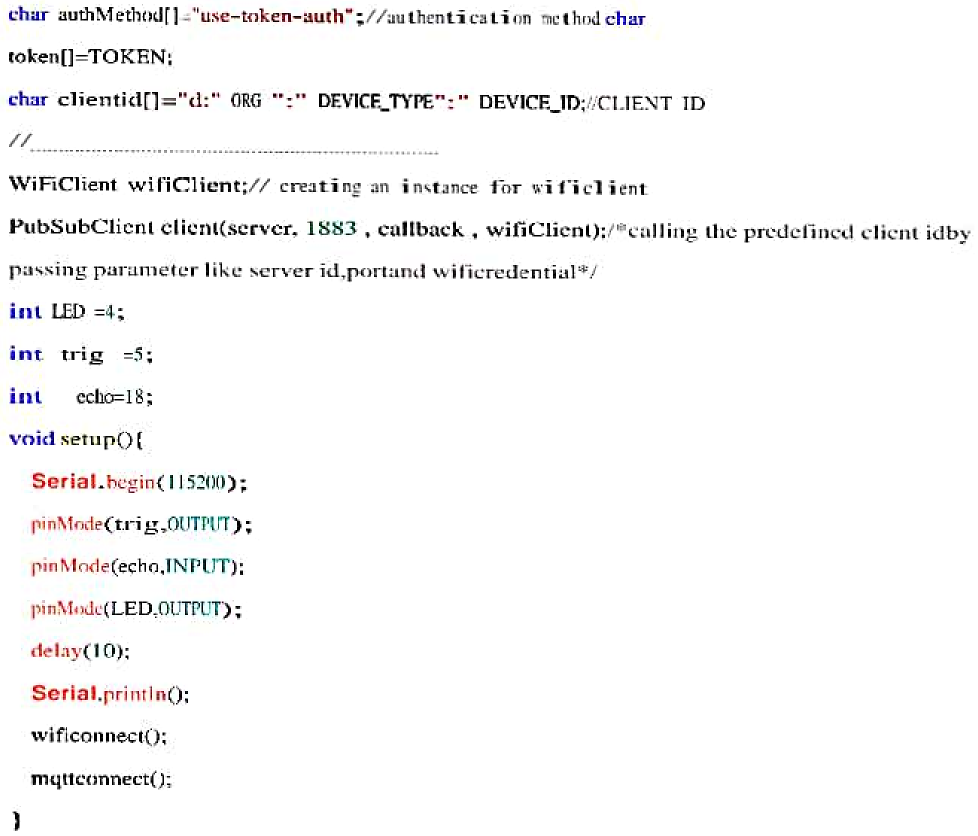
Coding:

```
 #include<WiFi.h>//library for wifi
#include<PubSubClient.h>//library for MQTT
void callback(char* subscribetopic, byte* payload,unsigned int payloadlength);
//----------------credentials of IBM Account------
#define ORG "45z3o2"// IBM ORGANIZATION ID
#define DEVICE_TYPE "ESP32_Controller"//DEVICE TYPE MENTIONED IN IOT WATSON PLATFORM#define
DEVICE_ID "bme2"//DEVICE ID MENTIONED IN IOT WATSON PLATEFORM
#define TOKEN "OKZ+q@JfPWDOd6wBTj"//Token
String data3;
float dist;
//------------customize the above value-------
char  server[]=ORG  ".messaging.internetofthings.ibmcloud.com";//server  name
char publishtopic[]="ultrasonic/evt/Data/fmt/json";/*topic name and type of event performand
  format in which data to be send*/
char subscribetopic[]="ultrasonic/cmd/test/fmt/String";/*cmd REPRESENT Command tupe and
COMMAND IS TEST OF FORMAT STRING*/
```



