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NSEMBED - S11

NSEMBED - MAJOR PROJECT DOCUMENTATION

A web server can be programmed on the ESP32 board that can show a web page. The web page on the ESP32 board should allow a user to command the ESP32 board to change the blinking pattern of the built-in by clicking on a link. There should be three blinking patterns on the ESP32 board.

I. PROJECT GOAL

The goal of this project is to successfully allow users to learn the morse code equivalent of the three indicated words by means of a blinking LED light through the ESP32 board.

II. PROJECT COMPONENTS

- ESP32 Board
- Type C Cable
- Arduino 1.8.15
- WiFi.h Arduino Library

III. BLINKING PATTERNS

The patterns are based on the indicated words namely “NSEMBED”, “Bernice”, and “Betito”. Each are chosen based on their significance to the project. NSEMBED is the subject / course that this project is for. Bernice is the first name of the student who developed this project. Betito is the last name of the student who developed this project. The morse code equivalent of these words are shown through the LED light of the ESP32 board. The dots and dashes have different durations in order for the user to be able to successfully distinguish between the two.

- For dashes (-), the LED is lit up for 3 Seconds
- For dots (.), the LED is lit up for 1 Second

Before the start of the blinking pattern, the LED would be lit up for 5 seconds to signify that the pattern will start. At the end of the pattern, the LED would be off for 5 seconds to signify that the pattern has ended.

There is also an additional option which is the reset button. The reset button allows for the user to reset the chosen pattern and for the LED to stay off until a pattern has been chosen once again.

IV. FLOW

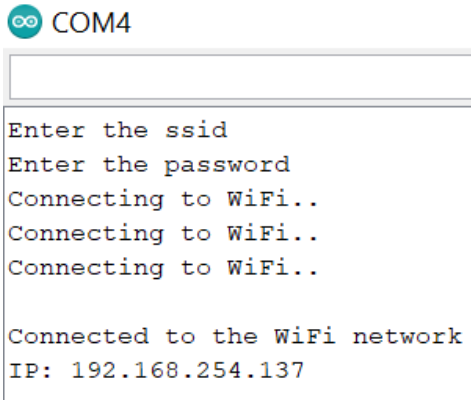

Fig. 4.1 Serial Monitor with WiFi Network Details

Upon running the program, the SSID and the password is first asked for in the serial monitor. Once both are entered, connecting to the WiFi would be attempted. Once connected, the IP address would be displayed on the serial monitor which would be used in order for the client to connect through any chosen browser.

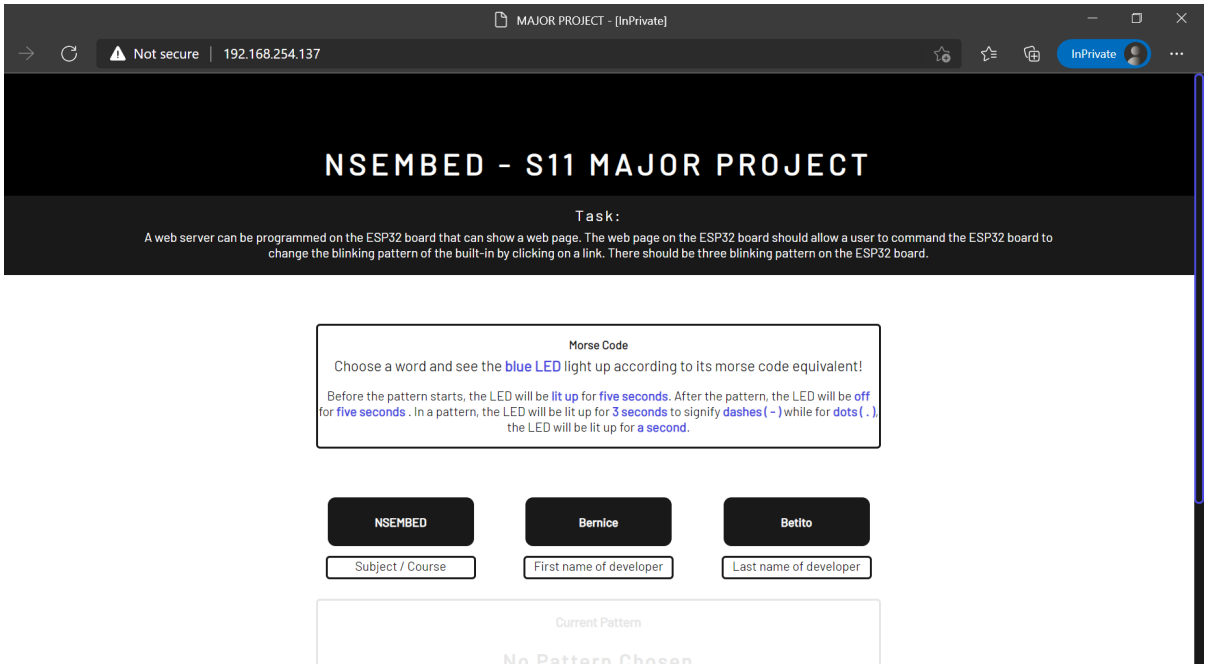

Fig. 4.2. Website

Through the browser, the client may enter the IP address to access the website. The user would then see the website once it successfully loads and may then start interacting. A guide could be seen which aids the user in understanding how to use the website.

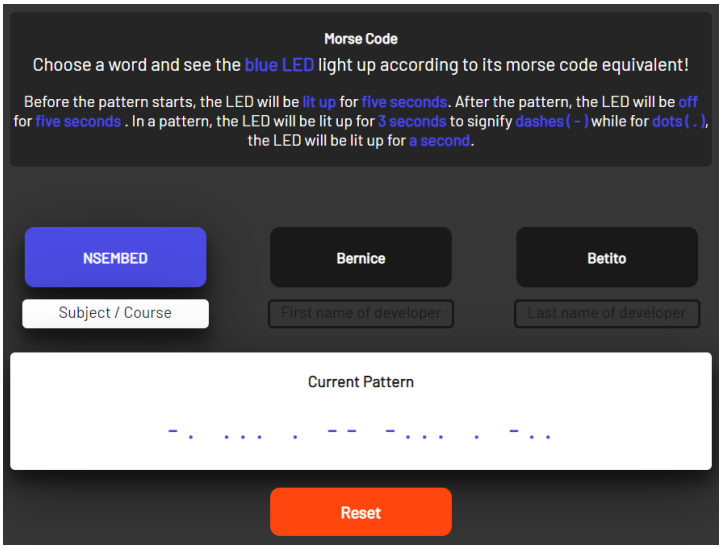

Fig. 4.3. Pattern #1 (NSEMBED)

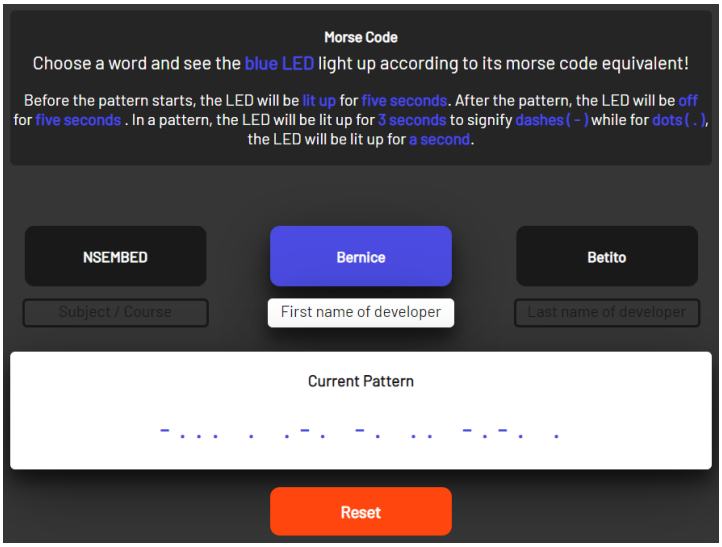

Fig. 4.4. Pattern #2 (Bernice)

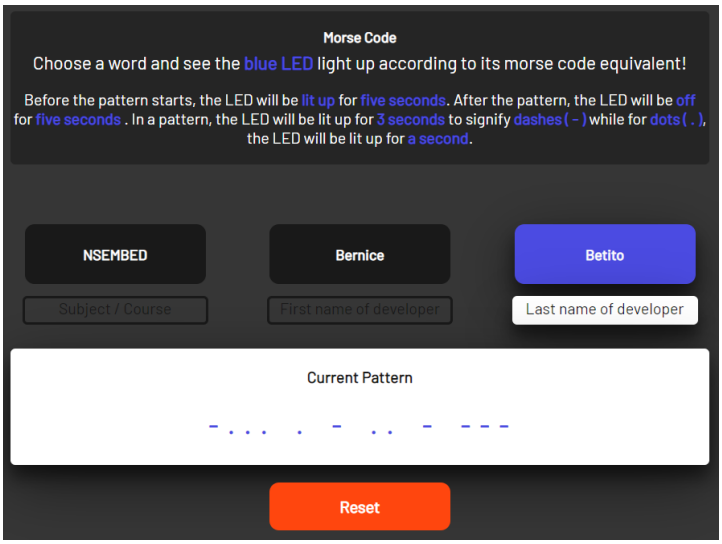

Fig. 4.5. Pattern #3 (Betito)

Once a pattern has been chosen, the chosen pattern would be shown on the “Current Pattern” box, allowing the user to easily follow the pattern being shown through the LED light of the ESP32 board. The reset button would also be enabled, giving the user the option to reset the current pattern at any time.

```
GET / HTTP/1.1
Host: 192.168.254.137
Connection: keep-alive
Cache-Control: max-age=0
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.961.47
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9
```

Fig. 4.6. HTTP GET Request for the website received from the browser

```
GET /button1 HTTP/1.1
Host: 192.168.254.137
Connection: keep-alive
Accept: */*
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.961.47
X-Requested-With: XMLHttpRequest
Referer: http://192.168.254.137/
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9

GET /button2 HTTP/1.1
Host: 192.168.254.137
Connection: keep-alive
Accept: */*
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.961.47
X-Requested-With: XMLHttpRequest
Referer: http://192.168.254.137/
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9

GET /button3 HTTP/1.1
Host: 192.168.254.137
Connection: keep-alive
Accept: */*
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.961.47
X-Requested-With: XMLHttpRequest
Referer: http://192.168.254.137/
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9

GET /resetbutton HTTP/1.1
Host: 192.168.254.137
Connection: keep-alive
Accept: */*
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/93.0.4577.63 Safari/537.36 Edg/93.0.961.47
X-Requested-With: XMLHttpRequest
Referer: http://192.168.254.137/
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9
```

Fig. 4.7. HTTP GET Requests for the buttons received from the browser

On the other hand, the serial monitor would also simultaneously display the different HTTP requests being received from the client.