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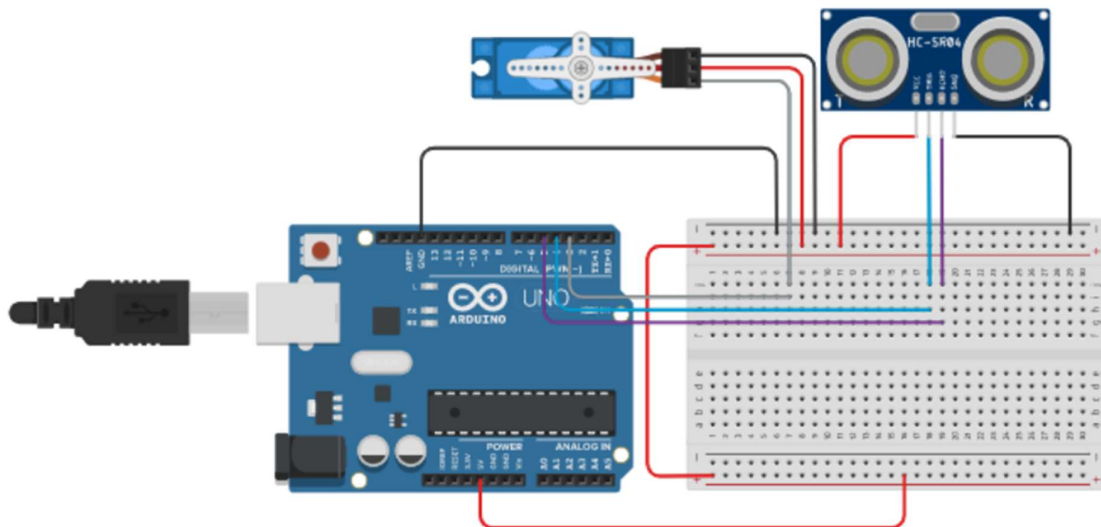
Course: Smart Bridge IoT

Assignment 2

Task:

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.

Architecture:



