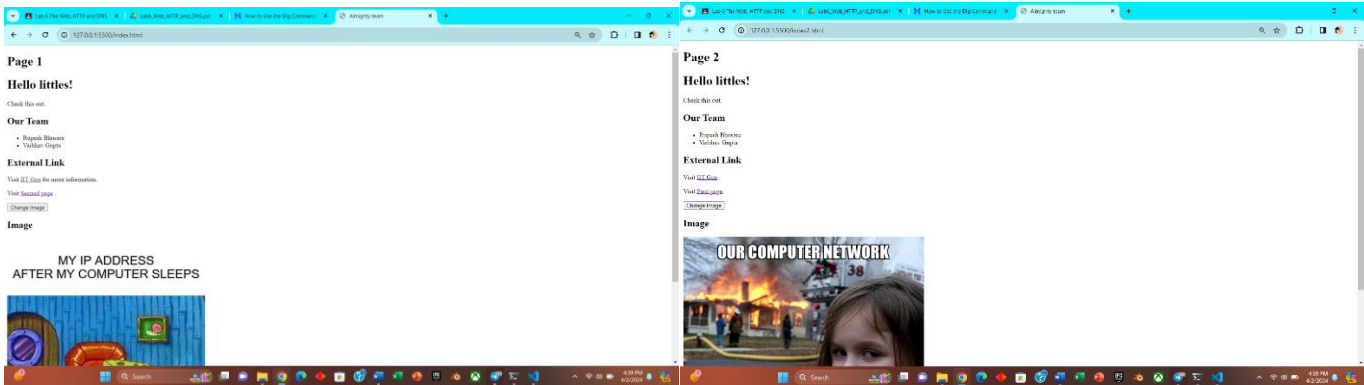


LAB 6: The Web, HTTP and DNS

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PART 1: Creating Webpages using HTML and Javascript

Q1. & Q2.:



PART 2: Creating a Web-server and observing HTTP traffic

Q3.

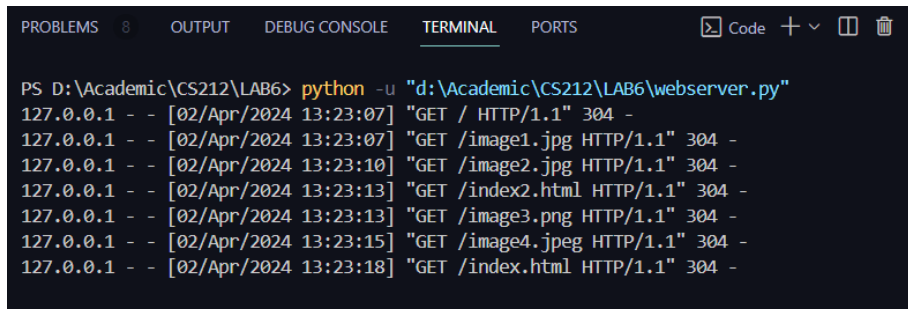
Changes that are made:

- Changed the self.path according to my files name.
- Changed the localhost to my device ip address.

```
def do_GET(self):  
    # check if the request contained a cookie called "FOO123"  
    self.cookieHeader = self.headers.get('Cookie')  
    if self.cookieHeader and "FOO" in self.cookieHeader:  
        # add some extra text to the html file  
        if "index" in self.path:  
            self.path = '/index2.html'  
        elif "index2" in self.path:  
            self.path = '/index.html'  
SimpleHTTPRequestHandler.do_GET(self)
```

```
server = ThreadingSimpleServer(('', 9096)), MyHTTPRequestHandler)  
try:
```

We checked, and our website can be accessed from another machine. We started the webserver and searched “http://10.196.35.18:9096” on browser of different machine. We get result as shown in following Images on host machine (whenever some action is done on other machine).

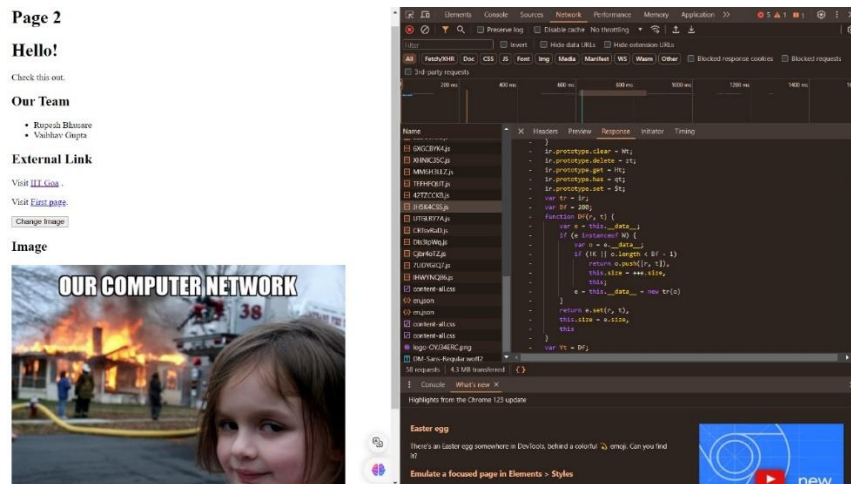


The screenshot shows a terminal window with a dark background. At the top, there are tabs for 'PROBLEMS', 'OUTPUT', 'DEBUG CONSOLE', 'TERMINAL' (which is active), and 'PORTS'. Below the tabs, the terminal displays the command to run a Python script: `PS D:\Academic\CS212\LAB6> python -u "d:\Academic\CS212\LAB6\webserver.py"`. Following this, there are seven lines of log output, each representing an HTTP GET request from the IP address 127.0.0.1. The requests are for the root path, /image1.jpg, /image2.jpg, /index2.html, /image3.png, /image4.jpeg, and /index.html. Each log line includes a timestamp and ends with a status code of 304 and a hyphen.

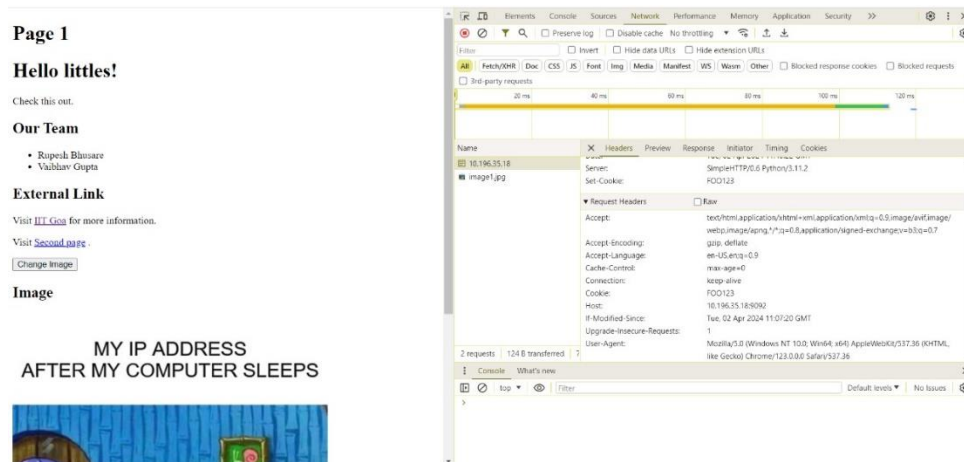
```
PROBLEMS 8 OUTPUT DEBUG CONSOLE TERMINAL PORTS Code + - [ ] [X]  
PS D:\Academic\CS212\LAB6> python -u "d:\Academic\CS212\LAB6\webserver.py"  
127.0.0.1 - - [02/Apr/2024 13:23:07] "GET / HTTP/1.1" 304 -  
127.0.0.1 - - [02/Apr/2024 13:23:07] "GET /image1.jpg HTTP/1.1" 304 -  
127.0.0.1 - - [02/Apr/2024 13:23:10] "GET /image2.jpg HTTP/1.1" 304 -  
127.0.0.1 - - [02/Apr/2024 13:23:13] "GET /index2.html HTTP/1.1" 304 -  
127.0.0.1 - - [02/Apr/2024 13:23:13] "GET /image3.png HTTP/1.1" 304 -  
127.0.0.1 - - [02/Apr/2024 13:23:15] "GET /image4.jpeg HTTP/1.1" 304 -  
127.0.0.1 - - [02/Apr/2024 13:23:18] "GET /index.html HTTP/1.1" 304 -
```

Q4.

- Yes, we can able to see the “raw” HTTP requests and responses.



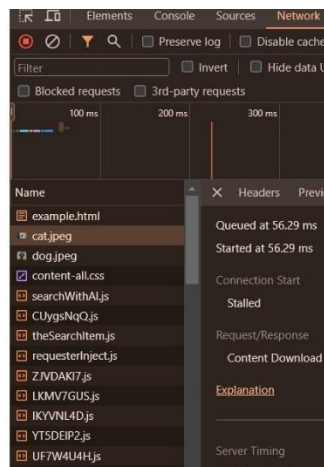
- Here persistent connection was used by the browser for viewing webpages. We came to this conclusion by looking at “connection: keep alive” shown in the request headers, image is attached below.



- We run <https://www.iitgoa.ac.in/~nehak/example.html> this webpage, for two images by looking at the time we come to conclusion that browser downloads the webpages components in sequential manner. Images is attached below.

