FINAL PROJECT

DATE	**20 th may 2023**
TEAM ID	**NM2023TMID10912**
PROJECT	**Smart billing system for water suppliers**

CODE:

https://wokwi.com/projects/365229207060700161

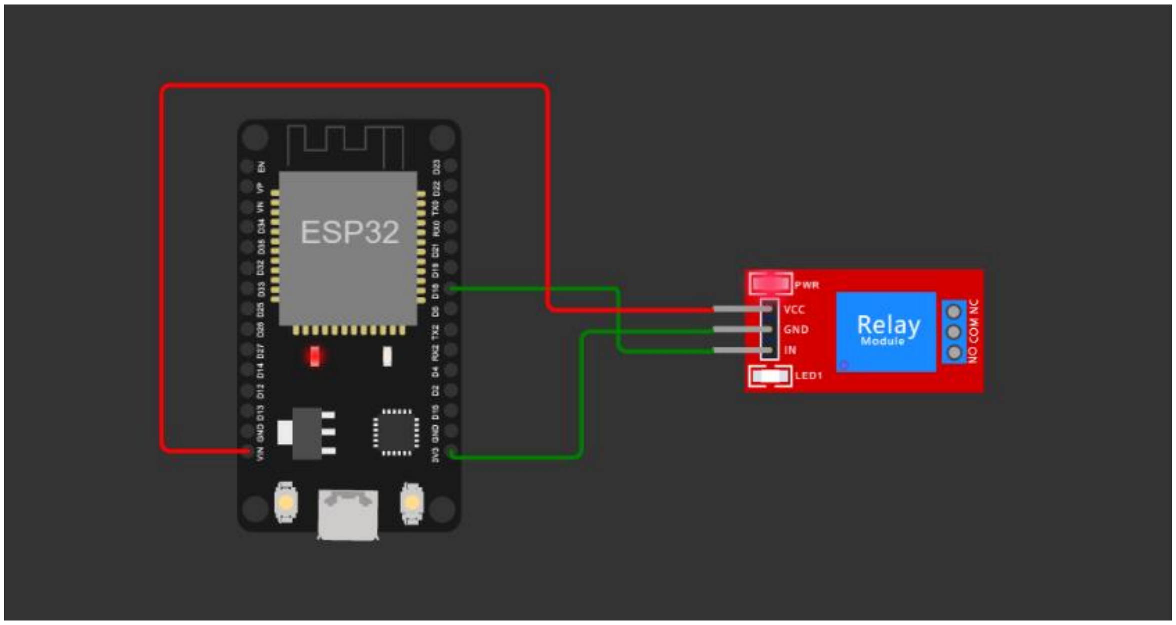
```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#define RELAY_PIN 18 // ESP32 pin GIOP18 connected to the IN pin of relay
#include "time.h"
float time1=0;
float motorbill;
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);

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

#define ORG "ekgqtl"//IBM ORGANITION ID
#define DEVICE_TYPE "ibmcloud"//Device type mentioned in ibm watson IOT
Platform
#define DEVICE_ID "1234" //Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"     //Token
String data3;
float h, t;
const char* ntpServer = "pool.ntp.org";
const long  gmtOffset_sec = 0;
const int   daylightOffset_sec = 3600;

//-------- 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);



// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin as an output.
  Serial.begin(115200);
  pinMode(RELAY_PIN, OUTPUT);
  delay(10);
  Serial.println();
  configTime(gmtOffset_sec, daylightOffset_sec, ntpServer);







  wificonnect();
  mqttconnect();
}

// the loop function runs over and over again forever
void loop() {
 // digitalWrite(RELAY_PIN, HIGH);
  //delay(1000);
  //digitalWrite(RELAY_PIN, LOW);
  //delay(1000);
 // motorbill=random(60,200);
  //motorbill=motorbill*5;
  //delay(1000);
  //PublishData(motorbill);
  if (!client.loop()) {
    mqttconnect();
  }
```

