ASSIGNMENT 4

Ultrasonic sensor simulation in Wokwi

TEAM ID	PNT2022TMID25027
PROJECT NAME	Real time River water quality monitoring and control system

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.

Code:

```
#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 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;
```

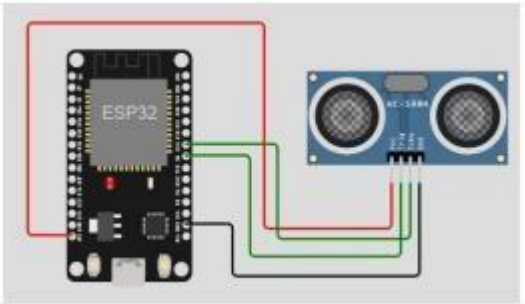
```
Serial.print("Distance (cm): ");
Serial.println(distance);
if(distance<100)
{
Serial.println("ALERT!!");
delay(1000);PublishData(distance);
delay(1000); if (!client.loop())
{ mqttconnect(); } } delay(1000);
}
void PublishData(float dist)
{ mqttconnect();
String payload = "{\"Distance\":";
payload += 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("Reconnecting client to "); Serial.println(server);
while (!!!client.connect(clientId, authMethod, token)) {
Serial.print(".");
delay(500); }initManagedDevic
e();
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="";
}
```

Diagram.json:

```
{
"version": 1,
"author": "sweetysharon",
"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" ] ]]
}
```

Circuit Diagram:



Output:

Wokwi output:

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

Distance (cm): 399.93
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.93
Distance (cm): 399.94
```