Assignment - 4

ESP 32 – Ultrasonic Sensor

Assignment Date	01 November 2022
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Maximum Marks	2 Marks

Question-1:

Write code and Connection in wokwi for ultrasonic sensor.

Solution:

Program:

```
#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* subscribetopic, byte*
payload, unsigned  int payloadLength);
 //-------credentials of IBM Accounts------

#define ORG "7dtxr4"//IBM ORGANITION ID
#define DEVICE_TYPE "monish"//Device type
mentioned in ibm watson IOT Platform
#define DEVICE_ID "monish123"//Device ID
mentioned in ibm watson IOT Platform
#define TOKEN "e)oFR*RTNM*NHbe2IM"
//Token
String data3;



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

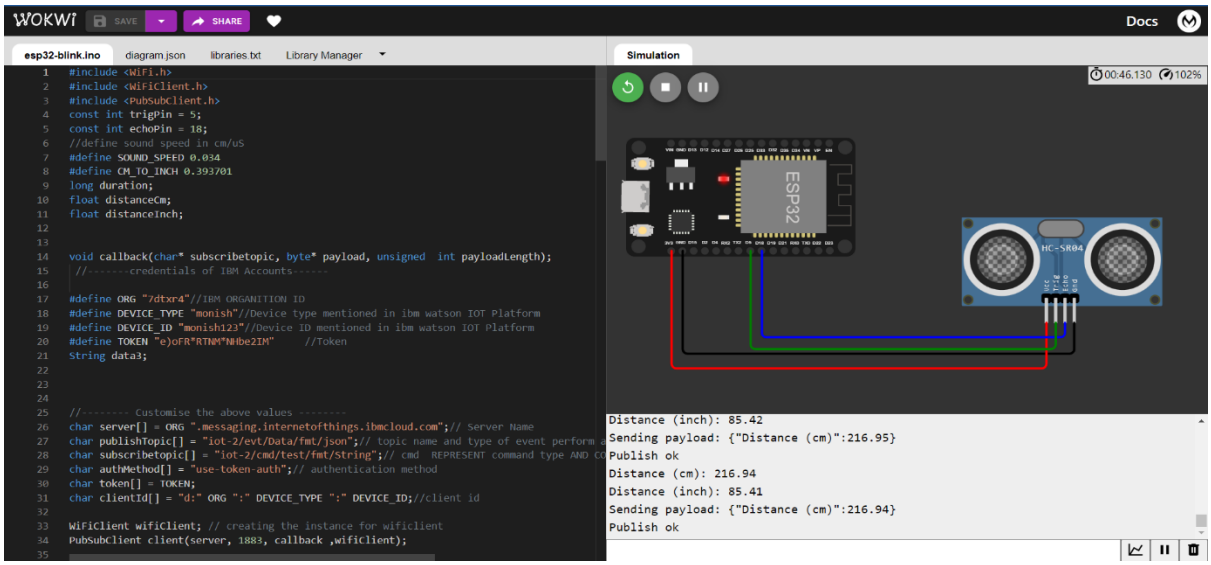
```
char server[] = ORG
".messaging.internetofthings.ibmcloud.com";//
Server Name
char publishTopic[] = "iot-
2/evt/Data/fmt/json";// topic name and type
of event perform and format in which data to
be send
char subscribetopic[] = "iot-
2/cmd/test/fmt/String";// cmd  REPRESENT
command type AND COMMAND 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 {
```

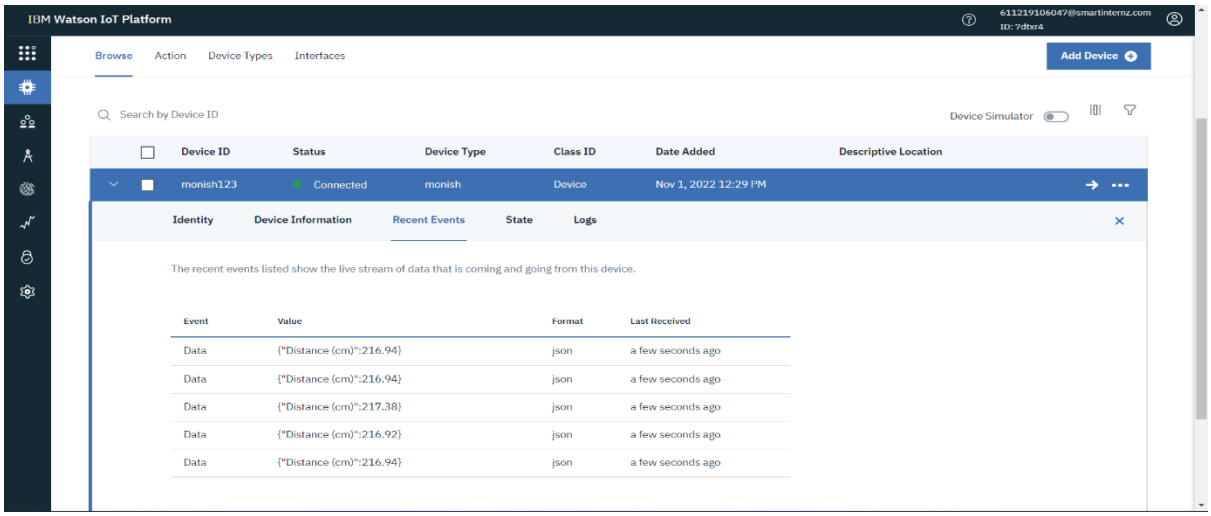
```
    Serial.println("Publish failed");
  }

}
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/347113256143290963