ASSIGNMENT-4
DISTANCE DETECTION USING ULTRASONICSENSOR

Date	12 November 2022
Team ID	PNT2022TMID38788
Project Name	Signs With Smart Connectivity for Better Road Safety
Maximum Marks	2 Marks

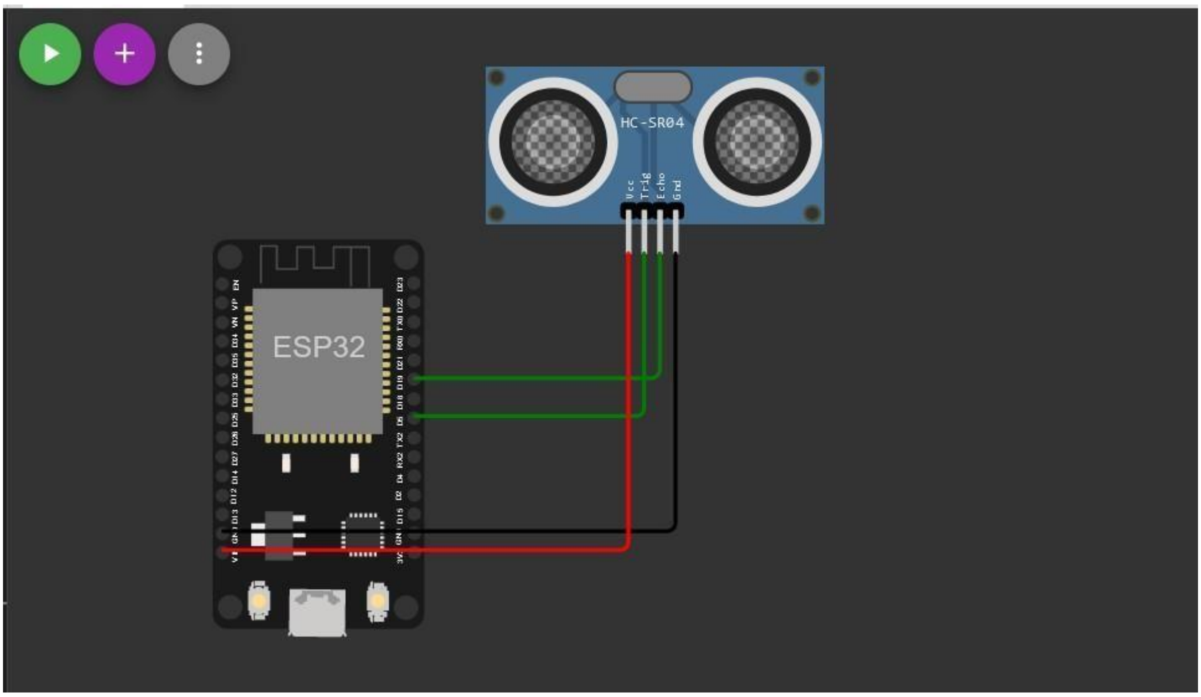
Question:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 centimeters it should send "alert" to IBM cloud and display in devicerecent events