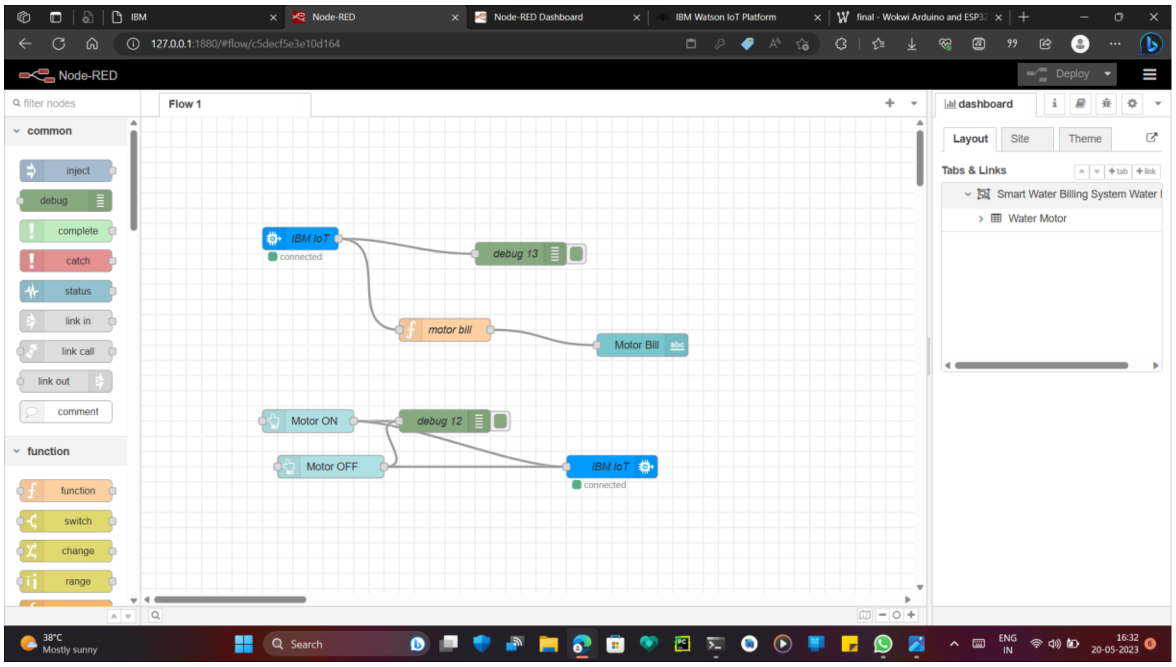
```
}

void PublishData(float motorbill) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"motorbill\":";
  payload += motorbill;

  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("connected and billing started");
  } 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);
  if(data3=="on")
  {
Serial.println(data3);
digitalWrite(RELAY_PIN, HIGH);
PublishData(0);
Serial.println("The time at which the motor is switched on:");
printLocalTime();

time1+=1;
```

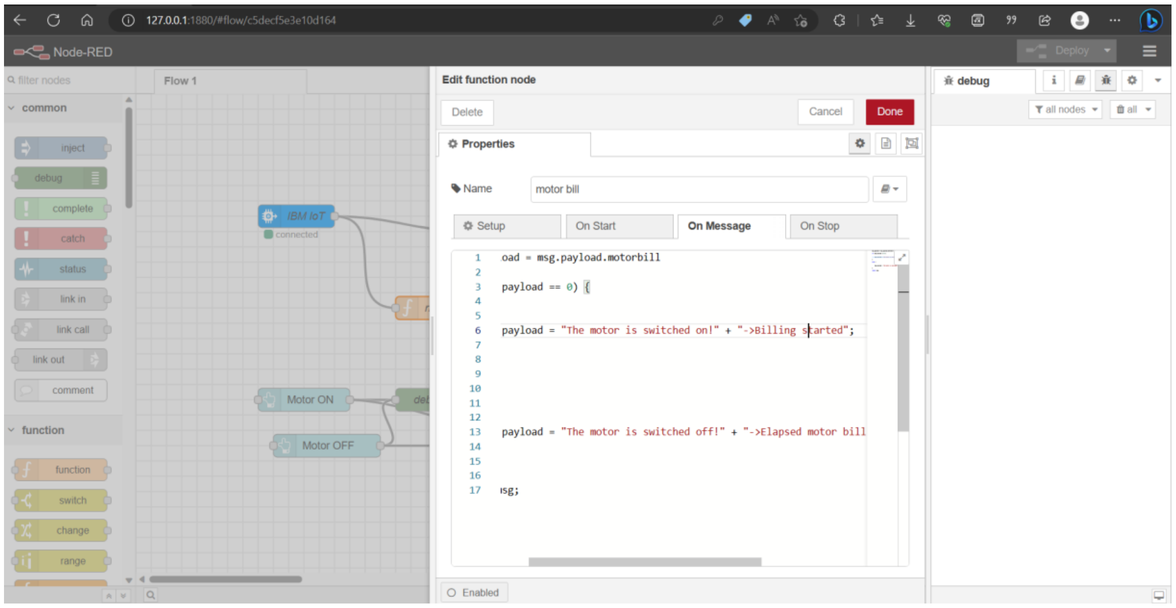
```
  }

  else if(data3=="off")
  {
  //Serial.print(time1);
Serial.println(data3);
digitalWrite(RELAY_PIN, LOW);
motorbill=random(60,200);
motorbill=motorbill*5;
delay(1000);
PublishData(motorbill);
Serial.println("The time at which the motor is switched off:");
printLocalTime();
time1=0;

  }

data3="";



}
void printLocalTime(){
  struct tm* timeinfo;
  time_t now;
  time(&now);

  timeinfo = localtime(&now);
  Serial.print(timeinfo,"%H:%M:%S");

  /* Serial.println("Hour: ");
  Serial.println(timeinfo, "%H");
  Serial.print("Hour (12 hour format): ");
  Serial.println(timeinfo, "%I");
  Serial.print("Minute: ");
  Serial.println(timeinfo, "%M");
  Serial.print("Second: ");
  Serial.println(timeinfo, "%S");*/


  Serial.println();
}
```

SCHEMATIC :


ESP32
EN
VP
VN
D34
D35
D32
D33
D25
D26
D27
D14
D12
D13
GND
VIN
D23
D22
TX0
RX0
D21
D19
D18
D5
TX2
RX2
D4
D2
D15
GND
3V3
PWR
VCC
GND
IN
LED1
Relay
Module
NO
COM
NC

Node-RED :



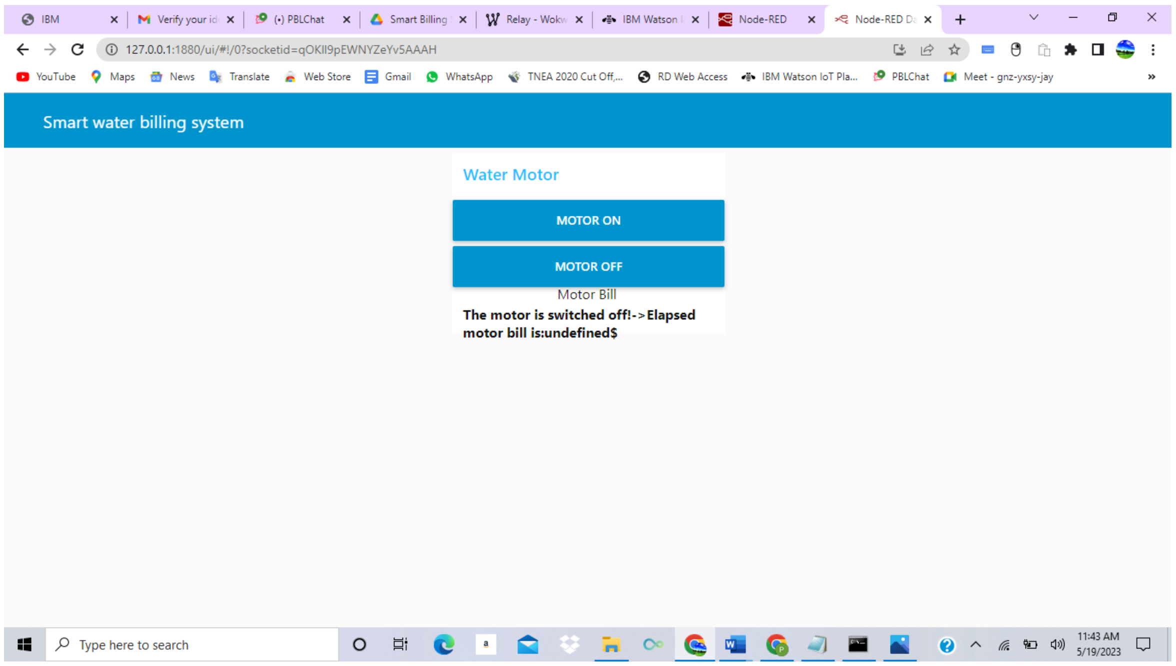

Edit function node

Name: motor bill

On Message

```
oad = msg.payload.motorbill

payload == 0) {


payload = "The motor is switched on!" + "->Billing started";






payload = "The motor is switched off!" + "->Elapsed motor bill



sg;
```

Output :



The motor is switched off!->Elapsed motor bill is:undefined$

0