ASSIGNMENT 4

Date	**25 October 2022**
Team ID	**PNT2022TMID06145**
Project Name	Real Time River water quality monitoring and Control system
Maximum Marks	**4 Mark**

Project Title: Real Time River water quality monitoring and Control system

Team Members:

1. **Hari Raama Krishnan S- Team Leader**
2. **Saran R-Team Member**
3. **Parthasarathi S- Team Member**
4. **Sasikumar M– Team Member**
5. **Mohamed Alla Pitchai M- Team Member**

QUESTION:

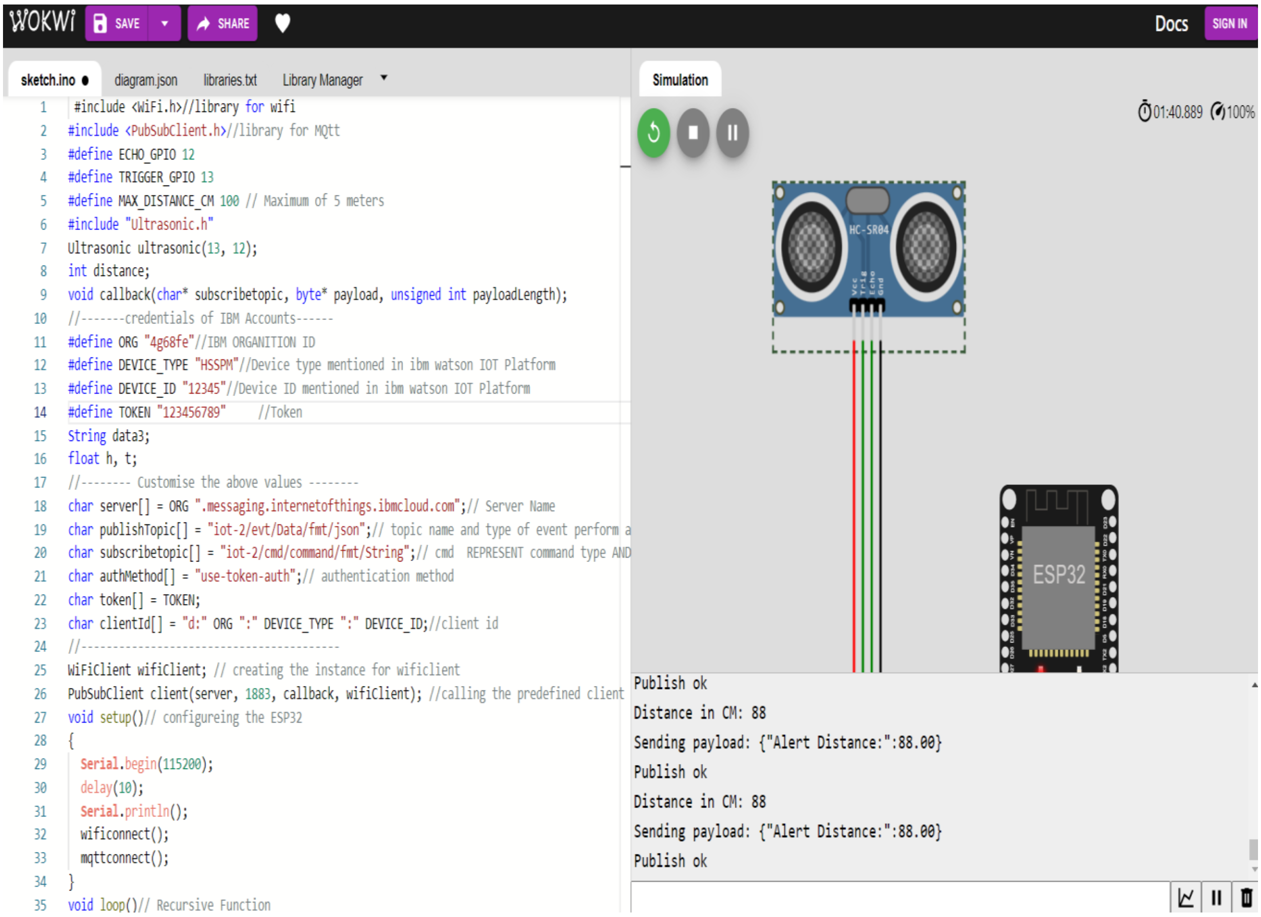
Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cms send "alert" to ibm cloud and display in device recent events.