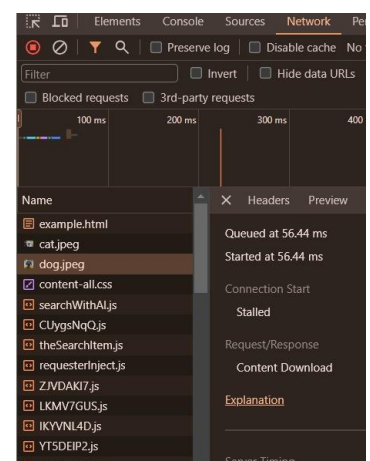
Page 1

This very simple webpage just has some text, a [link](#) to another webpage, and a couple of images ...



Page 1

This very simple webpage just has some text, a [link](#) to another webpage, and a couple of images ...



PART 3: DNS

Q5.

- the appropriate command options (for dig) to send a DNS query to the root server "a.root-servers.net", requesting for the address of all name-servers (NS) for the "com" top-level domains.

```
yudie@Dell-G15: ~$ sudo apt install -deb name
yudie@Dell-G15: ~$ dig @a.root-servers.net com NS

;<>> DiG 9.18.18-0ubuntu0.22.04.1-Ubuntu <>> a.root-servers.net com NS
(2 servers found)
;; global options: +cmd
;; Got answer:
;; flags: qr rd ra; QUERY: 1, ANSWER: 6, AUTHORITY: 12, ADDITIONAL: 27
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; DNS version: 0, flags: udp: 65535
;; QUESTION SECTION:
; com.                IN      NS

;; AUTHORITY SECTION:
com.                  172800  IN      NS      e.gtld-servers.net.
com.                  172800  IN      NS      b.gtld-servers.net.
com.                  172800  IN      NS      j.gtld-servers.net.
com.                  172800  IN      NS      f.gtld-servers.net.
com.                  172800  IN      NS      a.gtld-servers.net.
com.                  172800  IN      NS      g.gtld-servers.net.
com.                  172800  IN      NS      h.gtld-servers.net.
com.                  172800  IN      NS      l.gtld-servers.net.
com.                  172800  IN      NS      m.gtld-servers.net.
com.                  172800  IN      NS      c.gtld-servers.net.
com.                  172800  IN      NS      d.gtld-servers.net.

;; ADDITIONAL SECTION:
e.gtld-servers.net.  172800  IN      A        192.12.0.30
e.gtld-servers.net.  172800  IN      AAAA     2001:502:1c0a::30
b.gtld-servers.net.  172800  IN      A        192.32.94.30
b.gtld-servers.net.  172800  IN      AAAA     2001:503:2310::1:30
j.gtld-servers.net.  172800  IN      A        192.46.79.30
j.gtld-servers.net.  172800  IN      AAAA     2001:502:7890::30
f.gtld-servers.net.  172800  IN      A        192.35.52.30
f.gtld-servers.net.  172800  IN      AAAA     2001:503:19c1::30
a.gtld-servers.net.  172800  IN      A        192.35.51.30
a.gtld-servers.net.  172800  IN      AAAA     2001:503:103a::1:30
g.gtld-servers.net.  172800  IN      A        192.5.6.30
g.gtld-servers.net.  172800  IN      AAAA     2001:503:1a36::1:30
h.gtld-servers.net.  172800  IN      A        192.42.93.30
h.gtld-servers.net.  172800  IN      AAAA     2001:503:106a::1:30
l.gtld-servers.net.  172800  IN      A        192.34.112.30
l.gtld-servers.net.  172800  IN      AAAA     2001:502:13cc::30
m.gtld-servers.net.  172800  IN      A        192.43.162.30
m.gtld-servers.net.  172800  IN      AAAA     2001:508:d937::30
c.gtld-servers.net.  172800  IN      A        192.32.372.30
c.gtld-servers.net.  172800  IN      AAAA     2001:503:d20::30
d.gtld-servers.net.  172800  IN      A        192.26.92.30
d.gtld-servers.net.  172800  IN      AAAA     2001:503:83ab::30
; Query time: 210 msec
; SERVER: 199.41.9.48S(a.root-servers.net) (UDP)
; MSG SIZE rcvd: 828
yudie@Dell-G15: ~$
```