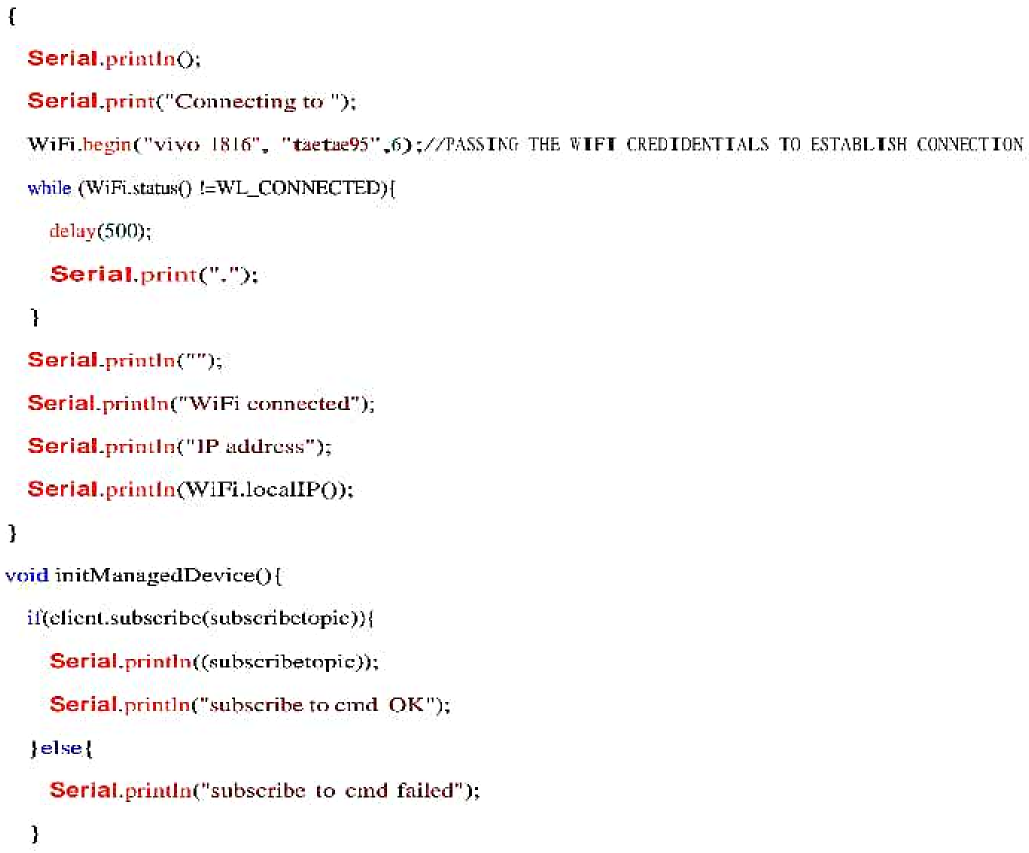
```
char authMethod[]="use-token-auth";//authentication method char
token[]=TOKEN;
char clientid[]="d:" ORG ":" DEVICE_TYPE":" DEVICE_ID;//CLIENT ID
//...............................................................................
WiFiClient wifiClient;// creating an instance for wificlient
PubSubClient client(server, 1883 , callback , wifiClient);/*calling the predefined client idby
passing parameter like server id,portand wificredential*/
int LED =4;
int  trig  =5;
int    echo=18;
void setup(){
  Serial.begin(115200);
  pinMode(trig,OUTPUT);
  pinMode(echo,INPUT);
  pinMode(LED,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}
```

```
void loop() {
  digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW);
  float dur=pulseIn(echo,HIGH);
  float dist=(dur * 0.0343)/2;
  Serial.print("distance in cm");
  Serial.println(dist);
  PublishData(dist); delay(1000);
  if (!client.loop()){
    mqttconnect();
  }
}
/*..............................................retriving          to  cloud...................................................... */
void PublishData(float dist){ mqttconnect();//function
  call for connecting to ibm
  /*creating the string in form of JSON to update the data to ibm cloud*/String
  object;
```