CODE:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#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 "4g68fe"//IBM ORGANITION ID
#define DEVICE_TYPE "HSSPM"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "123456789"     //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 = "";
}
```

SCHEMATIC/CIRCUIT DIAGRAM:



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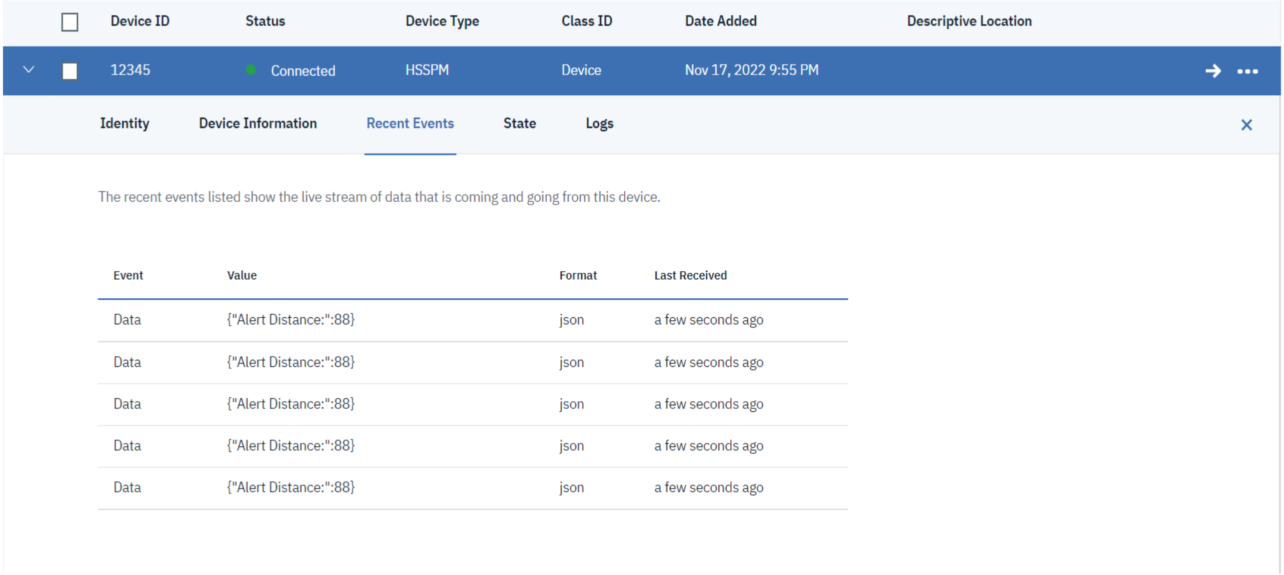
```

```
Publish ok
Distance in CM: 88
Sending payload: {"Alert Distance:":88.00}
Publish ok
Distance in CM: 88
Sending payload: {"Alert Distance:":88.00}
Publish ok
```

IBM CLOUD OUTPUT:



□	Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
□	12345	● Connected	HSSPM	Device	Nov 17, 2022 9:55 PM	

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

Event	Value	Format	Last Received
Data	{"Alert Distance:":88}	json	a few seconds ago
Data	{"Alert Distance:":88}	json	a few seconds ago
Data	{"Alert Distance:":88}	json	a few seconds ago
Data	{"Alert Distance:":88}	json	a few seconds ago
Data	{"Alert Distance:":88}	json	a few seconds ago

WOKWI LINK:
https://wokwi.com/projects/348593019726856787