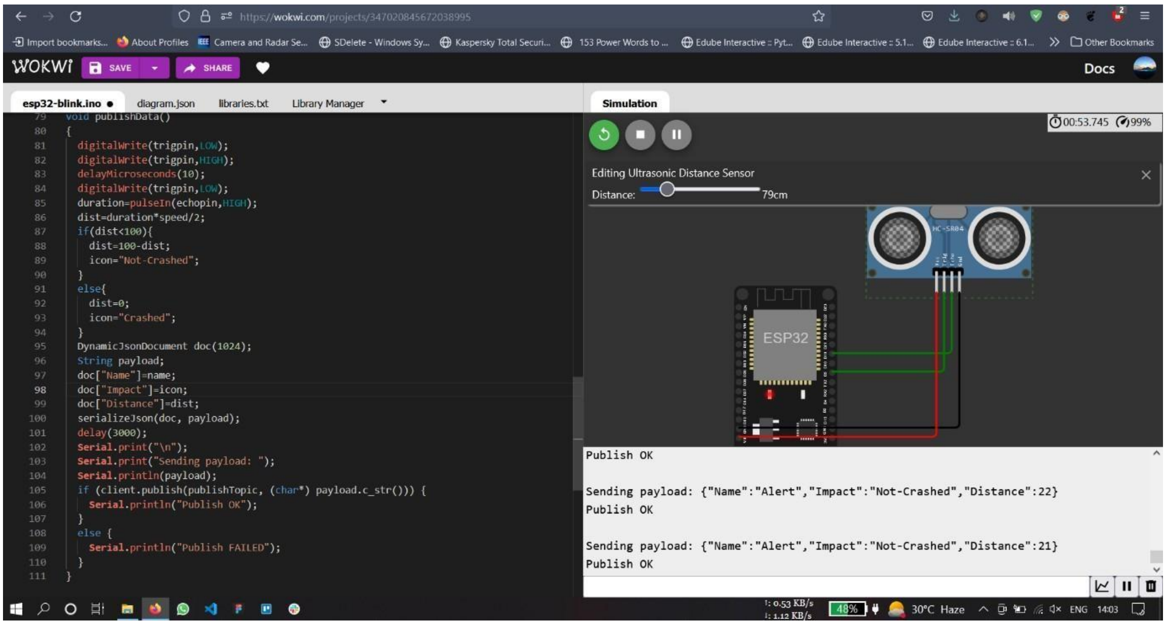
Code:

```
#include  <WiFi.h>
#include <PubSubClient.h>
#include <ArduinoJson.h>

WiFiClient wifiClient;

#define ORG "9tg03j"
#define DEVICE_TYPE "RaspberryPi"
#define DEVICE_ID "12345"
#define TOKEN "12345678"
#define speed 0.034

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/status1/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

PubSubClient client(server, 1883, wifiClient);
void publishData();

const int trigpin=5;
const int echopin=19;
String command;
String  data="";
String name="Alert";
String icon="";
long duration;
int dist;
void setup()
{
  Serial.begin(115200);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}
void loop() {
  publishData();
  delay(500);
  if (!client.loop()) {
    mqttConnect();
  }
}

void wifiConnect() {
  Serial.print("Connecting to "); Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.print("WiFi connected, IP address: "); Serial.println(WiFi.localIP());
}
void mqttConnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting MQTT client to "); Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
    Serial.print(".");
      Serial.print("*");
      delay(1000);
    }
    initManagedDevice();
    Serial.println();
  }
}

void initManagedDevice() {
  if (client.subscribe(topic)) {
    Serial.println(client.subscribe(topic));
    Serial.println("subscribe to cmd OK");
  }
  else {
    Serial.println("subscribe to cmd FAILED");
  }
}

void publishData()
{
  digitalWrite(trigpin,LOW);
  digitalWrite(trigpin,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin,LOW);
  duration=pulseIn(echopin,HIGH);
  dist=duration*speed/2;
  if(dist<100){
    dist=100-dist;
    icon="Not-Crashed";
  }
  else{
    dist=0;
    icon="Crashed";
  }
  DynamicJsonDocument doc(1024);
  String payload;
  doc["Name"]=name;
  doc["Impact"]=icon;
  doc["Distance"]=dist;
  serializeJson(doc, payload);
  delay(3000);
  Serial.print("\n");
  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish OK");
  }
  else {
    Serial.println("Publish FAILED");
  }
}
```

DIAGRAM:



OUTPUT:



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  String payload;
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  doc["Impact"]=icon;
  doc["Distance"]=dist;
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  delay(3000);
  Serial.print("\n");
  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish OK");
  }
  else {
    Serial.println("Publish FAILED");
  }
}
```

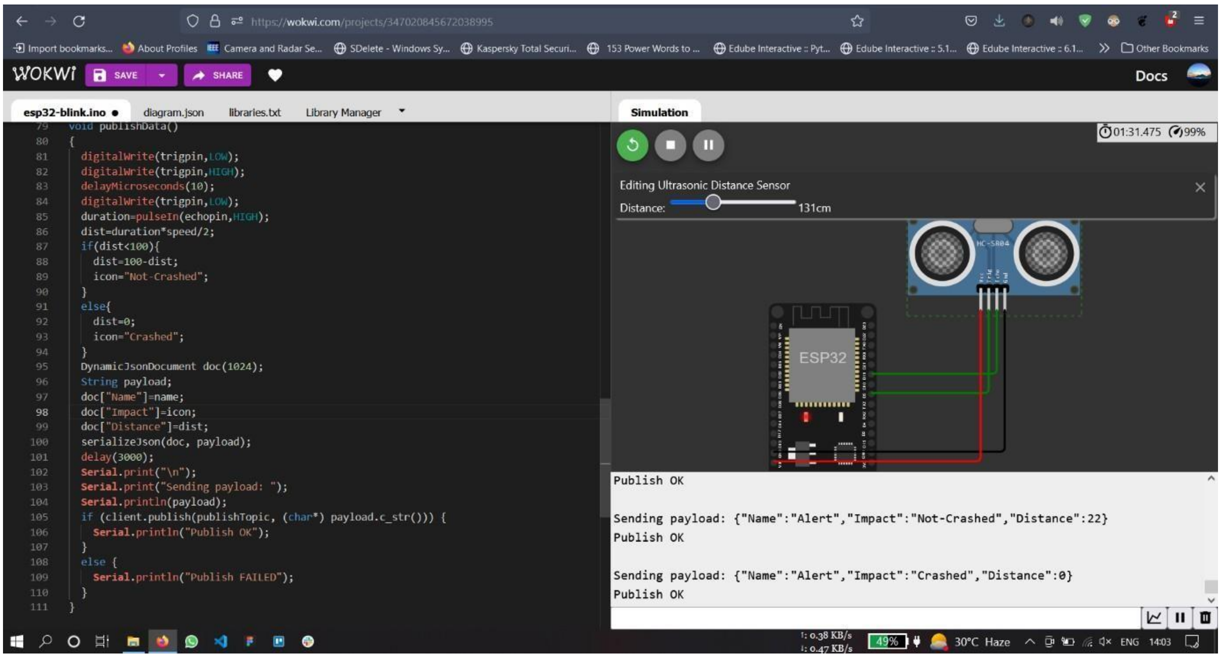
Editing Ultrasonic Distance Sensor

Distance: 79cm

