

ASSIGNMENT 4

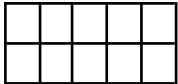
Date	25 October 2022
Student Name	MANNE NAGA BHARATH
Student Roll Number	111519106083
Team ID	PNT2022TMID14953
Maximum Marks	2 Marks

Question-1:

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

Code:

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



```
#include
```

```
<PubSubClient.h>
```

```
void callback(char* subscribetopic, byte* payload, unsigned  
int payloadLength);
```

```
//-----credentials of IBM Accounts-----
```

```
#define ORG "kotoq5"//IBM ORGANITION ID
```

```
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
```

```
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
```

```
#define TOKEN "12345678" //Token
```

```
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++) {

```

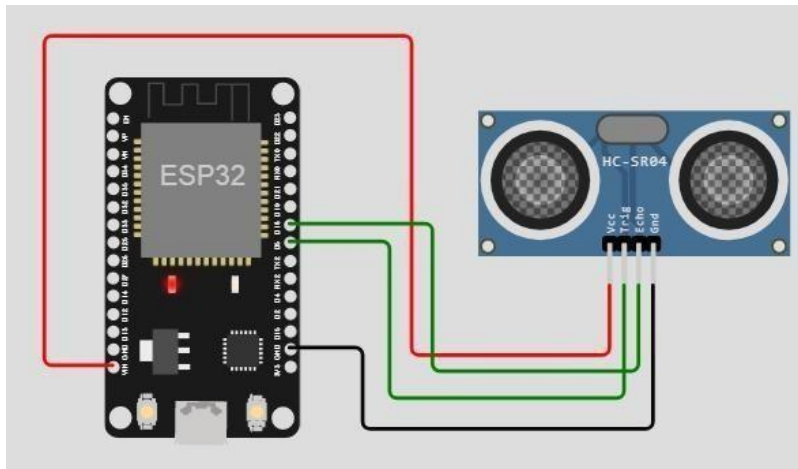
```
//Serial.print((char)payload[i]);
data3 += (char)payload[i];
}
Serial.println("data: "+ data3);
data3="";
}
```

Diagram.json:

```
{
  "version": 1,
  "author": "sweetysharon",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [
      "esp:VIN",
      "ultrasonic1:VCC",
      "red",
      [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]
    ],
    [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],
    [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
  ]
}
```

```
]
}
```

Circuit Diagram:



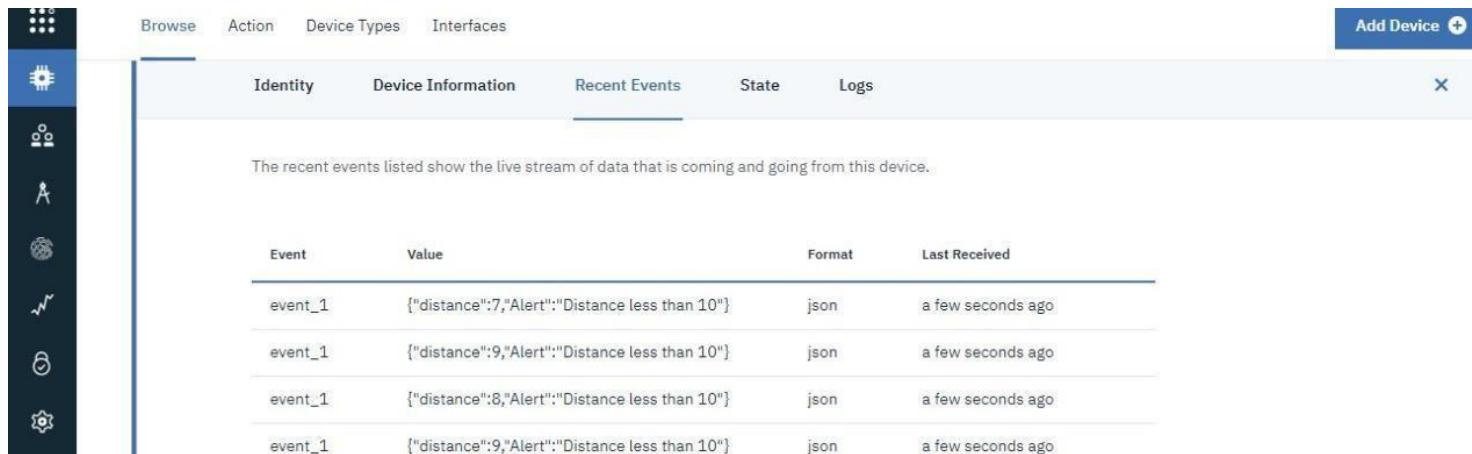
Output:

Wokwi output:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

IBM cloud output:



The screenshot shows the IBM Cloud IoT Platform interface. On the left is a dark sidebar with icons for various functions. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A blue 'Add Device +' button is in the top right. The main content area has tabs for 'Identity', 'Device Information', 'Recent Events' (which is selected), 'State', and 'Logs'. Below the 'Recent Events' tab, a message states: 'The recent events listed show the live stream of data that is coming and going from this device.' A table follows with four columns: 'Event', 'Value', 'Format', and 'Last Received'. It contains four rows of event data.

Event	Value	Format	Last Received
event_1	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago

Wokwi simulation link:

<https://wokwi.com/projects/346404308518961748>