COMPUTER NETWORK PROJECT

IOT SMARTHOME

Some solutions to control the device via WiFi

Contents

Introduction _____ **Error! Bookmark not defined.**

Devices _____ **Error! Bookmark not defined.**

Application _____ 4

Implementation _____ 8

References _____ 21

I. INTRODUCTION

The world nowadays getting more and more modern with many new kind of technology that can help and increase our life so that many smart device appear. Our group want to give a new solution to control our home appliances that seems very interesting.

By using the ESP8266 Node MCU with low price come with big benefits, we will show you how it can interact with some devices like led to control your device via Wifi Connection.

Group member
Tran Duy Bao – ITITIU15076

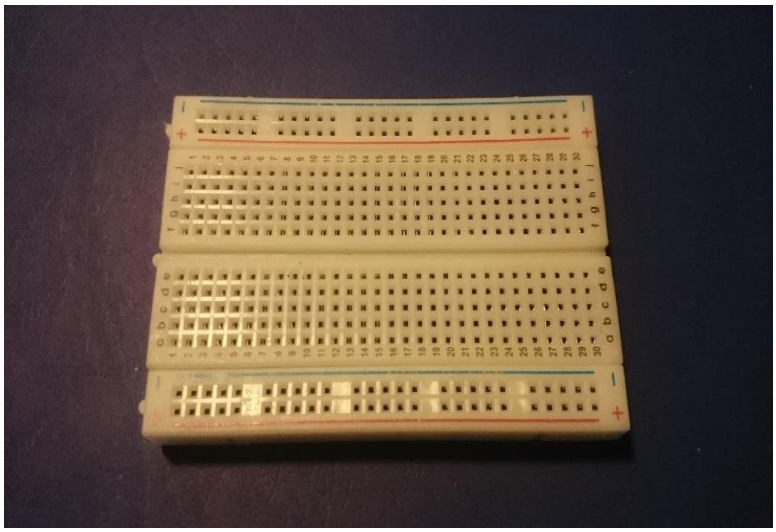
II. DEVICES

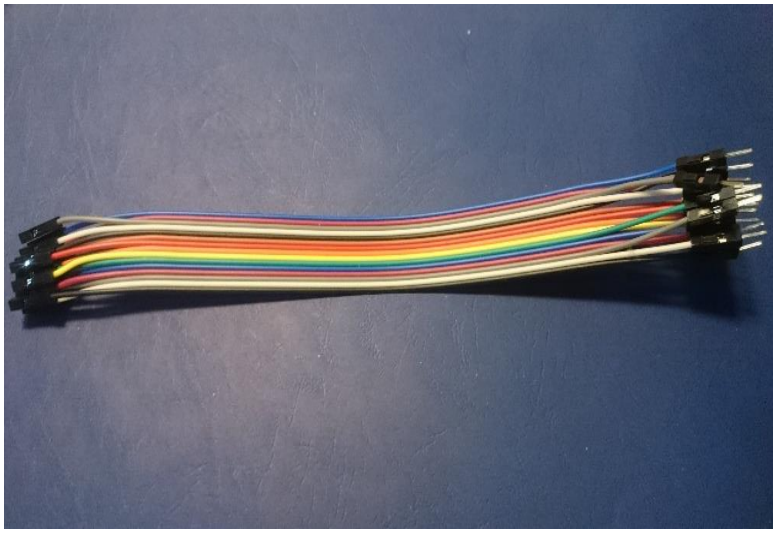
1. ESP8266 NodeMCU using CH340 microcontroller

- In some cases, your PC doesn't have driver to interface with the CH340 microcontroller,download the file in the link below to install driver : https://sparks.gogo.co.nz/ch340.html

