

UGANDA CHRISTIAN UNIVERSITY

A Centre of Excellence in the Heart of Africa

FACULTY OF ENGINEERING DESIGN AND TECHNOLOGY

GROUP: C QUESTION 3

COURSE: BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSCS)

COURSE UNIT: CSC 1307 COMPUTER SCIENCE WORKSHOP

LECTURER: BACHELOR OF SCIENCE IN COMPUTER SCIENCE (BSCS)

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GROUP C Qn. THREE: A mobile robot Z to move around edges of the table without falling using two distance sensors.

Objective of the project

Making a robot Z to move around the edges of the table without falling using two distance sensors.

Tools used in the project

2 ultrasonic sensors

A mobile platform of the robot with 2 servo motors and 2 plastic wheels

A breadboard

Arduino UNO R3

Jumper wires (male to male, male to female and female to female wires)

Power bank

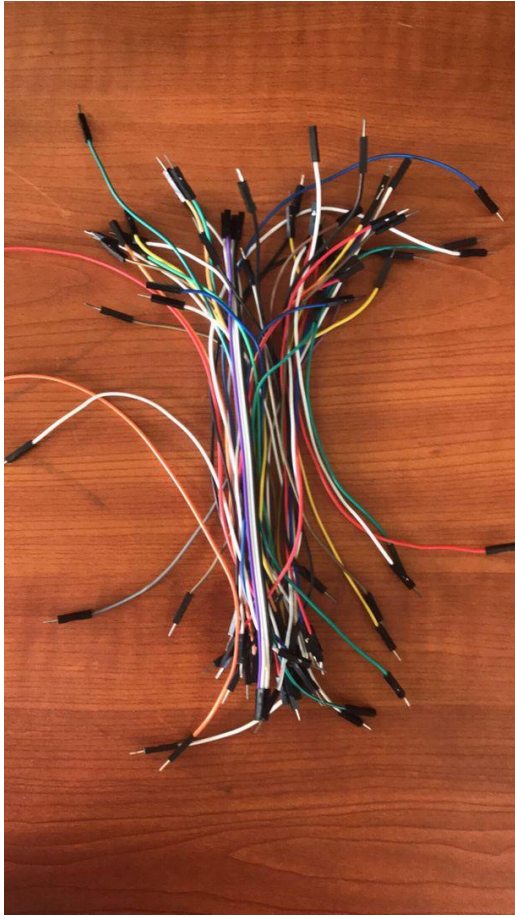
Features



ARDUINO UNO R3



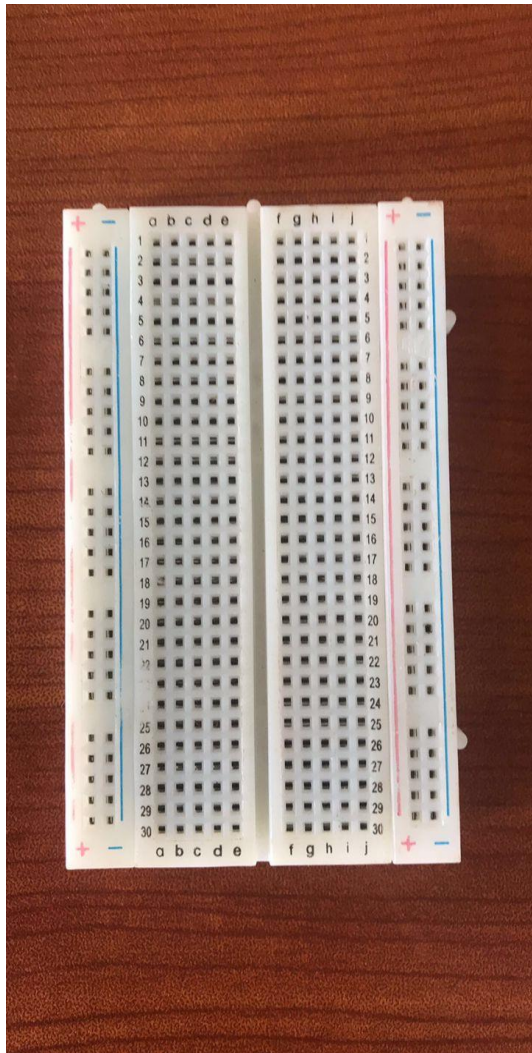
2 Ultrasonic sensors(distance sensors)



