

ASSIGNMENT-4

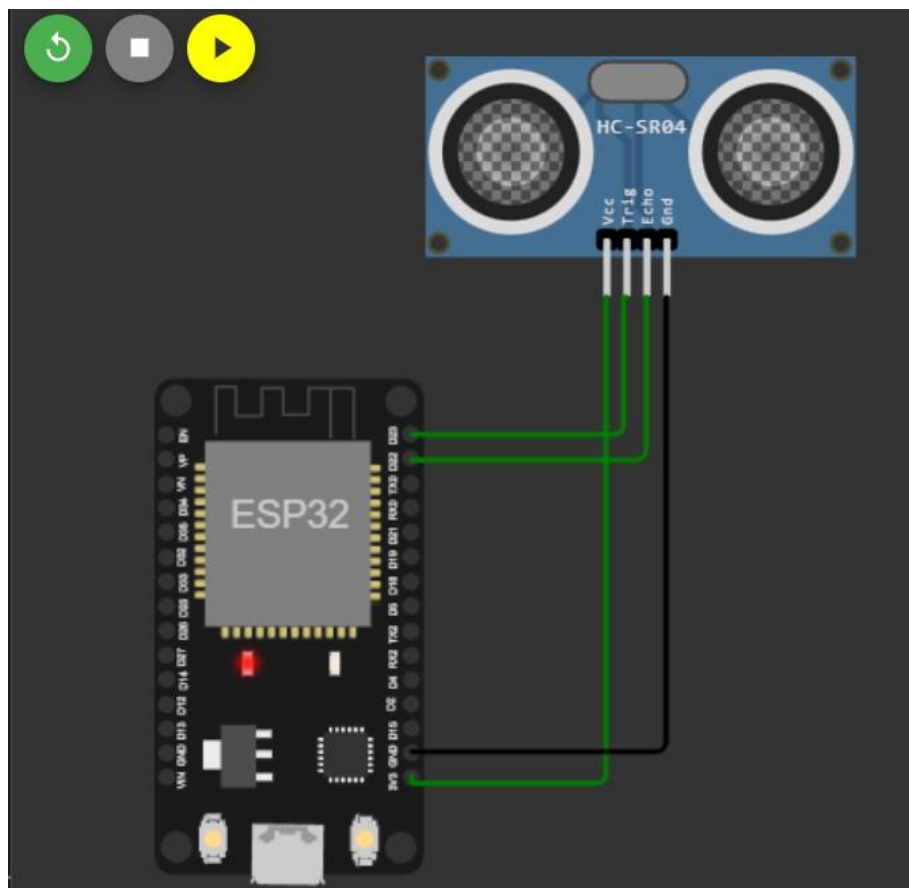
WOKWI PROGRAMMING

ASSIGNMENT DATE:	20-10-2022
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MAXIMUM MARKS:	

QUESTION:

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. Upload document with wokwi share link and images of IBM cloud.

CONNECTIONS:



WOKWI LINK:

<https://wokwi.com/projects/345955152667083348>

SOLUTION:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQTT
#include <HCSR04.h>
HCSR04 hc(23, 22);

#define TRIG_PIN 23 // ESP32 pin GPIO23 connected to Ultrasonic Sensor's
TRIG pin

#define ECHO_PIN 22 // ESP32 pin GPIO22 connected to Ultrasonic Sensor's
ECHO pin

float distance_cm;

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

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

#define ORG "epfem"//IBM ORGANITION ID

#define DEVICE_TYPE "abcd"//Device type mentioned in ibm watson IOT
Platform

#define DEVICE_ID "123"//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); //calling the predefined
client id by passing parameter like server id,portand wificredential

void setup()
{
    // begin serial port
    Serial.begin (9600);
    // configure the trigger pin to output mode
    pinMode(TRIG_PIN, OUTPUT);
    // configure the echo pin to input mode
    pinMode(ECHO_PIN, INPUT);
    delay(10);
    Serial.println();
    wificonnect();
    mqttconnect();
}

void loop()
{
    // generate 10-microsecond pulse to TRIG pin
    digitalWrite(TRIG_PIN, HIGH);
    delayMicroseconds(10);

```

```
digitalWrite(TRIG_PIN, LOW);
```

```
distance_cm=hc.dist();
```

```
// print the value to Serial Monitor
```

```
Serial.print("Distance: ");
```

```
Serial.print(distance_cm);
```

```
Serial.println(" cm");
```

```
PublishData(distance_cm);
```

```
if (!client.loop()) {
```

```
    mqttconnect();
```

```
}
```

```
delay(5000);
```

```
}
```

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

```
void PublishData(float dis) {
```

```
    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 += dis;
```

```
    payload += "}";
```

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

```
    Serial.println(payload);
```

```
    if(dis<100)
```

```

    {
        Serial.println("ALERT DISTANCE LESS THAN 100 CM");
    }
    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)  
{
```

```
    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];  
    }
```

```
}  
Serial.println("data: "+ data3);  
}
```

OUTPUT:



The screenshot shows an Arduino IDE serial monitor window. At the top, there are three circular icons: a green refresh icon, a grey stop icon, and a yellow play icon. In the top right corner, a timer shows '00:17.866' and a battery icon indicates '102%'.

The serial output text is as follows:

```
Connecting to ..  
WiFi connected  
IP address:  
10.10.0.2  
Reconnecting client to epfefm.messaging.internetofthings.ibmcloud.com  
iot-2/cmd/test/fmt/String  
subscribe to cmd OK  
  
Distance: 332.98 cm  
Sending payload: {"Distance":332.98}  
Publish ok  
Distance: 120.99 cm  
Sending payload: {"Distance":120.99}  
Publish ok  
Distance: 36.99 cm  
Sending payload: {"Distance":36.99}  
ALERT DISTANCE LESS THAN 100 CM  
Publish ok  
Distance: 380.97 cm  
Sending payload: {"Distance":380.97}  
Publish ok
```

IBM CLOUD:

123	Connected	abcd	Device	Oct 18, 2022 8:45 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":380.97}	json	a few seconds ago	
Data	{"Distance":36.99}	json	a few seconds ago	
Data	{"Distance":120.99}	json	a few seconds ago	
Data	{"Distance":332.98}	json	a few seconds ago	