Assignment -4
ESP32 Programming with IBM Cloud

Team ID	PNT2022TMID12798

Question-1:

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

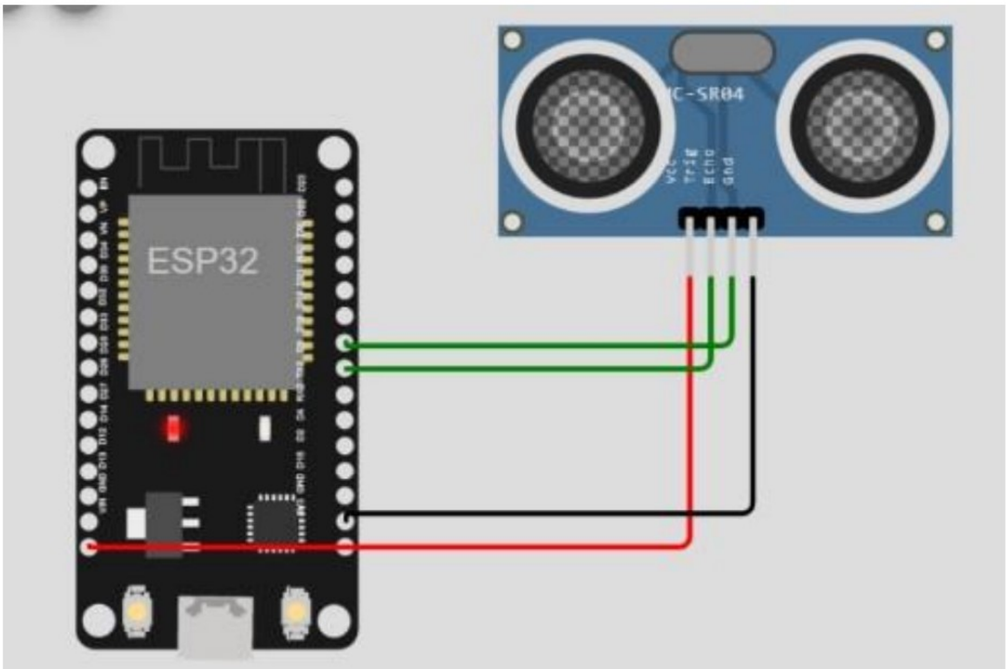
Upload document with wokwi share link and images of ibm cloud.

Solution:

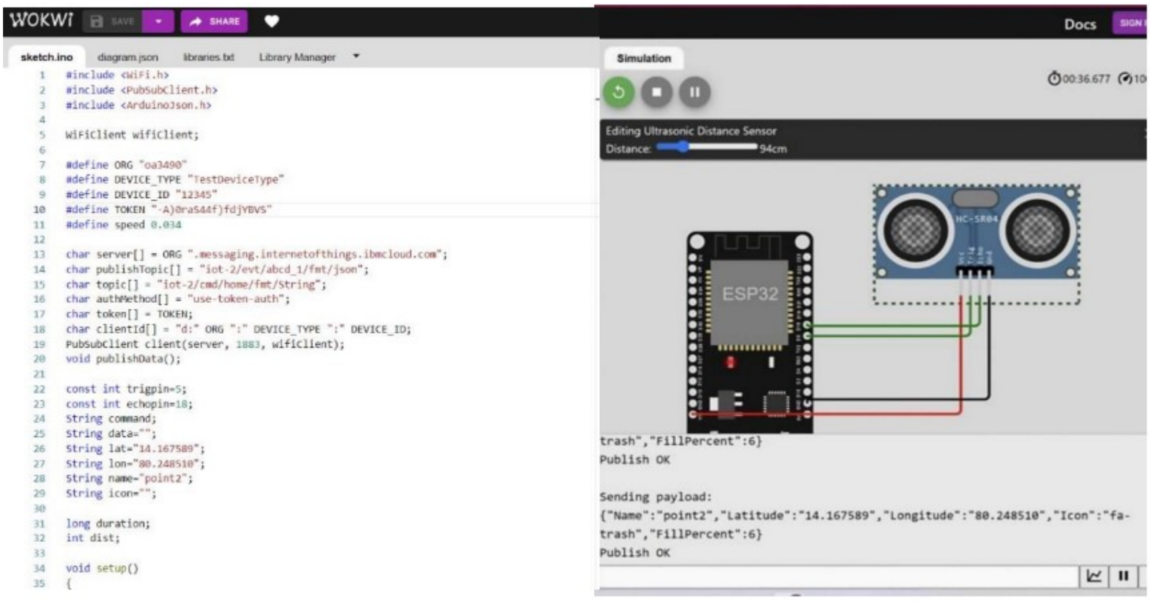
```
#include <WiFi.h>//library for wifi #include
 <PubSubClient.h>//library for MQtt


#define ECHO_GPIO 12
#define TRIGGER_GPIO 13
 #define MAX_DISTANCE_CM 100 // Maximum of 5 meters
 #include "Ultrasonic.h"


Ultrasonic ultrasonic(13, 12); int
 distance;


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


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


#define ORG "2melo1"//IBM ORGANITION ID
 #define DEVICE_TYPE "Kruthika"//Device type mentioned in ibm Watson IOT
 Platform
 #define DEVICE_ID "0405"//Device ID mentioned in ibm watson IOT
Platform #define TOKEN "12345678" //Token
String data3; float
 h, t;



//-------- 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/command/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
```

```
void setup()// configureing the ESP32 {

 Serial.begin(115200);
delay(10); Serial.println();
wificonnect(); mqttconnect();
}

void    loop()// Recursive Function
{

 distance = ultrasonic.read(CM);  if(distance
< 100){
 Serial.print("Distance in CM: ");
 Serial.println(distance);
PublishData(distance);
delay(1000); if
(!client.loop()) {
      mqttconnect();
  }

  }

  delay(1000);

}

/*..................................retrieving  to  Cloud..............................................................................*/

void    PublishData(float temp)
{ mqttconnect();//function call for connecting to
ibm
 /*  creating the String in in form JSon to update the data to ibm cloud
 */
 String payload = "{\"Alert Distance:\":";  payload
+= temp;
  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];
 }
 Serial.println("data: "+ data3);
if(data3=="lighton") {
Serial .println(data3);
 } else
 {
Serial .println(data3);
 }
data3= "";
}
```