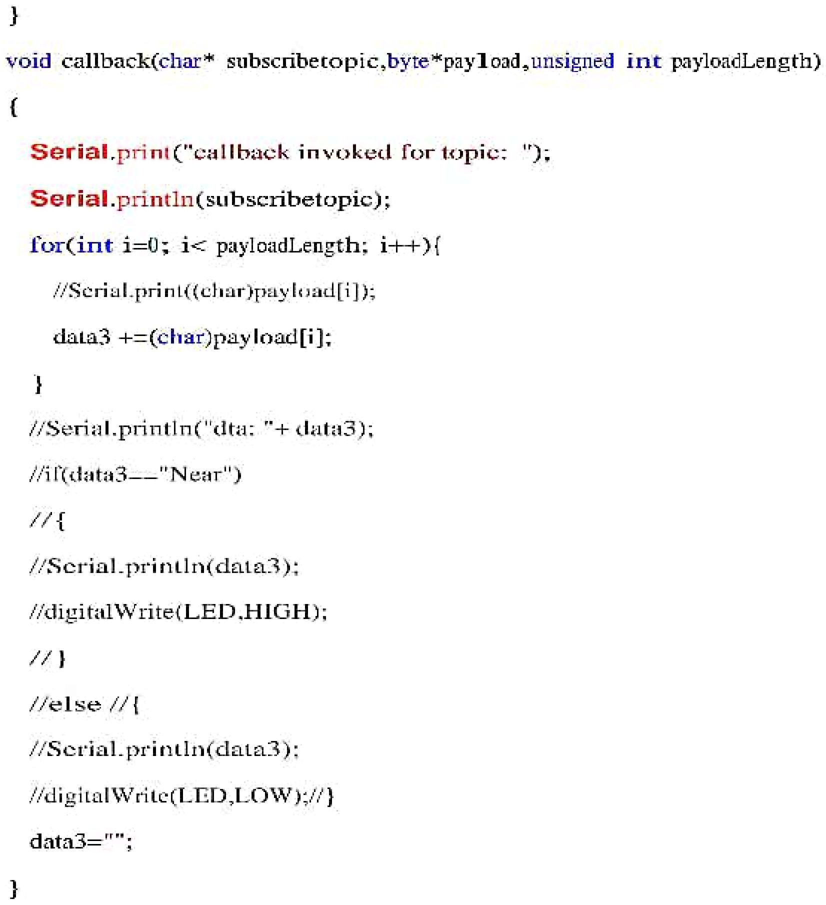
```
if(dist<100)
{
  digitalWrite(LED,HIGH);
  Serial.println("no object is near");
  object="Near";
}
else
{
  digitalWrite(LED,LOW);
  Serial.println("no object found");
  object="No";
}
String payload="{\"distance\":";
payload +=dist;
payload +="," "\"object\":\"";
payload += object;
payload += "\"}";

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

```
  if(client.publish(publishtopic, (char*) payload.c_str())){
    Serial.println("Publish ok");/* if its 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 defenition for  wificonnect
```

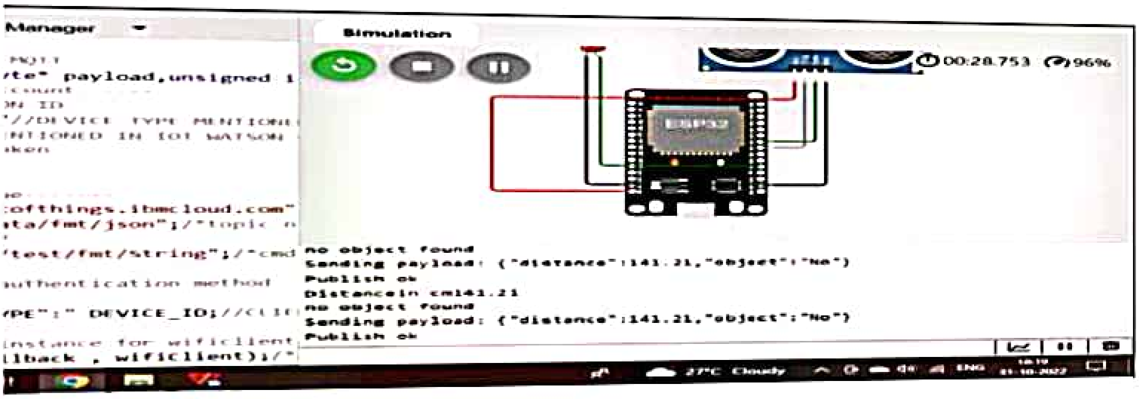


