

# Assignment-4

## Ultrasonic sensor simulation in Wokwi

### Question:

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

### Code:

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

voidcallback(char*subscribetopic,byte*payload,unsignedintpayloadLength);

//-----credentialsofIBMAccounts-----

#defineORG"kotoq5"//IBMORGANITIONID

#defineDEVICE_TYPE"ESP32"//DevicetypementionedinibmwatsonIOTPlatform#define
DEVICE_ID "12345"//Device ID mentioned in ibmwatson IOT
Platform#defineTOKEN"12345678"//Token Stringdata3;

charserver[]=ORG".messaging.internetofthings.ibmcloud.com";charpublishTopic[]="iot-
2/evt/Data/fmt/json"; charsubscribetopic[]="iot-
2/cmd/test/fmt/String";charauthMethod[]="use-token-auth"; chartoken[]=TOKEN;

charclientId[]="d:"ORG":"DEVICE_TYPE":"DEVICE_ID";

WiFiClientwifiClient;

PubSubClientclient(server,1883,callback,wifiClient);constint trigPin =5; const
int echoPin = 18;#defineSOUND_SPEED0.034longduration;

floatdistance;voidsetup(){

Serial.begin(115200);pinMode(trigPin,OUTPUT);pinMode(echoPin,
INPUT);wificonnect();mqttconnect();

}

voidloop()

{

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);
}
voidPublishData(floatdist){mqttconnect();
Stringpayload="{\"Distance\":";payload+=dist;
payload+=\", \"ALERT!!\": \"\"Distancelessthan100cms\"\"";payload+= "}";
Serial.print("Sendingpayload:"); Serial.println(payload);
if(client.publish(publishTopic,(char*)payload.c_str())){
Serial.println("Publishok");
}else{
Serial.println("Publishfailed");
}
}
voidmqttconnect(){ if (!client.connected())
{Serial.print("Reconnectingclientto");Serial.println(server);
while(!!!client.connect(clientId,authMethod,token)){
Serial.print(".");delay(500);
}
initManagedDevice();
Serial.println();

```

```

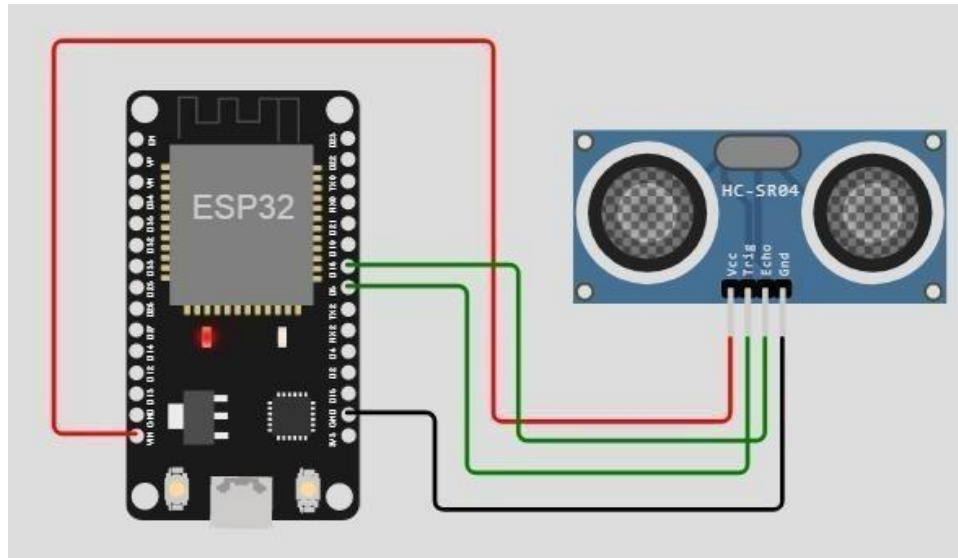
}
}
void wificonnect()
{
  Serial.println(); Serial.print("Connecting to "); WiFi.begin("Wokwi-GUEST", "", 6); while
  (WiFi.status() != WL_CONNECTED){delay(500);
  Serial.print(".");
}
  Serial.println(""); Serial.println("WiFiconnected"); Serial.println("IP address:
  ");Serial.println(WiFi.localIP());
}
void initManagedDevice(){
  if (client.subscribe(subscribetopic)) {Serial.println((subscribetopic)); Serial.println("subscribe
  tocmdOK");
  }else{
  Serial.println("subscribetocmdFAILED");
  }
}
void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
{
  Serial.print("callbackinvokedfortopic:");
  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 Diagram:

```
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:

Identity

Device Information

Recent Events

State

Logs

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