

**Assignment - 4**  
**Internet of Things (IoT)**

Assignment Date	12 November 2022
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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* subscribetopic, byte* payload, unsigned int payloadLength);

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

#define ORG "kotoq5"

"//IBM ORGANITION ID

#define DEVICE_TYPE "ESP32"

//Device type mentioned in ibm watson IOT Platform

#define DEVICE_ID "12345"

//Device ID mentioned in ibm watson IOT Platform

#define TOKEN "12345678"

//Token

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);

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");
}
}

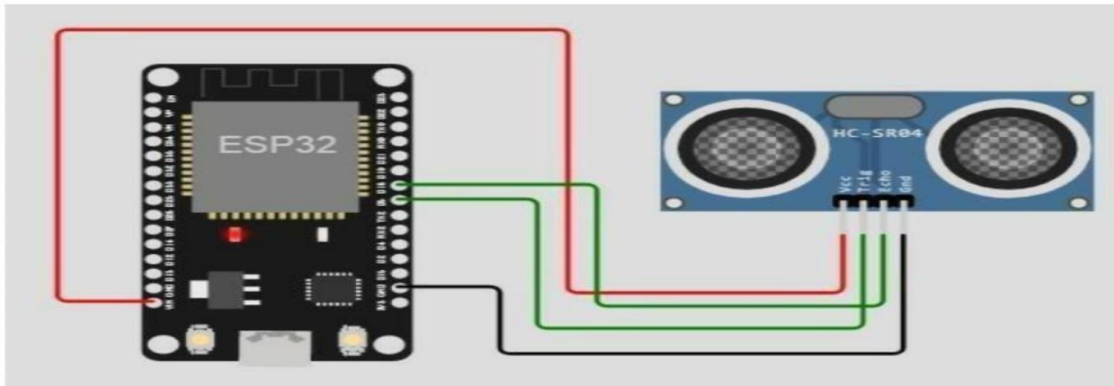
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
Serial.print("callback invoked for topic: ");
Serial.println(subscribetopic);
for (int i = 0; i < payloadLength; i++) {
//Serial.print((char)payload[i]);
data3 += (char)payload[i];
}

Serial.println("data: "+ data3);
data3=""; } Diagram.json:
{
"version": 1,
"author": "sweetysharon",
"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:



## Output:

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): 399.92
Distance (cm): 399.96
Distance (cm): 399.94
Distance (cm): 399.98
Distance (cm): 399.94
Distance (cm): 399.92
Distance (cm): 399.94
```

## IBM cloud output:

Browse Action Device Types Interfaces Add Device				
Identity Device Information Recent Events State Logs X				
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	{"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	

