# Assignment -4

| Assignment Date | 28 October 2022 |
|---|---|
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| Maximum Marks | 2 Marks |

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

Program:

```cpp
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
const int T=2;
const int E=21;
long d;
float Distance;
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);

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

#define ORG "hi70w8"//IBM ORGANITION ID
#define DEVICE_TYPE "Ultrasonic"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "789456"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "789456123"      //Token
String data3;


//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server
Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of
event perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT
command type AND COMMAND IS TEST OF FORMAT STRING
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id


//-----------------------------------------
WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the
predefined client id by passing parameter like server id,portand
wificredential
void setup()// configureing the ESP32
{
  Serial.begin(115200);
  pinMode(T,OUTPUT);
  pinMode(E,INPUT);
```

```
    Serial.println();
    wificonnect();
    mqttconnect();
}

void loop()// Recursive Function
{
    digitalWrite(T,LOW);
    delay(1000);
    digitalWrite(T,HIGH);
    delay(1000);
    digitalWrite(T,LOW);
    d=pulseIn(E,HIGH);
    Distance=d*(0.034/2);
    Serial.print("Distance in Cm:");
    Serial.println(Distance);
    if(Distance<100)
    {
        Serial.println("!!ALERT!!");
        delay(1000);
    PublishData(Distance);
    delay(1000);
    if (!client.loop()) {
        mqttconnect();
    }
    }
    delay(1000);
}

/*.....................................retrieving to
Cloud...............................*/

void PublishData(float dist) {
    mqttconnect();//function call for connecting to ibm
    /*
        creating the String in in form JSon to update the data to ibm cloud
    */
    String payload = "{\"Distance\":";
    payload += dist;
    payload += ",\"!!ALERT!!\":""\"Distance is less than 100 cms\"";
    payload += "}";
    Serial.print("Sending payload: ");
    Serial.println(payload);


    if (client.publish(publishTopic, (char*) payload.c_str())) {
        Serial.println("Publish ok");// if it sucessfully upload data on the
cloud then it will print publish ok in Serial monitor or else it will print
publish failed
    } else {
        Serial.println("Publish failed");
    }

}
void mqttconnect() {
    if (!client.connected()) {
        Serial.print("Reconnecting client to ");
        Serial.println(server);
        while (!!!client.connect(clientId, authMethod, token)) {
```

```arduino
      Serial.print(".");
      delay(500);
    }

    initManagedDevice();
    Serial.println();
  }
}
void wificonnect() //function defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to
establish the connection
  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:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to hi70w8.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance in Cm:64.97
!!ALERT!!
Sending payload: {"Distance":64.97,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:25.96
!!ALERT!!
Sending payload: {"Distance":25.96,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:92.97
!!ALERT!!
Sending payload: {"Distance":92.97,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:58.97
!!ALERT!!
Sending payload: {"Distance":58.97,"!!ALERT!!":"Distance is less than 100 cms"}
Publish ok
Distance in Cm:196.98
Distance in Cm:44.98
```

# Wokwi simulation link:

https://wokwi.com/projects/34684748167957768

Recent Events in IBM cloud: