ASSIGNMENT - 4

Team ID	PNT2022TMID32810
Name	SMART SOLUTIONS FOR RAILWAY SYSTEMS -IOT
Team Leader Name	SUBIKSHAA
Team Members Name	RITHESWETHA, SUBAPREETHI, VASUNTHARA
Maximum Marks	2 Marks

QUESTION :

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.

CODE :

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

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


#define ORG "prbqrn"                              // IBM organisation id
#define DEVICE_TYPE "Ultrasonic"                 // Device type mentioned in ibm watson iot platform
#define DEVICE_ID "Assignment"                    // Device ID mentioned in ibm watson iot platform
#define TOKEN "6qL3DUu-zuo8yPl7tS"         // Token
#define speed 0.034
#define led 14 String
data3;
int LED = 4;

//--------------------------------- customise above values ---------------------------------------------------

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";     // server name
char publishTopic[] = "iot-2/evt/sreedhar/fmt/json";                      // topic name and type of event perform and format in which data
to be send
char topic[] = "iot-2/cmd/led/fmt/String";                                 // cmd Represent type and command is test format of strings
char authMethod[] = "use-token-auth";                                      // authentication method char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;     //Client id

//--------------------------------------------------------------------------------------------------------------

WiFiClient wifiClient;                                          // creating instance for wificlient
PubSubClient client(server, 1883, wifiClient);                 // calling the predefined client id by passing parameter like server id,port
and wifi credential

const int trigpin=5; 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();                                                                                // function call to connect to ibm
}
}

/* -------------------------------------------------retrieving to cloud----------------------------------------------------*/

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("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)
 {
  digitalWrite(LED,HIGH);
  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()))    // if data is uploaded to cloud successfully,prints publish ok else prints
publish failed
  {
   Serial.println("Publish OK");
  }

 }
  if(dist>100)
   {
    digitalWrite(LED,HIGH);
String   payload   =   "{\"Distance\":";
payload += dist;
    payload += "}";

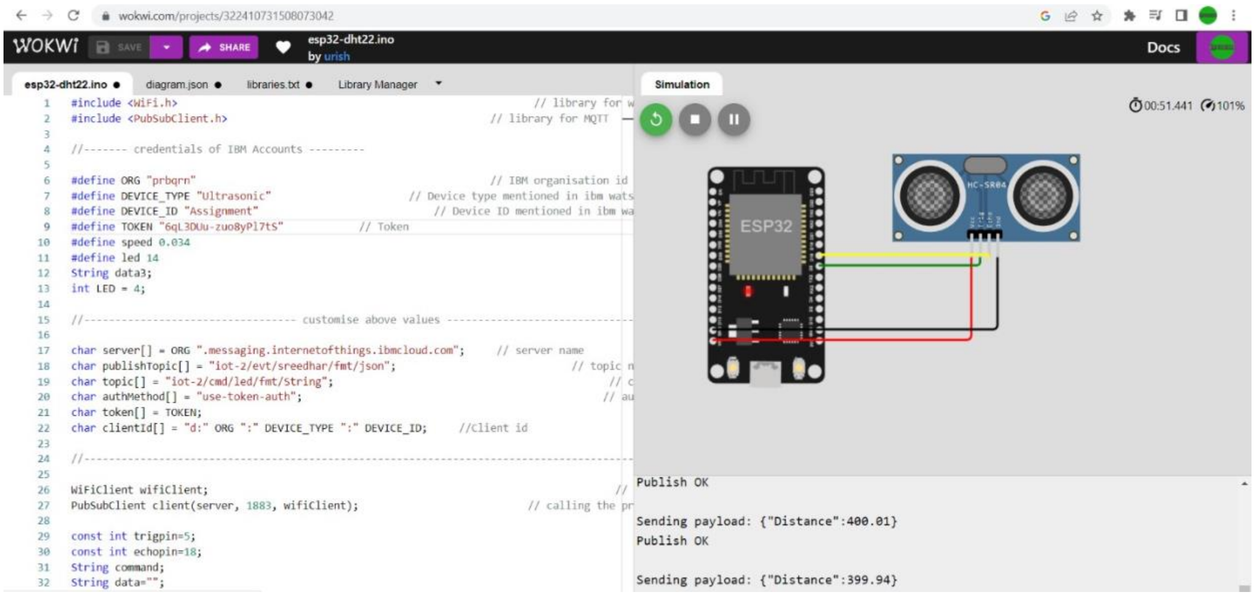
  Serial.print("\n");
  Serial.print("Sending             payload:             ");
Serial.println(payload);
  if(client.publish(publishTopic, (char*) payload.c_str()))
   {
   Serial.println("Publish OK");
   }
else
  {
   digitalWrite(LED,LOW);
   Serial.println("Publish FAILED");
  }

