

**Assignment -4**  
**IOT Based smart crop**  
**protection system**

Assignment Date	6 November 2022
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Maximum Marks	2 Marks

**Question-1:**

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less 100 cms send "alert" to ibm cloud and display in device recent events.

**Solution:**

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

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

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

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

```
#define ORG "za7x6f"//IBM ORGANITION ID
```

```
#define DEVICE_TYPE "rj46"//Device type mentioned in ibm watson IOT Platform
```

```
#define DEVICE_ID "raj46"//Device ID mentioned in ibm watson IOT Platform
```

```
#define TOKEN "R0Q4uhcOcd0hnom)K"
```

```
//Token String data3; float dist;
```

```
//----- 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


int LED = 4;
int trig = 5;
int echo = 18;
void setup()
{
  Serial.begin(115200);
  pinMode(trig,OUTPUT);
  pinMode(echo,INPUT);
  pinMode(LED, OUTPUT);
  delay(10); wificonnect();
  mqttconnect();
}
void loop()// Recursive Function
{
  digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW); float
  dur = pulseIn(echo,HIGH); float
  dist = (dur * 0.0343)/2;
  Serial.print ("Distancein cm");
  Serial.println(dist);
}

```

```

    PublishData(dist);
    delay(1000); if
    (!client.loop()) {
    mqttconnect();
    }
}
/* .....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
    object; if
    (dist < 100)
    {
        digitalWrite(LED,HIGH);
        Serial.println("object is near");
        object = "Near";
    }
    else
    {
        digitalWrite(LED,LOW);
        Serial.println("no object found");
        object = "No";
    }

    String payload = "{\"distance\":";
    payload += dist; payload += ","
    "\"object\":"; payload +=
    object; 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)) { 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];
}
data3="";
}

```

Reference:

<https://wokwi.com/projects/347322163482591827>

sketch.ino

diagram.json

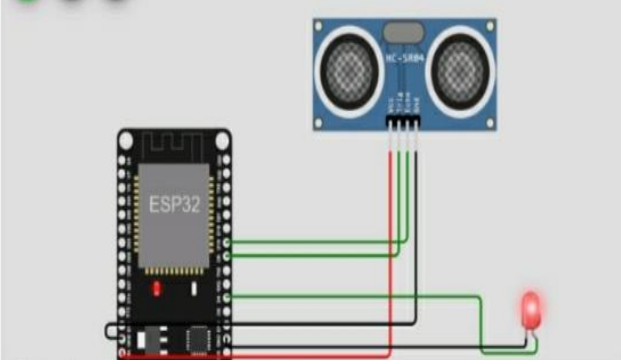
libraries.txt

Library Manager

```
64  /*
65   * creating the String in in form JSon to update the data to ibm cloud
66   */
67   String object;
68   if (dist <100)
69   {
70     digitalWrite(LED,HIGH);
71     Serial.println("object is near");
72     object = "Near";
73   }
74   else
75   {
76     digitalWrite(LED,LOW);
77     Serial.println("no object found");
78     object = "No";
79   }
80
81   String payload = "{\"distance\":";
82   payload += dist;
83   payload += "," " \"object\":";
84   payload += object;
85   payload += "\"}";
86
87
88   Serial.print("Sending payload: ");
89   Serial.println(payload);
90
91
92
```

Simulation

00:59.614 98%



object is near  
Sending payload: {"distance":59.51,"object":"Near"}  
Publish ok  
Distancein cm59.51  
object is near  
Sending payload: {"distance":59.51,"object":"Near"}  
Publish ok