ASSIGNMENT – 4

ULTRASONIC SENSOR SIMULATION IN WOKWI AND IBM CLOUD

Assignment Date	22 October 2022
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Maximum Marks	2 Marks

QUESTION:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cm send an “alert” to the 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);

#define ORG "i8xseg"

#define DEVICE_TYPE "ESP"

#define DEVICE_ID "2679"

#define TOKEN "9688811163"

String data3;


char server[]= ORG ".messaging.internetofthings.ibmcloud.com";

char publishTopic[]="iot-2/evt/distance/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);

#define ECHO_PIN 14
#define TRIG_PIN 12
#define led 27

void setup() {
  // put your setup code here, to run once:
  Serial.begin(115200);
  pinMode(led, OUTPUT);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
  wificonnect();
  mqttconnect();
}
float readDistanceCM() {
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  int duration=random(1,200);
  //Serial.println(duration);
  //duration = pulseIn(ECHO_PIN, HIGH);
  return duration ;
  //Serial.println(duration);

}
```

```
void loop() {
  float distance = readDistanceCM();
  //Serial.println(distance);

  bool isNearby = distance < 100;
  digitalWrite(led, isNearby);

  Serial.print("Measured distance: ");
  Serial.println(distance);
  if(distance<100){
    PublishData2(distance);

  }else{
    PublishData1(distance);

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

  //delay(2000);
}
void PublishData1(float dist){
  mqttconnect();
  String payload= "{\"distance\":";
  payload += dist;
  payload+="}";

  Serial.print("Sending payload:");
```

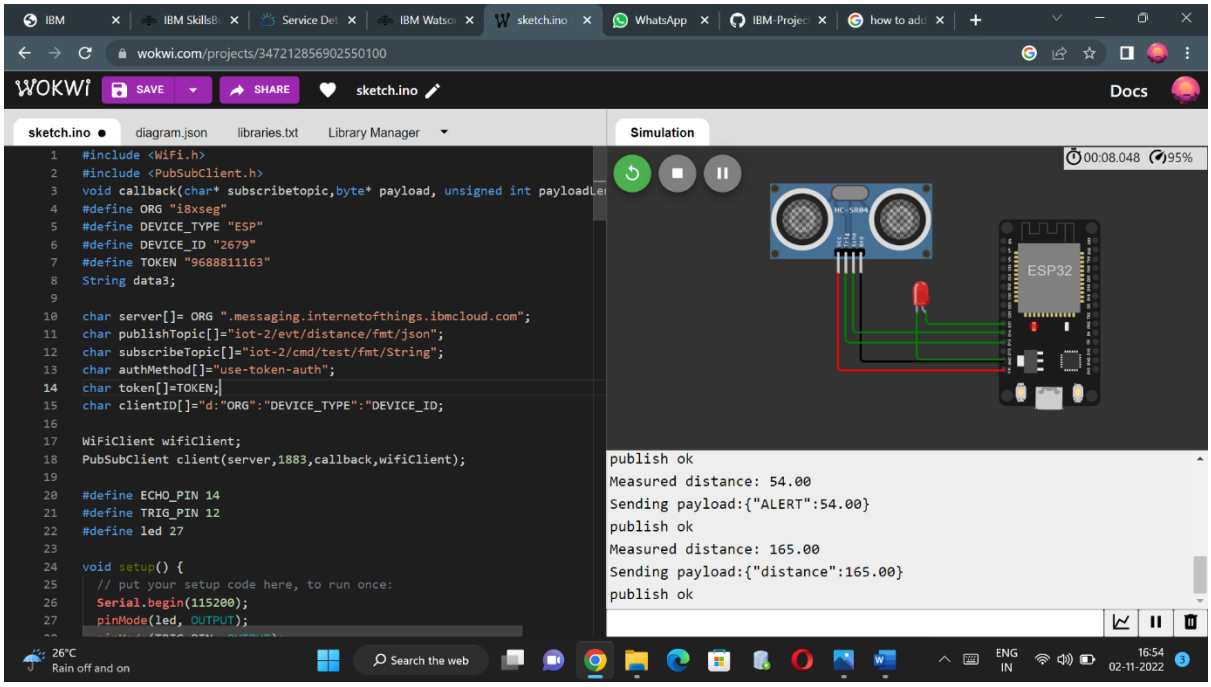
```
  Serial.println(payload);


  if(client.publish(publishTopic,(char*)payload.c_str())){
    Serial.println("publish ok");
  } else{
    Serial.println("publish failed");
  }
}
void PublishData2(float dist){
  mqttconnect();
  String payload= "{\"ALERT\":";
  payload += dist;
  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 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){
    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:");
```

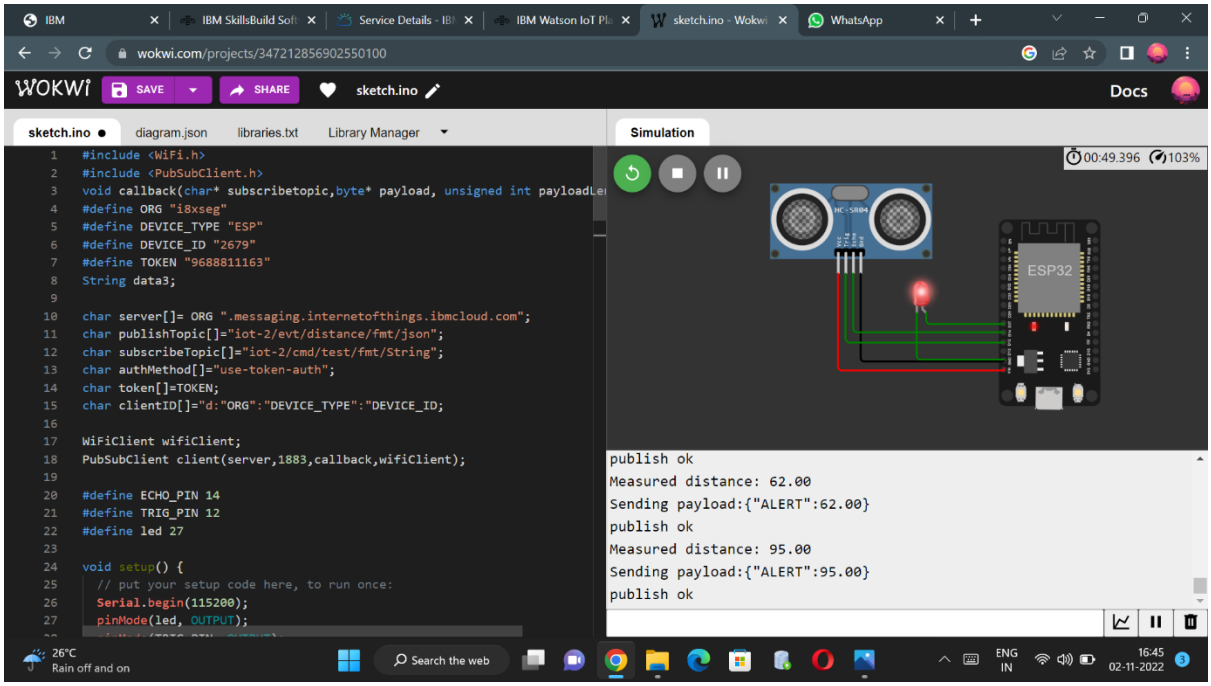
```
  Serial.println(subscribeTopic);

  for(int i=0; i<payloadLength; i++){

    data3 += (char)payload[i];

  }

  Serial.println("data:"+ data3);

  if(data3=="lighton"){

    Serial.println(data3);

    digitalWrite(led,HIGH);

  }else{

    Serial.println(data3);

    digitalWrite(led,LOW);

  }

  data3="";

}
```

Output:

Normal Case:



Alert Case:



IBM CLOUD STORAGE