

## ASSIGNMENT - 4

### ULTRASONIC SENSOR SIMULATION IN WOKWI

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Maximum Marks	2 Marks

#### QUESTION-1:

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an “Alert” to IBM cloud and display in the device recent events.

#### CODE:

```
#include <WiFi.h>
#include <PubSubClient.h>
void callback(char* subscribtopic, byte* payload, unsigned intpayloadLength);
//-----credentials of IBM Accounts-----
#define ORG "ytluse"
#define DEVICE_TYPE "2702"
#define DEVICE_ID "12345"
#define TOKEN "O+n)Eh+INX0y3?rG!8"
String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char subscribtopic[] = "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);
const int trigPin = 5;
const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
void setup() {
  Serial.begin(115200);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  wificonnect();
  mqttconnect();
}
void loop() {
  digitalWrite(trigPin, LOW);
```

```

delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration= pulseIn(echoPin, HIGH);
distance = duration * SOUND_SPEED/2;
Serial.print("Distance (cm): ");
Serial.println(distance);
if(distance<100)
{
Serial.println("ALERT!!");
delay(1000);
PublishData(distance);
delay(1000);
if (!client.loop()) {
mqttconnect();
}
}
delay(1000);
}
void PublishData(float dist) {
mqttconnect();
String payload = "{\"Distance\":";
payload += dist;
payload += ", \"ALERT!!\": \"\" \"Distance less than 100cms\"\""; 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++) {
//Serial.print((char)payload[i]);data3 +=
(char)payload[i];
}
Serial.println("data: "+ data3);data3="";
}

```

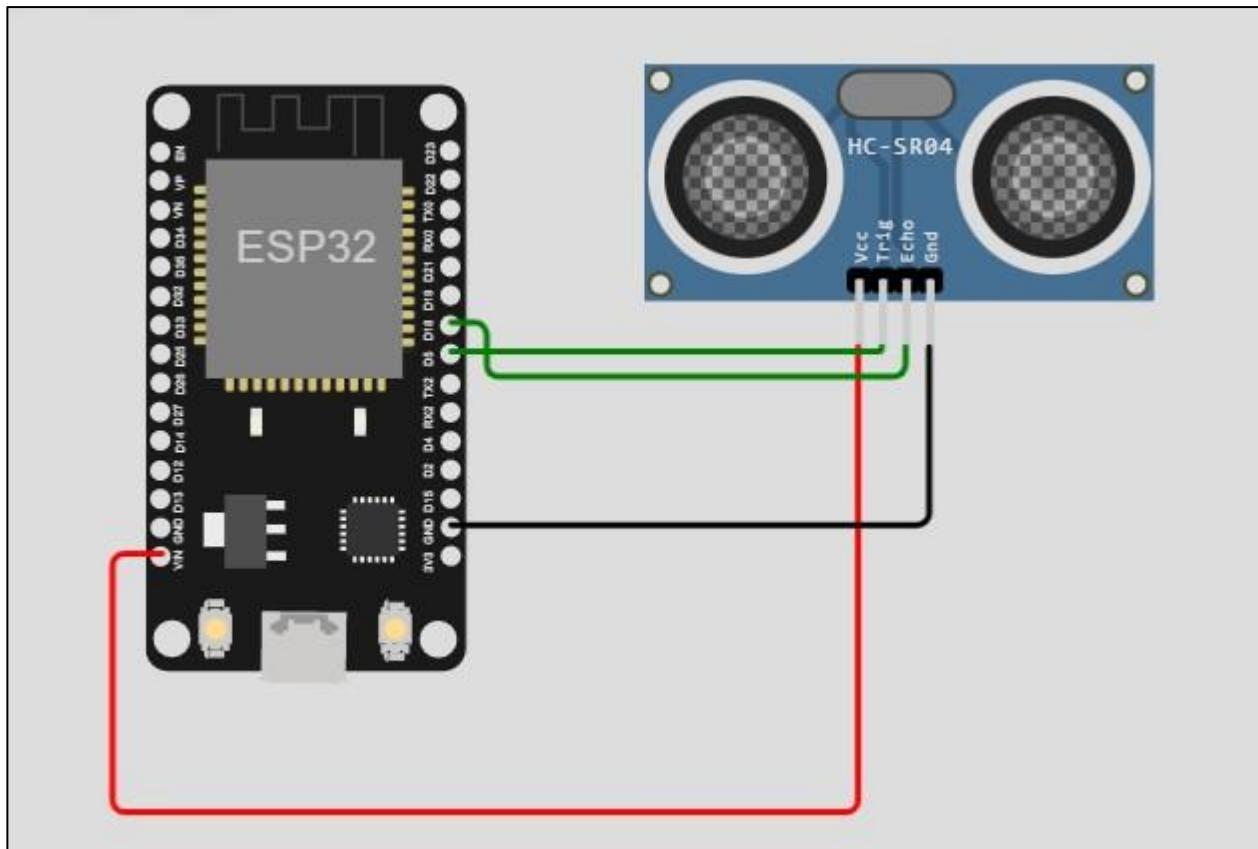
#### DIAGRAM.JSON:

```

{
  "version": 1,
  "author": "KESAVAMOORTHY M 19EC042",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67,
"attrs": { } },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17,"attrs": { } }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],[
      "esp:VIN",
      "ultrasonic1:VCC",
      "red",
      [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]
    ],
    [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],
    [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
  ]
}

