Tech Manual - Managing Ledstrip through Telegram

What you'll need:

- NodeMCU
- USB cable
- RGB Ledstrip

Libraries you'll need to install in Arduino:

- ESP8266Wifi
- WiFiClientSecure
- Adafruit_Neopixel
- UniversalTelegramBot

Step 1: Creating a Telegram Bot and getting your Telegram ID

Creating a Telegram Bot:

To install a bot in Telegram you'll need to have the Telegram app.

Once you've installed it you need to search 'BotFather'.

When you've started a chat with BotFather you can just follow the steps to create a new bot.

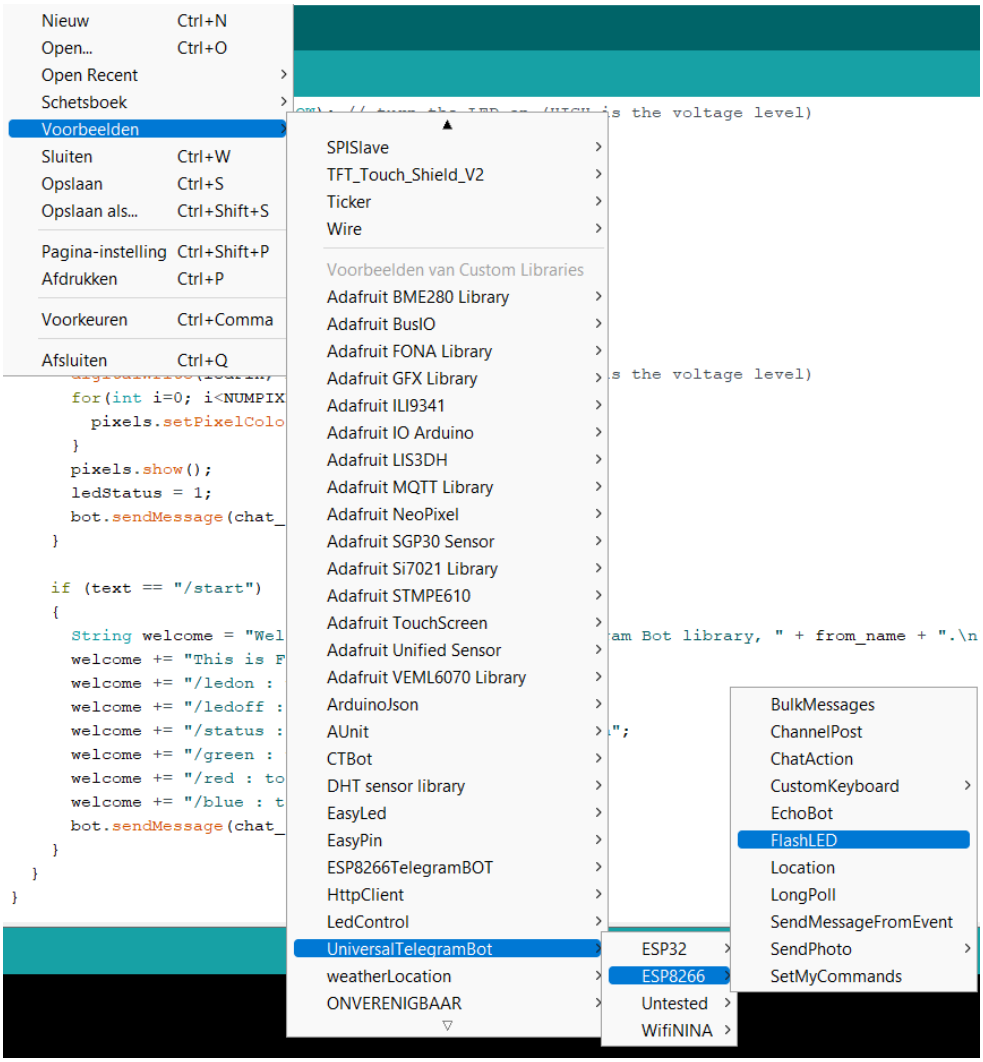
After you've created a bot you'll get a token. It's important that you safe the token as you'll need to use it later on.

Checkpoint! You've created a bot in Telegram!

Step 2: The Code

At first I openend the FlashLED file.

For this you'll need to go to **file > examples > UniversalTelegramBot > ESP8266 > FlashLED**



After you've done that you'll see a code for making the LED on the NodeMCU flash.

This means the code needs to be edited so that you can control the LEDstrip.

