

## Assignment - 4

Assignment Date	1 October 2022
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Student Roll Number	912019106008
Maximum Marks	2 Marks

### Question-1:

Write a code and make a connection in wokwi for ultrasonic sensor. Whenever distance is less than 100 send 'alert' to ibm cloud and display in device recent events.

### Solution:

#### Code:

```
#include <WiFi.h>
#include <PubSubClient.h>
WiFiClient wifiClient;
String data3;
#define ORG "4yi0vc"
#define DEVICE_TYPE "nodeMcu"
#define DEVICE_ID "Assignment4"
#define TOKEN "123456789"
#define speed 0.034
#define led 14
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/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="";
```

```
long duration;
float dist;
```

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

```

    wifiConnect();
    mqttConnect();
}

void loop() {
    bool isNearby = dist < 100;
    digitalWrite(led, isNearby);

    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(500);
        }
        initManagedDevice();
        Serial.println();
    }
}

void initManagedDevice() {
    if (client.subscribe(topic)) {
        // Serial.println(client.subscribe(topic));
        Serial.println("IBM 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){

```

```

String payload = "{\"Normal Distance\":\":";
payload += dist;
payload += "\"}";

Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish OK");
}

}

if(dist>101 && dist<111){
String payload = "{\"Alert distance\":\":";
payload += dist;
payload += "\"}";

Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if(client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Warning crosses 110cm -- it automaticaly of the loop");
    digitalWrite(led,HIGH);
}else {
    Serial.println("Publish 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++){
    dist += (char)payload[i];
}
Serial.println("data:" + data3);
if(data3=="lighton"){
    Serial.println(data3);
    digitalWrite(led,HIGH);
}
data3="";
}

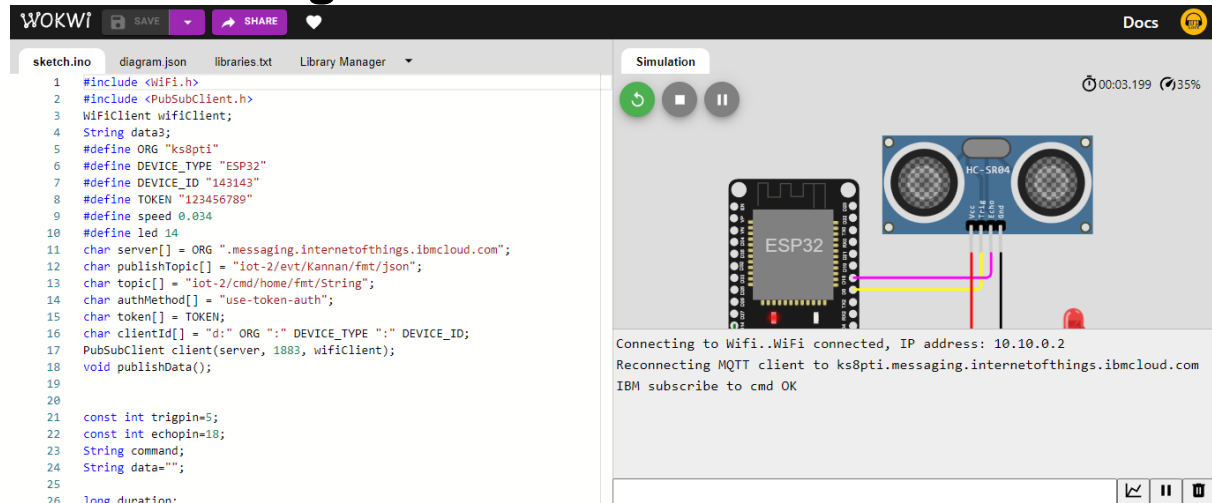
```

## WOKWI CODE:

<https://wokwi.com/projects/346937989346099796>

# OUTPUT

## Distance is greater than 100



The screenshot shows the Wokwi IoT simulator interface. On the left, the `sketch.ino` file contains the following code:

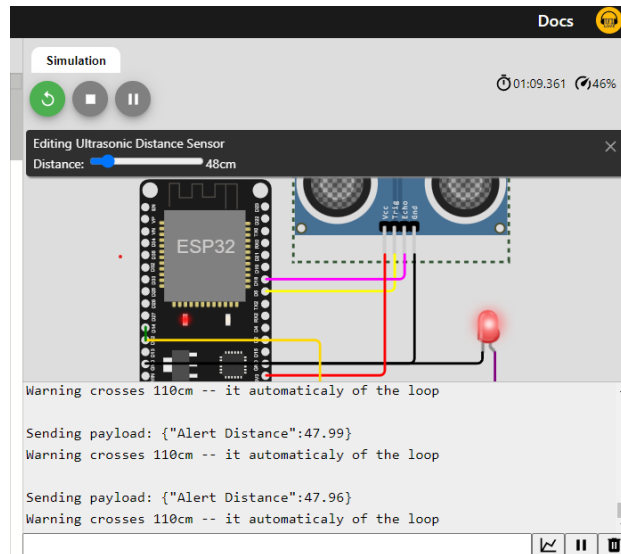
```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wificlient;
4 String data3;
5 #define ORG "ks8pti"
6 #define DEVICE_TYPE "ESP32"
7 #define DEVICE_ID "143143"
8 #define TOKEN "123456789"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Kannan/fmt/json";
13 char topic[] = "iot-2/cmd/home/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 PubSubClient client(server, 1883, wificlient);
18 void publishData();
19
20
21 const int trigpin=5;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
```

