**ASSIGNMENT- 4**

**Ultrasonic sensor simulation in Wokwi**

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| --- | --- |
| **Date** | **29 October2022** |
| **Team ID** | **PNT2022TMID41871** |
| **project** | **Real time river water quality monitoring and control system** |
| **Maximum Marks** | **2Marks** |

**Question-1:**

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

#include <WiFi.h> #include <PubSubClient.h> void callback(char\* subscribetopic, 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 subscribetopic[] = "iot-2/cmd/test/fmt/String";

char authMethod[] = "use-token-auth";

char token[]=TOKEN;

char clientId[] = "d:" ORG ":" DEVICE\_TYPE ":" DEVICE\_ID;

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(115200); pinMode(trigPin, OUTPUT); pinMode(echoPin, 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

**Serial**.print("Reconnecting client to ");

**Serial**.println(server);

PublishDat a(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("Reconnecting 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) { d

elay(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="";

}

**Diagram. json:**

{

"version": 1,

"author": "Aravind",

"editor": "wokwi",

"parts": [

{ "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67, "attrs": {} },

{ "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17, "attrs": {} }

],

"connections": [

[ "esp:TX0", "$serialMonitor:RX", "", [] ],

[ "esp:RX0", "$serialMonitor:TX", "", [] ],

[

"esp:VIN",

"ultrasonic1:VCC",

"red",

[ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]

],

[ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],

[ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],

[ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]

]

}

# **OUTPUT**:

Data send to the IBM cloud device when the object is far:



Data sent to the IBM Cloud Device when the object is near:



# When object is near to the ultrasonic sensor:

# 