Step 2.1: Filling in the empty spots

First of we need to fill the empty spots with your information.

```
// Wifi network station credentials
#define WIFI_SSID "YOUR_SSID"
#define WIFI_PASSWORD "YOUR_PASSWORD"
// Telegram BOT Token (Get from Botfather)
#define BOT_TOKEN "XXXXXXXXX:XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX"
```

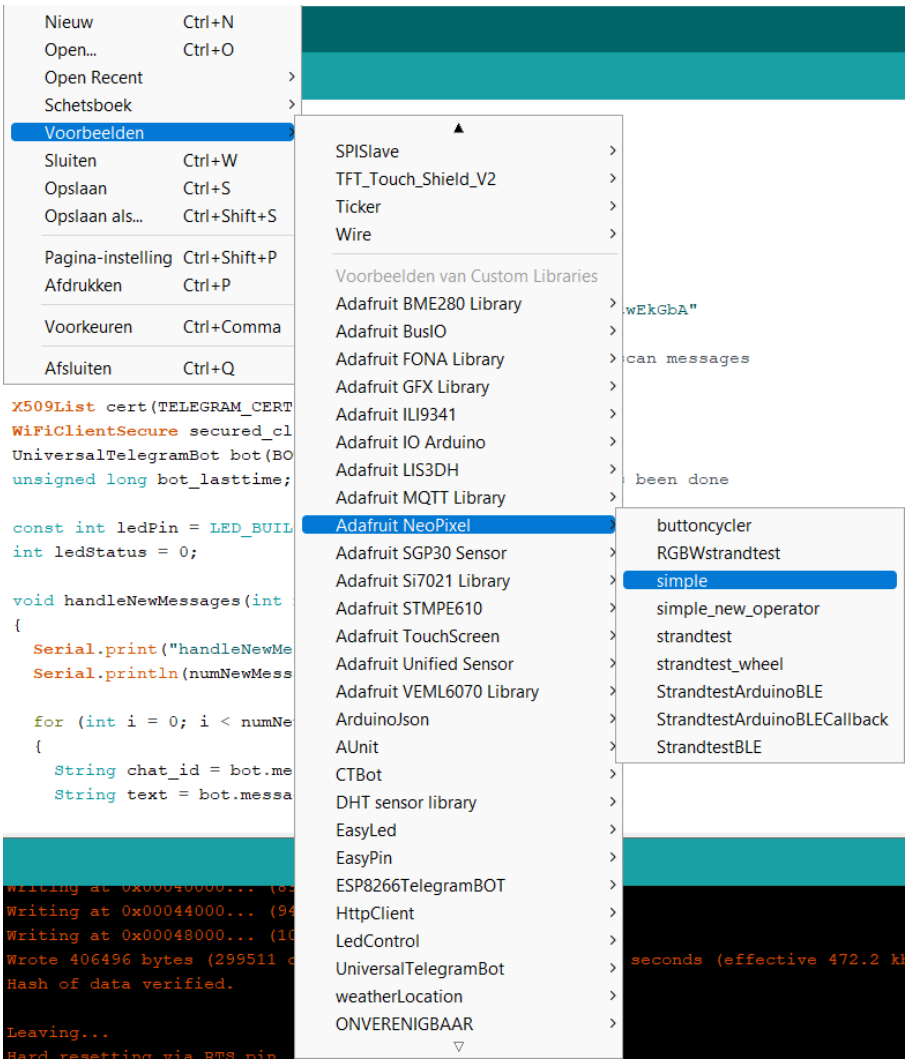
Remember the token you got form BotFather? This is the place where you should use it.

When you've done this you can test if it works.

Step 2.2: Adding the RGB LEDstrip to the code

To add the LEDstrip to the code I used the ‘simple’ file.

file > examples > Adafruit NeoPixel > simple



At first I tried only adding these lines under the bot token:

```
#define PIN        6
#define NUMPIXELS 16
Adafruit_NeoPixel pixels(NUMPIXELS, PIN, NEO_GRB + NEO_KHZ800);
```

And these lines in the void setup:

```
pixels.begin();
pixels.show();
```

But I got this error:

```
Tech_Manual_IoT_LEDstrip:34:1: error: 'Adafruit_NeoPixel' does not name a type
   34 | Adafruit_NeoPixel pixels(NUMPIXELS, PIN, NEO_GRB + NEO_KHZ800);
      | ^~~~~~~~~~~~~~~~
C:\Users\lisan\OneDrive\Documenten\Arduino\Tech_Manual_IoT_LEDstrip\Tech_Manual_IoT_LEDstrip.ino: In function 'void setup()':
Tech_Manual_IoT_LEDstrip:104:3: error: 'pixels' was not declared in this scope
  104 |   pixels.begin();
      |   ^~~~~~
Meerdere bibliotheken gevonden voor "UniversalTelegramBot.h"
Gebruikt: C:\Users\lisan\OneDrive\Documenten\Arduino\libraries\UniversalTelegramBot
Niet gebruikt: C:\Users\lisan\OneDrive\Documenten\Arduino\libraries\Universal-Arduino-Telegram-Bot-master
exit status 1
'Adafruit_NeoPixel' does not name a type
```

