

PROBLEM STATEMENT :

Signs with smart connectivity for better road safety.

DOMAIN :

Internet of Things

ASSIGNMENT 4:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud

By,

M.SANJAI (623519106031)

V.ARULKUMAR (623519106003)

M.ANATHARAJ(623519106001)

A.BOOBALAN (623519106006)

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/348022445131694676>

CODE:

```
#include <WiFi.h>

#include <WiFiClient.h>

#include <PubSubClient.h>

const int trigPin = 5; const int
echoPin = 18;

//define sound speed in cm/uS
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701

long duration; float distanceCm;
float distanceInch;
```

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

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

```
#define ORG "bovicw"//IBM ORGANITION ID
```

```
#define DEVICE_TYPE "Raspberrypi"//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;
```

```
//----- 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;//client id
```

```
WiFiClient wifiClient; // creating the instance for wificlient  
PubSubClient client(server, 1883, callback ,wifiClient);
```

```
void setup() {  
    Serial.begin(115200); // Starts the serial communication  
    pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output  
    pinMode(echoPin, INPUT); // Sets the echoPin as an Input  
    Serial.println(); wificonnect(); mqttconnect();  
  
}
```

```
void loop() { // Clears the  
    trigPin  digitalWrite(trigPin,  
    LOW);  delayMicroseconds(2);  
  
    // Sets the trigPin on HIGH state for 10 micro seconds  
    digitalWrite(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 inches
distanceInch = 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();
}
}

void PublishData(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");
```

```
}
```

```
}
```

```
voi
```

```
d
```

```
mq
```

```
ttco
```

```
nne
```

```

ct()

{
if
(!cl
ient
.co
nne
cte
d())
{
    Serial.print("Reconnecting client to ");
    Serial.println(server);    while (!!!client.connect(clientId,
authMethod, token)) {    Serial.print(".");
delay(500);
    }
    initManagedDevice();
    Serial.println();
} }

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)  
{
```



```

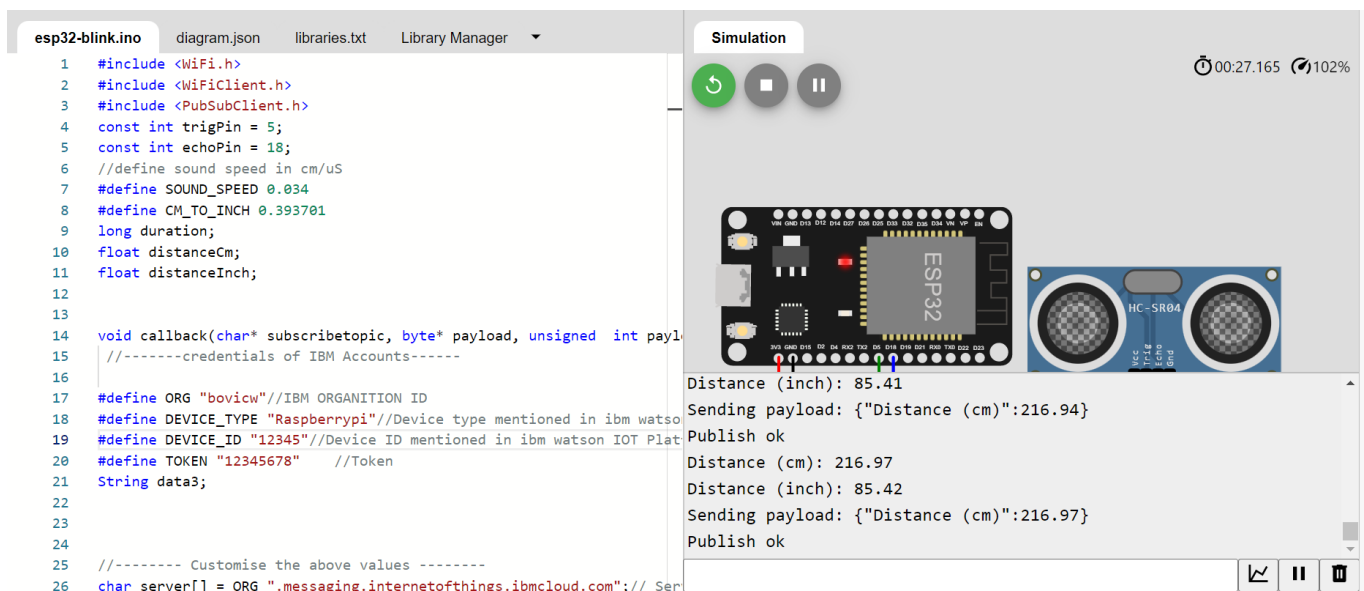
Serial.print("callback invoked for topic: ");

Serial.println(subscribetopic);  for (int i = 0; i < payloadLength;
i++) {    //Serial.print((char)payload[i]);    data3 +=
(char)payload[i];

    }
}

```

OUTPUT:



The screenshot shows the Arduino IDE interface. The left pane displays the code for `esp32-blink.ino`, which includes headers for `WiFi.h`, `WiFiClient.h`, and `PubSubClient.h`. It defines constants for `trigPin` (5) and `echoPin` (18), and defines `SOUND_SPEED` (0.034) and `CM_TO_INCH` (0.393701). The code defines a `callback` function that receives a topic and a payload, and it defines several constants for IBM Watson IoT Platform credentials. The right pane shows the simulation environment with an ESP32 board and an HC-SR04 ultrasonic sensor. The output window displays the following text:

```

Distance (inch): 85.41
Sending payload: {"Distance (cm)":216.94}
Publish ok
Distance (cm): 216.97
Distance (inch): 85.42
Sending payload: {"Distance (cm)":216.97}
Publish ok

```

Watson iot connected:

[Browse](#)[Action](#)[Device Types](#)[Interfaces](#)

Add Device +

Event	Value	Format	Last Received
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)":216.99}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago

Items per page 50 | 1–1 of 1 item

1 of 1 page < 1 >