

### **Assignment -4**

#### Distance Detection Using Ultrasonic Sensor

Assignment Date	25 October 2022
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Maximum Marks	2 Marks

#### **Question-1:**

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.

WOKWI LINK: <https://wokwi.com/projects/346502216516895315>

## CODE:

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

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-----credentials of IBM Accounts-----

#define ORG "f59trs" //IBM ORGANITION ID
#define DEVICE_TYPE "ultrasonicsensor" //Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "distancedetection" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "A1GMGaaF01nawa1QA3" //Token
String data3;
float dist;

//----- 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_TYPE ":" DEVICE_ID; //clientid

//
WiFiClient wifiClient; // creating the instance for wifi client
```



```

if (dist < 100)
{ 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");// 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();
}
}

String object;

```

```

// digitalWrite(LED,LOW);

// }
data3="";

}

```

```

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");
    }
}

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++) {
        //Serial.print((char)payload[i]); data3 +=
        (char)payload[i];
    }

    // Serial.println("data: "+ data3);
    // if(data3=="Near")
    // {
    // Serial.println(data3);
    // digitalWrite(LED,HIGH);

    // }

    // else
    // {
    // Serial.println(data3);

```

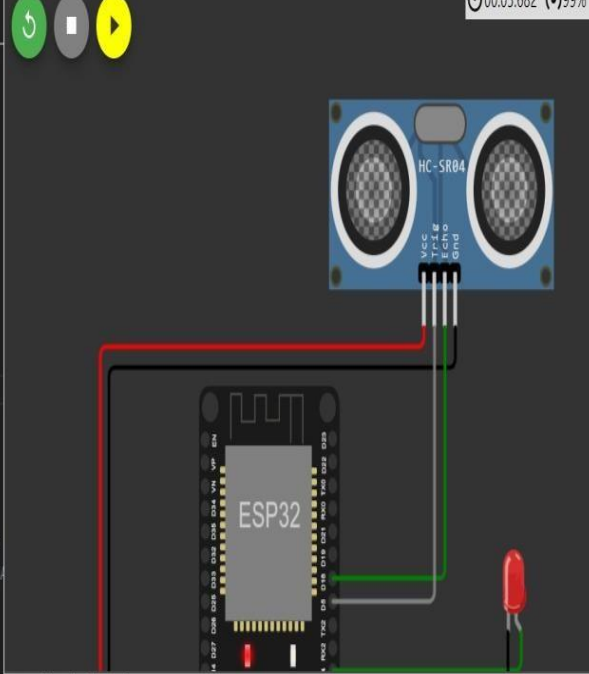
## OUTPUT: When object is not near to the ultrasonic

sketch.ino   diagram.json   libraries.txt   Library Manager