2. LED

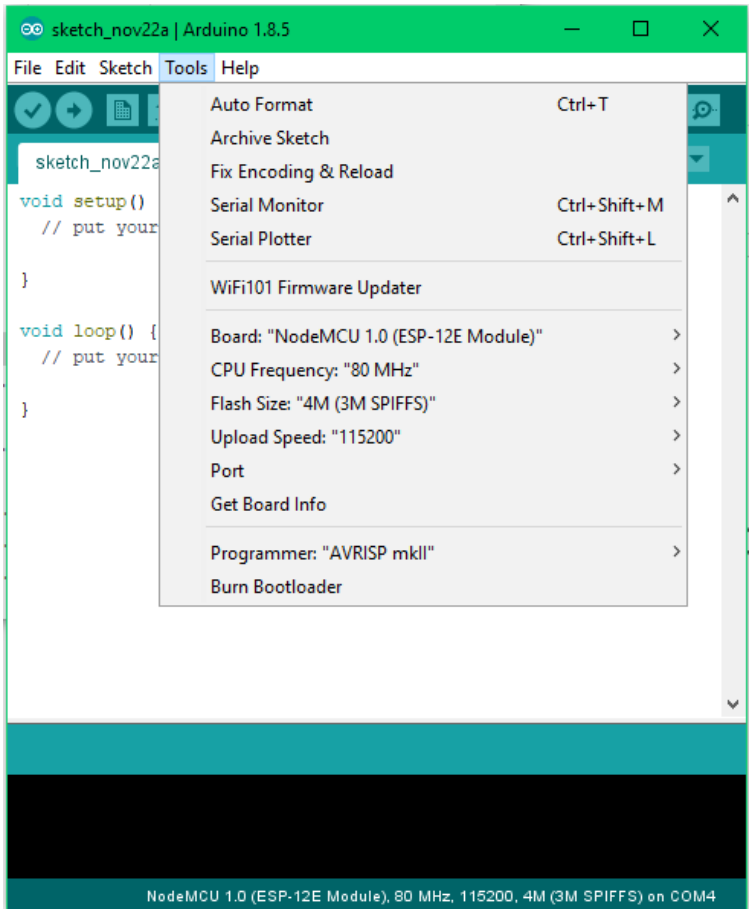
3. Test board , Wire





III. APPLICATION

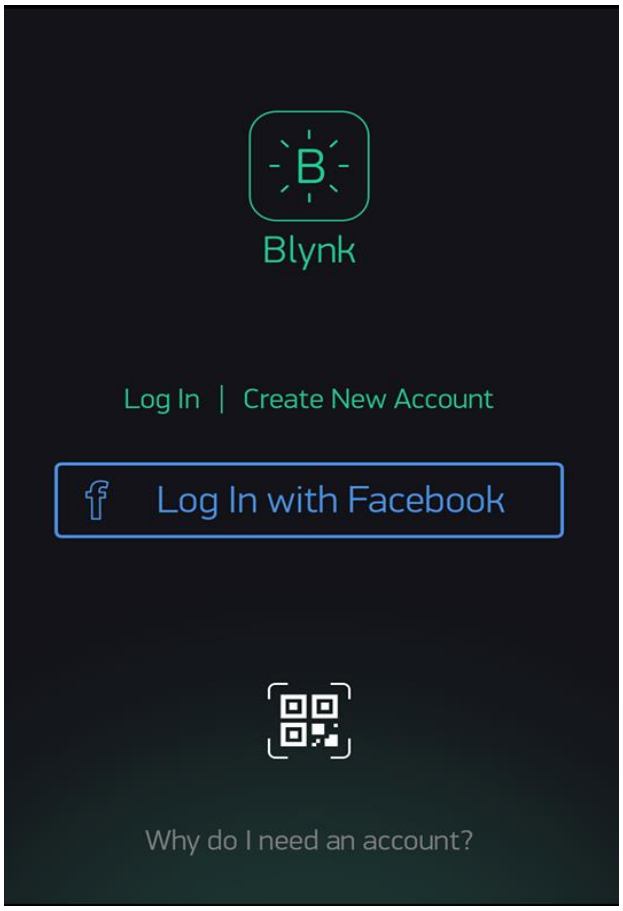
1. Adruino IDE 1.8.5



- You can use any version of Adruino IDE
- In the first use , there isn't a driver for the ESP8266 device ,this link show to install it : http://www.instructables.com/id/Programming-ESP8266-ESP-12E-NodeMCU-Using-Arduino-/

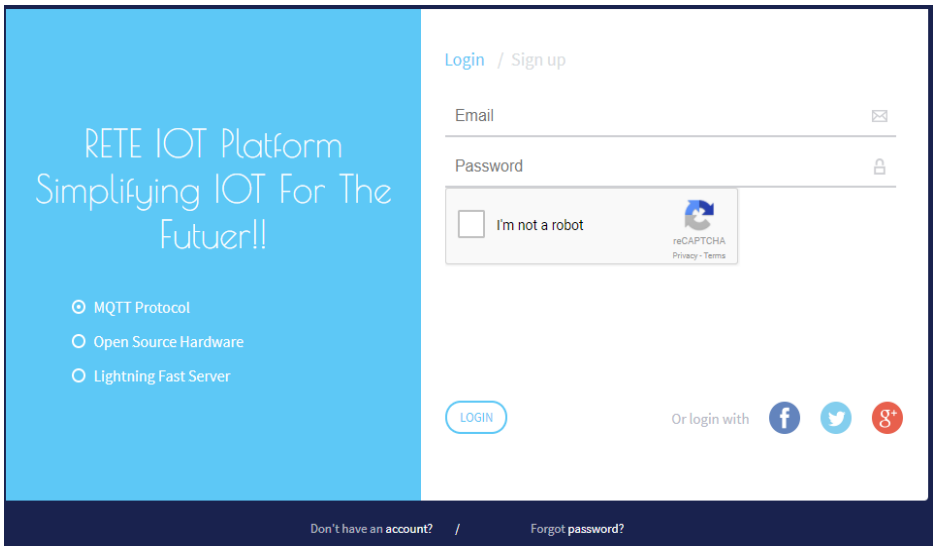
2. Blynk App :

- Blynk is one of the most popular mobile applications for the IOT. Works with anything: ESP8266, - Arduino, Raspberry Pi, SparkFun and others.
- In this project we use Blynk Server to control the led, you can create an account with your email and receive the Authentication token for your project
- Blynk app is available free on Android & IOS

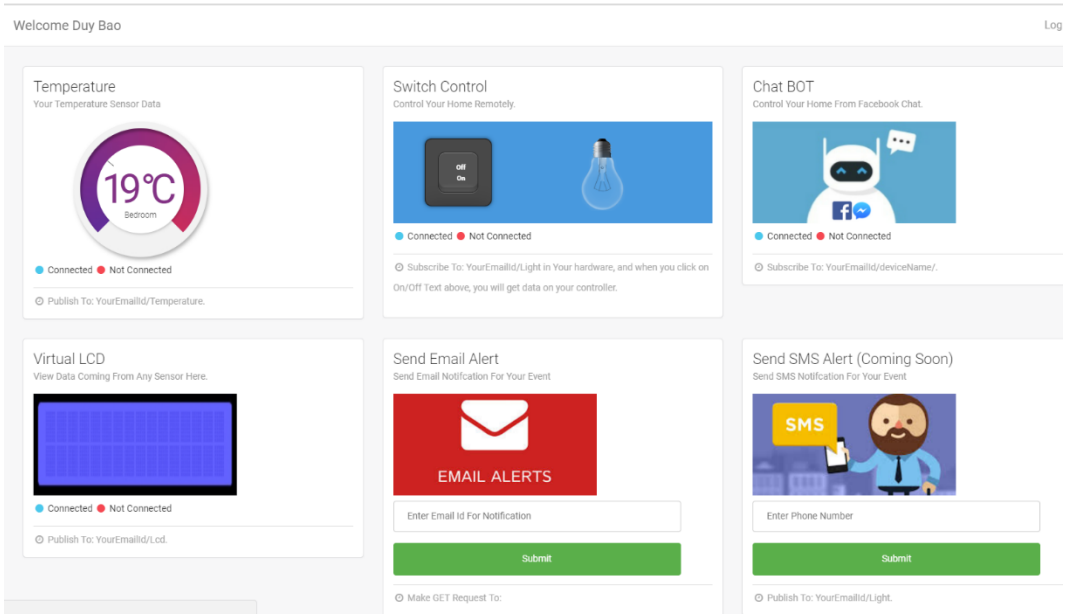


3. ReteIOT Platform website : http://io.reteiot.com/user/login

- ReteIOT is a flatform which provides MQTT protocol
- ReteIOT also works well with many Development Kit. It contains many function via API such as : display , manage chatbox, send email , send sms, ….
- You can create an account and use the API : http://io.reteiot.com/api/user/facebookchat/your-email

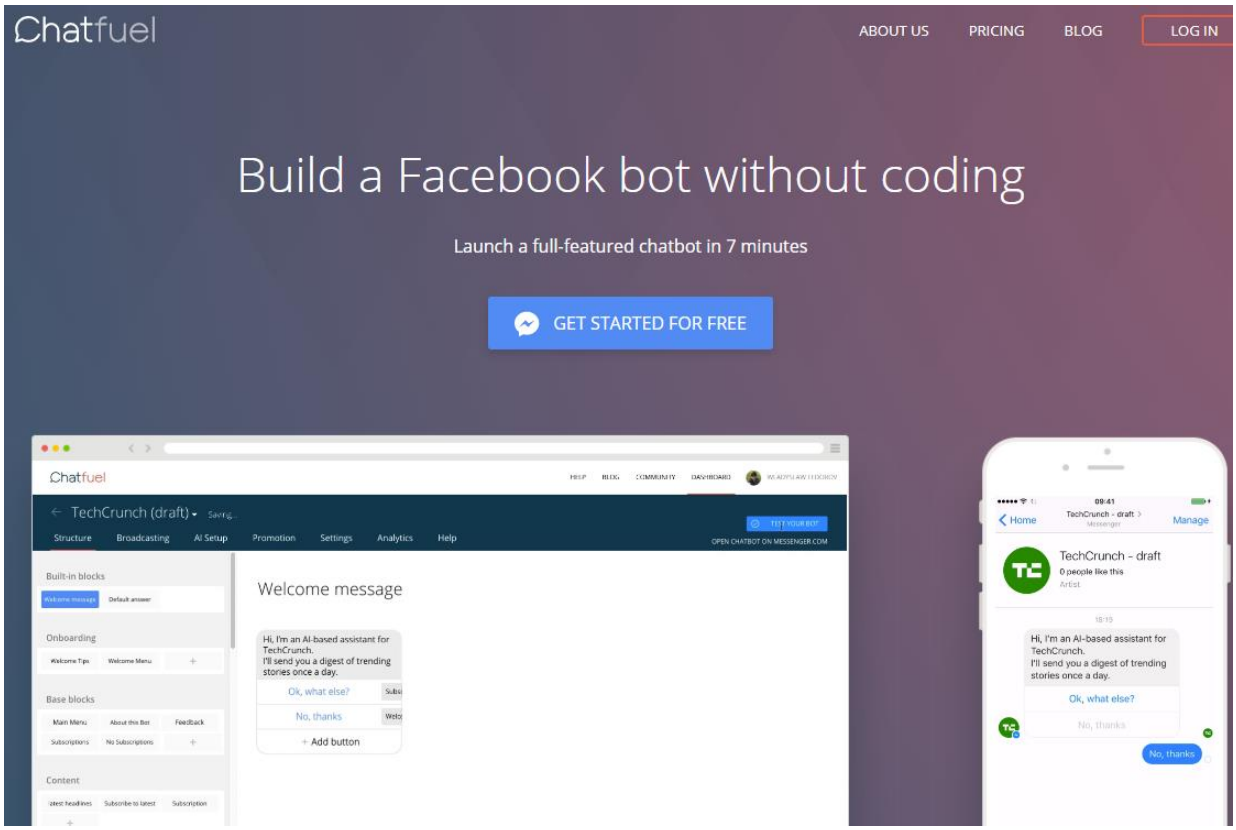


- After register and login , this is the main UI of the dashboard



4. Chatfuel : https://chatfuel.com/

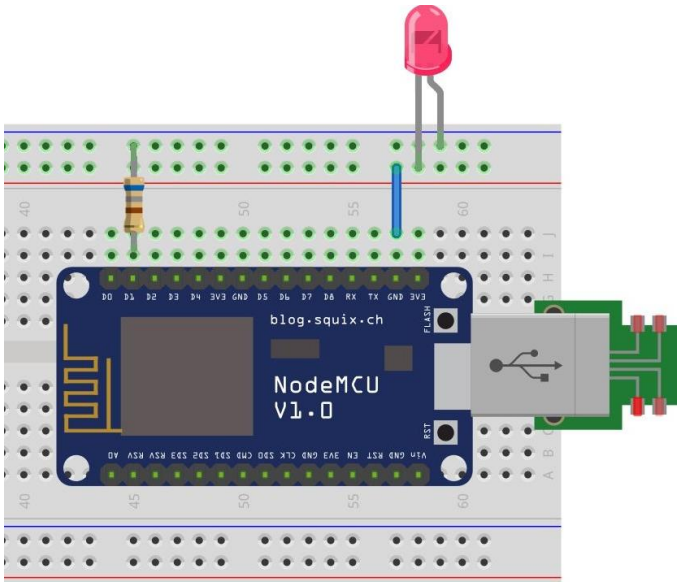
- This site use to create a automatically chatbot via your Facebook messenger
- -Chatfuel is a website where you can create an AI bot for your Facebook page.
- -You can login directly with your facebook account.



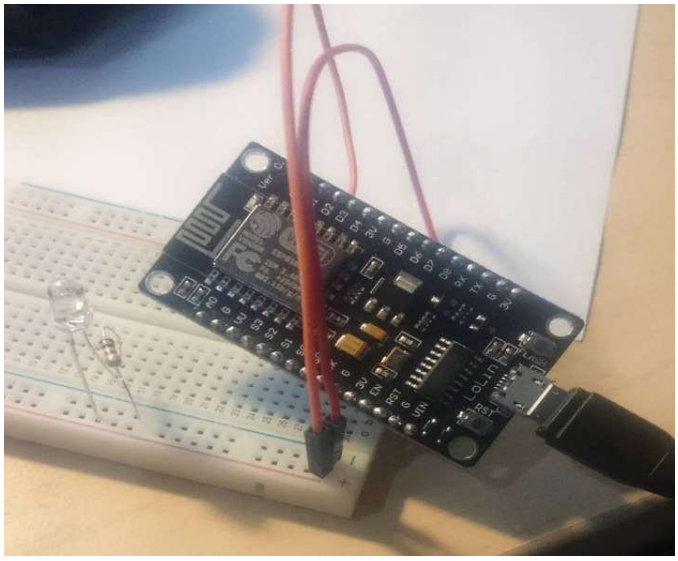
IV. IMPLEMENTATION

- SETUP THE DEVICES

- You can use any Digital Pin on the Kit to connect to the LED
- In this example, output D1 (GPIO5) is use to connect to LED Anode



The real view :