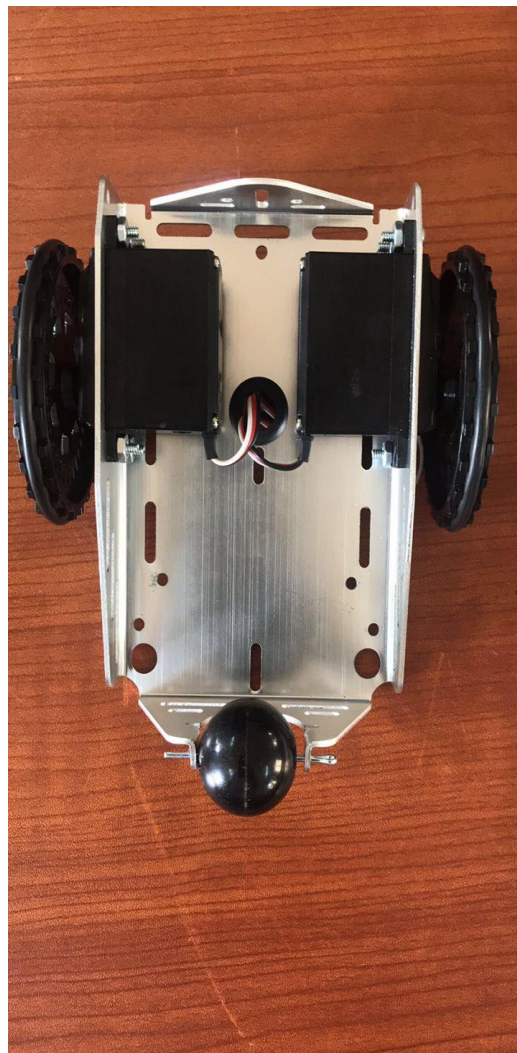
Wire jumpers



serial cable



Breadboard



A mobile platform of the robot with 2 servo
motors and 2 plastic wheels



Power bank used



power bank used

Dimensions of the table

Used a table of dimensions 155cm (155000mm) and 61cm (610mm).

PSEUDO CODE FOR THE PROJECT:

PSEUDO CODE.

Import the servo library.
 Create two servo objects: servo 1 and servo 2.
 Attach the trig pin of sensor 1 to port 9.
 Attach the echo pin of sensor 1 to port 10.
 Attach the trig pin of sensor 2 to port 5.
 Attach the echo pin of sensor 2 to port 4.
 Attach the dig pin of servo 1 to port 6.
 Attach the dig pin of servo 2 to port 7.
 Set trig pin 1 as an output pin.
 Set echo pin 1 as an input pin.
 Set trig pin 2 as an output pin.
 Set echo pin 2 as an input pin.
 Set the data rate in bits per second to 9600.

Turn trigger pin on to force out pulse.

Turn it off.

