Assignment -4
Python Programming

Assignment Date	25 October 2022
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Student Roll Number	95071914079
Maximum Marks	2 Marks

Question-1:

Write code and connections in wokwi for ultrasonic sensor.

Whenever distance is less than 100 cms send "alert" to ibm cloud and display in device recent events.

Upload document with wokwi share link and images of ibm cloud

Solution:

```
sketch.ino ●    diagram.json    libraries.txt ●    Library Manager    ▼

1   #include<WiFi.h>//library for wifi
2   #include<PubSubClient.h>//library for MQTT
3   void callback(char* subscribetopic, byte* payload,unsigned int payloadlength);
4   //---------------credentials of IBM Account------
5   #define ORG "izyy6o"// IBM ORGANIZATION ID
6   #define DEVICE_TYPE "iotdeviceproject"//DEVICE TYPE MENTIONED IN IOT WATSON PLATFORM
7   #define DEVICE_ID "229714"//DEVICE ID MENTIONED IN IOT WATSON PLATEFORM
8   #define TOKEN "24681012"//Token
9   String data3;
10  float dist;
11  //-----------customize the above value-------
12  char server[]=ORG ".messaging.internetofthings.ibmcloud.com";//server name
13  char publishtopic[]="ultrasonic/evt/Data/fmt/json";/*topic name and type of event perform
14  and format in which data to be send*/
15  char subscribetopic[]="ultrasonic/cmd/test/fmt/String";/*cmd REPRESENT Command tupe and
16  COMMAND IS TEST OF FORMAT STRING*/
17  char authMethod[]="use-token-auth";//authentication method
18  char token[]=TOKEN;
19  char clientid[]="d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//CLIENT ID
20  //-----------------------------------
21  WiFiClient wifiClient;// creating an instance for wificlient
22  PubSubClient client(server, 1883 , callback , wifiClient);/*calling the predefined client id
23  by passing parameter like server id,portand wificredential*/
24  int LED =4;
25  int trig =5;
26  int echo=18;
27  void setup()
28  {
29    Serial.begin(115200);
30    pinMode(trig,OUTPUT);
```

```
31      pinMode(echo,INPUT);
32      pinMode(LED,OUTPUT);
33      delay(10);
34      wificonnect();
35      mqttconnect();
36  }
37  void loop()//recursive function
38  {
39      digitalWrite(trig,LOW);
40      digitalWrite(trig,HIGH);
41      delayMicroseconds(10);
42      digitalWrite(trig,LOW);
43      float dur=pulseIn(echo,HIGH);
44      float dist=(dur * 0.0343)/2;
45      Serial.print("distance in cm");
46      Serial.println(dist);
47      PublishData(dist);
48      delay(1000);
49      if (!client.loop()){
50          mqttconnect();
51      }
52  }
53  /*.............................................retriving to cloud..........................................*/
54  void PublishData(float dist){
55      mqttconnect();//function call for connecting to ibm
56      /*creating the string in form of JSON to update the data to ibm cloud*/
57      String object;
58      if(dist<100)
59      {
60          digitalWrite(LED,HIGH);
```

```
61          Serial.println("no object is near");
62          object="Near";
63      }
64      else
65      {
66          digitalWrite(LED,LOW);
67          Serial.println("no object found");
68          object="No";
69      }
70      String payload="{\"distance\":";
71      payload +=dist;
72      payload +="," "\"object\":\"";
73      payload += object;
74      payload += "\"}";
75
76      Serial.print("Sending payload: ");
77      Serial.println(payload);
78      if(client.publish(publishtopic, (char*) payload.c_str())){
79          Serial.println("Publish ok");/* if its sucessfully upload data on the cloud then it will print
80          publish ok in serial monitor or else it will print publish failed*/
81      } else{
82          Serial.println("Publish failed");
83      }
84  }
85  void mqttconnect(){
86      if(!client.connected()){
87          Serial.print("Reconnecting client to ");
88          Serial.println(server);
89          while(!!!client.connect(clientid,authMethod, token)){
90              Serial.print(".");
91              delay(500);
```

```
 92        }
 93        initManagedDevice();
 94        Serial.println();
 95      }
 96    }
 97    void wificonnect()//function defenition for wificonnect
 98    {
 99      Serial.println();
100      Serial.print("Connecting to ");
101      WiFi.begin("Wokwi.GUEST", "",6);//PASSING THE WIFI CREDIDENTIALS TO ESTABLISH CONNECTION
102      while (WiFi.status() !=WL_CONNECTED){
103        delay(500);
104        Serial.print(".");
105      }
106      Serial.println("");
107      Serial.println("WiFi connected");
108      Serial.println("IP address");
109      Serial.println(WiFi.localIP());
110    }
111    void initManagedDevice(){
112      if(client.subscribe(subscribetopic)){
113        Serial.println((subscribetopic));
114        Serial.println("subscribe to cmd OK");
115      }else{
116        Serial.println("subscribe to cmd failed");
117      }
118    }
119    void callback(char* subscribetopic,byte*payload,unsigned int payloadLength)
120    {
121      Serial.print("callback invoked for topic: ");
122      Serial.println(subscribetopic);
```

```
123    for(int i=0; i< payloadLength; i++){
124      //Serial.print((char)payload[i]);
125      data3 +=(char)payload[i];
126    }
127    //Serial.println("dta: "+ data3);
128    //if(data3=="Near")
129    //{
130    //Serial.println(data3);
131    //digitalWrite(LED,HIGH);
132    //}
133    //else
134    //{
135    //Serial.println(data3);
136    //digitalWrite(LED,LOW);
137    //}
138    data3="";
139  }
```

OUTPUT:

DATA IS SENT TO IBM CLOUD WHEN NO OBJECT IS DETECTED

When no object is detected


```
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2    #include<PubSubClient.h>//library for MQ
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21   WiFiClient wifiClient;// creating an ins
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24   int LED =4;
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26   int echo=18;
27   void setup()
28   {
29     Serial.begin(115200);
```

```
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 is sent to ibm cloud when object is detected

When object is detected in ultrasonic detector


```
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distancein cm97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
```