1. Control the led by Web Server.

   On Arduino IDE : Verify and upload the code with your wifi ssid and password

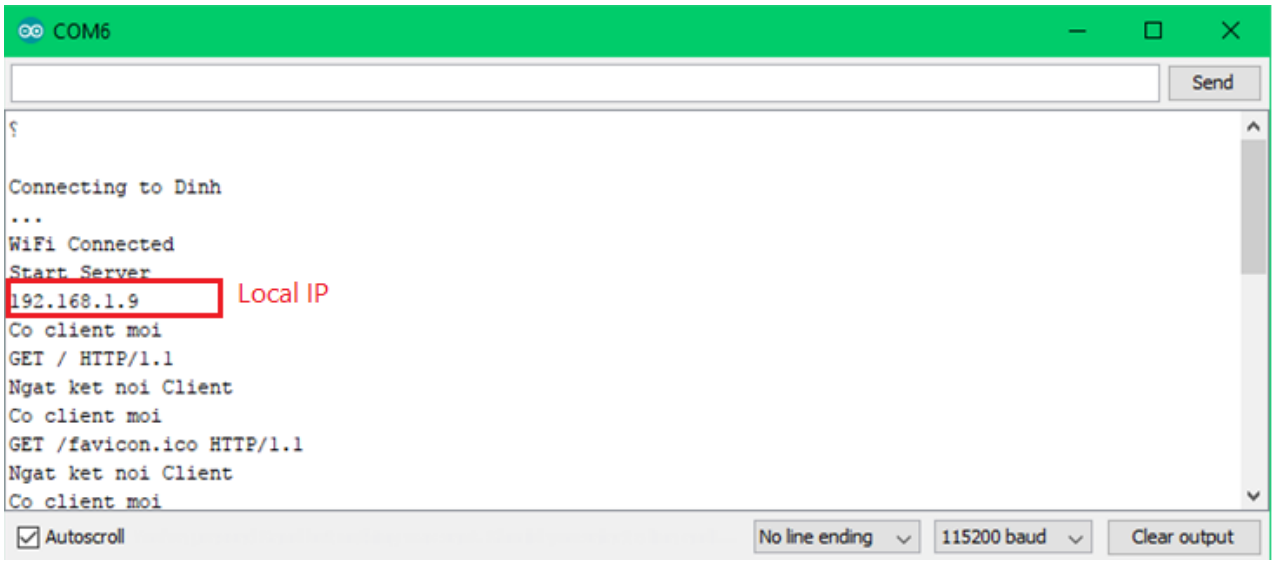
```
#include <ESP8266WiFi.h>
// WiFi Configuration
const char* ssid = “your wifi name";
const char* password = "12121212";
// Create Server
WiFiServer server(80);
int output_pin = 5; // (GPIO5 = output D1)
void setup() {
 Serial.begin(115200);
 delay(10);
 // GPIO5
 pinMode(output_pin, OUTPUT);
 digitalWrite(output_pin, 0);
 // WiFi Connection
 Serial.print("Connecting to ");
 Serial.println(ssid);
```

```
 while (WiFi.status() != WL_CONNECTED) {
  delay(500);
  Serial.print(".");
 }
 Serial.println("");
 Serial.println("WiFi Connected");

 // Start server
 server.begin();
 Serial.println("Start Server");

 // IP print
 Serial.println(WiFi.localIP());
}
```

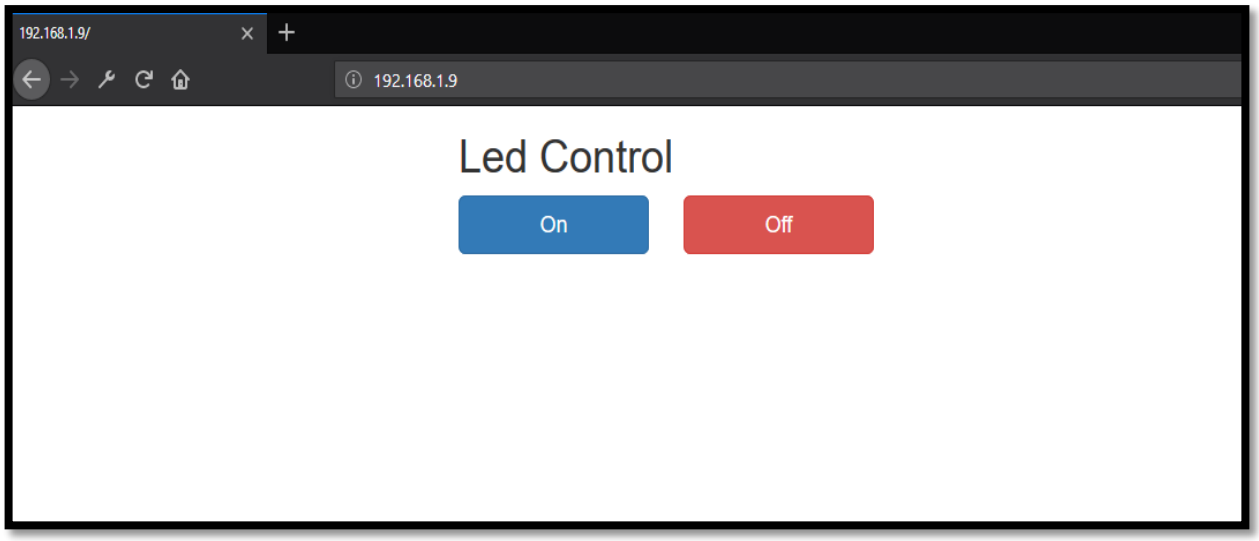
```
// Check Client Connection
WiFiClient client = server.available();
if (!client) {
  return;
}

// Client send data
Serial.println("Co client moi");
while(!client.available()){
  delay(1);
}

// Read client data
String req = client.readStringUntil('\r');
Serial.println(req);
client.flush();
```

```
// Prepare HTML page to response
 String s = "HTTP/1.1 200 OK\r\nContent-Type: text/html\r\n\r\n";
 s += "<head>";
 s += "<meta name=\"viewport\" content=\"width=device-width, initial-scale=1\">";
 s += "<script src=\"https://code.jquery.com/jquery-2.1.3.min.js\"></script>";
 s += "<link rel=\"stylesheet\"
href=\"https://maxcdn.bootstrapcdn.com/bootstrap/3.3.4/css/bootstrap.min.css\">";
 s += "</head>";
 s += "<div class=\"container\">";
 s += "<h1>Led Control</h1>";
 s += "<div class=\"row\">";
 s += "<div class=\"col-md-2\"><input class=\"btn btn-block btn-lg btn-primary\"
type=\"button\" value=\"On\" onclick=\"on()\"></div>";
 s += "<div class=\"col-md-2\"><input class=\"btn btn-block btn-lg btn-danger\"
type=\"button\" value=\"Off\" onclick=\"off()\"></div>";
 s += "</div></div>";
 s += "<script>function on() {$.get(\"/on\");}</script>";
 s += "<script>function off() {$.get(\"/off\");}</script>";
// Send information to client
 client.print(s);
 delay(1);
 Serial.println("Client Disconnection");
}
```

