

IBM ASSESSMENT 4

NAME: BHARANI S

ROLL NO: 737819CSR015

Write code and connections 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. Upload document with wokwi share link and images of IBM cloud.

CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
#define ORG "690mb4"
#define DEVICE_TYPE "ultrasonic"
#define DEVICE_ID "12345"
#define TOKEN "QQ71Jg9YXF2GxjYM9g"
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribetopic[] = "iot-2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 5;
const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wificonnect();
  mqttconnect();
}
void loop()
{
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
```

```

digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = duration * SOUND_SPEED/2;
Serial.print("Distance (cm): ");
Serial.println(distance);
if(distance<100)
{
Serial.println("ALERT!!");
delay(1000);
PublishData(distance);
delay(1000);
if (!client.loop()) {
mqttconnect();
}
}
delay(1000);
}
void PublishData(float dist) {
mqttconnect();
String payload = "{\"Distance\":\"";
payload += dist;
payload += "\",\"ALERT!!\":\"\"Distance less than 100cms\"";
payload += "\"}";
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish ok");
} else {
Serial.println("Publish failed");
}
}
void mqttconnect() {
if (!client.connected()) {
Serial.print("Reconnecting client to ");
Serial.println(server);
while (!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(500);
}
initManagedDevice();
Serial.println();
}
}
void wificonnect()
{
Serial.println(); Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() != WL_CONNECTED) { delay(500);

```

```

Serial.print(".");
}
Serial.println("");
Serial.println("WiFi connected");
Serial.println("IP address: ");
Serial.println(WiFi.localIP());
}
void initManagedDevice() {
if (client.subscribe(subscribetopic)) {
Serial.println((subscribetopic));
Serial.println("subscribe to cmd OK");
} else {
Serial.println("subscribe to cmd FAILED");
}
}
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
Serial.print("callback invoked for topic: ");
Serial.println(subscribetopic);
for (int i = 0; i < payloadLength; i++) {
data3 += (char)payload[i];
}
Serial.println("data: "+ data3);
data3="";
}

```

Diagram.json:

```

{
  "version": 1,
  "author": "BHARANI S 19CSR015",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -1.33, "left": 56,
"attrs": {} },
    {
      "type": "wokwi-hc-sr04",
      "id": "ultrasonic1",
      "top": -32.23,
      "left": -180.5,
      "attrs": { "distance": "234" }
    }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [ "ultrasonic1:VCC", "esp:VIN", "red", [ "v0" ] ],
    [ "ultrasonic1:GND", "esp:GND.1", "black", [ "v190.56", "h282.55", "v-103.33" ] ],
    [ "ultrasonic1:TRIG", "esp:D5", "green", [ "v0" ] ],

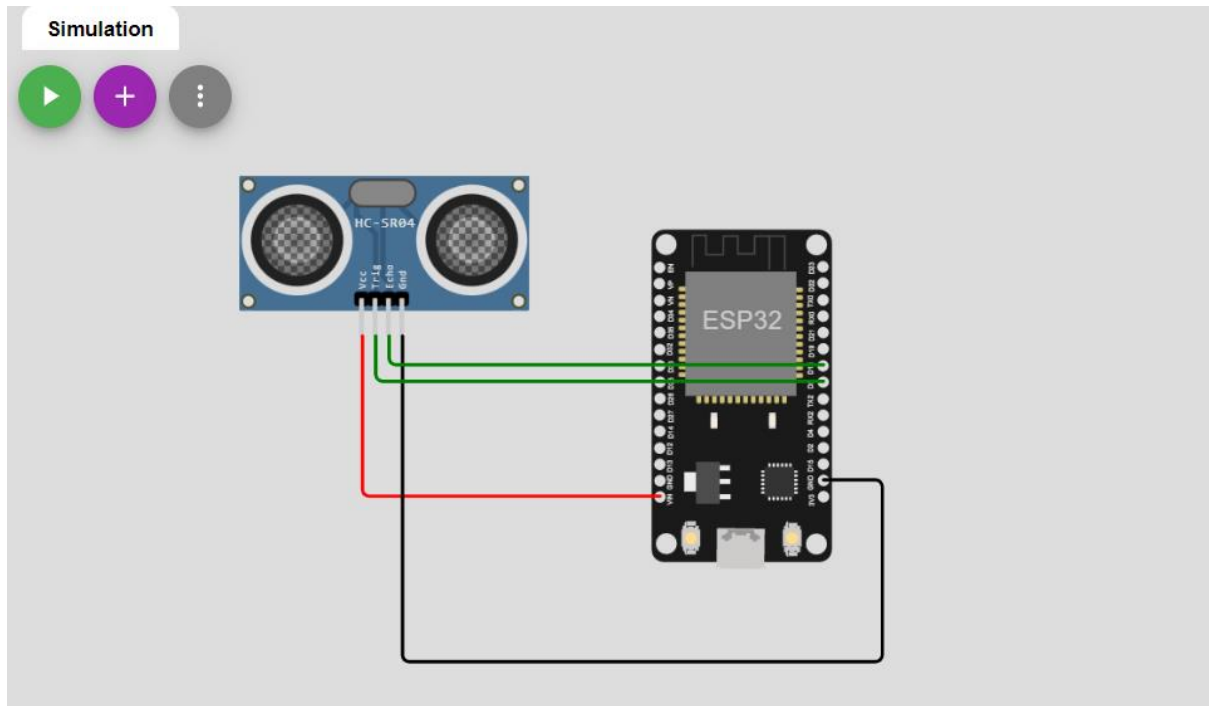
```

```

    [ "ultrasonic1:ECHO", "esp:D18", "green", [ "v0" ] ]
  ]
}

```

Circuit diagram:



Output:

The simulation output shows the distance measured by the ultrasonic sensor. The output displays three consecutive readings: 177.97 cm, 177.96 cm, and 177.96 cm.

```

Reconnecting client to 690mb4.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 177.97
Distance (cm): 177.96
Distance (cm): 177.96

```

Link: <https://wokwi.com/projects/347553393472963156>

IBM cloud output:

The screenshot displays the IBM Watson IoT Platform interface. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A user profile for 'bharanis.19cse@kongu.edu' with ID '690mb4' is visible in the top right. The main content area shows details for a device with ID '12345', which is 'Connected' and of type 'ultrasonic'. The 'Recent Events' tab is active, showing a table of data events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. It lists four data events, each with a JSON value containing distance and alert information, in 'json' format, received 'a few seconds ago'. The last event shows a distance of 96.95.

Event	Value	Format	Last Received
Data	{"Distance":46.95,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":46.95,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":46.95,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":96.95,"ALERT!!":"Distance less than ...	json	a few seconds ago