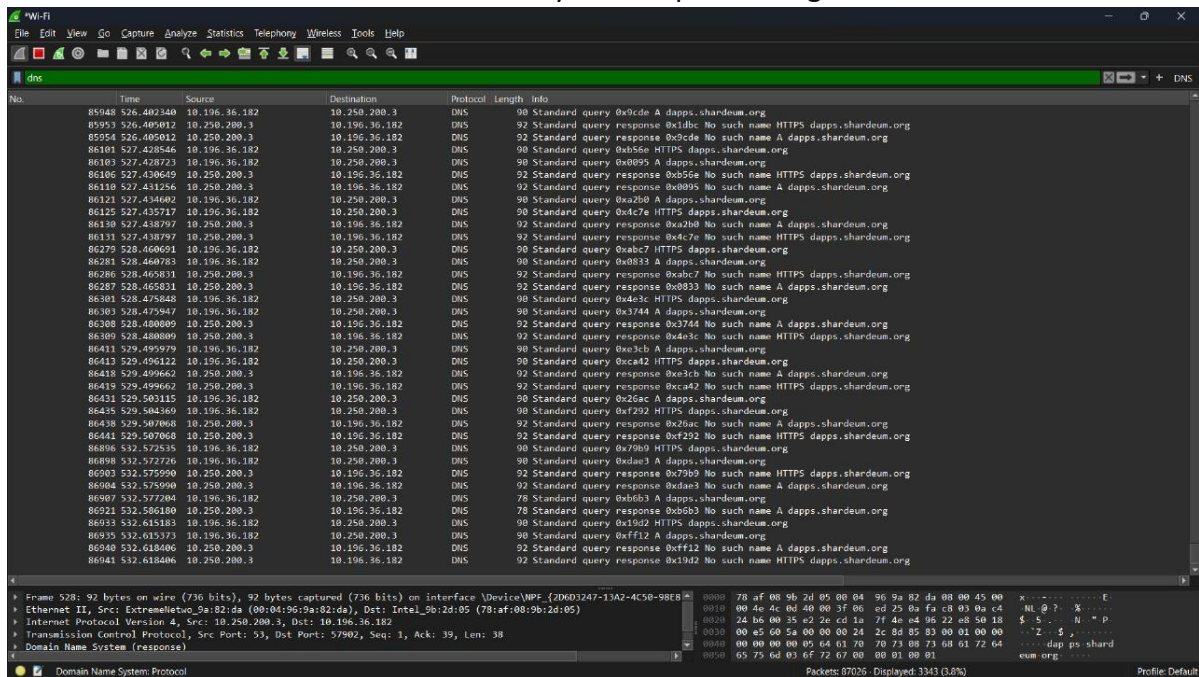
- This output traces the DNS resolution for "leetcode.com" from the root servers to the authoritative name servers (rob.ns.cloudflare.com and melinda.ns.cloudflare.com). It confirms the NS records and encounters some unsuccessful attempts with IPv6 addresses before successfully resolving using IPv4.

```
yudie@Dell-G15: ~$ dig +trace leetcode.com NS

;<>> DiG 9.18.18-0ubuntu0.22.04.1-Ubuntu <>> +trace leetcode.com NS
;; global options: +cmd
.                0      IN      NS      e.root-servers.net.
.                0      IN      NS      h.root-servers.net.
.                0      IN      NS      l.root-servers.net.
.                0      IN      NS      i.root-servers.net.
.                0      IN      NS      a.root-servers.net.
.                0      IN      NS      d.root-servers.net.
.                0      IN      NS      c.root-servers.net.
.                0      IN      NS      b.root-servers.net.
.                0      IN      NS      j.root-servers.net.
.                0      IN      NS      k.root-servers.net.
.                0      IN      NS      g.root-servers.net.
.                0      IN      NS      m.root-servers.net.
.                0      IN      NS      f.root-servers.net.
; Received 432 bytes from 172.21.96.1#53(172.21.96.1) in 210 ms

;; UDP setup with 2001:500:12::d0d#53(2001:500:12::d0d) for leetcode.com failed: network unreachable.
;; UDP setup with 2001:500:12::d0d#53(2001:500:12::d0d) for leetcode.com failed: network unreachable.
;; UDP setup with 2001:500:12::d0d#53(2001:500:12::d0d) for leetcode.com failed: network unreachable.
com.            172800  IN      NS      e.gtld-servers.net.
com.            172800  IN      NS      b.gtld-servers.net.
com.            172800  IN      NS      j.gtld-servers.net.
com.            172800  IN      NS      m.gtld-servers.net.
com.            172800  IN      NS      i.gtld-servers.net.
```

- Open Wireshark and observe the DNS traffic on your computer using the filter “dns”



- Find address of your local DNS server

Default Gateway : 10.196.63.250

- Find out addresses of any 3 root-level DNS servers:

d.root-servers.net (IPv4): 199.7.91.13

e.root-servers.net (IPv4): 192.203.230.10

f.root-servers.net (IPv4): 192.5.5.241