```
1 #include <WiFi.h> //library for wifi
2 #include <PubSubClient.h> //library for MQTT
3
4
5 void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);
6
7 //-----credentials of IBM Accounts-----
8
9 #define ORG "f59trs" //IBM ORGANIZATION ID
10 #define DEVICE_TYPE "ultrasonicsensor" //Device type mentioned in ibm watson IOT Platform
11 #define DEVICE_ID "distancedetection" //Device ID mentioned in ibm watson IOT Platform
12 #define TOKEN "ALMGaaF01nawa1QA3" //Token
13 String data3;
14 float dist;
15
16
17 //----- Customise the above values -----
18 char server[] = ORG ".messaging.internetofthings.ibmcloud.com"; // Server Name
19 char publishTopic[] = "iot-2/evt/Data/fmt/json"; // topic name and type of event perform and
20 char subscribetopic[] = "iot-2/cmd/test/fmt/String"; // cmd REPRESENT command type AND COMM
21 char authMethod[] = "use-token-auth"; // authentication method
22 char token[] = TOKEN;
23 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID; //client id
24
25
26 //-----
27 WiFiClient wificlient; // creating the instance for wificlient
28 PubSubClient client(server, 1883, callback ,wificlient); //calling the predefined client id
29
30 int LED = 4;
31 int trig = 5;
32 int echo = 18;
33 void setup()
```

Simulation

00:05.682 99%



no object found

Sending payload: {"distance":403.45,"object":"No"}


Publish ok

Distancein cm233.00

no object found

Sending payload: {"distance":233.00,"object":"No"}

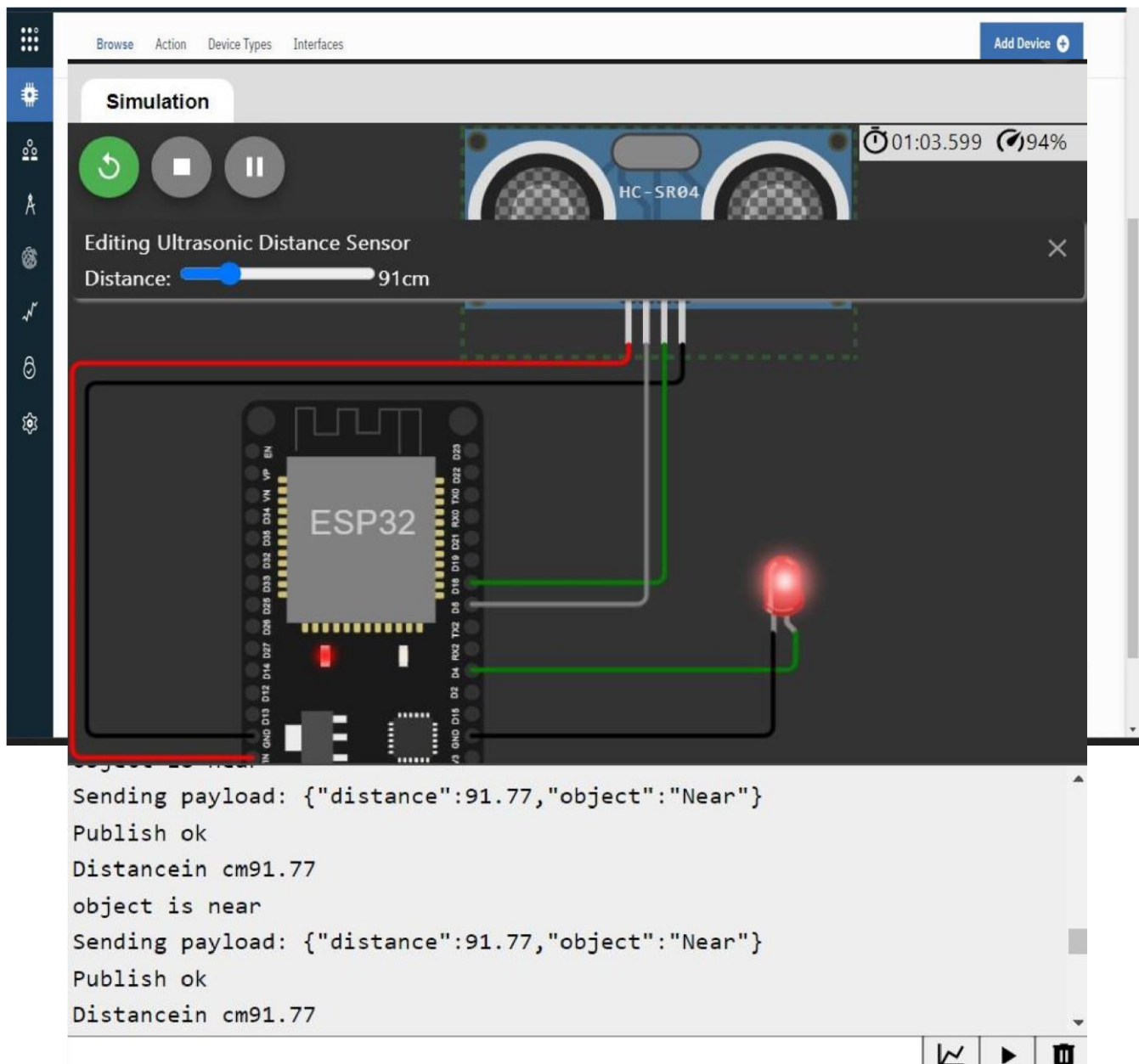
Publish ok



sensor

**Data sent to the IBM cloud device when the object is far**

### When object is nearer to the ultrasonic sensor Data sent





to the IBM cloud device when the object is near

The screenshot displays the IBM Cloud IoT Platform console. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A search bar is present, and an 'Add Device' button is in the top right. The main content area shows a list of devices. The selected device is 'distancedetection', which is 'Connected' and has a 'Device Type' of 'ultrasonicsensor'. Below the device list, the 'Recent Events' tab is active, showing a table of events. The table has columns for 'Event', 'Value', 'Format', and 'Last Received'. The events are JSON objects containing distance and object status. At the bottom, a status bar indicates '0 Simulations running'.

Event	Value	Format	Last Received
Data	{"distance":91.77,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.75,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.77,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.79,"object":"Near"}	json	a few seconds ago
Data	{"distance":91.8,"object":"Near"}	json	a few seconds ago

0 Simulations running