Code:

```
// importing servo package
#include <Servo.h>

//setting up pin numbers
Servo motor;
int signal = 3;
int trigger = 4;
int echo = 5;
```

```
void setup()
{
    //configuring pins
    pinMode(signal, OUTPUT);
    pinMode(trigger, OUTPUT);
    pinMode(echo, INPUT);
    motor.attach(signal);

    //using serial monitor to debug the results
    Serial.begin(9600);
}

void loop()
{
    //keep the doors closed initially
    motor.write(0);

    //Initiating trigger
    digitalWrite(trigger, LOW);
    digitalWrite(trigger, HIGH);
    delayMicroseconds(20);
    digitalWrite(trigger, LOW);

    //receiving echo
    float dur = pulseIn(echo, HIGH);

    //calculating distance using formula
    float dis = (dur * 0.035)/2;

    //print the distance recorded by Ultra Sonic sensor
    Serial.print("Distance measured: ");
    Serial.println(dis);
}
```

```

//open if distance less than 2m
if(dis < 200){
    //open the garage doors when vehicle approaches
    motor.write(90);
    Serial.println("Doors opened.");

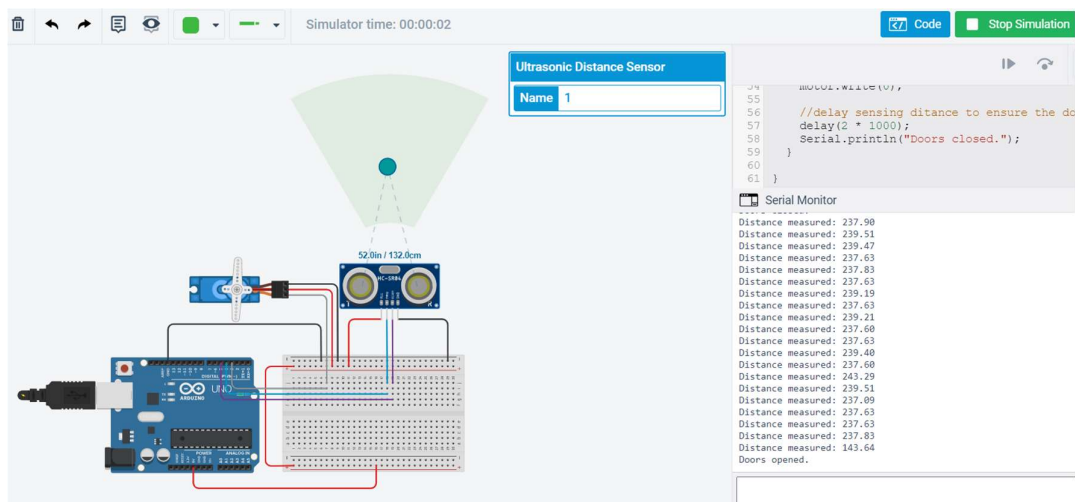
    //wait gates opened for 30 secs to enter vehicle
    delay(15 * 1000);
    //close the doors again
    motor.write(0);

    //delay sensing distance to ensure the doors closed
    delay(2 * 1000);
    Serial.println("Doors closed.");
}
}

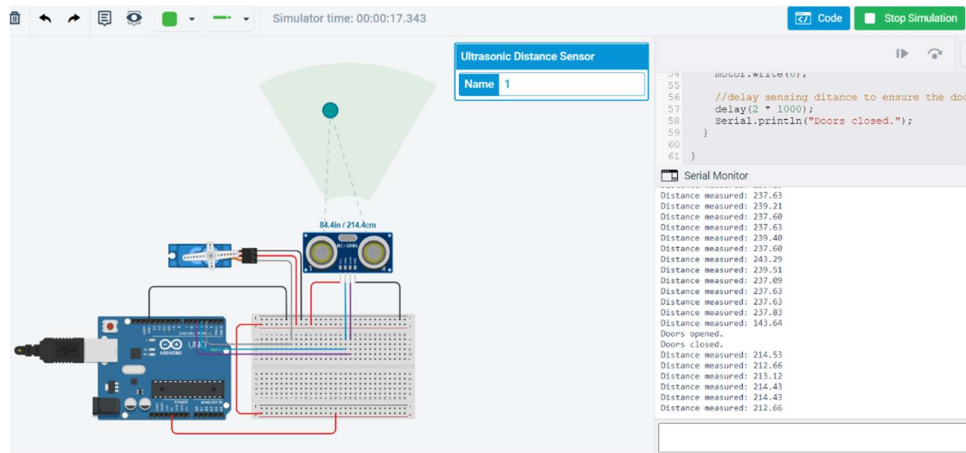
```

Working Prototype: (Note: Threshold distance is 200cm ~ 2m)

1. Garage doors opening when vehicle detected



2. Doors closing after vehicle passed or vehicle is not detected



Simulator time: 00:00:17.343

Ultrasonic Distance Sensor
Name 1

```
54 //delay sensing distance to ensure the door is closed
55
56 //delay sensing distance to ensure the door is closed
57 delay(2 * 1000);
58 Serial.println("Doors closed.");
59
60
61 }
```

Serial Monitor

Distance measured: 237.63
Distance measured: 239.21
Distance measured: 237.68
Distance measured: 237.63
Distance measured: 239.48
Distance measured: 237.68
Distance measured: 243.29
Distance measured: 239.51
Distance measured: 237.69
Distance measured: 237.63
Distance measured: 237.63
Distance measured: 237.63
Distance measured: 143.64
Doors opened.
Doors closed.
Distance measured: 214.53
Distance measured: 212.66
Distance measured: 213.12
Distance measured: 214.43
Distance measured: 214.43
Distance measured: 212.66