Assignment -4
Python Programming

Assignment Date	10-NOV-2022
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Maximum Marks	2 Marks

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:

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

WiFiClient wifiClient;

#define ORG "kr9fjo"
#define DEVICE_TYPE "TestDeviceType"
#define DEVICE_ID "12345"
#define TOKEN "VJsSC148dk1dCN3UqS"
#define speed 0.034
char server[] = ORG
".messaging.internetofthings.ibmcloud.com"; char
publishTopic[] = "iot-2/evt/abcd_1/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="";
String lat="14.167589";
String lon="80.248510";
String name="point2";
String icon="";
long
duration;  int
dist;
void
setup() {
```

```cpp
  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);
```

```cpp
  duration=pulseIn(echopin,HIGH);
  dist=duration*speed/2;
if(dist<100){
    dist=100-dist; icon="fa-
    trash";
  }else{ dist=0;
    icon="fa-trash-
    o";
  }
  DynamicJsonDocument doc(1024);
  String                payload;
  doc["Name"]=name;
  doc["Latitude"]=lat;
  doc["Longitude"]=lon;
  doc["Icon"]=icon;
  doc["FillPercent"]=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:

Screenshot 1 — Wokwi project (sketch.ino):

```
1   #include <WiFi.h>
2   #include <PubSubClient.h>
3   #include <ArduinoJson.h>
4
5   WiFiClient wifiClient;
6
7   #define ORG "kr9fjo"
8   #define DEVICE_TYPE "TestDeviceType"
9   #define DEVICE_ID "12345"
10  #define TOKEN "VJsSC148dk1dCN3UqS"
11  #define speed 0.034
12
13  char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
14  char publishTopic[] = "iot-2/evt/abcd_1/fmt/json";
15  char topic[] = "iot-2/cmd/home/fmt/String";
16  char authMethod[] = "use-token-auth";
17  char token[] = TOKEN;
18  char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
19  PubSubClient client(server, 1883, wifiClient);
20  void publishData();
21
22  const int trigpin=5;
23  const int echopin=18;
24  String command;
25  String data="";
26  String lat="14.167589";
27  String lon="80.248510";
28  String name="point2";
29  String icon="";
30
31  long duration;
32  int dist;
33
34  void setup()
35  {
36    Serial.begin(115200);
37    pinMode(trigpin, OUTPUT);
```


Screenshot 2 — IBM Watson IoT Platform, Recent Events:

Device ID: 12345 — Status: Disconnected — Device Type: Rasberypi — Class ID: Device — Date Added: Oct 31, 2022 3:19 PM — Added By: venkateshbg01@gmail.com

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Distance	{"distance=":74}	json	a few seconds ago
Distance	{"distance=":89}	json	a few seconds ago
Distance	{"distance=":12}	json	a few seconds ago
Distance	{"distance=":52}	json	a few seconds ago
Distance	{"distance=":45}	json	a few seconds ago