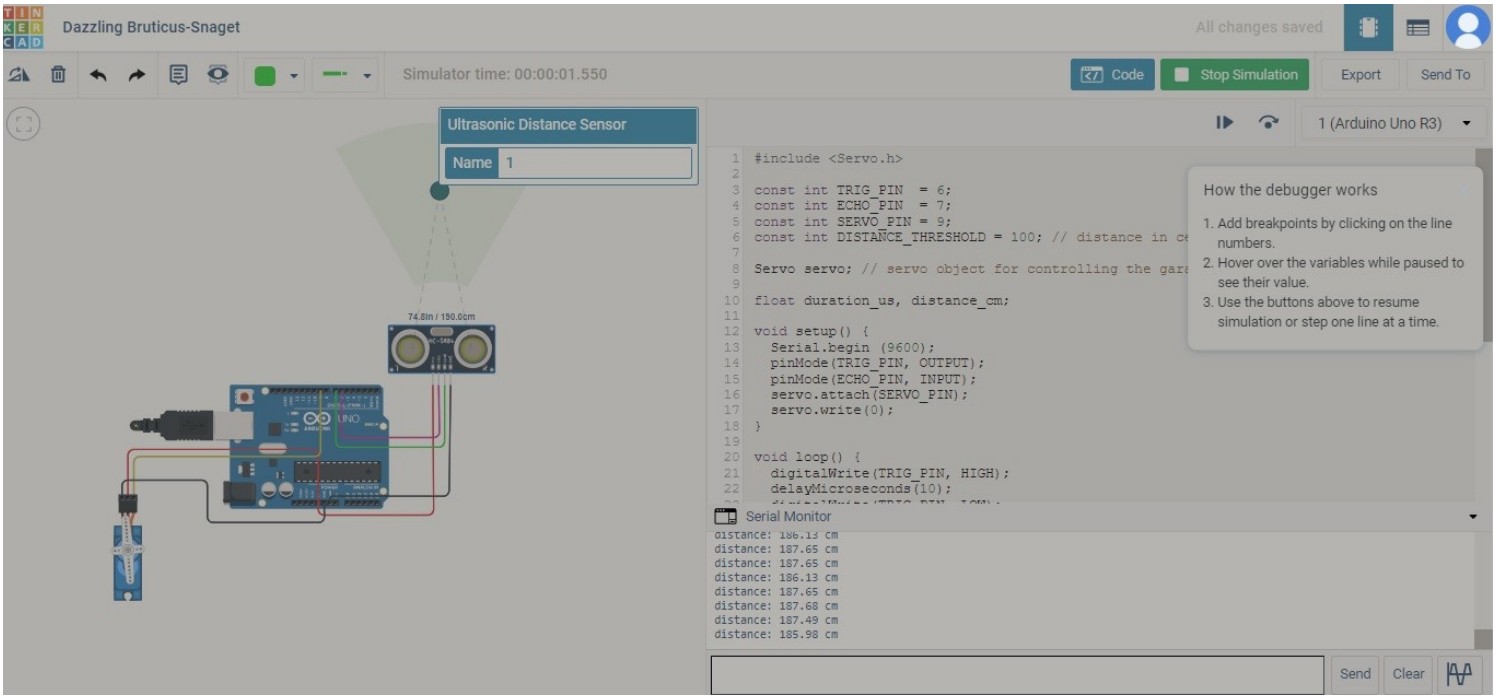
Assignment 2

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.