So I noticed that I didn't put the right PIN and NUMPIXELS, so with that being said: it is important to put the right PIN and the right number of leds on the ledstrip. So I changed that:

```
#define PIN       D5
#define NUMPIXELS 12
Adafruit_NeoPixel pixels(NUMPIXELS, PIN, NEO_GRB + NEO_KHZ800);
```

That also didn't solve the problem, so I looked at the work of another student and saw that they had this line aswell.

```
#define PIXEL_TYPE NEO_GRB + NEO_KHZ800
```

So I added that line aswell.

It still gave the same error. So then I decided to check everything. Then I realised that I didn't include the Adafruit_Neopixel library. After that it worked.

I still needed to add some code in 'void handleNewMessages', for that I also looked at the work of the other student:

```
if (text == "/ledon")
{
  digitalWrite(ledPin, LOW);// turn the LED on (HIGH is the voltage level)
  for(int i=0; i<NUMPIXELS; ++i) {
    pixels.setPixelColor(i, pixels.Color(255, 255, 255));
  }
  pixels.show();
  ledStatus = 1;
  bot.sendMessage(chat_id, "Led is ON", "");
}

if (text == "/ledoff")
{
  ledStatus = 0;
  digitalWrite(ledPin, HIGH); // turn the LED off (LOW is the voltage level)
  pixels.clear();
  pixels.show();
  bot.sendMessage(chat_id, "Led is OFF", "");
}
```

After that I uploaded the code and it worked.

Checkpoint: The LEDstrip has been added to the code

Step 2.3: Adding the code to change the color of the ledstrip.

For this step I also looked at the code from the other student.

```
if (text == "/red")
{
  #define COLOR 255,0,0
    for(int i=0; i<NUMPIXELS; ++i) {
      pixels.setPixelColor(i, pixels.Color(COLOR));
      pixels.show();
    }

}
```

This didn't work for me. I didn't get an error but the ledstrip wouldn't turn red. So I looked at 'simple' file again, and changed it to this:

```
if (text == "/red")
{
    for(int i=0; i<NUMPIXELS; ++i) {
      pixels.setPixelColor(i, pixels.Color(255, 0, 0));
      pixels.show();
    }

}
```

This did work. Then I also decided to add a message in Telegram that said the lights were red.

```
if (text == "/red")
{
    for(int i=0; i<NUMPIXELS; ++i) {
      pixels.setPixelColor(i, pixels.Color(255, 0, 0));
      pixels.show();
      bot.sendMessage(chat_id, "Ledcolor is red", "");
    }

}
```

This message will show after the user types '/red' to the bot.

```
if (text == "/start")
{
  String welcome = "Welcome to Universal Arduino Telegram Bot library, " + from_name
  welcome += "This is Flash Led Bot example.\n\n";
  welcome += "/ledon : to switch the Led ON\n";
  welcome += "/ledoff : to switch the Led OFF\n";
  welcome += "/red : to switch the color to red\n";
  welcome += "/status : Returns current status of LED\n";
  bot.sendMessage(chat_id, welcome, "Markdown");
}
```

This message shows when the user types '/start'. This is the normal welcoming text but I also added what the user needs to type if they want the color red.

Checkpoint: The color of the LEDs can change

Extra step

You can also add more colors to the code. It's the same as how the red color was added:

```
 if (text == "/green")
{
    for(int i=0; i<NUMPIXELS; ++i) {
      pixels.setPixelColor(i, pixels.Color(0, 255, 0));
      pixels.show();
      bot.sendMessage(chat_id, "Ledcolor is green", "");
    }

}
```

```
String welcome = "Welcome to Universal Arduino Telegram Bot library, " +
welcome += "This is Flash Led Bot example.\n\n";
welcome += "/ledon : to switch the Led ON\n";
welcome += "/ledoff : to switch the Led OFF\n";
welcome += "/red : to switch the color to red\n";
welcome += "/green : to switch the color to green\n";
welcome += "/status : Returns current status of LED\n";
bot.sendMessage(chat_id, welcome, "Markdown");
```

Sources I used:

I followed this article to create the manual:

https://randomnerdtutorials.com/telegram-control-esp32-esp8266-nodemcu-outputs/

I also looked at the work of other students:

https://github.com/TeunvK/IoT/wiki/Tech-Todo-3