

ASSIGNMENT – 4

Ultrasonic sensor simulation in Wokwi

Date	10 November 2022
Team ID	PNT2022TMID31597
Project Name	Real-Time River Water Quality Monitoring and Control System.
Maximum Marks	2 Marks

QUESTIONS:

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

CODE:

```
#include <WiFi.h> #include
<PubSubClient.h>
void callback(char* subscribtopic, byte* payload, unsigned int payloadLength);
//-----credentials of IBM Accounts-----
#define ORG "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678" //Token
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json"; char
subscribtopic[] = "iot-2/cmd/test/fmt/String"; char authMethod[]
= "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 5; const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
void setup() {
Serial.begin(1
15200);
pinMode(trigP
```

```

in, OUTPUT);
pinMode(echo
Pin, INPUT);
wificonnect(); mqttconnect();
} void
loop() {
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW); duration =
pulseIn(echoPin, HIGH); distance =
duration * SOUND_SPEED/2;
Serial.print("Distance (cm): ");
Serial.println(distance); if(distance<100)
{
Serial.println("ALERT!!");
delay(1000);
PublishData(distance);
delay(1000); if
(!client.loop()) {
mqttconnect();
} }
delay(1000);
}
void PublishData(float dist) { mqttconnect();
String payload = "{\"Distance\":\""; payload
+= dist;
payload += "\",\"ALERT!!\":\"\"Distance less than 100cms\""; payload
+= "\"}";
Serial.print("Sending payload: ");
Serial.println(payload);

if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish ok");
} else {
Serial.println("Publish failed");
} } void mqttconnect() {
if (!client.connected()) {
Serial.print("Reconnecti
ng client to ");
Serial.println(server);
while (!client.connect(clientId, authMethod, token)) {
Serial.print("."); delay(500);
}
initManagedDevice();
Serial.println();

```

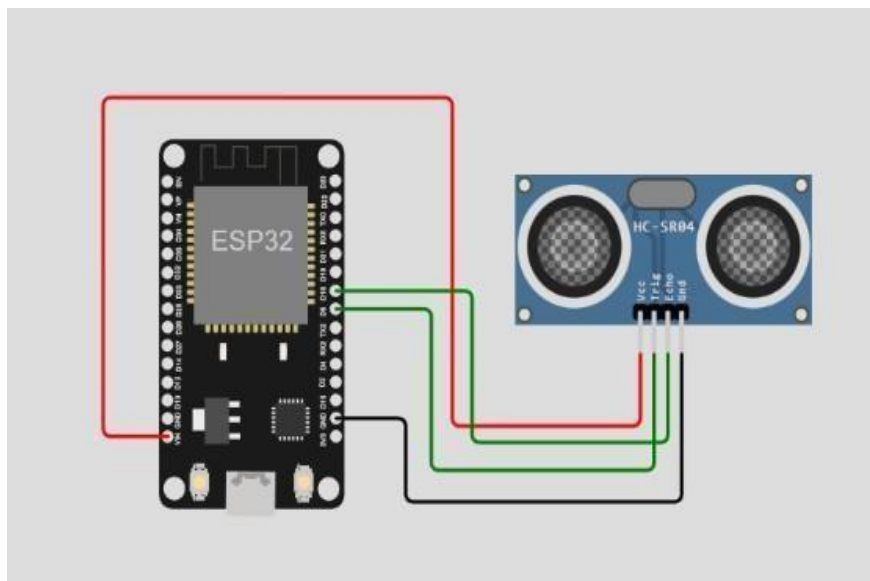
```

} }
void wificonnect()
{
  Serial.println();
  Serial.print("Connecting      to      ");
  WiFi.begin("Wokwi-GUEST", "", 6); 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);
  data3="";
}
.json CODE:

