Assignment - 4

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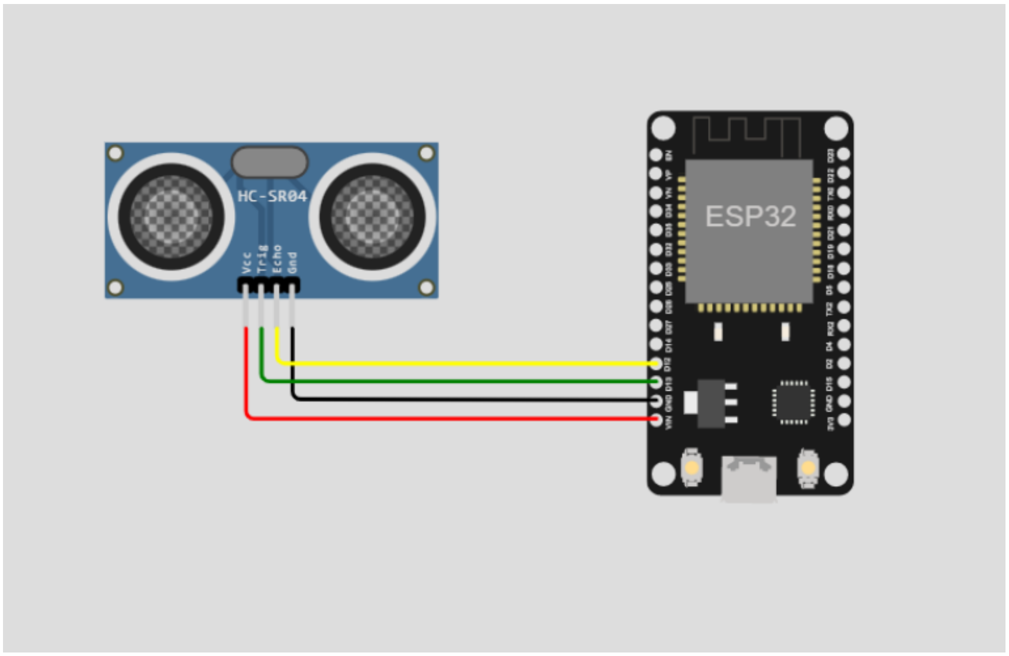
OBJECTIVES:-
Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.

LINK :- sketch.ino - Wokwi Arduino and ESP32 Simulator

CIRCUIT:-



CODE:-

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#define TRIG_PIN 13
#define ECHO_PIN 12

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

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

```
#define ORG "hg0hll"//IBM ORGANITION ID
#define DEVICE_TYPE "123"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "abcd"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"     //Token

//-------- 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/command/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);  //calling the
predefined client id by passing parameter like server id,portand
wificredential

void setup()// configureing the ESP32
{
  Serial.begin(115200);
  pinMode(TRIG_PIN, OUTPUT);
  digitalWrite(TRIG_PIN, LOW);
  pinMode(ECHO_PIN, INPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
{
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  float duration_us = pulseIn(ECHO_PIN, HIGH);
  float distance = 0.017 * duration_us;

  if(distance<100)
  {
    PublishData(distance,"ALERT");
  }else{
    PublishData(distance,"SAFE");
  }

  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}

/*.....................................retrieving to
Cloud...............................*/

void PublishData(float d,char s[]) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Distance\":";
  payload+=d;
  payload+=",";
  payload+="\"MESSAGE\":";
  payload+="\"";
  payload+=s;
  payload+="\"";
  payload+="}";

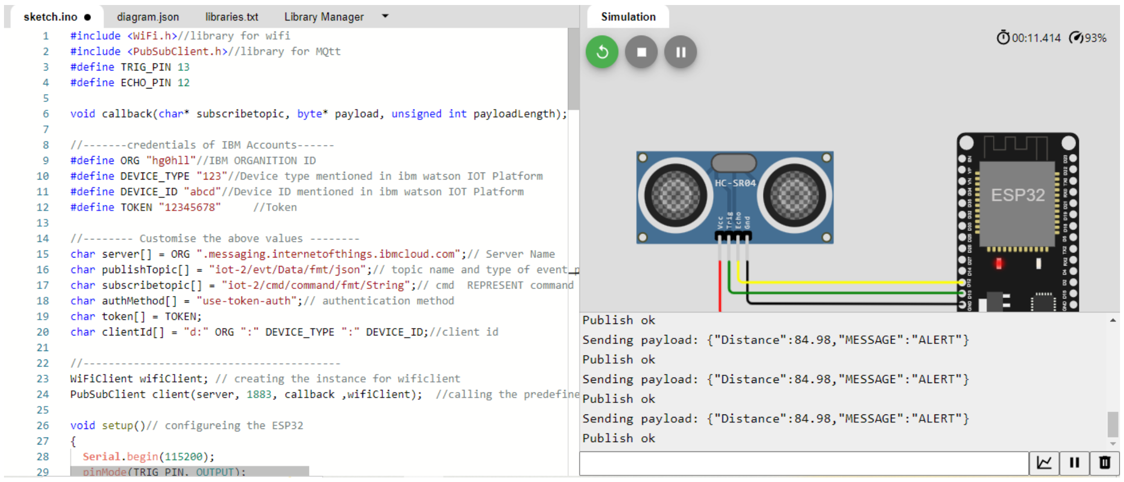
  Serial.print("Sending payload: ");
  Serial.println(payload);

  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");
  }
}
void mqttconnect() {
  if (!client.connected()) {
    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)
{

}
```

