

Assignment -1
Python Programming

Assignment Date	15 October 2022
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Maximum Marks	2 Marks

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

Code :

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

void callback(char* subscribetopic,byte* payload,unsigned int payloadLength);
#define ORG "vy6h4o"
#define DEVICE_TYPE "akha215"
#define DEVICE_ID "akha215"
#define TOKEN "S7d2t()HWfU5eiM!vM"
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701

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

long duration;
float distanceCm;
float distanceInch;
String data;

char server[]=ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/event_1/fmt/json";
char subscribeTopic[] = "iot-2/cmd/home/fmt/String";
char authMethod[] = "use-token-auth";
char token[] =TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;

WiFiClient 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
```

```

    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);

    delay(1000);

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

void PublishData(float distanceCm)
{
    mqttconnect ();
    String payload;

    if(distanceCm<100.0)
    {
        payload = "{\"Alert\":\"";
        payload += distanceCm;
        payload += "\"}";
    }
}

```

```

else
{
    payload = "{\"distanceCm\":\"";
    payload += distanceCm;
    payload += "\"";
}

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

if(client.publish(publishTopic , (char*) payload.c_str())){
    Serial.println("Publish ok");}
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()
{
    Serial.println();
    Serial.print("Connecting to");

    WiFi.begin("Wokwi-GUEST","",6);
    while(WiFi.status() != WL_CONNECTED)
    {

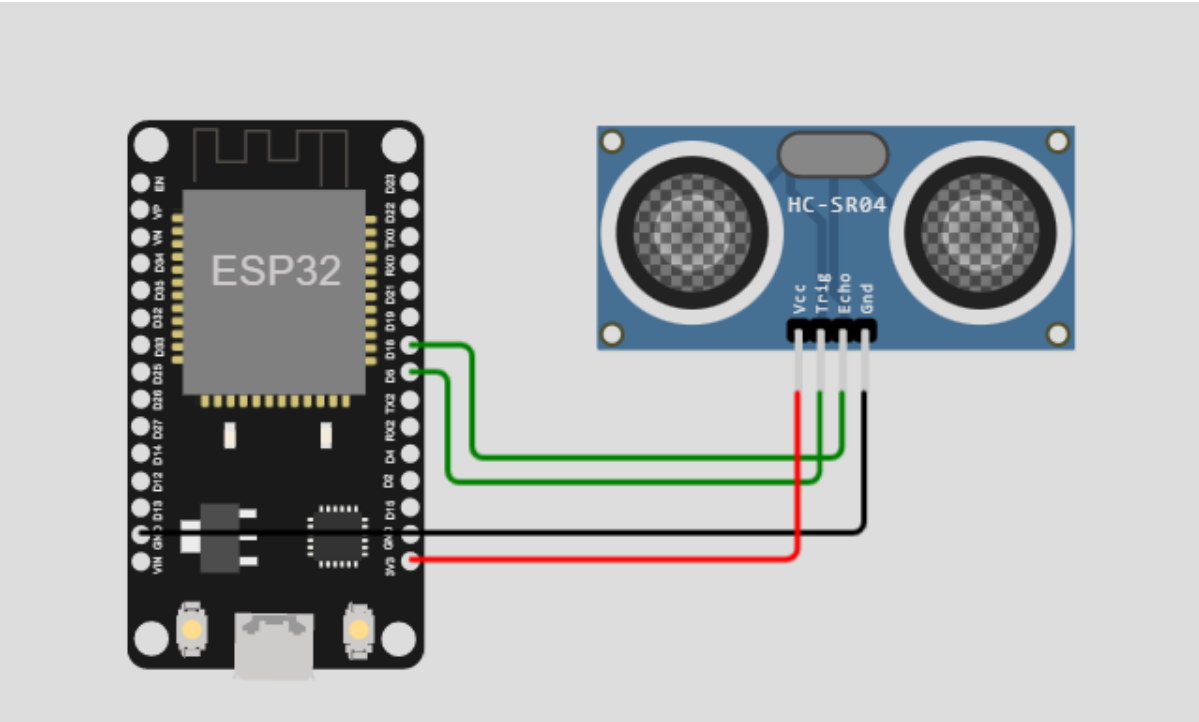
```

```

        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);
}

```



```
Distance (cm): 125.95
Sending payload: {"distanceCm":125.95}Publish ok
Distance (cm): 65.98
Sending payload: {"Alert":65.98}Publish ok
Distance (cm): 65.98
Sending payload: {"Alert":65.98}Publish ok
Distance (cm): 65.98
```

Event	Value	Format	Last Received
event_1	{"Alert":65.98}	json	a few seconds ago
event_1	{"Alert":65.98}	json	a few seconds ago
event_1	{"distanceCm":125.95}	json	a few seconds ago
event_1	{"distanceCm":125.95}	json	a few seconds ago
event_1	{"distanceCm":126}	json	a few seconds ago

Wokwi link: <https://wokwi.com/projects/346284079114617428>