

Assignment - 4
ESP 32 – Ultrasonic Sensor

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| Assignment Date | 31 October 2022 |
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| Student Roll Number | 611219106027 |
| Maximum Marks | 2 Marks |

Question-1:

Write code and Connection in wokwi for ultrasonic sensor

Solution:

Project:

```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701
long duration;
float distanceCm;
float distanceInch;

void callback(char* subscribtopic, byte* payload, unsigned int payloadLength);
//-----credentials of IBM Accounts-----

#define ORG "8cz1ls"//IBM ORGANITION ID
#define DEVICE_TYPE "assign4"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "assign4"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "SKJMA9dGIyoV@_nTG-" //Token
String data3;

//----- Customise the above values -----
char server[] = ORG ".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 subscribtopic[] = "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

WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient);
```

```

void setup() {
    Serial.begin(115200); // Starts the serial communication
    pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
    pinMode(echoPin, INPUT); // Sets the echoPin as an Input
    Serial.println();
    wificonnect();
    mqttconnect();
}

void loop() {
    // Clears the trigPin
    digitalWrite(trigPin, LOW);
    delayMicroseconds(2);
    // Sets the trigPin on HIGH state for 10 micro seconds
    digitalWrite(trigPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin, LOW);

    // Reads the echoPin, returns the sound wave travel time in microseconds
    duration = pulseIn(echoPin, HIGH);

    // Calculate the distance
    distanceCm = duration * SOUND_SPEED/2;

    // Convert to inches
    distanceInch = distanceCm * CM_TO_INCH;

    // Prints the distance in the Serial Monitor
    Serial.print("Distance (cm): ");
    Serial.println(distanceCm);
    Serial.print("Distance (inch): ");
    Serial.println(distanceInch);

    PublishData(distanceCm);
    delay(1000);
    if (!client.loop()) {
        mqttconnect();
    }
}

void PublishData(float Cm) {
    mqttconnect();//function call for connecting to ibm
    /*
        creating the String in in form JSON to update the data to ibm cloud
    */
    String payload = "{\"Distance (cm)\":";
    payload += Cm;
    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");
}

}

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)
{

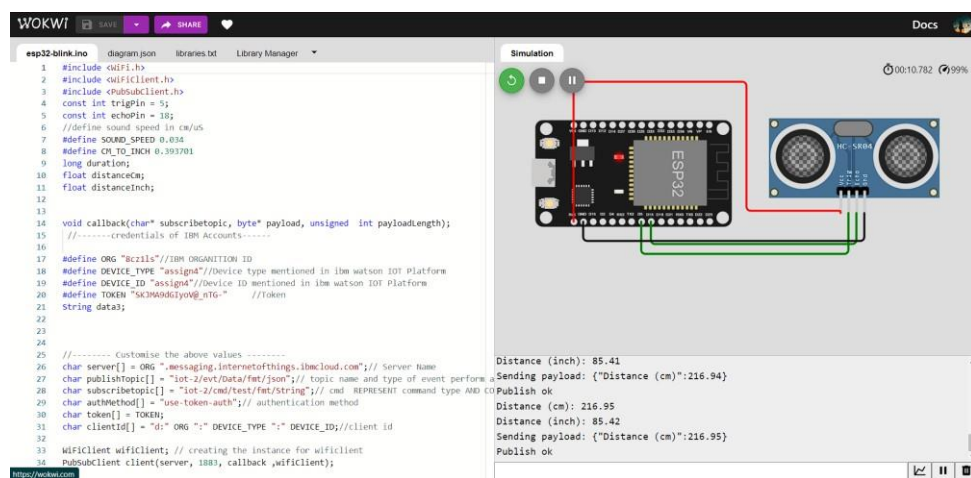
```

```

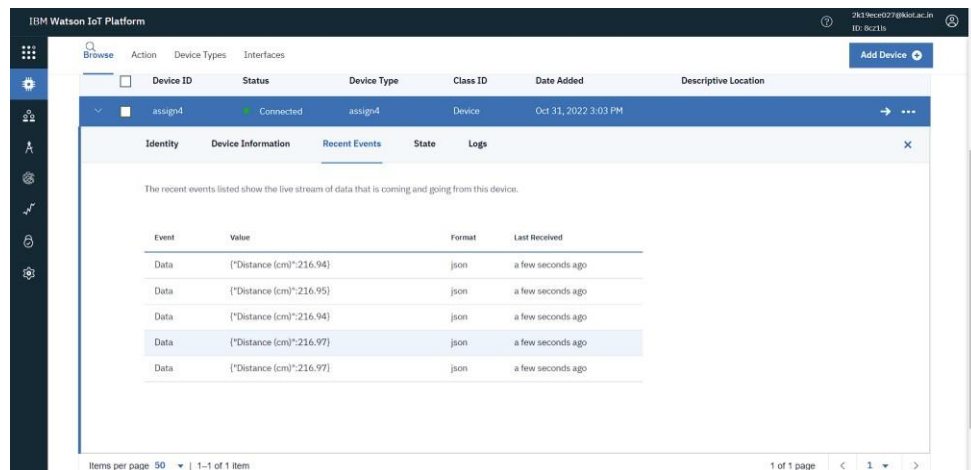
Serial.print("callback invoked for topic: ");
Serial.println(subscribetopic);
for (int i = 0; i < payloadLength; i++) {
  //Serial.print((char)payload[i]);
  data3 += (char)payload[i];
}
}
}

```

Wokwi Simulation:



IoT Watson Platform:



Wokwi Project Link: <https://wokwi.com/projects/347026268483486290>