

ASSIGNMENT-4

Date	30 October 2022
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Maximum Marks	2 Marks

Problem Statement:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cm send "alert" to IBM cloud and display in 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);
}
}

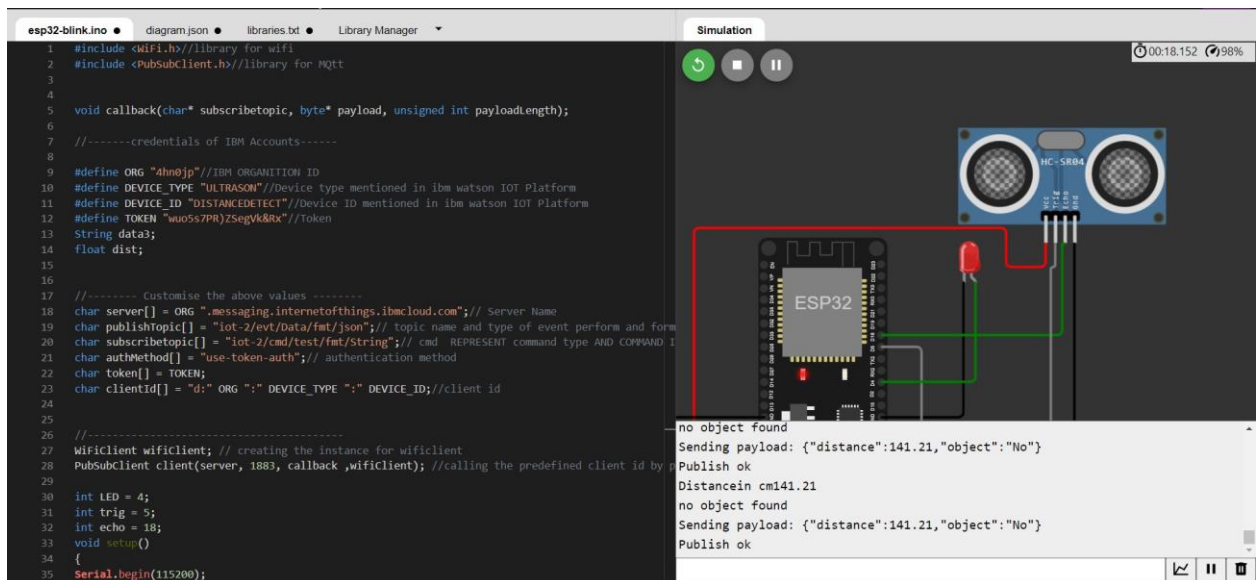
```

```

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="";
}

```

OUTPUT:



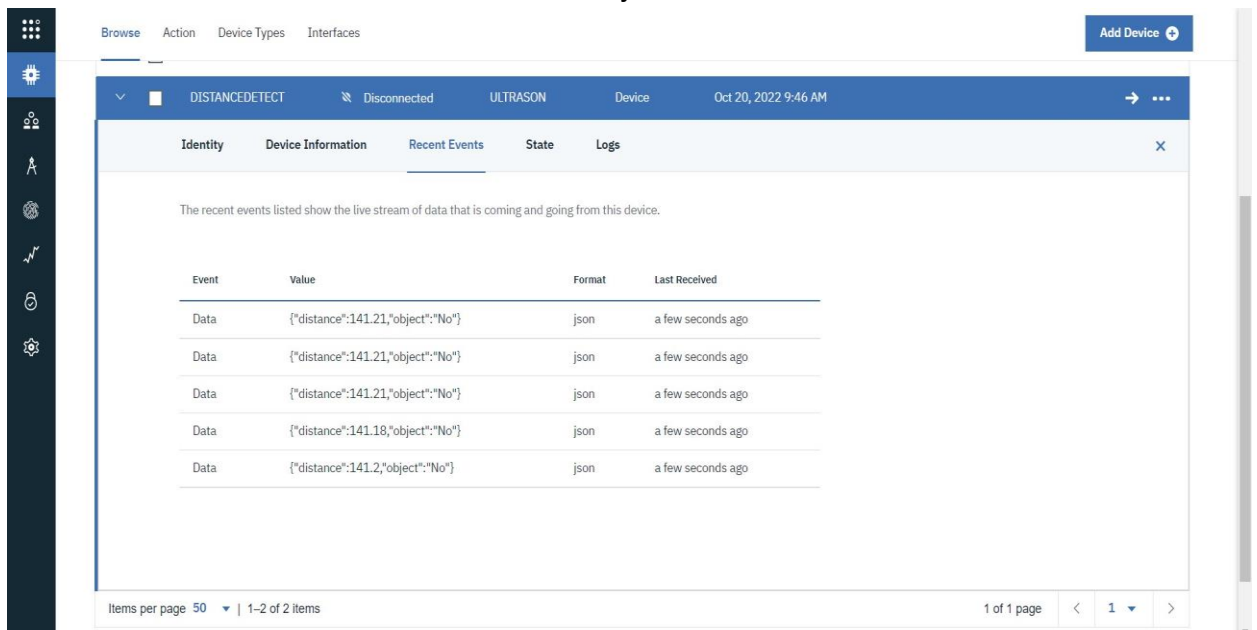
The screenshot shows the Arduino IDE with the following code in `esp32-blink.ino`:

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3
4 void callback(char* topic, byte* payload, unsigned int payloadLength);
5
6 //-----credentials of IBM Accounts-----
7
8 #define ORG "dhnajp" //IBM ORGANITION ID
9 #define DEVICE_TYPE "ULTRASON" //Device type mentioned in ibm watson IOT Platform
10 #define DEVICE_ID "DISTANCEDETECT" //Device ID mentioned in ibm watson IOT Platform
11 #define TOKEN "wuo5s7PR)ZSegV&R&X" //Token
12 String data3;
13 float dist;
14
15 //----- Customise the above values -----
16
17 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
18 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event perform and form
19 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND COMMAND ID
20 char authMethod[] = "use-token-auth"; // authentication method
21 char token[] = TOKEN;
22 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
23
24 //-----
25
26 WiFiClient wificlient; // creating the instance for wificlient
27 PubSubClient client(server, 1883, callback, wificlient); //calling the predefined client id by
28
29 int LED = 4;
30 int trig = 5;
31 int echo = 18;
32 void setup()
33 {
34   Serial.begin(115200);
35 }
```