```
Publish OK

Sending payload: {"Name":"Alert","Impact":"Not-Crashed","Distance":22}
Publish OK

Sending payload: {"Name":"Alert","Impact":"Not-Crashed","Distance":21}
Publish OK
```



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  DynamicJsonDocument doc(1024);
  String payload;
  doc["Name"]=name;
  doc["Impact"]=icon;
  doc["Distance"]=dist;
  serializeJson(doc, payload);
  delay(3000);
  Serial.print("\n");
  Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish OK");
  }
  else {
    Serial.println("Publish FAILED");
  }
}
```

Editing Ultrasonic Distance Sensor

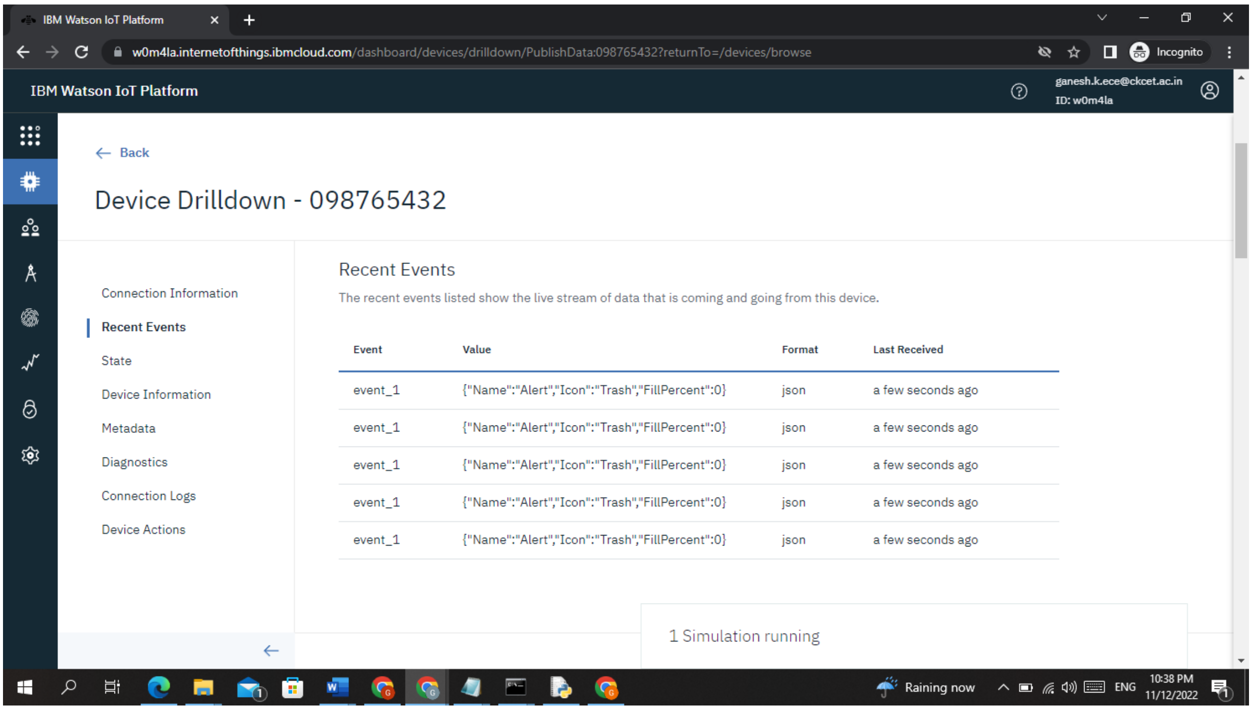
Distance: 131cm

```
Publish OK

Sending payload: {"Name":"Alert","Impact":"Not-Crashed","Distance":22}
Publish OK

Sending payload: {"Name":"Alert","Impact":"Crashed","Distance":0}
Publish OK
```

Data uploaded to Iot Watson Platform



Device Drilldown - 098765432

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
event_1	{"Name":"Alert","Icon":"Trash","FillPercent":0}	json	a few seconds ago
event_1	{"Name":"Alert","Icon":"Trash","FillPercent":0}	json	a few seconds ago
event_1	{"Name":"Alert","Icon":"Trash","FillPercent":0}	json	a few seconds ago
event_1	{"Name":"Alert","Icon":"Trash","FillPercent":0}	json	a few seconds ago
event_1	{"Name":"Alert","Icon":"Trash","FillPercent":0}	json	a few seconds ago

1 Simulation running