

ASSIGNMENT-4

Question-1:

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

PROGRAM:-

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

WiFiClient wifiClient;

#define ORG "us27lh"
#define DEVICE_TYPE "CROP"
#define DEVICE_ID "KEERTHIKA123"
#define TOKEN "keekee123"
#define speed 0.034

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
char topic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;

char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

PubSubClient client(server, 1883, wifiClient);

void publishData();

const int trigpin=5;
```

```

const int echopin=18;
String command;
String data="";
long duration;
int dist;
void setup()
{
  Serial.begin(115200);
  pinMode(trigpin, OUTPUT);
  pinMode(echopin, INPUT);
  wifiConnect();
  mqttConnect();
}
void loop() {
  publishData();
  delay(500);
  if (!client.loop()) {
    mqttConnect();
  }
}
void wifiConnect() {
  Serial.print("Connecting to "); Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.print("WiFi connected, IP address: "); Serial.println(WiFi.localIP());
}

```

```

void mqttConnect() {
  if (!client.connected()) {
    Serial.print("Reconnecting MQTT client to "); Serial.println(server);
    while (!client.connect(clientId, authMethod, token)) {
      Serial.print(".");
      delay(1000);
    }
    initManagedDevice();
    Serial.println();
  }
}

void initManagedDevice() {
  if (client.subscribe(topic)) {
    Serial.println(client.subscribe(topic));
    Serial.println("subscribe to cmd OK");
  } else {
    Serial.println("subscribe to cmd FAILED");
  }
}

void publishData()
{
  digitalWrite(trigpin,LOW);
  digitalWrite(trigpin,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigpin,LOW);
  duration=pulseIn(echopin,HIGH);
  dist=duration*speed/2;
  if(dist<100){
    DynamicJsonDocument doc(1024);

```

```
String payload;  
doc["Distance Alert:"]=dist;  
serializeJson(doc, payload);  
delay(3000);  
Serial.print("\n");  
Serial.print("Sending payload: ");  
Serial.println(payload);  
if (client.publish(publishTopic, (char*) payload.c_str())) {  
    Serial.println("Publish OK");  
} else {  
    Serial.println("Publish FAILED");  
}  
}  
}
```

OUTPUT:-

The screenshot displays the Wokwi IoT Platform interface. On the left, the 'sketch.ino' file contains the following code:

```
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3 #include <ArduinoJson.h>
4 WiFiClient wifiClient;
5 #define ORG "us271h"
6 #define DEVICE_TYPE "CROP"
7 #define DEVICE_ID "KEERTHIKA123"
8 #define TOKEN "keekke123"
9 #define speed 0.034
10 char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
11 char publishTopic[] = "iot-2/evt/data/fmt/json";
12 char topic[] = "iot-2/cmd/home/fmt/String";
13 char authMethod[] = "use-token-auth";
14 char token[] = TOKEN;
15 char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
16 PubSubClient client(server, 1883, wifiClient);
17 void publishData();
18 const int trigpin=5;
19 const int echopin=18;
20 String command;
21 String data="";
22 long duration;
23 int dist;
24 void setup()
25 {
26   Serial.begin(115200);
27   pinMode(trigpin, OUTPUT);
28   pinMode(echopin, INPUT);
29   wifiConnect();
30   mqttConnect();
31 }
32 void loop() {
33   publishData();
34   delay(5000);
35 }
```

The simulation window on the right shows an ESP32 microcontroller connected to an HC-SR04 ultrasonic sensor. The output log displays the following messages:

```
Publish OK
Sending payload: {"Distance Alert":"61"}
Publish OK
Sending payload: {"Distance Alert":"61"}
Publish OK
```

The bottom status bar indicates the simulation is running with 1.005 KB/s CPU usage, 1.197 KB/s MEM usage, and a timestamp of 03:42 PM on 31-10-2022.

Service Details - IBM Cloud

IBM Watson IoT Platform

sketchino - Wokwi Arduino and ESP32

IBM

us27lh.internetofthings.ibmcloud.com/dashboard/devices/browse

IBM MURAL GitHub photo editor GMAIL Meet - jkc-hvy-fgt Paraphrase Online... Easy to use Online...

IBM Watson IoT Platform

922119106040@smartinternz.com ID: us27lh

Browse

Action

Device Types

Interfaces

Add Device

KEERTHIKA123

Connected

CROP

Device

Oct 31, 2022 3:11 PM

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 Alert":61}	json	a few seconds ago
Data	{"Distance Alert":61}	json	a few seconds ago
Data	{"Distance Alert":61}	json	a few seconds ago
Data	{"Distance Alert":61}	json	a few seconds ago
Data	{"Distance Alert":61}	json	a few seconds ago

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1 of 1 page

1

11.1 KB/s

37.3 KB/s

CPU 57 %

MEM: 85 %

03:42 PM

31-10-2022