The simulation window shows the following output:

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

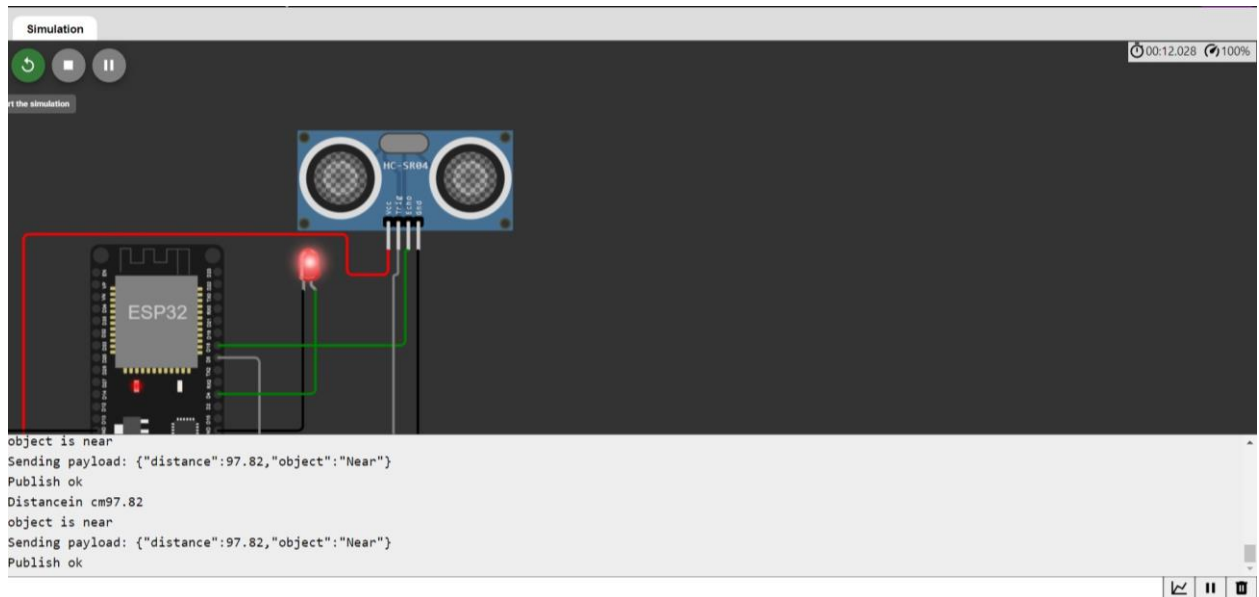
Data send to the IBM cloud device when the object is far



The screenshot shows the IBM Watson IoT Platform console. The 'Recent Events' tab is selected, displaying the following data:

Event	Value	Format	Last Received
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

when object is near to the ultrasonic sensor



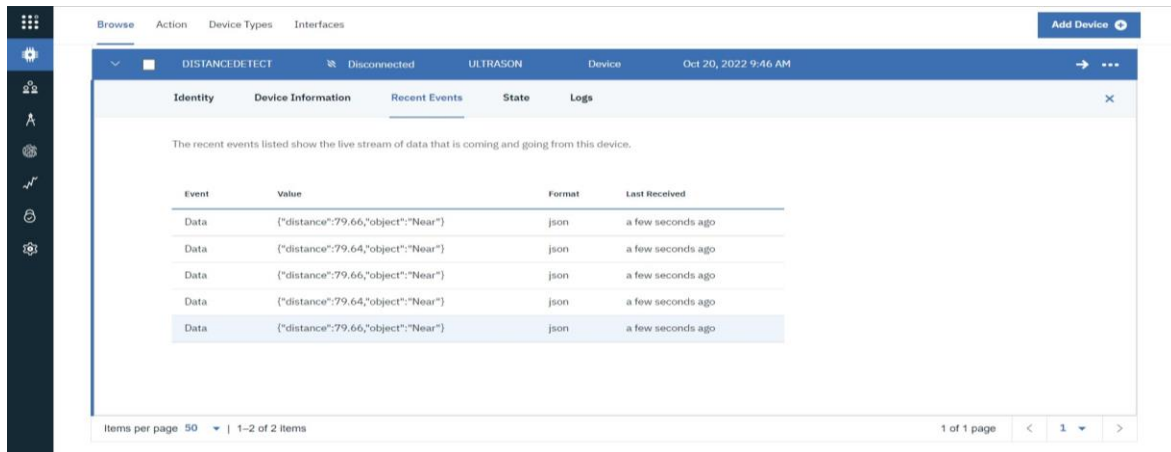
Simulation

00:12.028 100%

object is near

```
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distance in cm 97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
```

Data sent to the IBM Cloud Device when the object is near



Browse Action Device Types Interfaces Add Device

DISTANCEDETECT Disconnected ULTRASON Device Oct 20, 2022 9:46 AM

Identity Device Information Recent Events State Logs

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago

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