Here is the result on serial monitor :



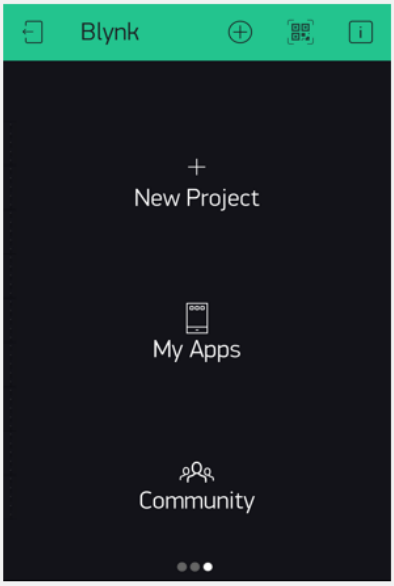
Go to 192.168.1.xx on the brower , the page is displayed with button to control the led



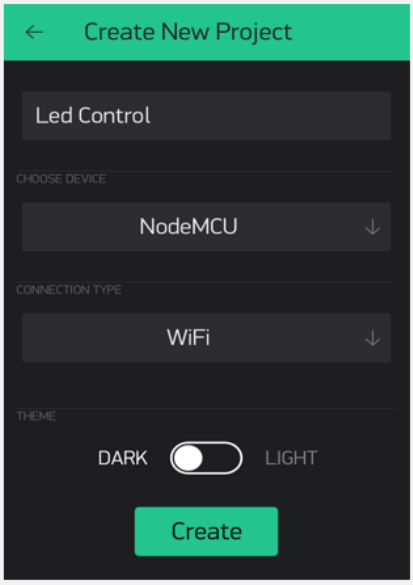
2. Control the led via Blynk api

- On Blynk App :

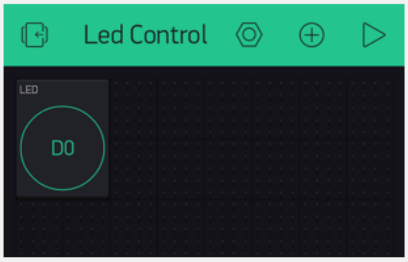
- Add a New Project



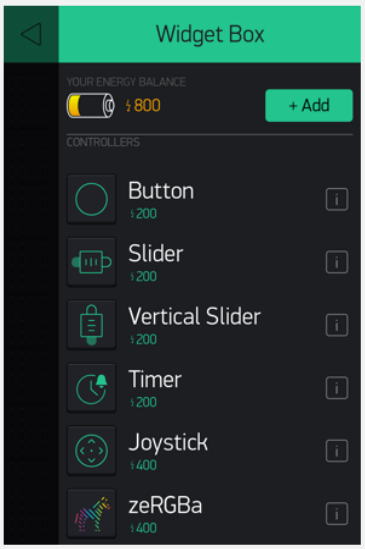
- Set the name, choose device is NodeMCU and connection is WiFi