```
{
  Serial.println();
  Serial.print("Connecting to ");
  WiFi.begin("vivo 1816", "taetae95",6);//PASSING THE WIFI CREDIDENTIALS TO ESTABLISH CONNECTION
  while (WiFi.status() !=WL_CONNECTED){
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP 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("dta: "+ data3);
  //if(data3=="Near")
  //{
  //Serial.println(data3);
  //digitalWrite(LED,HIGH);
  //}
  //else //{
  //Serial.println(data3);
  //digitalWrite(LED,LOW);//}
  data3="";
}
```

Output:



```
MQTT
yte* payload,unsigned i
count
ON ID
"//DEVICE TYPE MENTIONE
NTIONED IN IOT WATSON
oken

ne
:ofthings.ibmcloud.com"
ata/fmt/json";/"topic n

/test/fmt/string";/"cmd

authentication method

YPE":" DEVICE_ID;//CLIE

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```
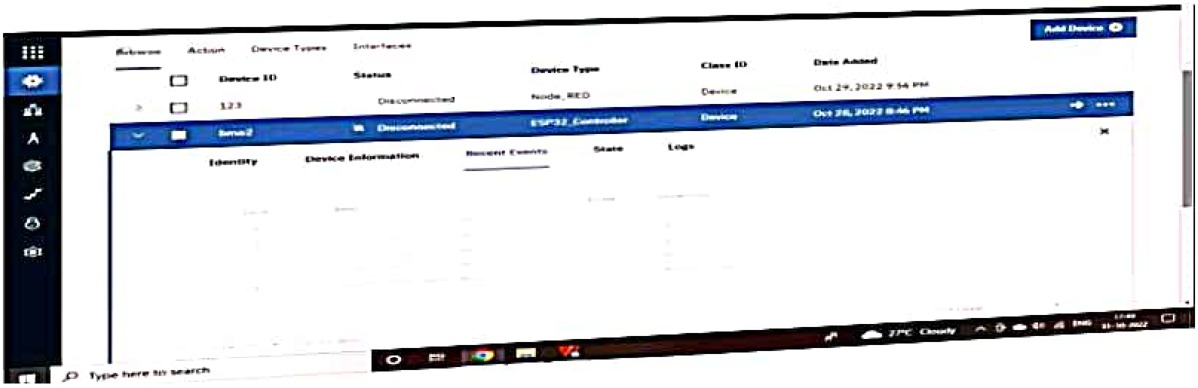

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```



	Device ID	Status	Device Type	Class ID	Date Added
□	123	Disconnected	Node_RED	Device	Oct 29, 2022 9:54 PM
□	bma2	Disconnected	ESP32_Controller	Device	Oct 28, 2022 8:46 PM