On the right, the simulation output shows the following messages:

```
Connecting to Wifi..Wifi connected, IP address: 10.10.0.2
Reconnecting MQTT client to ks8pti.messaging.internetofthings.ibmcloud.com
IBM subscribe to cmd OK
```

IBM cloud is connected and LED is off state

## Distance is less than 100



The screenshot shows the Wokwi IoT simulator interface. On the left, the `sketch.ino` file contains the following code:

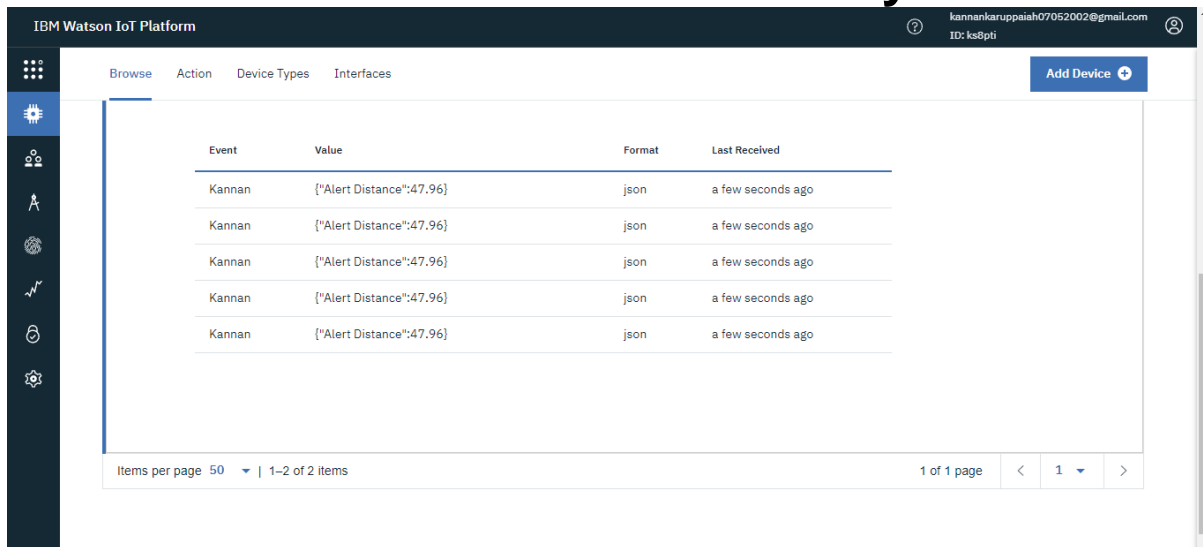
```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 WiFiClient wificlient;
4 String data3;
5 #define ORG "ks8pti"
6 #define DEVICE_TYPE "ESP32"
7 #define DEVICE_ID "143143"
8 #define TOKEN "123456789"
9 #define speed 0.034
10 #define led 14
11 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
12 char publishTopic[] = "iot-2/evt/Kannan/fmt/json";
13 char topic[] = "iot-2/cmd/home/fmt/String";
14 char authMethod[] = "use-token-auth";
15 char token[] = TOKEN;
16 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
17 PubSubClient client(server, 1883, wificlient);
18 void publishData();
19
20
21 const int trigpin=5;
22 const int echopin=18;
23 String command;
24 String data="";
25
26 long duration;
```

On the right, the simulation output shows the following messages:

```
Warning crosses 110cm -- it automaticaly of the loop
Sending payload: {"Alert Distance":47.99}
Warning crosses 110cm -- it automaticaly of the loop
Sending payload: {"Alert Distance":47.96}
Warning crosses 110cm -- it automaticaly of the loop
```

LED is on state

# IBM Cloud foundry connection



The screenshot shows the IBM Watson IoT Platform interface. At the top, the header reads "IBM Watson IoT Platform" and includes a user profile for "kannankaruppaiah07052002@gmail.com" with ID "ks8pti". Below the header, there are tabs for "Browse", "Action", "Device Types", and "Interfaces". A sidebar on the left contains various icons for navigation. The main content area displays a table with the following data:

Event	Value	Format	Last Received
Kannan	{"Alert Distance":47.96}	json	a few seconds ago
Kannan	{"Alert Distance":47.96}	json	a few seconds ago
Kannan	{"Alert Distance":47.96}	json	a few seconds ago
Kannan	{"Alert Distance":47.96}	json	a few seconds ago
Kannan	{"Alert Distance":47.96}	json	a few seconds ago

At the bottom of the table, there is a pagination control showing "Items per page 50" and "1-2 of 2 items". The page number "1 of 1 page" is also visible.

Getting alert message from wokwi