Assignment -4

Python Programming

Assignment Date	05 November 2022
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Maximum Marks	2 Marks

Question-1:

Write code and connection in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an alert to the IBM cloud and display in the device recent events.

Solution:

Code:

```
#include <WiFi.h>
#include <PubSubClient.h>
#include <ArduinoJson.h>

WiFiClient wifiClient;

#define ORG "50flc2"
#define DEVICE_TYPE "esp32_rasp"
#define DEVICE_ID "assignment-4"
#define TOKEN "Yu435T(1VH+cV-!O(3"
#define speed 0.034

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/event_1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();

const int trigpin=5;
const int echopin=18;
String command;
String data="";
String lat="14.167589";
String lon="80.248510";
String name="point2";
String icon="";

long duration;
int dist;
```

```
void setup()
{
  Serial.begin(115200);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}

void loop() {

  publishData();
  delay(500);

  if (!client.loop()) {
    mqttConnect();
  }
}

void wifiConnect() {
  Serial.print("Connecting to "); Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.print("WiFi connected, IP address: ");
Serial.println(WiFi.localIP());
}

void mqttConnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting MQTT client to ");
Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(1000);
    }
    initManagedDevice();
    Serial.println();
  }
}

void initManagedDevice() {
  if (client.subscribe(topic)) {
     Serial.println(client.subscribe(topic));
    Serial.println("subscribe to cmd OK");
  } else {
```

```
    Serial.println("subscribe to cmd FAILED");
  }
}
void publishData()
{
  digitalWrite(trigpin,LOW);
  digitalWrite(trigpin,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin,LOW);
  duration=pulseIn(echopin,HIGH);
  dist=duration*speed/2;

  if(dist<100){
    dist=100-dist;
    icon="fa-trash";
  }else{
    dist=0;
    icon="fa-trash-o";
  }
  DynamicJsonDocument doc(1024);
  String payload;
  doc["Name"]=name;
  doc["Latitude"]=lat;
  doc["Longitude"]=lon;
  doc["Icon"]=icon;
  doc["FillPercent"]=dist;
  serializeJson(doc, payload);
  delay(3000);
  Serial.print("\n");
  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish OK");
  } else {
    Serial.println("Publish FAILED");
  }
}
```

Diagram.json

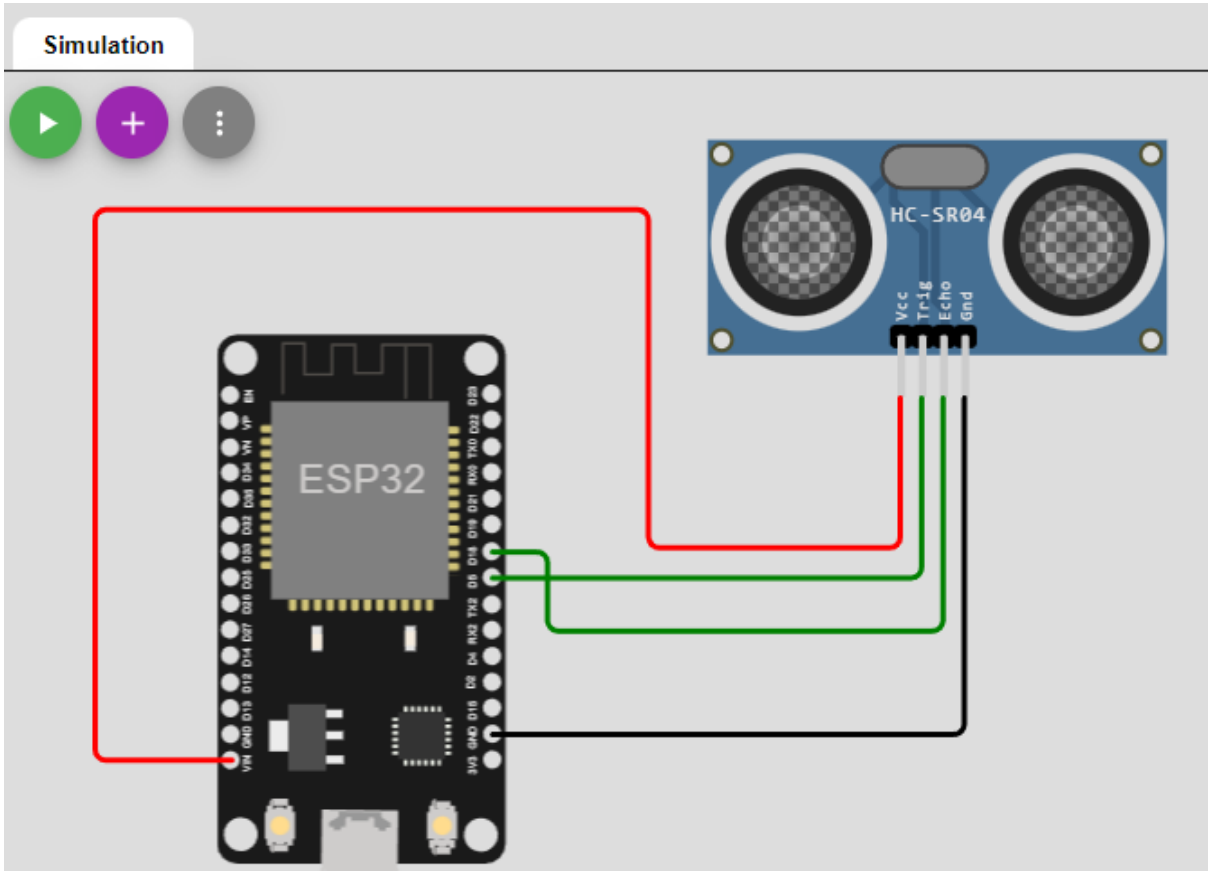
```
{
  "version": 1,
  "author": "Nivedha",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": 20,
"left": -24.67, "attrs": {} },
```

```
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": -
49.54, "left": 155.67, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [
      "esp:VIN",
      "ultrasonic1:VCC",
      "red",
      [ "h-50.66", "v-202.96", "h204.67", "v124.67", "h85.33" ]
    ],
    [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h0" ] ],
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h20.37",
"v29.17", "h146" ] ],
    [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h0" ] ]
  ]
}
```

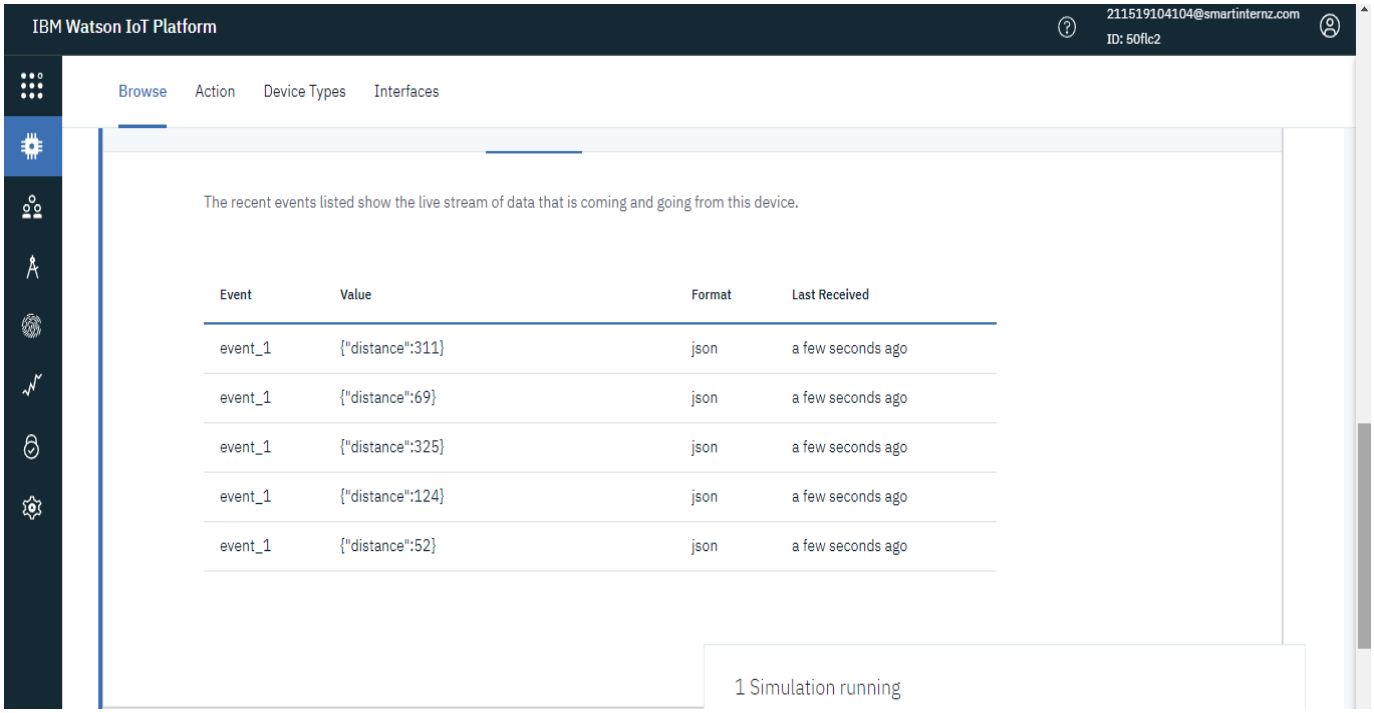
Wokwi link:

https://wokwi.com/projects/305566932847821378

OUTPUT:




```
publish ok
Measured distance: 112.00
Sending payload:{"distance":112.00}
publish ok
Measured distance: 81.00
Sending payload:{"ALERT":81.00}
publish ok
```


IBM Watson IoT Platform
211519104104@smartinternz.com
ID: 50f1c2
Browse
Action
Device Types
Interfaces
The recent events listed show the live stream of data that is coming and going from this device.
Event
Value
Format
Last Received
event_1
{"distance":311}
json
a few seconds ago
event_1
{"distance":69}
json
a few seconds ago
event_1
{"distance":325}
json
a few seconds ago
event_1
{"distance":124}
json
a few seconds ago
event_1
{"distance":52}
json
a few seconds ago
1 Simulation running