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REG NO: 2019504008

ASSIGNMENT -4

➢ Write code and connections in wokwi for the ultrasonic sensor.

➢ Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

➢ Upload document with wokwi share link and images of IBM cloud.

CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic,byte* payload, unsigned int payloadLength);
#define ORG "88z5c8"
#define DEVICE_TYPE "ESPULTRA"
#define DEVICE_ID "123"
#define TOKEN "12345678"
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();
  }
```

```
}

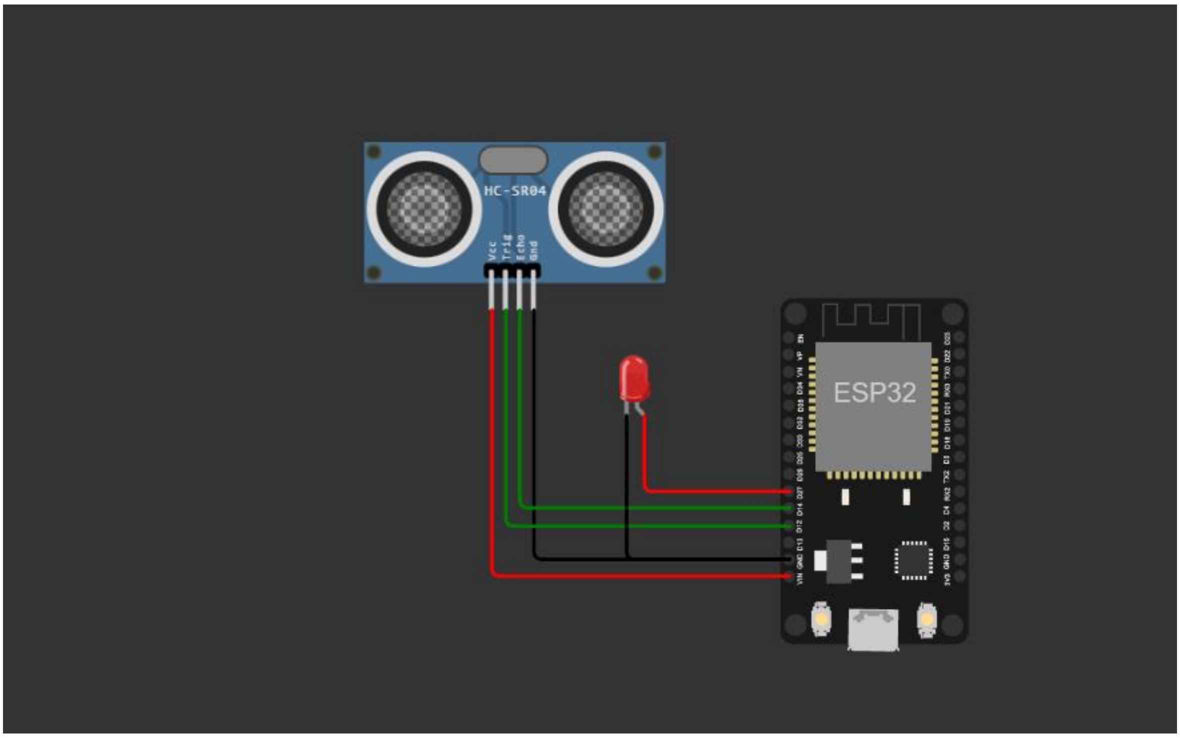
void wificonnect(){
  Serial.println();
  Serial.print("Connecting to");

  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");
  }
}

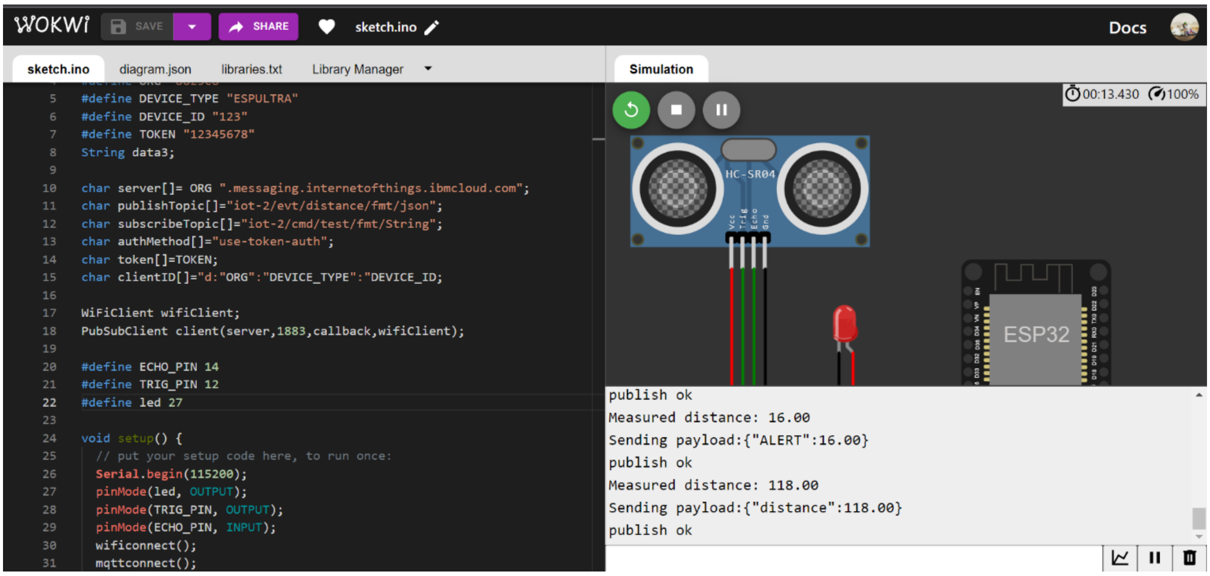
void callback(char* subscribeTopic, byte* payload, unsigned int payloadLength){
  Serial.print("callback invoked for topic:");
  Serial.println(subscribeTopic);
  for(int i=0; i<payloadLength; i++){
    data3 += (char)payload[i];
  }
  Serial.println("data:"+ data3);
  if(data3=="lighton"){
    Serial.println(data3);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

Circuit:



Output:

normal(>100cms)



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#define led 27

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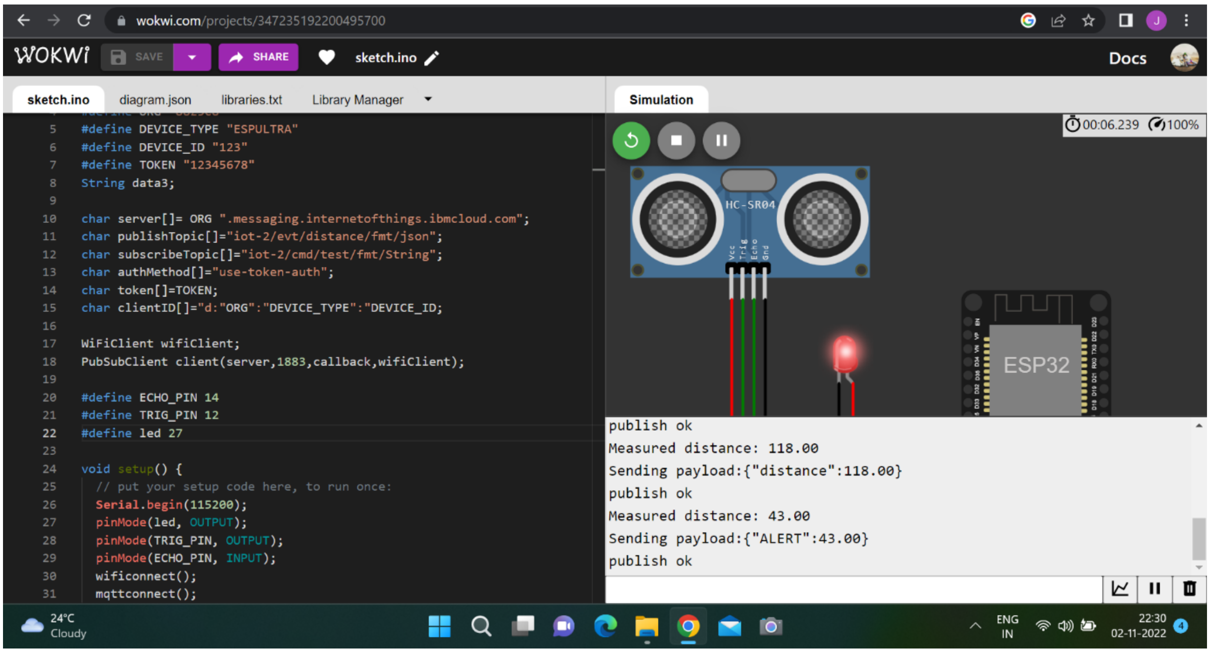
  mqttconnect();
```

```
publish ok
Measured distance: 16.00
Sending payload:{"ALERT":16.00}
publish ok
Measured distance: 118.00
Sending payload:{"distance":118.00}
publish ok
```

Alert(<100cms)



```
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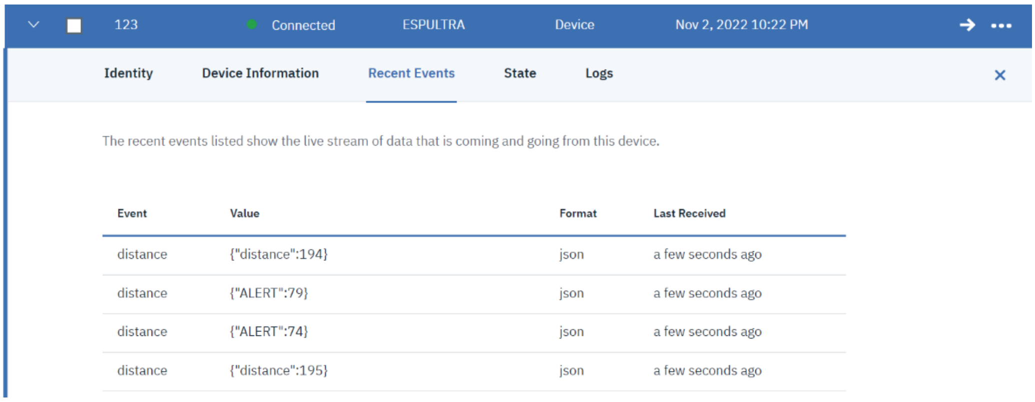
  pinMode(ECHO_PIN, INPUT);
  wificonnect();
  mqttconnect();
```

```
publish ok
Measured distance: 118.00
Sending payload:{"distance":118.00}
publish ok
Measured distance: 43.00
Sending payload:{"ALERT":43.00}
publish ok
```

IBM CLOUD DISPLAY IN RECENT EVENTS:



The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
distance	{"distance":194}	json	a few seconds ago
distance	{"ALERT":79}	json	a few seconds ago
distance	{"ALERT":74}	json	a few seconds ago
distance	{"distance":195}	json	a few seconds ago

DISCUSSSION OF THE RESULT:

➢ The connection has been made for ultrasonic sensor using LED and ESP32 using wowki simulator.

➢ It is observed that when the distance is greater than 100cms, it doesn’t send any alert message.

➢ But, when the distance is less than 100cms, it sends an alert message to the IBM cloud and the corresponding message can be viewed under IBM cloud device recent events