OUTPUT:-



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//-------- 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_
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd  REPRESENT command
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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);  //calling the predefine

void setup()// configureing the ESP32
{
  Serial.begin(115200);
  pinMode(TRIG_PIN, OUTPUT);
```

```
Publish ok
Sending payload: {"Distance":84.98,"MESSAGE":"ALERT"}
Publish ok
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Publish ok
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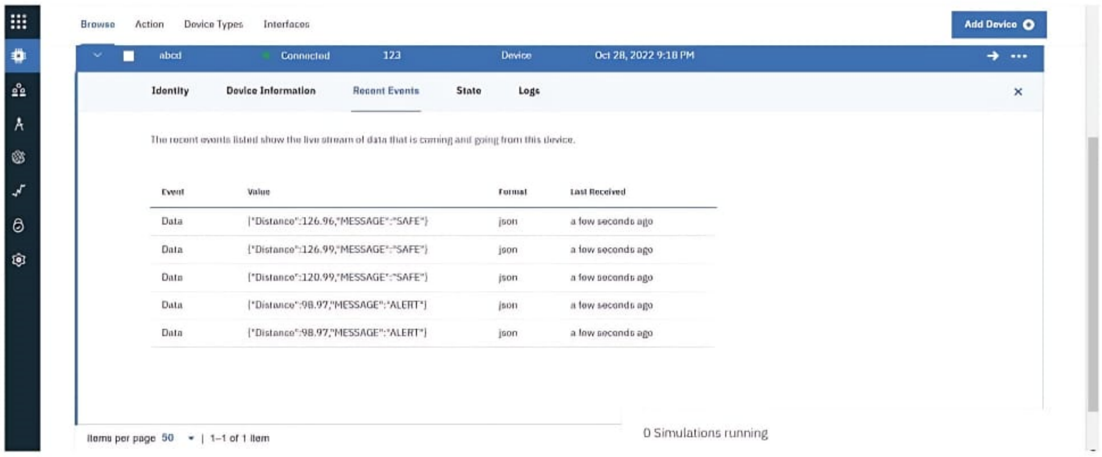
Publish ok
```



abcd · Connected · 123 · Device · Oct 28, 2022 9:18 PM

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":126.96,"MESSAGE":"SAFE"}	json	a few seconds ago
Data	{"Distance":126.99,"MESSAGE":"SAFE"}	json	a few seconds ago
Data	{"Distance":120.99,"MESSAGE":"SAFE"}	json	a few seconds ago
Data	{"Distance":98.97,"MESSAGE":"ALERT"}	json	a few seconds ago
Data	{"Distance":98.97,"MESSAGE":"ALERT"}	json	a few seconds ago

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0 Simulations running