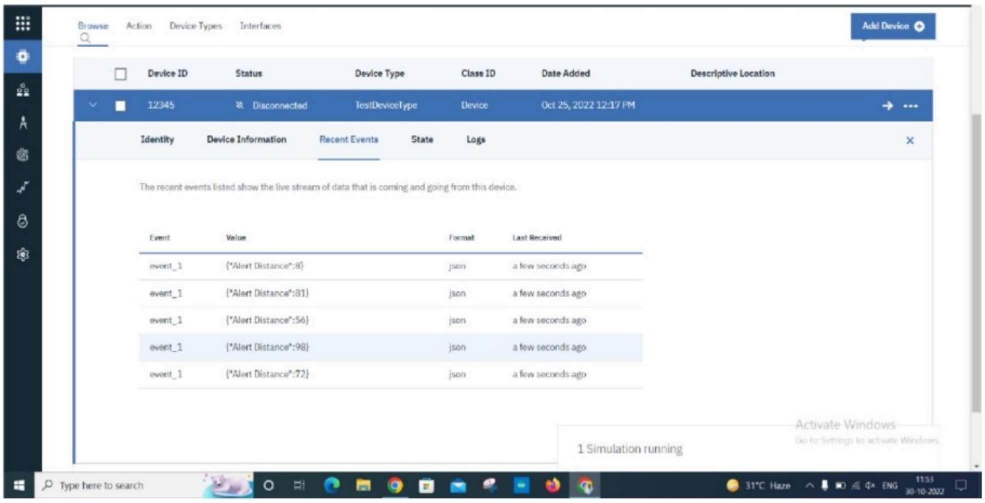
OUTPUT:



```
#include <WiFi.h>
#include <PubSubClient.h>
#include <ArduinoJson.h>

WiFiClient wifiClient;

#define ORG "oa3490"
#define DEVICE_TYPE "TestDeviceType"
#define DEVICE_ID "12345"
#define TOKEN "-A)0raS44f)fdjYBVS"
#define speed 0.034

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/abcd_1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
PubSubClient client(server, 1883, wifiClient);
void publishData();

const int trigpin=5;
const int echopin=18;
String command;
String data="";
String lat="14.167589";
String lon="80.248510";
String name="point2";
String icon="";

long duration;
int dist;

void setup()
{
```

```
trash","FillPercent":6}
Publish OK

Sending payload:
{"Name":"point2","Latitude":"14.167589","Longitude":"80.248510","Icon":"fa-
trash","FillPercent":6}
Publish OK
```

Output(IBM Cloud):



□	Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
□	12345	Disconnected	TestDeviceType	Device	Oct 25, 2022 12:17 PM	

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

Event	Value	Format	Last Received
event_1	{"Alert Distance":8}	json	a few seconds ago
event_1	{"Alert Distance":81}	json	a few seconds ago
event_1	{"Alert Distance":56}	json	a few seconds ago
event_1	{"Alert Distance":98}	json	a few seconds ago
event_1	{"Alert Distance":72}	json	a few seconds ago

1 Simulation running