ASSIGNMENT 4

Date	18 October 2022
Team ID	PNT2022TMID19515
Project Name	Project – Real time river water quality monitoring and Control System
Maximum Marks	4 Marks

Project Title : Real-Time River Water Quality Monitoring And Control

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Team ID: PNT2022TMID19515

Team Members:

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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.

ANSWER:

https://wokwi.com/projects/346293039536276051

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

#include <PubSubClient.h>//library for MQtt



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

```
#define ORG "dymr4l"//IBM ORGANITION ID

#define DEVICE_TYPE "NodeMCU"

#define DEVICE_ID "2004" //Device ID mentioned in ibm watson IOT Platform

#define TOKEN "Nirmal@2002" //Token
```

```cpp
String data3;

float dist;
```

```cpp
char server[] = "dymr4l.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/test/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
```

```cpp
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
```

```cpp
int LED = 4;

int trig = 5;

int echo = 18;
```

```cpp
void setup()

{

Serial.begin(115200);

pinMode(trig, OUTPUT);

pinMode(echo, INPUT) ;

pinMode(LED, OUTPUT);

delay(10);

wificonnect();

mqttconnect();
```

```arduino
}

void loop()// Recursive Function

{

digitalWrite(trig, LOW) ;

digitalWrite(trig,HIGH);

delayMicroseconds(10);

digitalWrite(trig, LOW) ;

float duration = pulseIn(echo,HIGH) ;

float distance = (duration * 0.0343)/2;

Serial.print("Distancein cm");

Serial.println(distance);

PublishData(distance);

delay(1000);

if(!client.loop()) {

mqttconnect();

}

}

void PublishData(float distance)

{

mqttconnect();//function call for

String object;

if(distance < 100)

{

digitalWrite(LED,HIGH);
```

```
Serial.println("object is near");

object = "Near";

}

else

{

digitalWrite(LED, LOW) ;

Serial.println("no object found");

object = "No";

}
```

```
String payload = "{\"distance\":";

payload += distance;

payload += "," "\"object\":";

payload += object;

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");

}
```

```
}
```

```cpp
void mqttconnect() {

if (!client.connected()) {

Serial.print("Reconnecting client to ");

Serial.println(server);

while (!!!client.connect(clientId, authMethod, token)) {

Serial.print(".");

delay(500);

}
```

```cpp
initManagedDevice();

Serial.println();

}

}
```

```cpp
void wificonnect() //function defination for wificonnect

{

Serial.println();

Serial.print("Connecting to ");
```
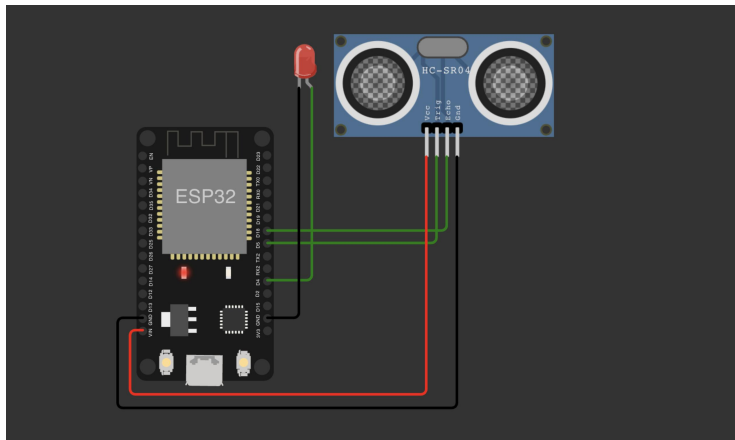
```cpp
WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection

while (WiFi.status() != WL_CONNECTED) {

delay(500);

Serial.print(".");

}

Serial.println("");

Serial.println("WiFi connected");

Serial.println("IP address: ");
```

```cpp
Serial.println(WiFi.localIP());

}
```

```cpp
void initManagedDevice() {

if (client.subscribe(subscribetopic)) {

Serial.println((subscribetopic));

Serial.println("subscribe to cmd OK");

} else {

Serial.println("subscribe to cmd FAILED");

}

}
```
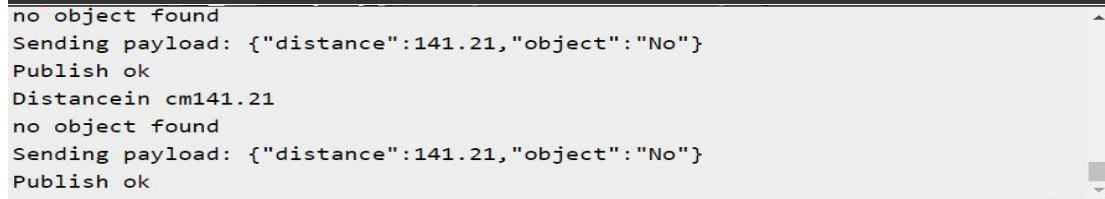
```cpp
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)

{

Serial.print("callback invoked for topic: ");

Serial.println(subscribetopic);

for (int i = 0; i < payloadLength; i++) {

data3 += (char)payload[i];

}

Serial.println("data: "+ data3);

data3="";

}
```
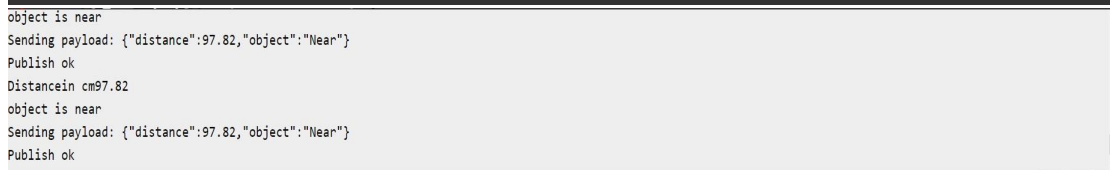
CIRCUIT:

OUTPUT:

When object is near:-

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

Browse	Action	Device Types	Interfaces		Add Device ⊕

| ⌄ ■ | DISCANCEDETECT | ⍃ Disconnected | ULTRASON | Device | Oct 20, 2022 9:46 AM | → ⋯ |

| Identity | Device Information | Recent Events | State | Logs | ✕ |

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

Event	Value	Format	Last Received
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

When object is far:-

```
ensor
53cm
```

```
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distancein cm97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
```

Browse   Action   Device Types   Interfaces   Add Device

| DISTANCEDETECT | Disconnected | ULTRASON | Device | Oct 20, 2022 9:46 AM |

Identity   Device Information   Recent Events   State   Logs

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

Event	Value	Format	Last Received
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago