ASSIGNMENT – 4
Ultrasonic sensor simulation in Wokwi

Date	16 October 2022
Team ID	PNT2022TMID52558
Project Name	Signs with smart connectivity for better road safety

Question:
Write code and connections in Wowki for ultrasonic sensor. Whenever distance is less than 100cms send “alert” to IBM cloud and display in device recent events.

Program Code:

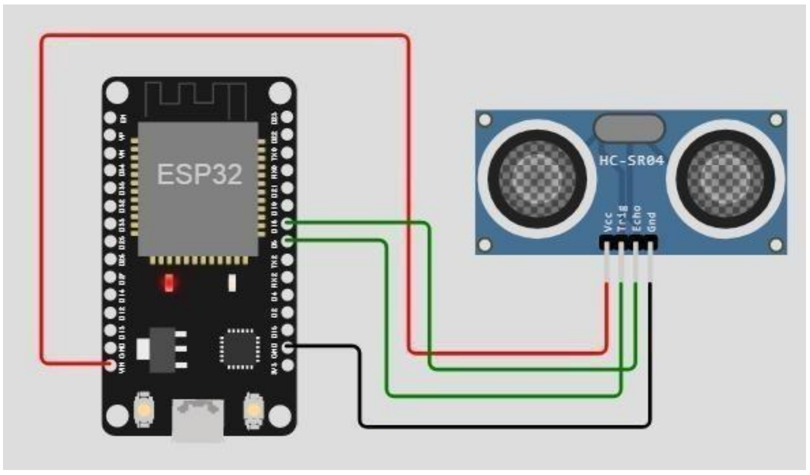
```
#include <WiFi.h>//library for wifi

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

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

\

//-------credentials of IBM Accounts------

#define ORG "xdhbdo"//IBM ORGANITION ID

#define DEVICE_TYPE "sulana_4"//Device type mentioned in ibm watson IOT Platform#define

DEVICE_ID "5678"//Device ID mentioned in ibm watson IOT Platform

#define TOKEN "PF32(1uMuVfTcLC7)h" //Token

String data3;

//-------- Customise the above values --------

charserver[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name

char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform

andformat in

which data to be send

char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd REPRESENT commandtype

AND

COMMAND IS TEST OF FORMAT STRING

char authMethod[] = "use-token-auth";// authentication methodchar 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
bypassing
parameter like server id,portand wificredential
const int trigpin = 5;
const int echopin = 18;
const int ledpin = 2;
long duration ;
float distance;
#define sound_speed 0.034
void setup() {
// put your setup code here, to run once:
Serial.begin(115200);
pinMode(trigpin, OUTPUT);
pinMode(echopin, OUTPUT);
pinMode(ledpin, OUTPUT);
wificonnect(); mqttconnect();
}
void loop() {
digitalWrite(trigpin, LOW);
digitalWrite(trigpin, HIGH);
delayMicroseconds(10);
digitalWrite(trigpin, LOW);
duration= pulseIn(echopin,HIGH);
distance = duration * sound_speed /2;
if(distance<=100){
PublishData(distance);
delay(1000);
if (!client.loop()) {
mqttconnect();
}
digitalWrite(ledpin, HIGH);
```

```
Serial.println("ALERT
....................................... !!!")
;
Serial.println(distance);
}
else
{
digitalWrite(ledpin, LOW);
}
// put your main code here, to run repeatedly:
delay(10); // this speeds up the simulation
}
/*.....................................retrieving to Cloud.....................................*/
void PublishData(float distance) { mqttconnect();//function call
for connecting to ibm
// creating the String in in form JSon to update the data to ibm cloudString payload
= "{\"ALERT...!! \": ";
payload += distance;
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 printpublish
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");
}
```

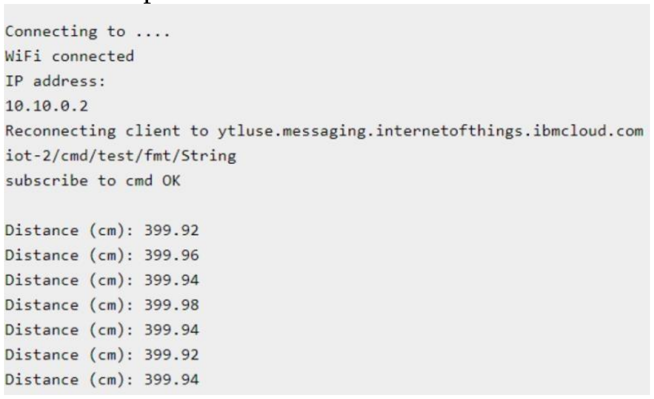
```
}
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
Serial.print("callback invoked for topic: ");
Serial.println(subscribetopic);
for (int i = 0; i < payloadLength; i++) {
//Serial.print((char)payload[i]); data3
+= (char)payload[i];
}
Serial.println("data: "+ data3);
if(data3=="lighton")
{
Serial.println(data3);
}
else
{
Serial.println(data3);
}
data3="";
}
```

Circuit Diagram:



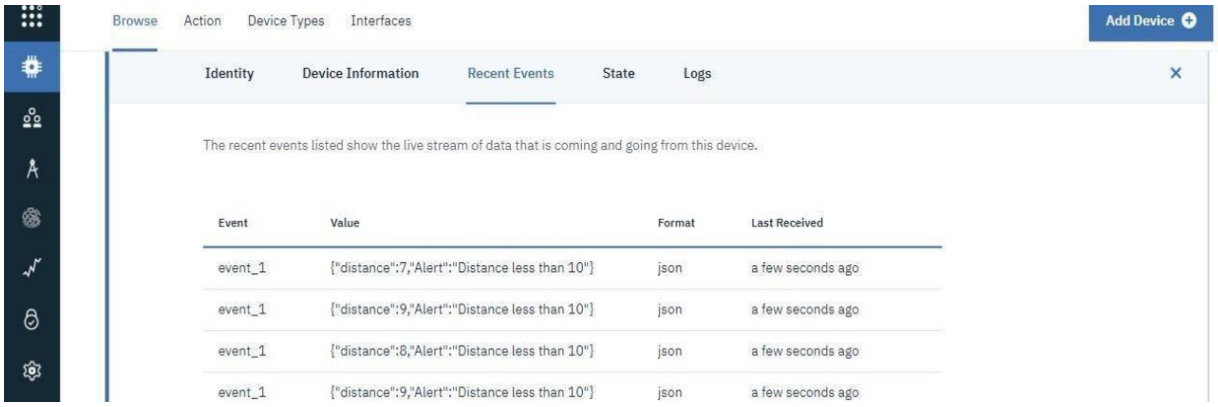
Output:

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 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"}	json	a few seconds ago