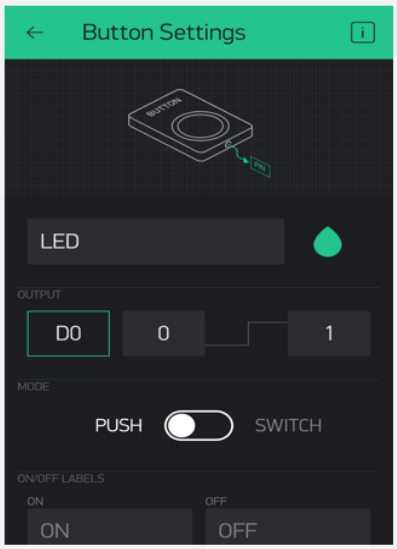
- A button is created



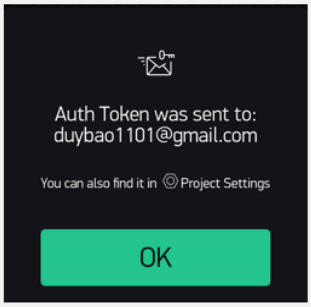
- Add a Button

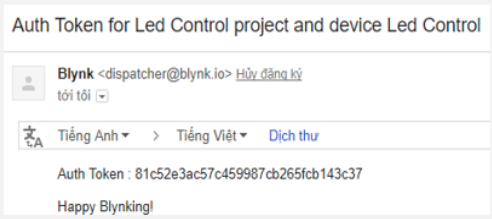


- Set the output is Digital , in the example is D0 , and the mode is Switch



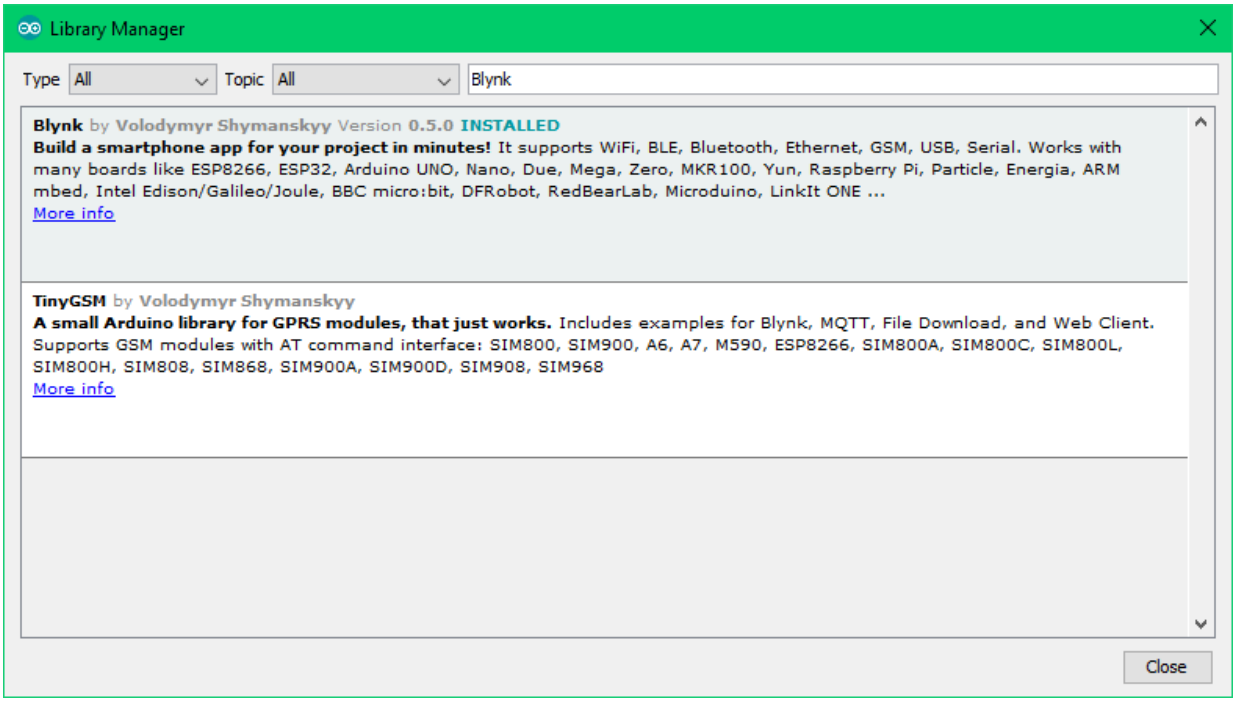
- An Auth token is sent to your email





On Arduino IDE :

- To use Blynk API, add Blynk library on Library Manager



Here is the code to work :

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

//Configure the Auth Token, Wifi SSID, Wifi Password
char auth[] = "YourAuthToken";
char ssid[] = "YourNetworkName";
char pass[] = "YourPassword";
```

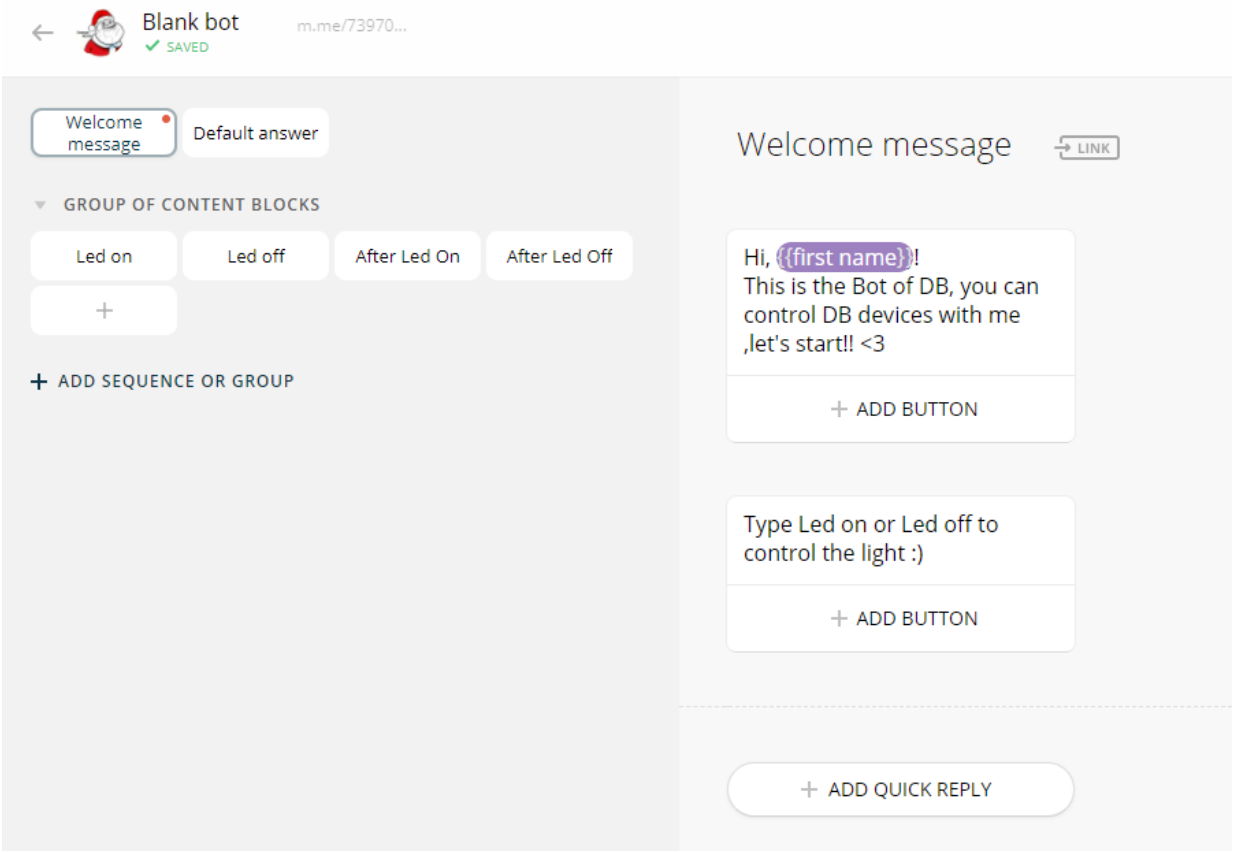
```
void setup()
{
 Serial.begin(9600);
//Connect to Blynk
 Blynk.begin(auth, ssid, pass);
}
void loop()
{
//Run the Blynk
 Blynk.run();
}
```

Run the code , then turn on the Blynk App to control your led

3. Control the led via Facebook Messenger

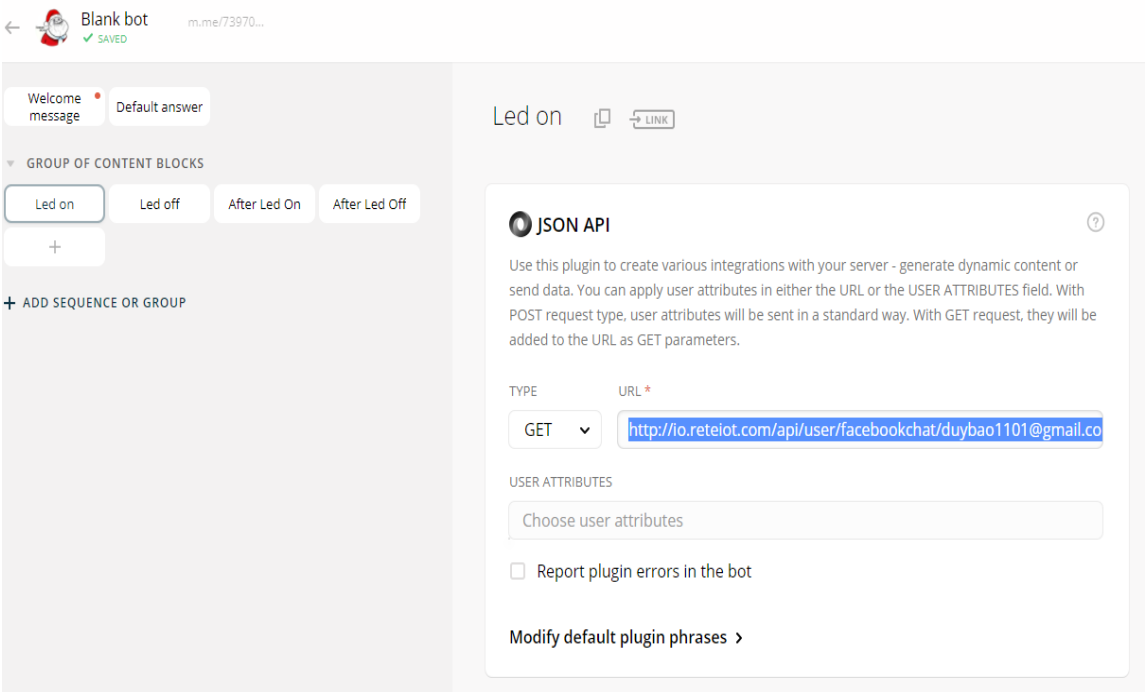
On Chatfuel :

- First you need to login Chatfuel with your Facebook account and set-up your Facebook Page
- Then add some Welcome Message :

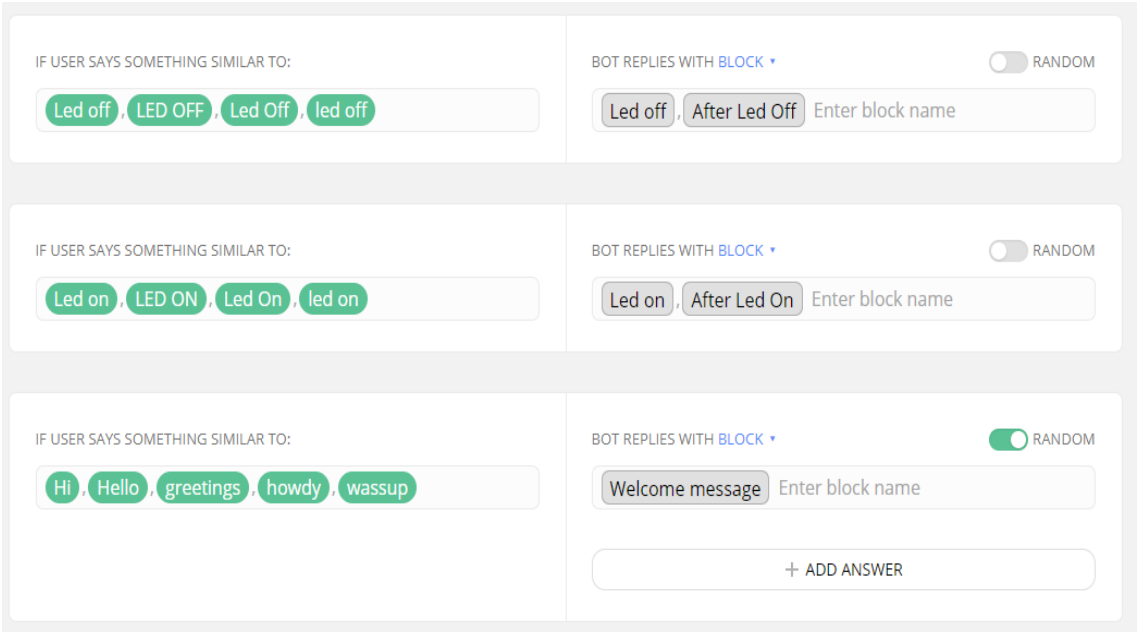


- Set the block to Turn on the Led
- Type of the block is JSON API with type : GET
- Use the URL is the ReteIOT API : http://io.reteiot.com/api/user/facebookchat/your-email/facebook-led/on
- Apply same way to Turn off the Led : http://io.reteiot.com/api/user/facebookchat/your-email/facebook-led/off

- Set 2 more blocks to notify the status of the Led.

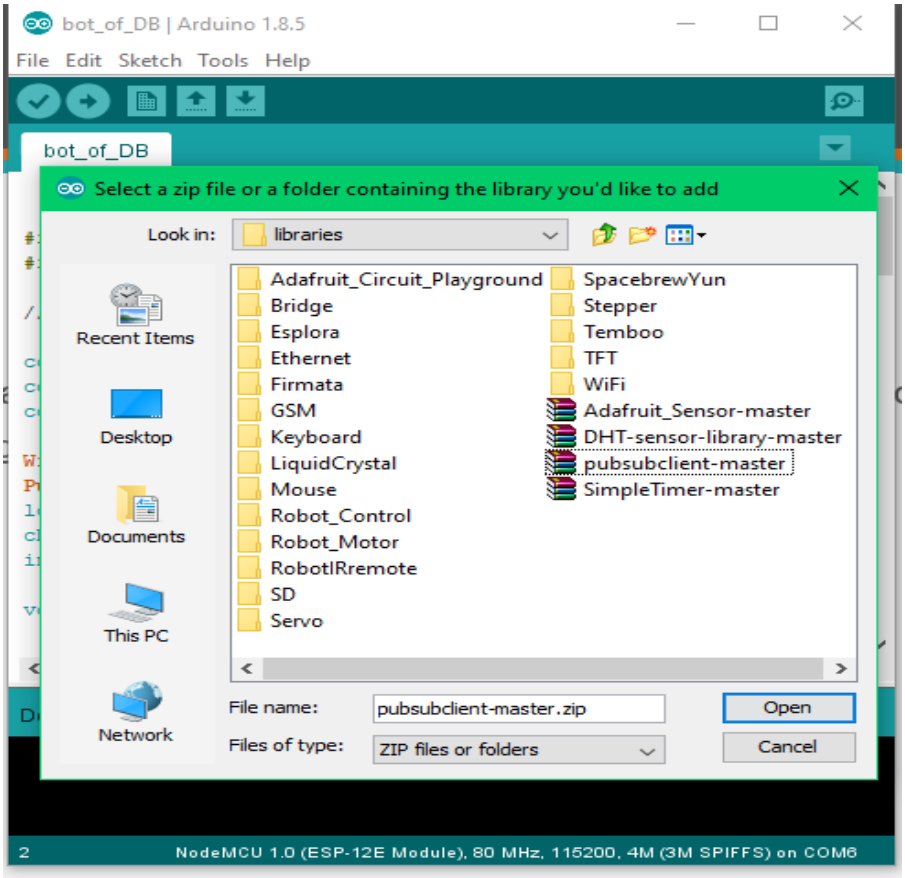


- Set the AI mode for your Facebook Bot.
- So that's all for your bot.



On Arduino IDE :

- To make the code work on ReteIOT Platform, you have to add the ReteIOT file in the Arduino IDE library download the link below then extracted to library folder of Arduino https://github.com/knolleary/pubsubclient



Verify and Upload the code

```
#include <ESP8266WiFi.h>
#include <PubSubClient.h>

// Update these with values suitable for your network.

const char* ssid = "your-wifiname"; // change to your home wifi name
const char* password = "your-password"; //  change to your home wifi password
const char* mqtt_server = "io.reteiot.com"; // MQTT broker Name

WiFiClient espClient;
PubSubClient client(espClient);
long lastMsg = 0;
char msg[50];
int value = 0;
```

```
void setup_wifi() {

 delay(10);
 // We start by connecting to a WiFi network
 Serial.println();
 Serial.print("Connecting to ");
 Serial.println(ssid);
 WiFi.begin(ssid, password);

 while (WiFi.status() != WL_CONNECTED) {
  delay(500);
  Serial.print(".");
 }
 randomSeed(micros());
 Serial.println("");
 Serial.println("WiFi connected");
 Serial.println("IP address: ");
 Serial.println(WiFi.localIP());
}
```

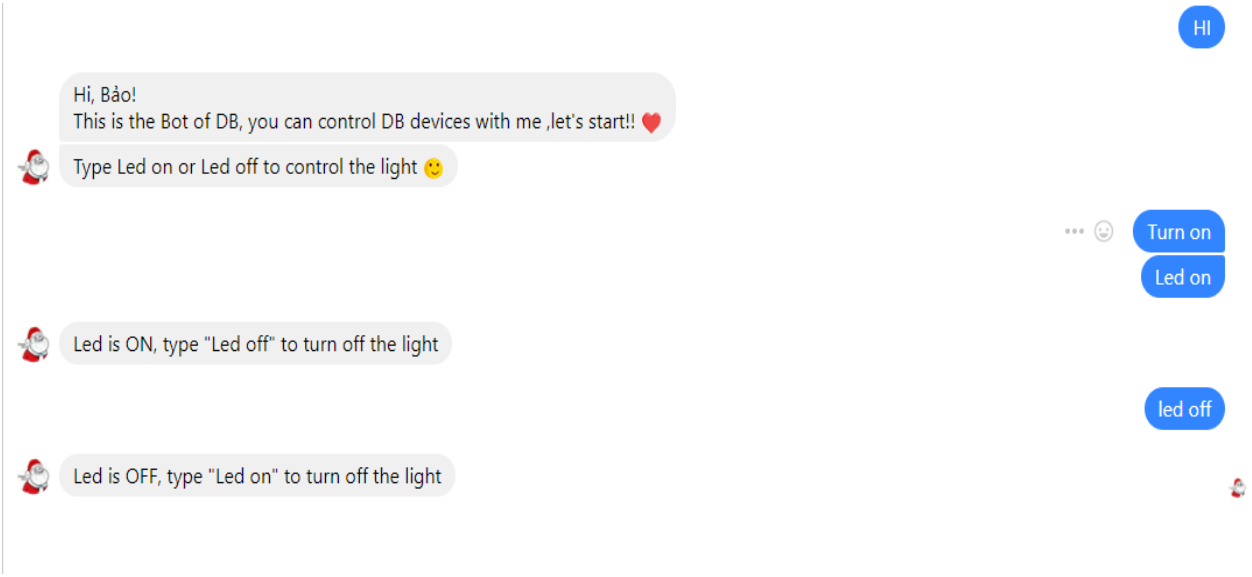
```
void callback(char* topic, byte* payload, unsigned int length)
{
  Serial.print("Message arrived [");
  Serial.print(topic);
  Serial.print("] ");
  for (int i = 0; i < length; i++) {
    Serial.print((char)payload[i]);
  }
  Serial.println();
  // Switch on the LED if an 1 was received as first character
  if ((char)payload[0] == 'o' && (char)payload[1]== 'n') {
 // Here we are comparing if ON command is coming from
 server.
    digitalWrite(D1, HIGH);
  } else {
    digitalWrite(D1, LOW);
  }
}
```

```
void reconnect() {
  // Loop until we're reconnected
 while (!client.connected()) {
  Serial.print("Attempting MQTT connection...");
  // Create a random client ID
  String clientId = "ESP8266Client-";
  clientId += String(random(0xffff), HEX);
  // Attempt to connect
  if (client.connect(clientId.c_str())) {
    Serial.println("connected");
     digitalWrite(BUILTIN_LED, LOW);
    client.subscribe("your-email/facebook-led");
  //  change your email id , you can also change facebook-led and keep
what ever device name here.
  } else {
    Serial.print("failed, rc=");
    Serial.print(client.state());
    Serial.println(" try again in 5 seconds");
    // Wait 5 seconds before retrying
    delay(5000); }}}
```

```
void setup() {
  pinMode(BUILTIN_LED, OUTPUT);
  pinMode(D1, OUTPUT);
  Serial.begin(115200);
  setup_wifi();
    //Connect to MQTT_Server
  client.setServer(mqtt_server, 1883);
  client.setCallback(callback);
  digitalWrite(BUILTIN_LED, HIGH);
  digitalWrite(D1, LOW);
}
```

```
void loop() {

 if (!client.connected()) {
    digitalWrite(BUILTIN_LED, HIGH);
   reconnect();
 }
 client.loop();

}
```

Then chat with your bot



V. REFERENCES

- Node MCU Datasheet : https://nodemcu.readthedocs.io/en/master/
- Arduino IDE download link : https://www.arduino.cc/en/Main/Software
- ESP8266 library for Arduino IDE guide : http://www.instructables.com/id/Programming-ESP8266-ESP-12E-NodeMCU-Using-Arduino-/
- RetelOT Platform website : http://io.reteiot.com/user/login
- RetelOT library for Adruino IDE : https://github.com/knolleary/pubsubclient
- ChatFuel website : https://chatfuel.com/
- Project code : https://drive.google.com/drive/folders/1aKLZ-TqnPARR8P0c1UkzRM2XZZ0LAWd8?usp=sharing