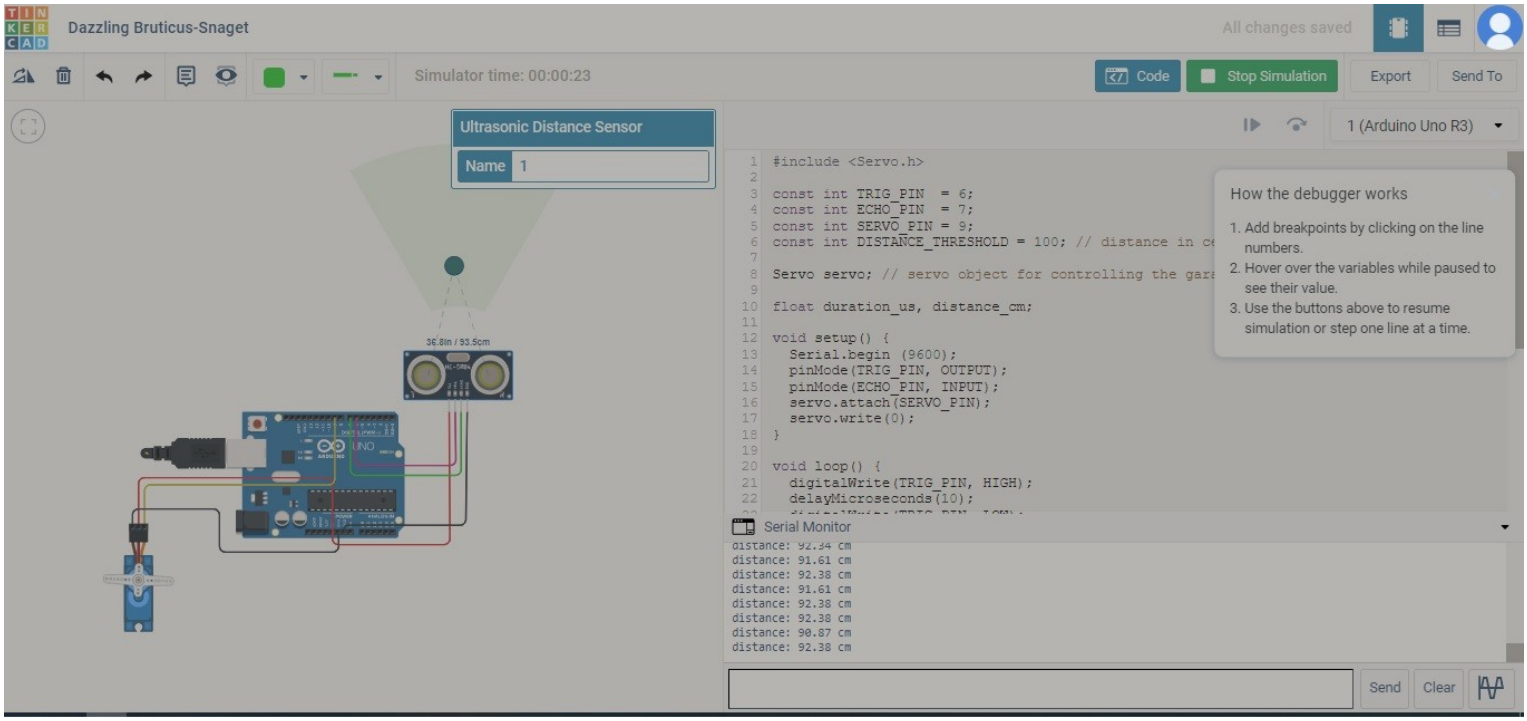
Ans.

The distance we have taken in this code for the Ultrasonic sensor to detect car is 100 cms.

1) Below is a screenshot of the code running in TinkerCad. The position of servo motor is at 0 degree initially. The distance of object is farther than 100cms.



2) Below image shows the Servo motor rotated at an angle of 90degrees as the object distance is less than 100cms.



Actual Code is as follows:

```
#include <Servo.h>

const int TRIG_PIN  = 6;
const int ECHO_PIN  = 7;
const int SERVO_PIN = 9;
const int DISTANCE_THRESHOLD = 100; // distance in centimeters

Servo servo; // servo object for controlling the garage door

float duration_us, distance_cm;

void setup() {
  Serial.begin (9600);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
  servo.attach(SERVO_PIN);
  servo.write(0);
}

void loop() {
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);

  // measure duration of pulse from ECHO pin
  duration_us = pulseIn(ECHO_PIN, HIGH);
  // calculate the distance
  distance_cm = 0.017 * duration_us;

  if(distance_cm < DISTANCE_THRESHOLD)
    servo.write(360); // rotate servo motor to 360 degree to open the door
  else
    servo.write(0);  // rotate servo motor to 0 degree to close the door

  // print the value to Serial Monitor
  Serial.print("distance: ");
  Serial.print(distance_cm);
  Serial.println(" cm");

  delay(500);
}
```