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Lab 1: Web Server Programming

How to Compile:

- Code 200: For code 200 you would need to run <http://localhost:8888/index.html> in your search bar
- Code 301: For code 301 you would need to run <http://localhost:8888/page1.html> in your search bar
 - This would lead you to a new page called <http://localhost:8888/page2.html>
- Code 404: For code 404 you can run anything else except the 3 links above
 - Example <http://localhost:8888/pag.html>

Restrictions:

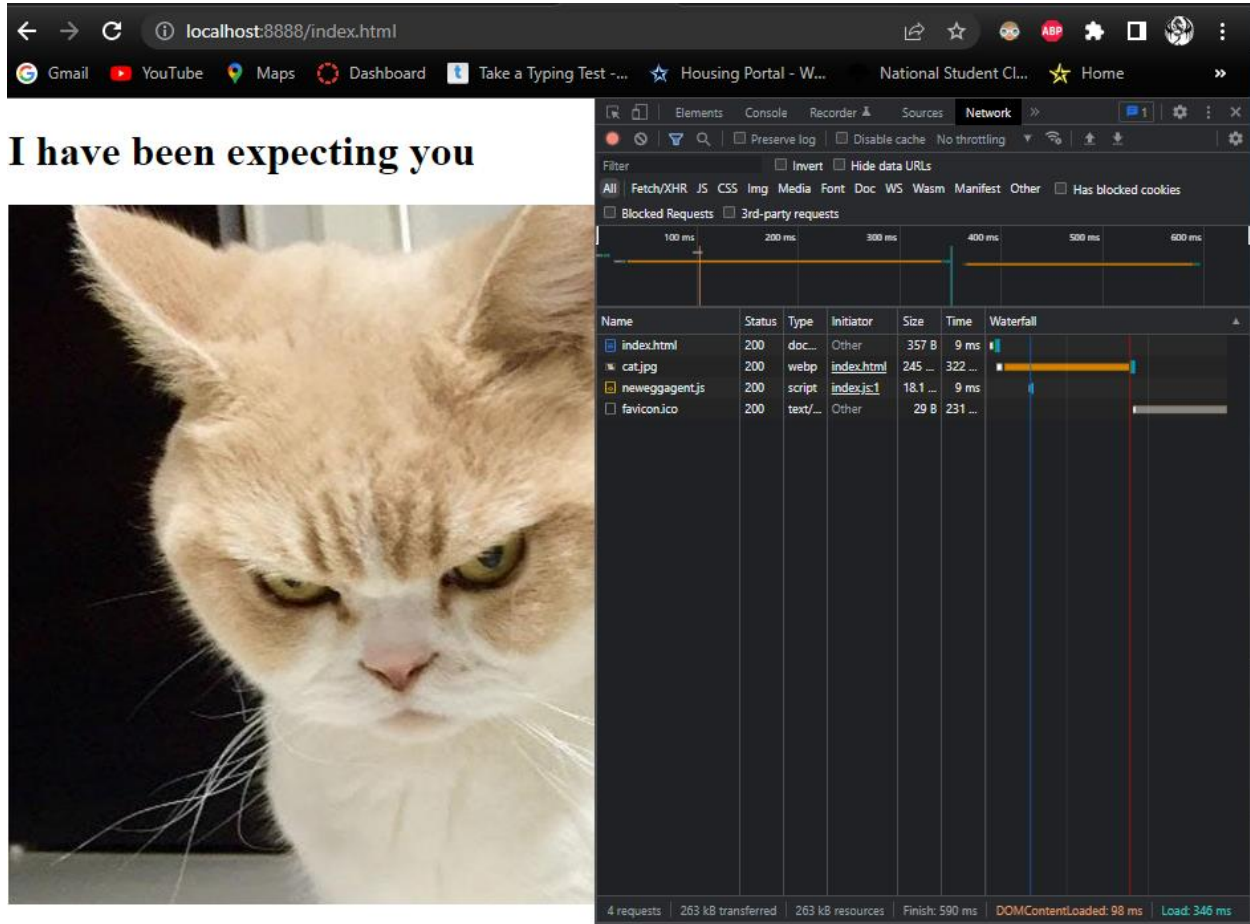
- For Code 301 it did not show up in wireshark however it did show up when I inspected it on Chrome by right clicking and clicking inspect. Then clicking Network. Afterwards I ran the url for code 301 and it showed up

!!! Pictures of each code running though inspect and wireshark are below this page

Cited Sorces:

- This help me with how to start it the code. I also looked at the slides as well to see if I forgot anything
 - <https://medium.com/swlh/build-web-server-from-scratch-with-python-60188f3b162a>
- This helped me with multireading, I didn't really implement the code just looked at the function and how it was called
 - <https://www.geeksforgeeks.org/socket-programming-multi-threading-python/>
- This just helped me know what I am trying to do and how to write the error code
 - <https://developer.mozilla.org/en-US/docs/Web/HTTP/Status>

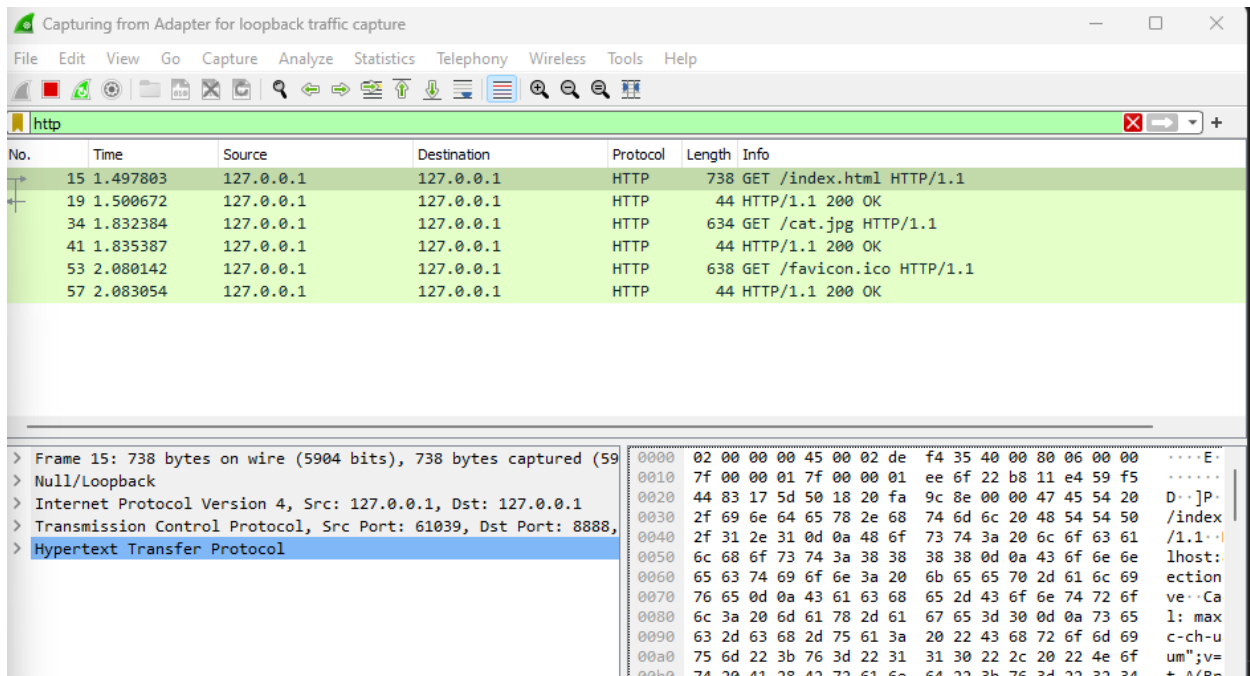
Code 200:



The screenshot shows a web browser at `localhost:8888/index.html` displaying the text "I have been expecting you" and a close-up image of a cat. The Chrome DevTools Network tab is open, showing a list of requests:

Name	Status	Type	Initiator	Size	Time	Waterfall
index.html	200	doc...	Other	357 B	9 ms	
cat.jpg	200	webp	index.html	245 ...	322 ...	
neweggagents.js	200	script	index.js:1	18.1 ...	9 ms	
favicon.ico	200	text/...	Other	29 B	231 ...	

The bottom status bar indicates: 4 requests | 263 kB transferred | 263 kB resources | Finish: 590 ms | DOMContentLoaded: 98 ms | Load: 346 ms



The screenshot shows Wireshark capturing traffic on the `http` filter. The packet list shows several HTTP GET requests to `localhost:8888`:

No.	Time	Source	Destination	Protocol	Length	Info
15	1.497803	127.0.0.1	127.0.0.1	HTTP	738	GET /index.html HTTP/1.1
19	1.500672	127.0.0.1	127.0.0.1	HTTP	44	HTTP/1.1 200 OK
34	1.832384	127.0.0.1	127.0.0.1	HTTP	634	GET /cat.jpg HTTP/1.1
41	1.835387	127.0.0.1	127.0.0.1	HTTP	44	HTTP/1.1 200 OK
53	2.080142	127.0.0.1	127.0.0.1	HTTP	638	GET /favicon.ico HTTP/1.1
57	2.083054	127.0.0.1	127.0.0.1	HTTP	44	HTTP/1.1 200 OK

The packet details for the first packet (Frame 15) are shown:

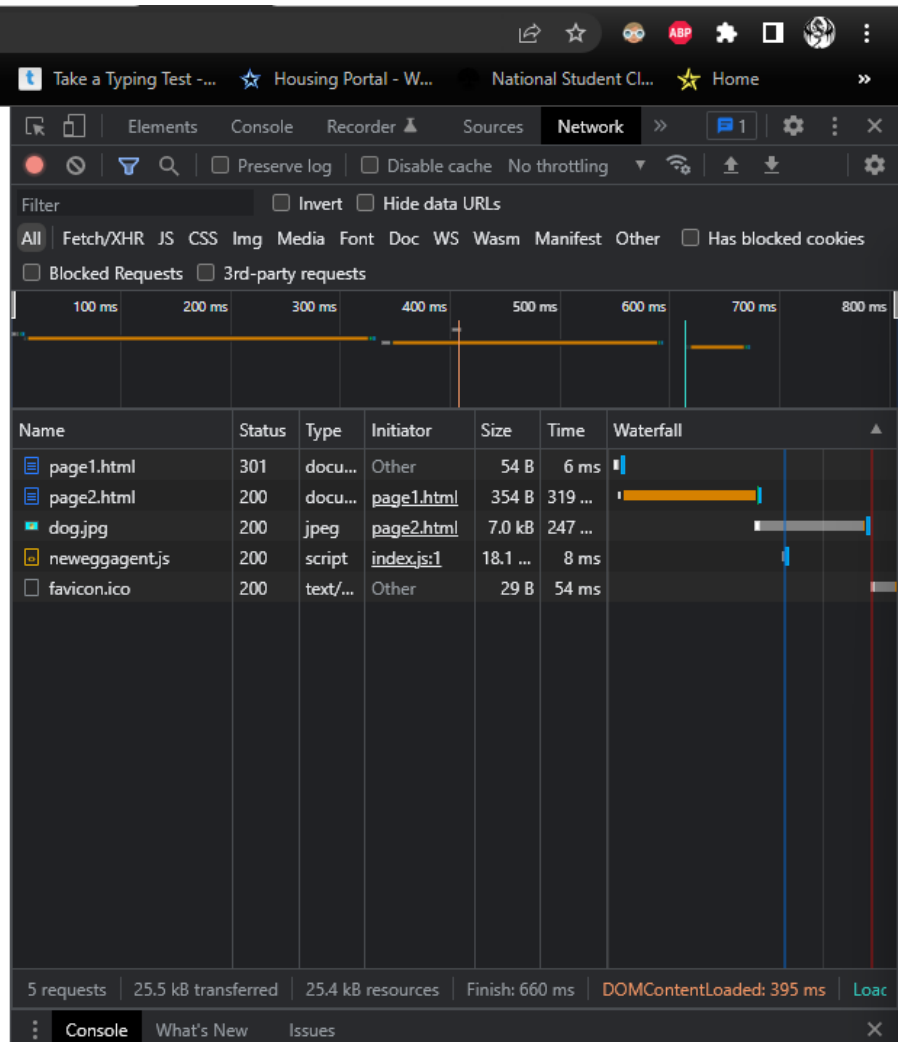
- > Frame 15: 738 bytes on wire (5904 bits), 738 bytes captured (5904 bits) on 0
- > Null/Loopback
- > Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1
- > Transmission Control Protocol, Src Port: 61039, Dst Port: 8888, Seq: 304414400, Win: 65535, Len: 738
- > Hypertext Transfer Protocol

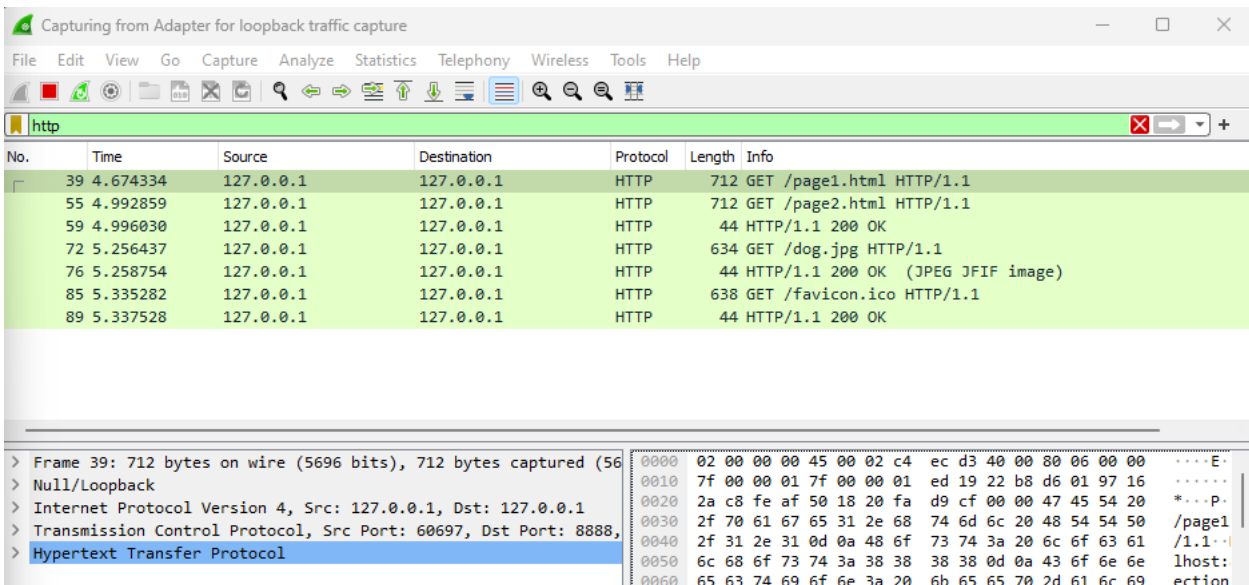
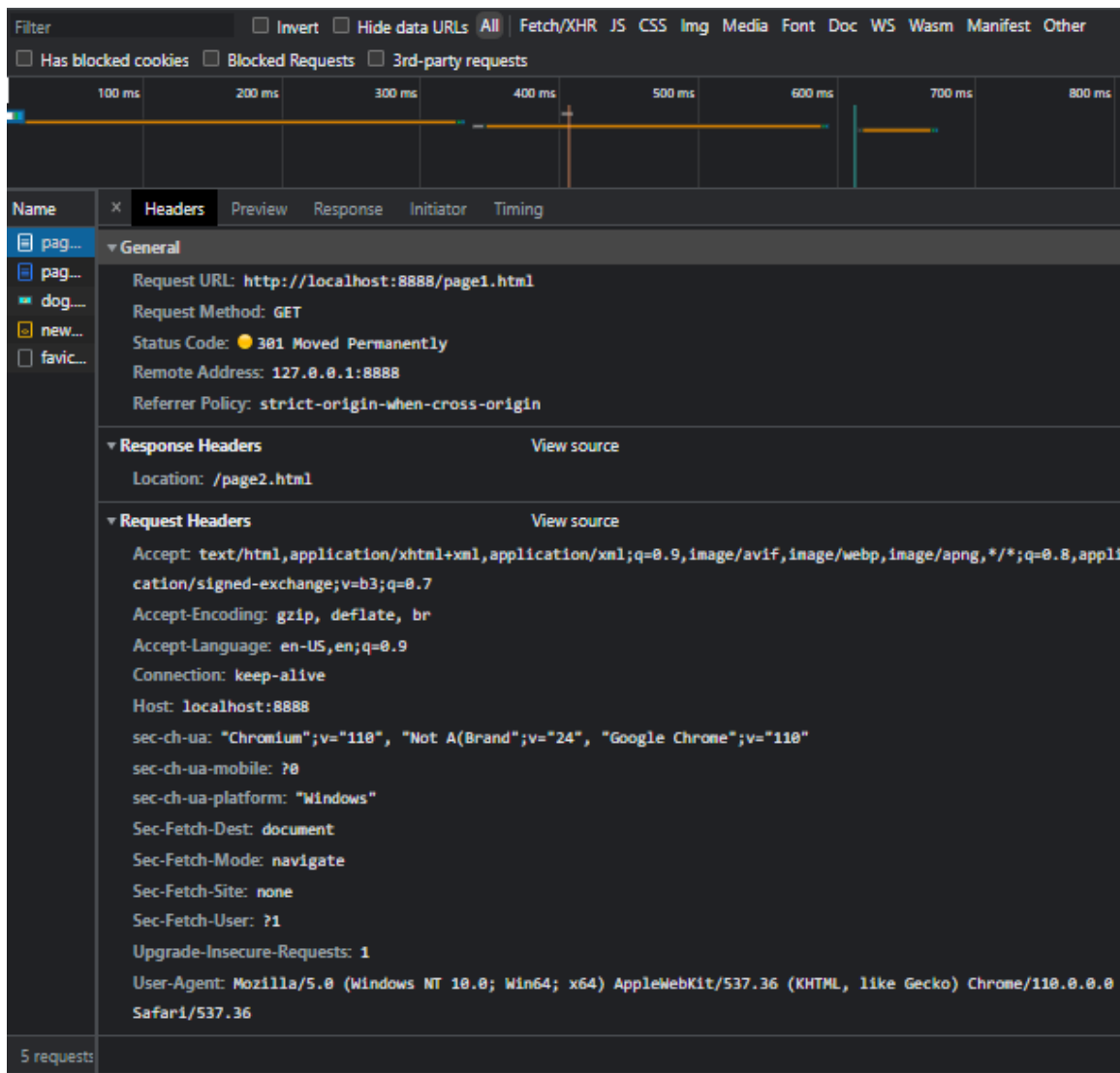
The packet bytes pane shows the raw data in hexadecimal and ASCII:

```
0000 02 00 00 00 45 00 02 de f4 35 40 00 80 06 00 00 .....E-
0010 7f 00 00 01 7f 00 00 01 ee 6f 22 b8 11 e4 59 f5 .....
0020 44 83 17 5d 50 18 20 fa 9c 8e 00 00 47 45 54 20 D..]P.....
0030 2f 69 6e 64 65 78 2e 68 74 6d 6c 20 48 54 54 50 /index.....
0040 2f 31 2e 31 0d 0a 48 6f 73 74 3a 20 6c 6f 63 61 /1.1.....
0050 6c 68 6f 73 74 3a 38 38 38 0d 0a 43 6f 6e 6e hlost:.....
0060 65 63 74 69 6f 6e 3a 20 6b 65 65 70 2d 61 6c 69 ection.....
0070 76 65 0d 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f ve..Ca.....
0080 6c 3a 20 6d 61 78 2d 61 67 65 3d 30 0d 0a 73 65 l: max.....
0090 63 2d 63 68 2d 75 61 3a 20 22 43 68 72 6f 6d 69 c-ch-u.....
00a0 75 6d 22 3b 76 3d 22 31 31 30 22 2c 20 22 4e 6f um";v=.....
00b0 74 20 41 28 42 72 61 6e 64 22 3b 76 3d 22 32 34 t A(8r.....
```

Code 301:

What the dog doing?





Code 404:

The screenshot displays a web browser window with the address bar showing `localhost:8888/inde.html`. The page content indicates a 404 error: "This localhost page can't be found" and "No webpage was found for the web address: http://localhost:8888/inde.html".

The browser's developer tools are open to the Network tab, showing a single request to `localhost:8888/inde.html`. The request details are as follows:

- Name:** inde...
- General:**
 - Request URL: `http://localhost:8888/inde.html`
 - Request Method: `GET`
 - Status Code: `404 Not Found`
 - Remote Address: `127.0.0.1:8888`
 - Referrer Policy: `strict-origin-when-cross-origin`
- Request Headers:**
 - Accept: `text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7`
 - Accept-Encoding: `gzip, deflate, br`
 - Accept-Language: `en-US,en;q=0.9`
 - Cache-Control: `max-age=0`
 - Connection: `keep-alive`
 - Host: `localhost:8888`
 - sec-ch-ua: `"Chromium";v="110", "Not A(Brand";v="24", "Google Chrome";v="110"`
 - sec-ch-ua-mobile: `?0`
 - sec-ch-ua-platform: `"Windows"`
 - Sec-Fetch-Dest: `document`
 - Sec-Fetch-Mode: `navigate`
 - Sec-Fetch-Site: `none`
 - Sec-Fetch-User: `?1`
 - Upgrade-Insecure-Requests: `1`
 - User-Agent: `Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/110.0.0.0 Safari/537.36`

The network analyzer window shows the captured traffic. The first packet is an HTTP GET request to `/inde.html` (737 bytes). The second packet is an HTTP 404 Not Found response (44 bytes).

The packet details for the 404 response are as follows:

- Frame 20:** 737 bytes on wire (5896 bits), 737 bytes captured (5896 bits) on interface 0
- Null/Loopback**
- Internet Protocol Version 4, Src:** 127.0.0.1, **Dst:** 127.0.0.1
- Transmission Control Protocol, Src Port:** 61091, **Dst Port:** 8888
- Hypertext Transfer Protocol**

The raw data for the 404 response is shown in hexadecimal and ASCII:

```
0000 02 00 00 00 45 00 02 dd f5 41 40 00 80 06 00 00 .....E
0010 7f 00 00 01 7f 00 00 01 ee a3 22 b8 90 6c c0 14 .....
0020 5e 40 6f db 50 18 20 fa c1 74 00 00 47 45 54 20 ^@o-P
0030 2f 69 6e 64 65 2e 68 74 6d 6c 20 48 54 54 50 2f /inde
0040 31 2e 31 0d 0a 48 6f 73 74 3a 20 6c 6f 63 61 6c 1.1..H
0050 68 6f 73 74 3a 38 38 38 38 0d 0a 43 6f 6e 6e 65 host:8
0060 63 74 69 6f 6e 3a 20 6b 65 65 70 2d 61 6c 69 76 ction:
0070 65 0d 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f 6c e..Cac
0080 3a 20 6d 61 78 2d 61 67 65 3d 30 0d 0a 73 65 63 : max-
0090 2d 63 68 2d 75 61 3a 20 22 43 68 72 6f 6d 69 75 -ch-ua
00a0 6d 22 3b 76 3d 22 31 31 30 22 2c 20 22 4e 6f 74 m";v="
00b0 20 41 28 42 72 61 6e 64 22 3b 76 3d 22 32 34 22 A(Bra
```