 }


 }
```

OUTPUT :

Code simulation on wokwi



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char topic[] = "iot-2/cmd/led/fmt/String";                                          // c
char authMethod[] = "use-token-auth";                                              // au
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;     //Client id

//------------------------------------------------------------------------------------

WiFiClient wifiClient;                                                            //
PubSubClient client(server, 1883, wifiClient);                      // calling the pr

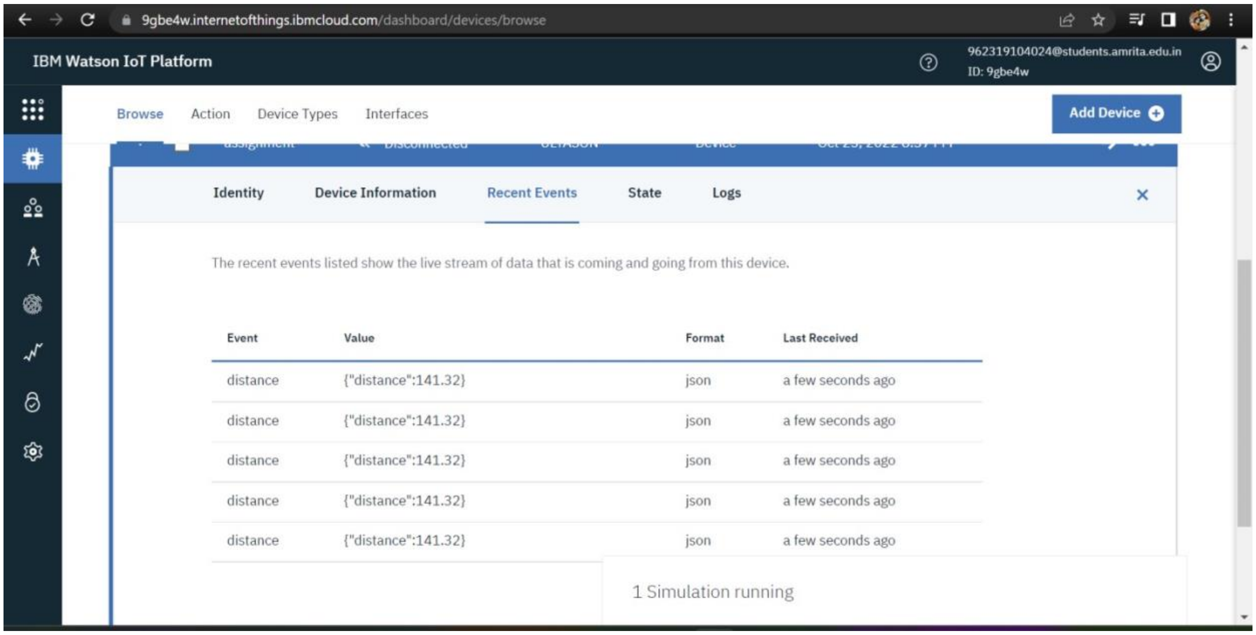
const int trigpin=5;
const int echopin=18;
String command;
String data="";
```

```
Publish OK

Sending payload: {"Distance":400.01}
Publish OK

Sending payload: {"Distance":399.94}
```

Data sent to IBM Cloud with distance



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

Event	Value	Format	Last Received
distance	{"distance":141.32}	json	a few seconds ago
distance	{"distance":141.32}	json	a few seconds ago
distance	{"distance":141.32}	json	a few seconds ago
distance	{"distance":141.32}	json	a few seconds ago
distance	{"distance":141.32}	json	a few seconds ago

1 Simulation running

Link : https://wokwi.com/projects/346676889639715411