Assignment -4

Python Programming

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

```
sketch.ino ● diagram.json libraries.txt ●
                                             Library Manager *
       1 #include<WiFi.h>//library for wifi
            #include<PubSubClient.h>//library for MQTT
Solution: 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
            #define DEVICE_ID "229714"//DEVICE ID MENTIONED IN IOT WATSON PLATEFORM
           #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
       char publishtopic[]="ultrasonic/evt/Data/fmt/json";/*topic name and type of event perform
       14 and format in which data to be send*/
       char subscribetopic[]="ultrasonic/cmd/test/fmt/String";/*cmd REPRESENT Command tupe and
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*/
                                                                                                                            Co
       24
           int LED =4;
                                                                                                                            nn
       25 int trig =5;
                                                                                                                            ec
       26 int echo=18;
                                                                                                                            ti
       27
            void setup()
       28
                                                                                                                            ng
       29
             Serial.begin(115200);
                                                                                                                            to
       30
             pinMode(trig,OUTPUT);
```

```
sketch.ino •
             diagram.json libraries.txt ● Library Manager ▼
           pinMode(echo,INPUT);
   31
          pinMode(LED,OUTPUT);
   32
   33
          delay(10);
   34
          wificonnect();
   35
          mqttconnect();
   36
         void loop()//recursive function
   37
   38
          digitalWrite(trig,LOW);
   39
   40
          digitalWrite(trig,HIGH);
   41
          delayMicroseconds(10);
   42
          digitalWrite(trig,LOW);
          float dur=pulseIn(echo,HIGH);
float dist=(dur * 0.0343)/2;
   43
   44
          Serial.print("distance in cm");
   45
          Serial.println(dist);
   46
          PublishData(dist);
   47
   48
          delay(1000);
   49
          if (!client.loop()){
   50
           mqttconnect();
   51
   52
   53
         /*....retriving to cloud.....*/
         void PublishData(float dist){
   54
   55
          mqttconnect();//function call for connecting to ibm
           /*creating the string in form of JSON to update the data to ibm cloud*/
   56
          String object;
          if(dist<100)
   58
   59
            digitalWrite(LED,HIGH);
← → C • wokwi.com/projects/346566226034557523
                                                                                                              日本
WOKWI 🔒 SAVE
                             - SHARE
sketch.ino •
                            libraries.txt ●
                                            Library Manager •
               diagram.json
   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
           String payload="{\"distance\":";
   70
           payload +=dist;
payload +="," "\"object\":\"";
   71
    72
           payload += object;
   73
           payload += "\"}";
    74
   75
   76
           Serial.print("Sending payload: ");
   77
           Serial.println(payload);
          if(client.publish(publishtopic, (char*) payload.c_str())){
    Serial.println("Publish ok");/* if its successfully upload data on the cloud then it will print
    78
    79
             publish ok in serial monitor or else it will print publish failed*/
   20
   81
           } else{
            Serial.println("Publish failed");
   82
   83
           }
   84
   85
         void mqttconnect(){
   86
           if(!client.connected()){
             Serial.print("Reconnecting client to ");
   87
   88
             Serial.println(server);
             while(!!!client.connect(clientid,authMethod, token)){
   20
   90
               Serial.print(".");
               delay(500);
   91
```

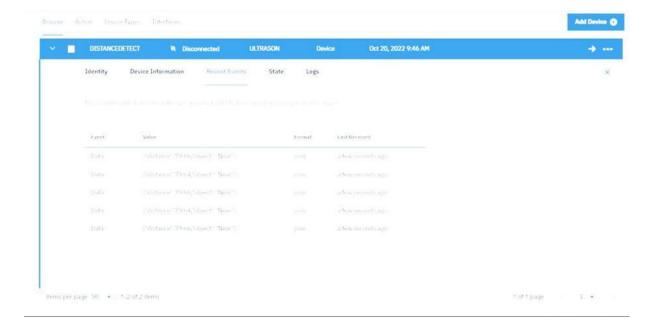
```
libraries.txt ●
                                            Library Manager *
sketch.ino •
                diagram.json
    92
    93
             initManagedDevice();
    94
             Serial.println();
    95
    96
         void wificonnect()//function defenition for wificonnect
    97
    98
    99
           Serial.println();
           Serial.print("Connecting to ");
WiFi.begin("Wokwi.GUEST", "",6);//PASSING THE WIFI CREDIDENTIALS TO ESTABLISH CONNECTION
   100
   101
           while (WiFi.status() !=WL_CONNECTED){
   102
             delay(500);
   103
             Serial.print(".");
   104
   105
           Serial.println("");
   106
           Serial.println("WiFi connected");
   107
           Serial.println("IP address");
   108
   109
           Serial.println(WiFi.localIP());
   110
         void initManagedDevice(){
   111
           if(client.subscribe(subscribetopic)){
   112
             Serial.println((subscribetopic));
   113
             Serial.println("subscribe to cmd OK");
   114
   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: ");
           Serial.println(subscribetopic);
   122
← → C  

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                                                                                                                日女
WOKWI

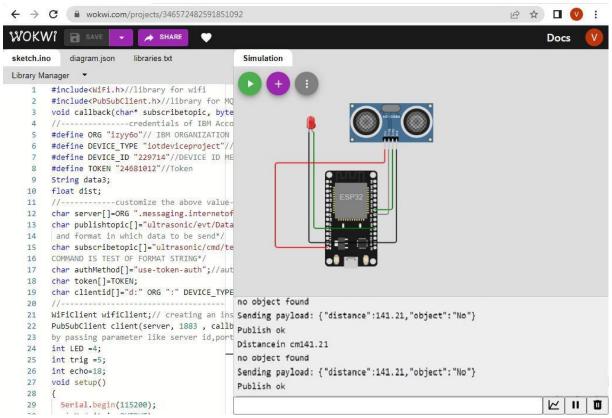
→ SHARE

            3 SAVE
sketch.ino •
                                            Library Manager •
               diagram.json
                              libraries.txt ●
           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="";
```

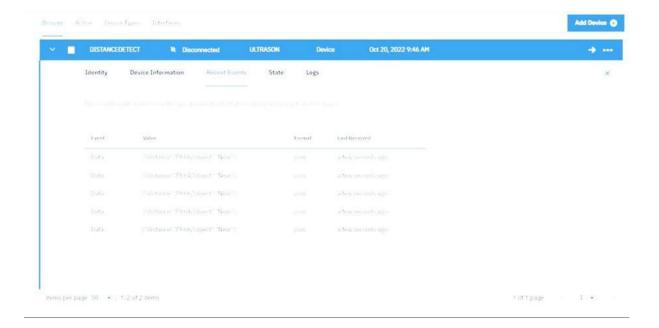
DATA IS SENT TO IBM CLOUD WHEN NO OBJECT IS DETECTED



When no object is detected



Data is sent to ibm cloud when object is detected



When object is detected in ultrasonic detector