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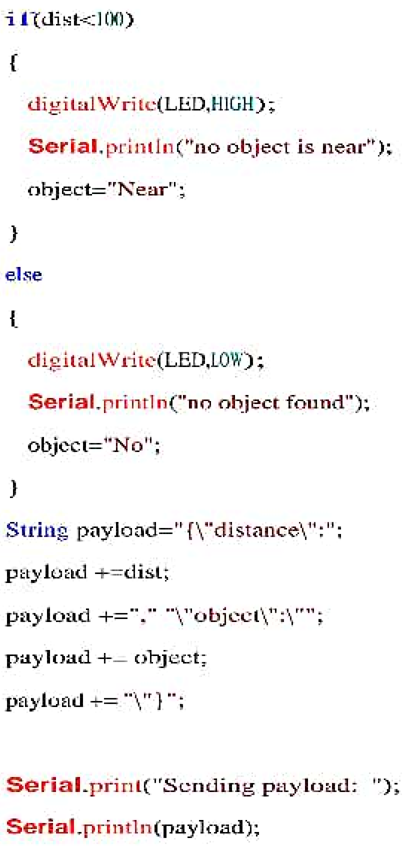

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payload +=dist;
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Serial.print("Sending payload:  ");
Serial.println(payload);
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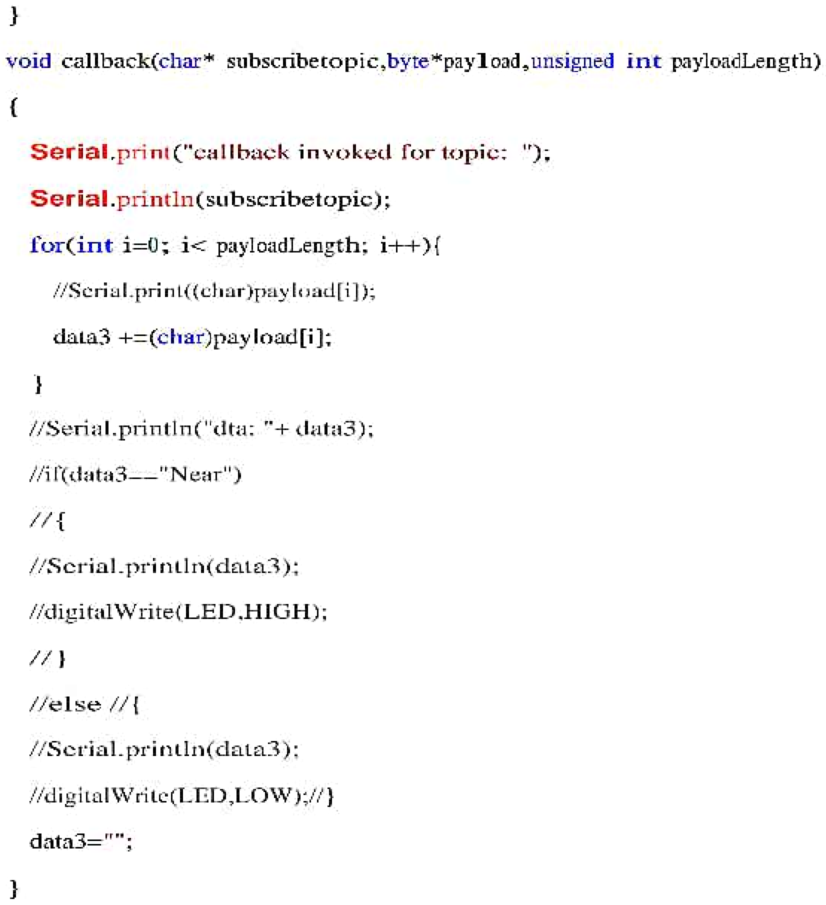

