PROBLEM STATEMENT:

IoT Based Smart Solution for Railways

DOMAIN:

Internet of Things

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

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Question-1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cmssend "alert" to IBM cloud and display in device recent events.

WOKWILINK:

https://wokwi.com/projects/347928184351621715

CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
#define ORG " uh41ng"
#define DEVICE TYPE "Ultrasonic"
#define DEVICE_ID "Jayaprakash"
#define TOKEN " 7904887662" String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/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); int LED = 4;
int trig = 5;
int echo = 18;
void setup()
Serial.begin(115200);
pinMode(trig,OUTPUT);
pinMode(echo,INPUT);
pinMode(LED, OUTPUT);
delay(10);
wificonnect();
mqttconnect();
void loop()
```

```
digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW);
  float dur = pulseIn(echo,HIGH);
  float dist = (dur * 0.0343)/2;
  Serial.print ("Distancein cm");
  Serial.println(dist);
  PublishData(dist);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}
void PublishData(float dist) {
  mqttconnect();
  String object;
  if (dist <100)</pre>
   digitalWrite(LED,HIGH);
   Serial.println("object is near");
    object = "Near";
  }
  else
  {
    digitalWrite(LED,LOW);
    Serial.println("no object found");
   object = "No";
  String payload = "{\"distance\":";
  payload += dist;
  payload += "," "\"object\":\"";
  payload += object;
  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 client 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++) {</pre>
    data3 += (char)payload[i];
  }
data3="";
}
```

OUTPUT:

```
WOKWI 🖪 SAVE
                                                                                                                                                                                                                                                      Docs
                                                                                                                                             Simulation
   sketch.ino • diagram.json
                                               libraries.txt Library Manager ▼
               #include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
                                                                                                                                                                                                                                                  Ō00:12.059 (%8%
                                                                                                                                         5 1
               void callback(char* subscribetopic, byte* payload, unsigned int payloadLeng
               //----credentials of IBM Accounts-----
              #define ORG "uh41ng"/IBM ORGANITION ID
#define DEVICE_TYPE "Ultrasonic"//Device type mentioned in ibm watson IOT P
#define DEVICE_ID "Jayaprakash"//Device ID mentioned in ibm watson IOT Plat
               #define TOKEN "7904887662" //Token String data3;
               float dist;
              //----- Customise the above values -----
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Na
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of e
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT comma
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
                                                                                                                                        no object found
                                                                                                                                         Sending payload: {"distance":403.47, "object": "No"}
                                                                                                                                         Publish ok
                                                                                                                                        Distancein cm403.49
                                                                                                                                        no object found
              WiFiClient wifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient); //calling the pred
Publish ok
                                                                                                                                         Sending payload: {"distance":403.49,"object":"No"}
               int LED = 4;
```

Watson iot connected:

