

Assignment - 4
WOKWI CONNECTION

Assignment Date	8 November 2022
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Maximum Marks	2 Marks

QUESTION:

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.

CODE:

```
#include <WiFi.h>//library for wifi

#include <PubSubClient.h>//library for MQTT

WiFiClient wifiClient;

String data3;

#define ORG "tktpjm"

#define DEVICE_TYPE "NodeMCU"

#define DEVICE_ID "12345"

#define TOKEN "1234567890"

#define speed 0.034

#define led 14

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";

char publishTopic[] = "iot-2/evt/NodeMCU/fmt/json";

char topic[] = "iot-2/cmd/status/fmt/String";

char authMethod[] = "use-token-auth";

char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

PubSubClient client(server, 1883, wifiClient);


const int trigpin=19;

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 = "{\"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("Publish OK");  
        }  
    }  
  
    if(dist>100){  
        String payload = "{\"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");

}else {

    Serial.println("Publish FAILED");

}

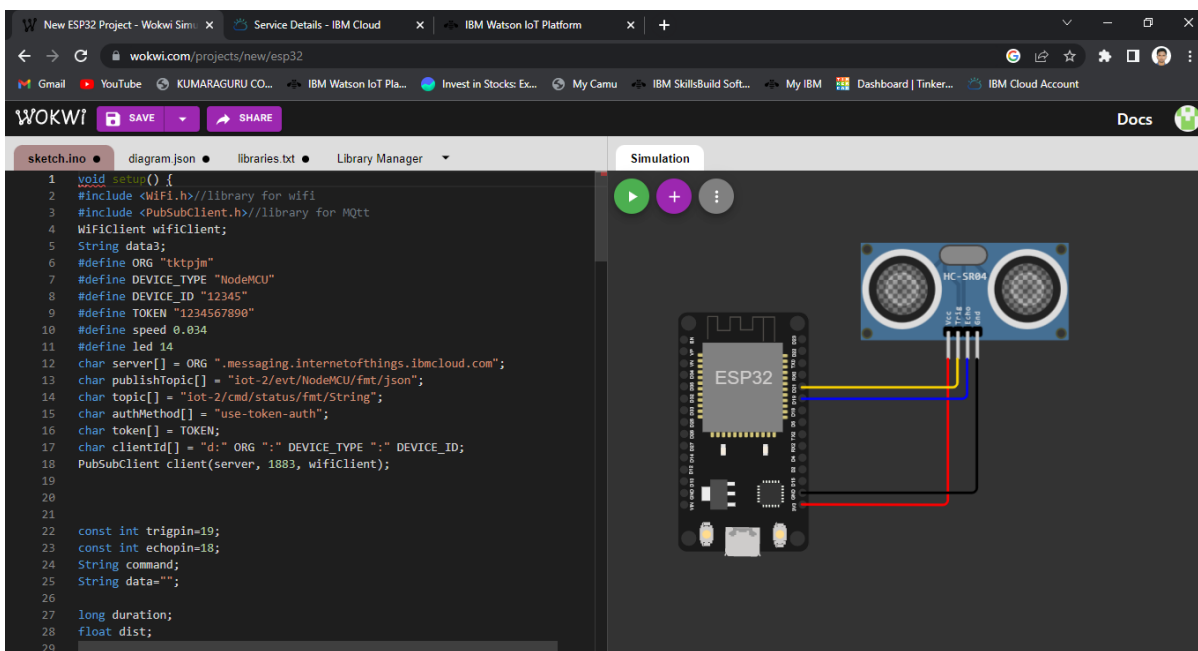
}

}

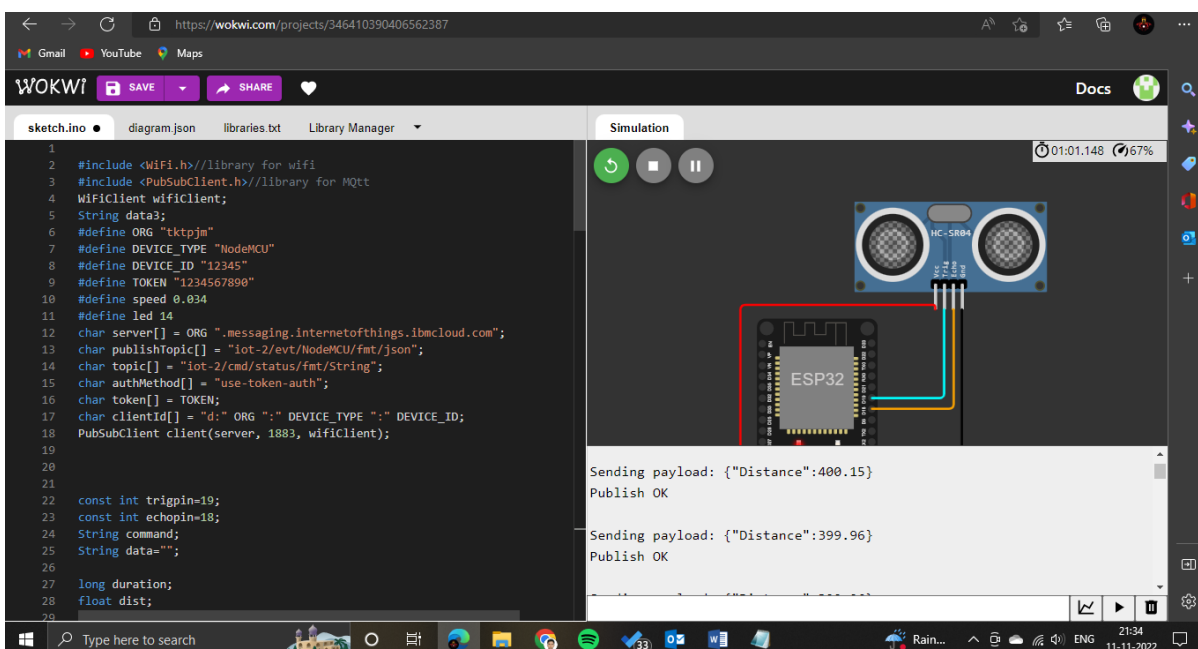
}

```

OUTPUT:



WHEN DISTANCE IS GREATER THAN 100CM:



IBM RECENT EVENTS:

The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes tabs for 'sketch.ino - Wokwi Arduino and...', 'Service Details - IBM Cloud', 'IBM Watson IoT Platform', and 'Simulating devices - IBM Docu...'. The main content area is titled 'Browse' and displays a table of recent events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. The events are listed as follows:

Event	Value	Format	Last Received
NodeMCU	{"Distance":160.97}	json	a few seconds ago
NodeMCU	{"Distance":160.97}	json	a few seconds ago
NodeMCU	{"Distance":160.96}	json	a few seconds ago
NodeMCU	{"Distance":160.97}	json	a few seconds ago
NodeMCU	{"Distance":153.97}	json	a few seconds ago

Below the table, there is a status bar indicating '1 Simulation running' and 'Items per page: 50 | 1-1 of 1 item'.

WHEN DISTANCE IS LESSER THAN 100CM:

The screenshot shows the Wokwi IDE interface. The left pane displays the 'sketch.ino' file with the following code:

```
1
2 #include <WiFi.h> //library for wifi
3 #include <PubSubClient.h> //library for MQTT
4 WiFiClient wificlient;
5 String data3;
6 #define ORG "tktpjm"
7 #define DEVICE_TYPE "NodeMCU"
8 #define DEVICE_ID "12345"
9 #define TOKEN "1234567890"
10 #define speed 0.034
11 #define led 14
12 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
13 char publishTopic[] = "iot-2/evt/NodeMCU/fmt/json";
14 char topic[] = "iot-2/cmd/status/fmt/String";
15 char authMethod[] = "use-token-auth";
16 char token[] = TOKEN;
17 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
18 PubSubClient client(server, 1883, wificlient);
19
20
21
22 const int trigpin=19;
23 const int echopin=18;
24 String command;
25 String data="";
26
27 long duration;
28 float dist;
```

The right pane shows a simulation of an ESP32 device with an Ultrasonic Distance Sensor. The sensor's distance is set to 60cm. The simulation output shows the following messages:

```
Publish OK
Sending payload: {"Alert Distance":59.96}
Publish OK
Sending payload: {"Alert Distance":59.96}
Publish OK
```

IBM RECENT EVENTS:

The screenshot shows the IBM Watson IoT Platform dashboard. The top navigation bar includes tabs for 'sketchino - Wokwi Arduino and', 'Service Details - IBM Cloud', 'IBM Watson IoT Platform', and 'Simulating devices - IBM Docum...'. The main header displays the user's email 'srinathsoundareas6@gmail.com' and ID 'tktpjm'. The left sidebar contains icons for various IoT functions. The main content area is titled 'Browse' and shows a table of recent events. The table has four columns: 'Event', 'Value', 'Format', and 'Last Received'. The events are all from the device 'Nico#NCJ' and contain the value '["Alert Distance":86.96]' in JSON format, received 'a few seconds ago'. A status box at the bottom right indicates '1 Simulation running'. The bottom of the screen shows a Windows taskbar with various application icons and the system clock showing 21:40 on 11-11-2022.

IBM Watson IoT Platform

srinathsoundareas6@gmail.com
ID: tktpjm

Browse Action Device Types Interfaces Add Device

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

Event	Value	Format	Last Received
Nico#NCJ	["Alert Distance":86.96]	json	a few seconds ago
Nico#NCJ	["Alert Distance":86.96]	json	a few seconds ago
Nico#NCJ	["Alert Distance":86.96]	json	a few seconds ago
Nico#NCJ	["Alert Distance":86.96]	json	a few seconds ago
Nico#NCJ	["Alert Distance":86.96]	json	a few seconds ago

Items per page: 50 | 1-1 of 1 item

1 Simulation running

Type here to search Rain... ENG 21:40 11-11-2022

WOKWI: <https://wokwi.com/projects/348047443911246419>