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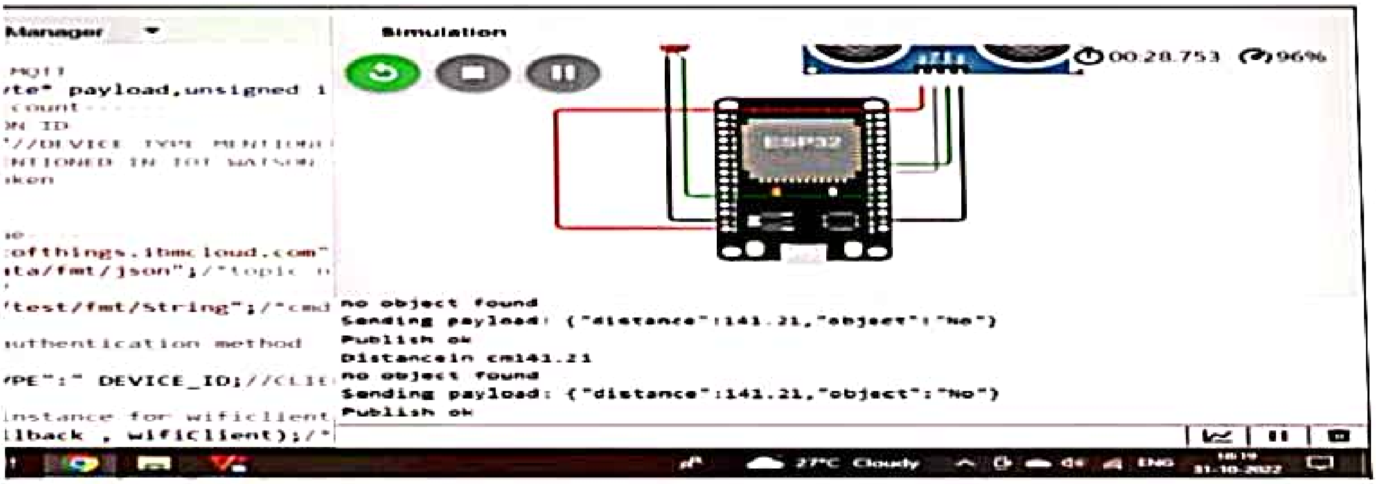
Output:



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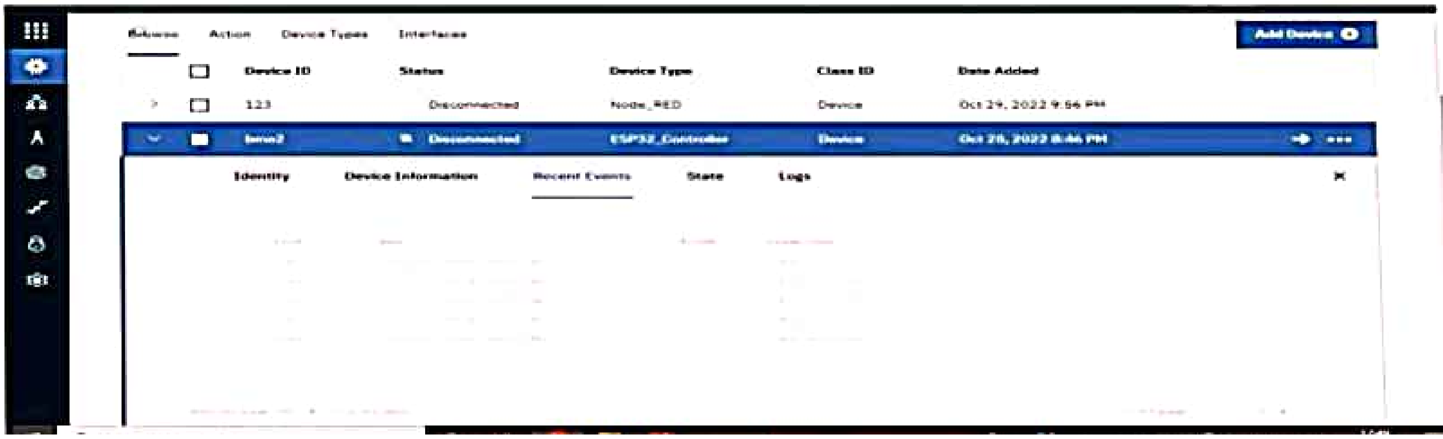

	Device ID	Status	Device Type	Class ID	Date Added
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∨ □	bmo2	Disconnected	ESP32_Controller	Device	Oct 28, 2022 8:46 PM