TEAM ID	PNT2022TMID36755
Project name	IoT based smart crop protection system

ASSIGNMENT - 4

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 "rwazv5"              // IBM organisation id
#define DEVICE_TYPE "NodeRed" // Device type mentioned in ibm watson iot platform
#define DEVICE_ID "12345"      // Device ID mentioned in ibm watson iot platform
#define TOKEN "vC@S3TBre6(97jAOJ_"          // 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;
```

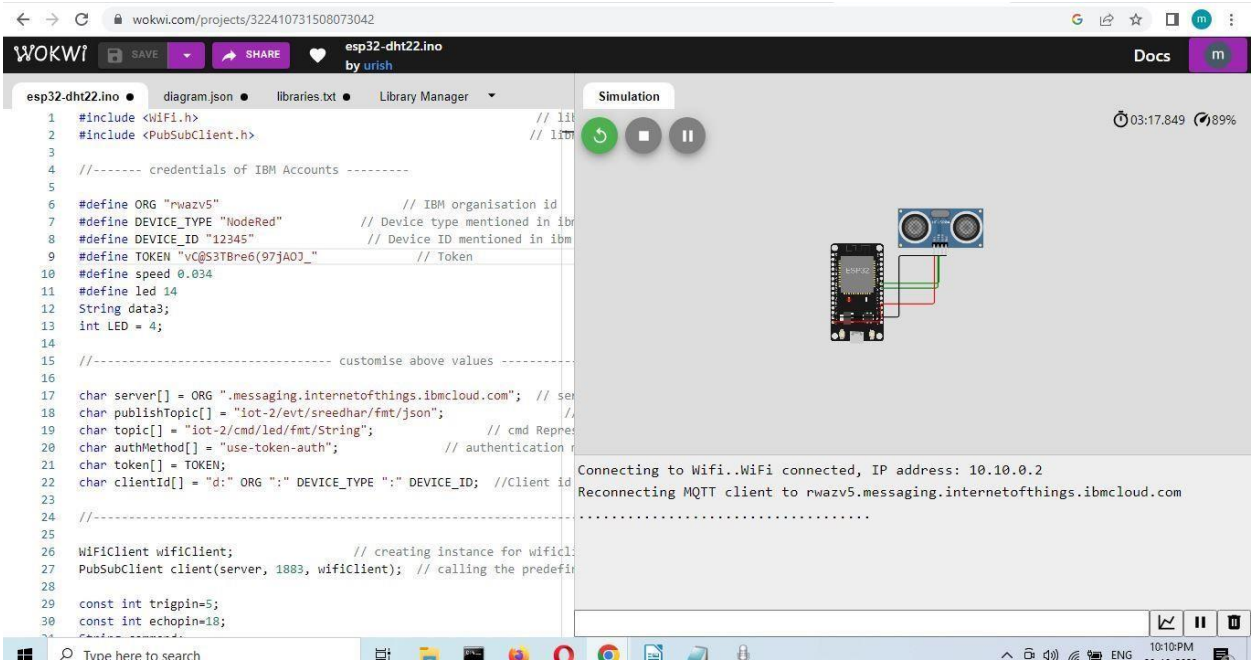
```
String command;
String data="";

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



Data sent to IBM Cloud with distance