

**Problem statement :**

IoT based safety gadget for child safety monitoring and notification.

**Domain :**

Internet of Things Assignment 4: Distance detection using ultrasonic sensor

**ASSIGNMENT 4 :**

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cm send "alert" to IBM cloud and display in device recent events.

**WOWKI LINK:**

<https://wokwi.com/projects/347922168846221908>

**BY,**

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### Solution:

```
#include<WiFi.h>
#include<WiFiClient.h>#includ
e<PubSubClient.h>constinttr
igPin = 5; constintechoPin =
18;
//define sound speed in cm/uS
#define SOUND_SPEED
0.034#define CM_TO_INCH
0.393701long duration;
floatdistanceCm;
floatdistanceInch;

void callback(char* subscribetopic, byte* payload,unsignedintpayloadLength); //-----
credentials of IBM Accounts-----

#define ORG "tfltte"//IBM ORGANITION ID
#define DEVICE_TYPE "esp32"//Device type mentioned in ibmwatson IOT Platform
#define DEVICE_ID "SAMEERA"//Device ID mentioned in ibmwatson IOT Platform
#define TOKEN "8754774055" //Token
String data3;

//----- Customise the above values -----char server[] = ORG
".messaging.internetofthings.ibmcloud.com";// Server NamecharpublishTopic[] = "iot-
2/evt/Data/fmt/json";// topic name and type of event perform and format in which data
to be send
charsubscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT command type AND
COMMAND IS TEST OF FORMAT STRINGcharauthMethod[] = "use-token-auth";// authentication
methodchar token[] = TOKEN; charclientId[] = "d:" ORG ":" DEVICE_TYPE ":"
DEVICE_ID;//client id
WiFiClientwifiClient; // creating the instance for wificlient
PubSubClient client(server, 1883, callback ,wifiClient);

voidsetup() {
Serial.begin(115200); // Starts the serial
communicationpinMode(trigPin, OUTPUT); // Sets the trigPin
as an OutputpinMode(echoPin, INPUT); // Sets the echoPin as
an InputSerial.println(); wificonnect(); mqttconnect();
}

voidloop() { // Clears the
trigPindigitalWrite(trigPin,
LOW); delayMicroseconds(2);
// Sets the trigPin on HIGH state for 10 micro
secondsdigitalWrite(trigPin, HIGH);
delayMicroseconds(10); digitalWrite(trigPin, LOW);
```

```

// Reads the echoPin, returns the sound wave travel time in microseconds    duration
= pulseIn(echoPin, HIGH);

// Calculate the distance
distanceCm = duration * SOUND_SPEED/2;

// Convert to inchesdistanceInch =
distanceCm * CM_TO_INCH;

// Prints the distance in the Serial Monitor
Serial.print("Distance (cm): ");
Serial.println(distanceCm);
Serial.print("Distance (inch): ");
Serial.println(distanceInch);

PublishData(distanceCm);
delay(1000);    if
(!client.loop()) {
mqttconnect();
}
}    voidPublishData(float Cm) {
mqttconnect();//function call for connecting to ibm
/*    creating the String in in form JSon to update the data to ibm
cloud
*/
String payload = "{\"Distance (cm)\":";
payload += Cm;    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");
}
} voidmqttconnect() {
if (!client.connected()) {
Serial.print("Reconnecting client to ");    Serial.println(server);
while(!!!client.connect(clientId, authMethod, token)) {
Serial.print(".");    delay(500);
}
}
initManagedDevice();
Serial.println();
} } voidwificonnect() //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];
}
}

```

## Output:

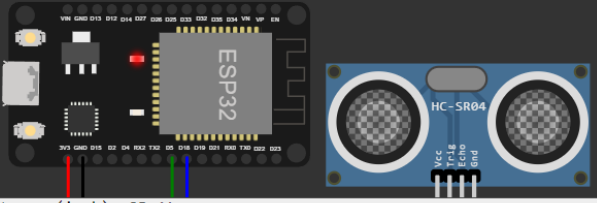
WOKWI SAVE SHARE esp32-arduino.ino copy Docs SIGN IN

esp32-blink.ino diagram.json libraries.txt Library Manager

```
1 #include <WiFi.h>
2 #include <WiFiClient.h>
3 #include <PubSubClient.h>
4 const int trigPin = 5;
5 const int echoPin = 18;
6 //define sound speed in cm/uS
7 #define SOUND_SPEED 0.034
8 #define CM_TO_INCH 0.393701
9 long duration;
10 float distanceCm;
11 float distanceInch;
12
13
14 void callback(char* subscribtopic, byte* payload, unsigned int payloadLength)
15 //-----credentials of IBM Accounts-----
16
17 #define ORG "tfltte"//IBM ORGANITION ID
18 #define DEVICE_TYPE "esp32"//Device type mentioned in ibm watson IOT Platform
19 #define DEVICE_ID "SAMEERA"//Device ID mentioned in ibm watson IOT Platform
20 #define TOKEN "8754774055" //Token
21 String data3;
22
23
24
25 //----- Customise the above values -----
26 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
27 char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event
28 char subscribtopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT command
29 char authMethod[] = "use-token-auth";// authentication method
```

Simulation

01:37.019 49%



Distance (inch): 85.41  
Sending payload: {"Distance (cm)":216.94}  
Publish ok  
Distance (cm): 216.94  
Distance (inch): 85.41  
Sending payload: {"Distance (cm)":216.94}  
Publish ok

IBM Watson IoT Platform 623519106030@smartinternz.com ID: tfltte

Browse Action Device Types Interfaces Add Device

SAMEERA Connected esp32 Device 10 Nov 2022 12:13

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
Data	{"Distance (cm)":216.97}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago
Data	{"Distance (cm)":216.97}	json	a few seconds ago