```

```
sketch.ino  diagram.json  libraries.txt  Library Manager  ▼
1  {
2    "version": 1,
3    "author": "sweetysharon",
4    "editor": "wokwi",
5    "parts": [
6      { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {} },
7      { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }
8    ],
9    "connections": [
10     [ "esp:TX0", "$serialMonitor:RX", "", [] ],
11     [ "esp:RX0", "$serialMonitor:TX", "", [] ],
12     [
13       "esp:VIN",
14       "ultrasonic1:VCC",
15       "red",
16       [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]
17     ],
18     [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],
19     [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
20     [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
21   ]
22 }
```

CIRCUIT DIAGRAM:

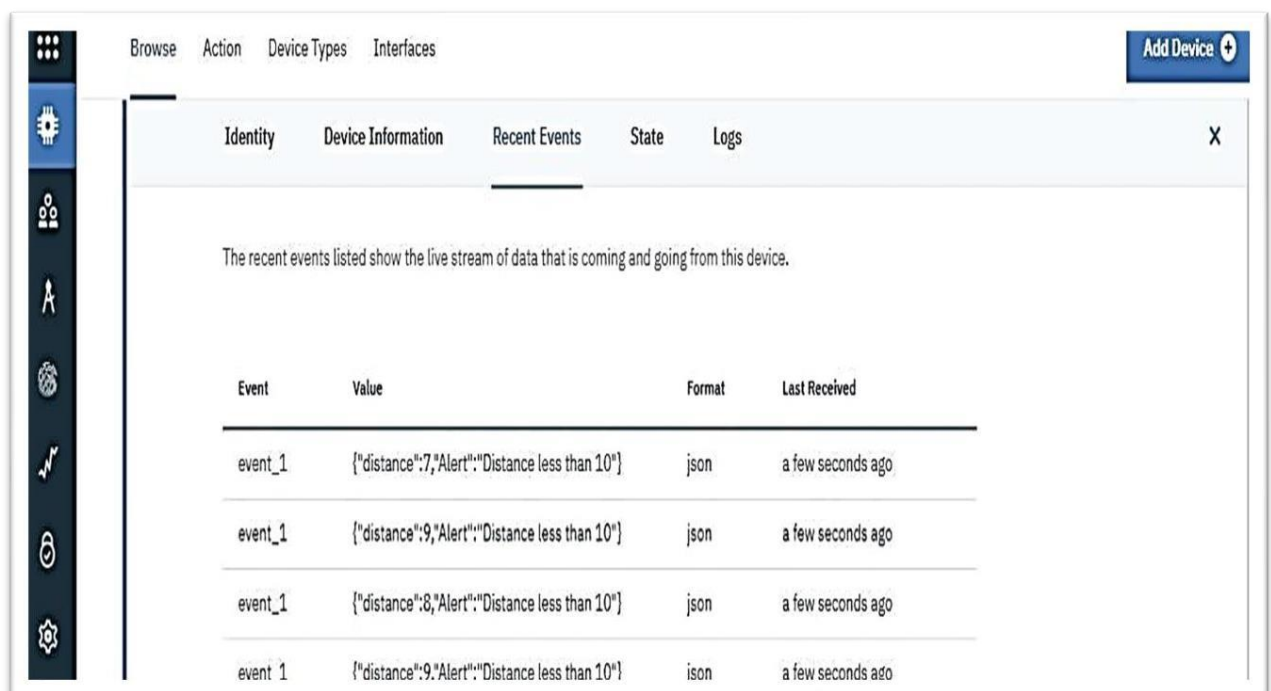


WOKWI OUTPUT:

```
Connecting to ....
WiFi connected
IP address:
10.10.0.2
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK

Distance (cm): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

IBM CLOUD OUTPUT:



The screenshot shows the IBM Cloud IoT Platform console. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A sidebar on the left contains icons for various functions. The main content area is titled 'Recent Events' and displays a table of live data streams.

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	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event 1	{"distance":9,"Alert":"Distance less than 10"}	ison	a few seconds ago