Assignment-4

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PROJECT NAME:SMART SOLUTIONS FOR RAILWAYS

Write code and connections in wokwi for ultrasonic sensor.

Whenever distance is less than 100 cms send "alert" to ibm cloud and display in device recent events.

Solution code:

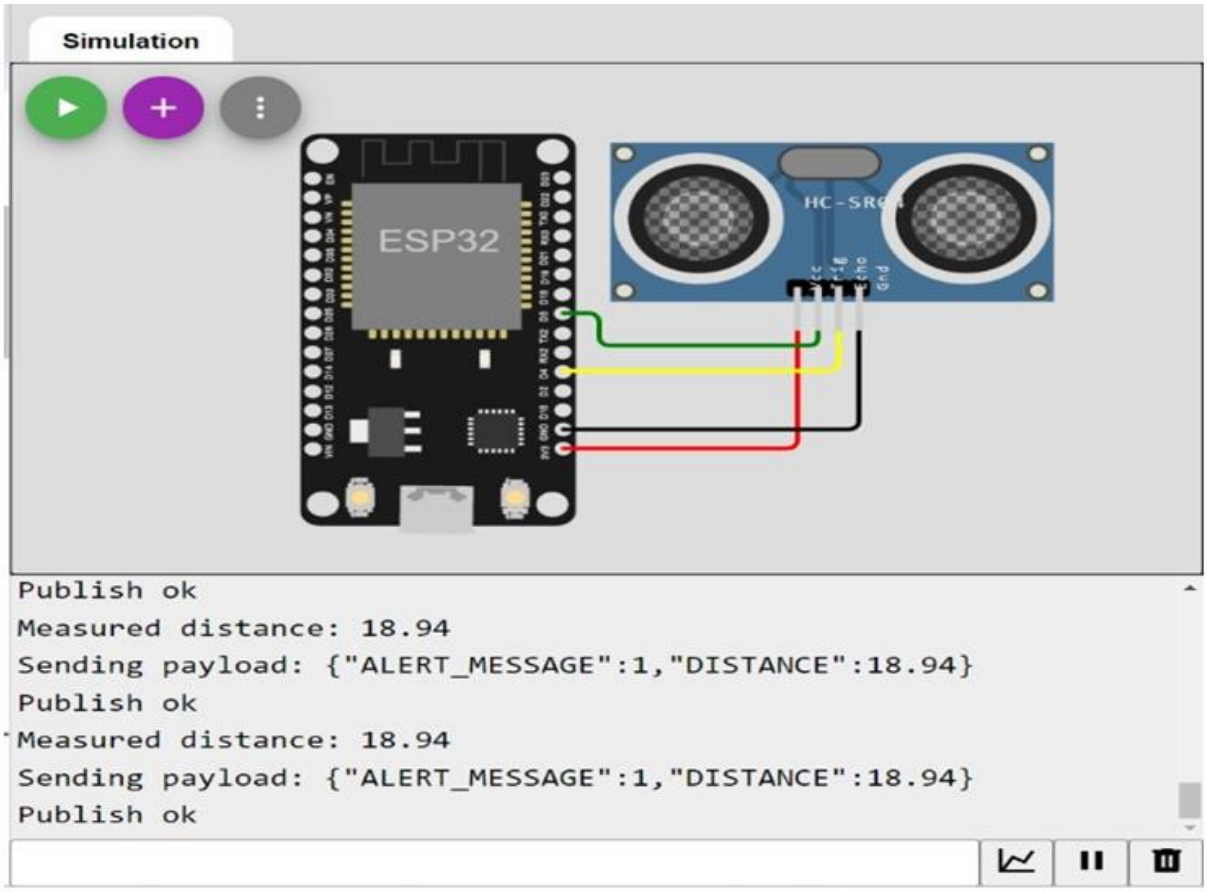
```
#include <WiFi.h>//library for wifi

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

#define ORG "74593u”

#define DEVICE_NAME "iot"

#define DEVICE_ID "12345”

#define TOKEN”0987654321"

const int T_PIN = 5;

const int E_PIN = 4;

//-------- 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_E ":" DEVICE_D;//client id

//-------------------------------------------------

WiFiClient wifiClient; // creating the instance for wificlient

PubSubClient client(server, 1883, wifiClient); //calling the predefined client id by passing parameter like server id,portand wificredential


void setup() {
```

```
  Serial.begin(115200);
  pinMode(T_PIN, OUTPUT);
  pinMode(E_PIN, INPUT);
  wificonnect();
  mqttconnect();
}

float readDistanceCM() {
  digitalWrite(T_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(T_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(T_PIN, LOW);
  int duration = pulseIn(E_PIN, HIGH);
  return duration * 0.034 / 2;
}

void loop() {

  float distance = readDistanceCM();
  Serial.print("Measured distance: ");
  Serial.println(distance);
  if(distance<=100){
  PublishData(distance);
  }

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

void PublishData(float distance) {
```

```
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  bool status=true;
  String payload = "{\"ALERT_MESSAGE\":";
  payload += status;
  payload += "," "\"DISTANCE\":";
  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 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");
  }
}
```

Output:



WOKWI LINK: https://wokwi.com/projects/322577683855704658

IBM Cloud Image: