

CS 118

Project 1: Web Server Implementation using BSD Sockets

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Description

This project consists of one code file which implements a simple server that serves files that are requested by a browser. It opens two sockets: one it uses to listen to requests and one it uses to respond to requests with the required headers and files. Then when it gets a request, it parses the request to get the correct filename being requested. It also has to get the extension of the file being requested to make sure to set the right Content-Type header in the response. The last thing it does when processing is that it replaces all instances of “%20” with a space because that’s how a space is encoded in URLs. Finally it takes all this information and sends the correct response header by measuring the requested file’s size and getting its type. Then it sends the file in 1024 byte chunks.

Difficulties

The biggest difficulty we had was figuring out how to handle all the different file types. However, we quickly realized that we handle them all basically the same way but we just change the Content-Type header in the response to match the file extension. Other than that, we did not run into too many difficulties other than random c segmentation fault bugs. The sample code on github was very useful when starting the project.

How to run

Once you extract the file, enter the directory inside. Then you have to enter two commands to run the server.

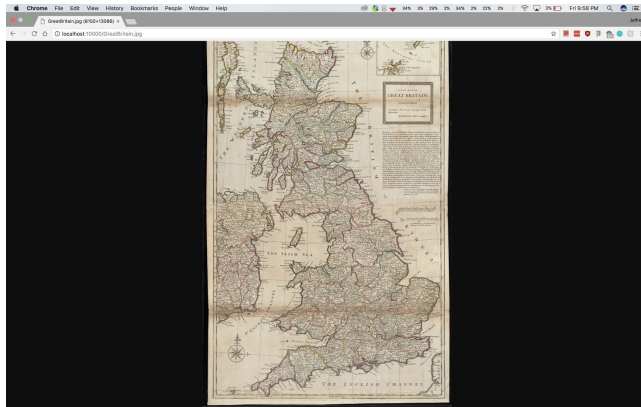
```
make
./server 10000
```

These commands will start the server on port 10000. Then when a browser hits the server by going to `http://localhost:10000/filename` it will serve that file. The server should run until it is shut down with ctrl-c. You might not be able to start the server on the same port for up to a couple minutes afterwards because the socket needs to timeout and shut down. We also noticed a slight bug with some browsers that do a get request for the favicon for a site. If a browser requests a favicon, you’ll always see the 404 not found page because that favicon file doesn’t exist.

Sample usage and output

Large Jpeg Image

URL + output



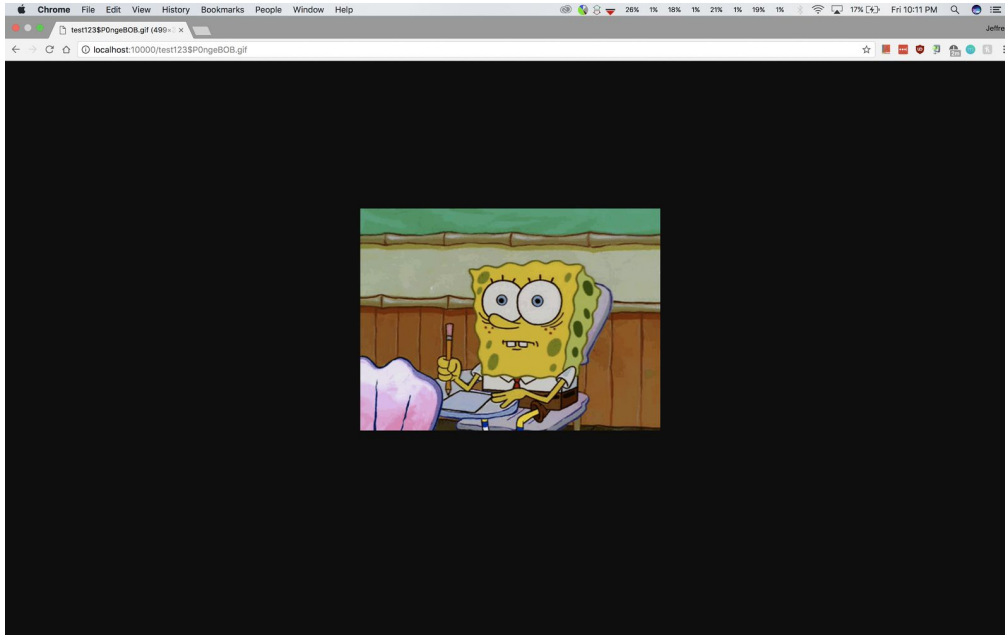
Request shown in console

```
vpn-128-97-245-41:CS-118-Project-1 jeffreyqiu$ ./server 10000
GET /GreatBritain.jpg HTTP/1.1
Host: localhost:10000
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_2) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/64.0.3282.119 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9

vpn-128-97-245-41:CS-118-Project-1 jeffreyqiu$
```

GIF

URL + Output



Request shown in console

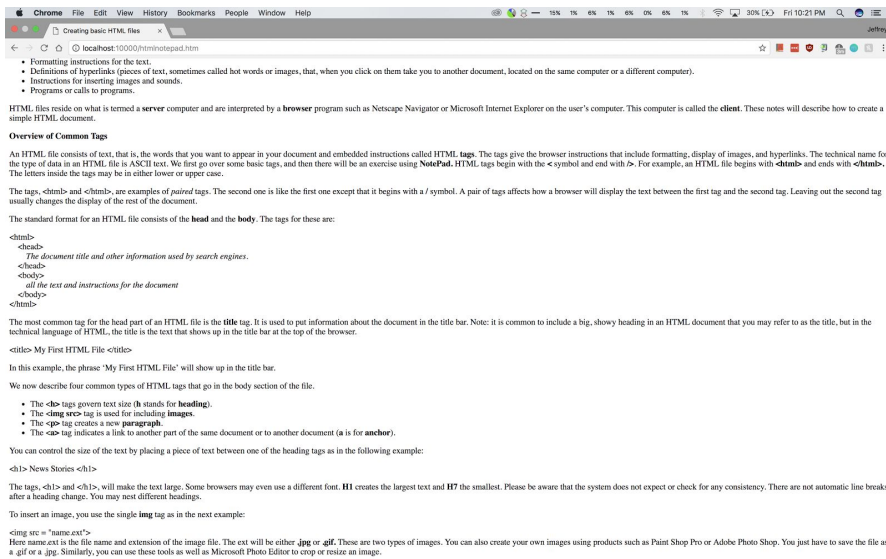
```

vyn-128-97-245-41:CS-118-Project-1 jeffreyqiu$ ./server 10000
GET /test123$P0nge80B.gif HTTP/1.1
Host: localhost:10000
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_2) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/64.0.3282.119 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9

```

HTML File

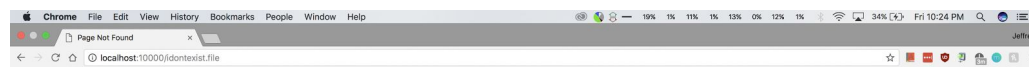
URL + Output



Request shown in console

```
lvpn-128-97-245-41:CS-118-Project-1 jeffreyqiu$ ./server 10000
GET /htmlnotepad.htm HTTP/1.1
Host: localhost:10000
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_2) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/64.0.3282.119 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
```

Does Not Exist URL + Output



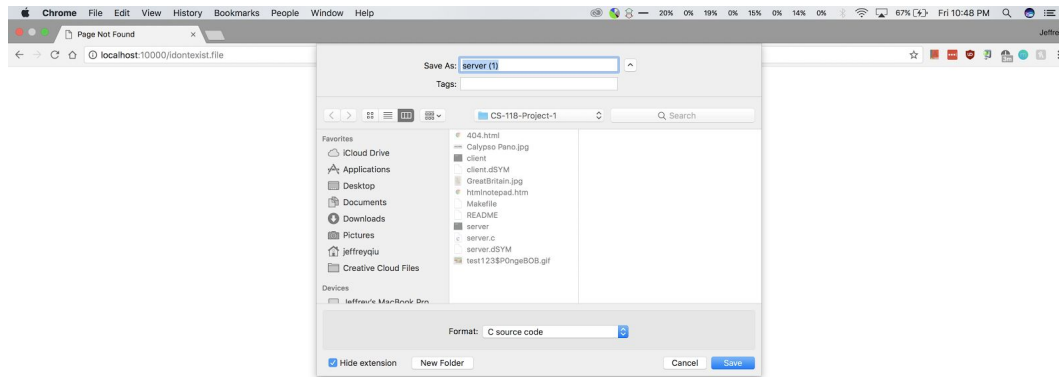
Page Not Found
Sorry, but the page you were trying to
view does not exist.

Request shown in console

```
lvpn-128-97-245-41:CS-118-Project-1 jeffreyqiu$ ./server 10000
GET /ldontexist.file HTTP/1.1
Host: localhost:10000
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_2) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/64.0.3282.119 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
```

Binary File

URL + Output



Request shown in console

```
/vnp-128-97-245-41:CS-118-Project-1 jeffreyqiu$ ./server 10000
GET /server.c HTTP/1.1
Host: localhost:10000
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_12_2) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/64.0.3282.119 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate, br
Accept-Language: en-US,en;q=0.9
```