```

## CIRCUIT DIAGRAM:



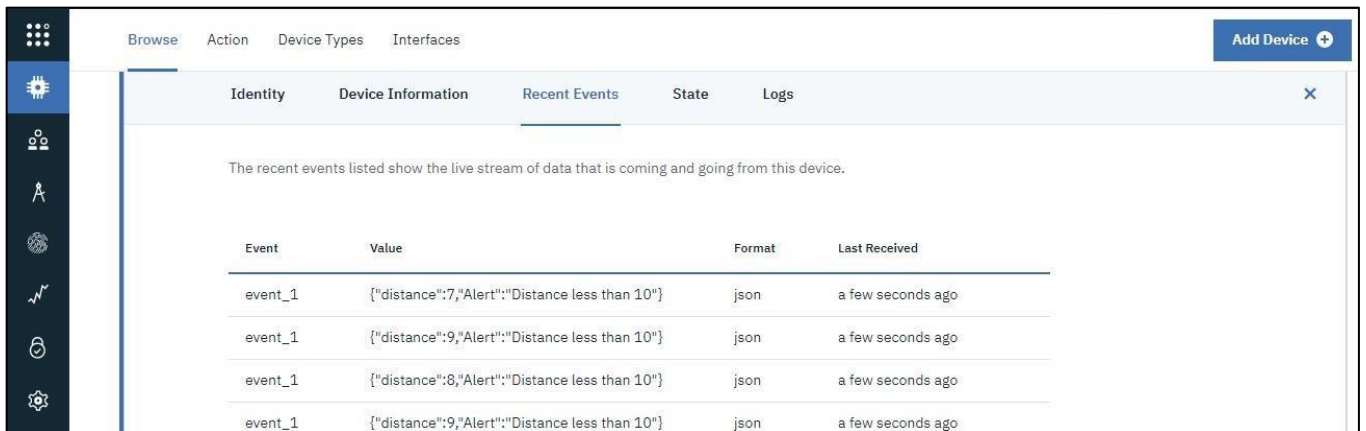
Circuit Diagram For Ultrasonic Sensor Simulation In Wokwi

## WOKWI OUTPUT:

```
Connecting to ...  
WiFi connected  
IP address:  
10.10.0.2  
Reconnecting client to ytluse.messaging.internetofthings.ibmcloud.com  
iot-2/cmd/test/fmt/String  
subscribe to cmd OK  
  
Distance (cm): 399.96  
Distance (cm): 399.94  
Distance (cm): 399.94  
Distance (cm): 399.94  
Distance (cm): 399.96  
Distance (cm): 399.94  
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Distance (cm): 399.94
```

Wokwi Output For Ultrasonic Sensor Simulation In Wokwi

## IBM CLOUD OUTPUT:



The screenshot shows the IBM Cloud IoT Platform interface. On the left is a dark sidebar with icons for home, devices, alerts, and settings. The top navigation bar includes 'Browse', 'Action', 'Device Types', and 'Interfaces'. A blue 'Add Device' button is in the top right. The main content area has tabs for 'Identity', 'Device Information', 'Recent Events' (which is selected), 'State', and 'Logs'. Below the 'Recent Events' tab, a message states: 'The recent events listed show the live stream of data that is coming and going from this device.' Below this message is a table with four columns: 'Event', 'Value', 'Format', and 'Last Received'. The table contains four rows of data, all with 'event\_1' in the 'Event' column and 'a few seconds ago' in the 'Last Received' column.

Event	Value	Format	Last Received
event_1	{"distance":7,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":8,"Alert":"Distance less than 10"}	json	a few seconds ago
event_1	{"distance":9,"Alert":"Distance less than 10"}	json	a few seconds ago

## IBM CLOUD OUTPUT

## WOKWI SIMULATION LINK:

<https://wokwi.com/projects/346425661051634259>