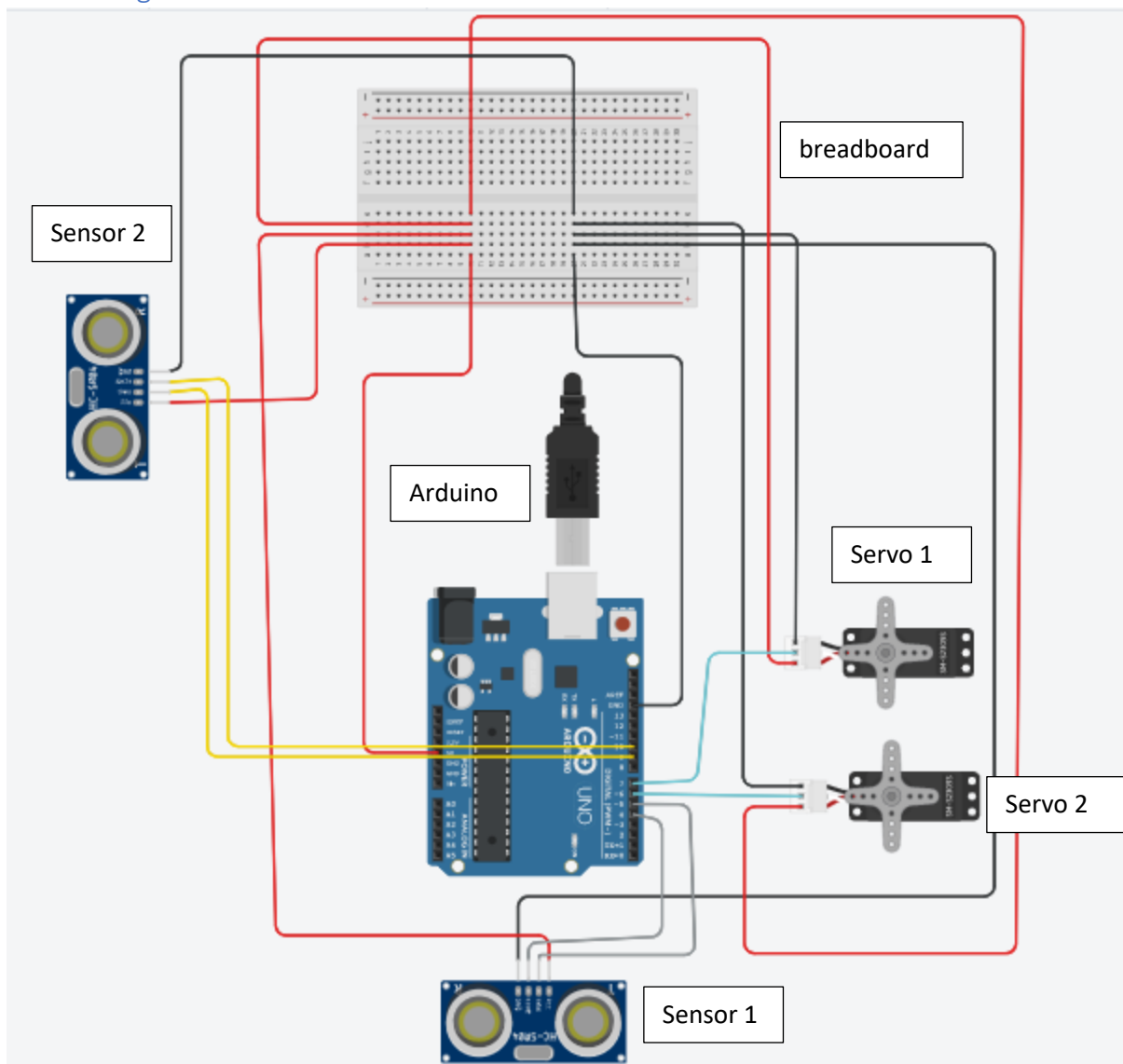
Then turn echo pin on to read pulse and calculate how long it takes to return the pulse.

Use that time to calculate the distance and print it to the serial monitor.

If the distance from sensor 2 is less than 4cm, it's on the table and if the distance from sensor 2 is greater than 4cm it's off the table, meaning that the robot should move forward in a straight line.

If the distance from sensor 2 and the distance from sensor 1 are greater than 4cm, the robot should turn to the left, away from the edge.

Circuit diagram:



Arduino program code for the project

```
#include <Servo.h>

Servo servo1;
Servo servo2;

int TriggerPIN1 = 9;
int EchoPIN1 = 10;
int TriggerPIN2 = 5;
int EchoPIN2 = 4;

void setup(){
  servo1.attach(6);
  servo2.attach(7);
  pinMode(TriggerPIN1,OUTPUT);
  pinMode(EchoPIN2,INPUT);
  pinMode(TriggerPIN2,OUTPUT);
  pinMode(EchoPIN2,INPUT);
  Serial.begin(9600);
}

void loop(){
  digitalWrite(TriggerPIN1,LOW);
  delayMicroseconds(2);
  digitalWrite(TriggerPIN1,HIGH);
  delayMicroseconds(2);
  digitalWrite(TriggerPIN1,LOW);

  long timedelay = pulseIn(EchoPIN1,HIGH);
  int distance1 = 0.0343 * (timedelay/2);

  Serial.print("Sensor 1 : ");
  Serial.println(distance1);

  delayMicroseconds(2);

  digitalWrite(TriggerPIN2,LOW);
  delayMicroseconds(2);
  digitalWrite(TriggerPIN2,HIGH);
  delayMicroseconds(2);
  digitalWrite(TriggerPIN2,LOW);

  long td = pulseIn(EchoPIN2,HIGH);
  int distance2 = 0.0343 * (td/2);
```

```
Serial.print("Sensor 2 : ");
Serial.println(distance2);

if(distance2 > 4 && distance1 > 4){
    servo1.write(70); //makes the rover turn leftwards
    servo2.write(70);
    delay(500);
}
else if (distance2 < 4 && distance1 >4){
    servo1.write(0); //makes the rover move in a continuous straight line
    servo2.write(180);
}

}
```