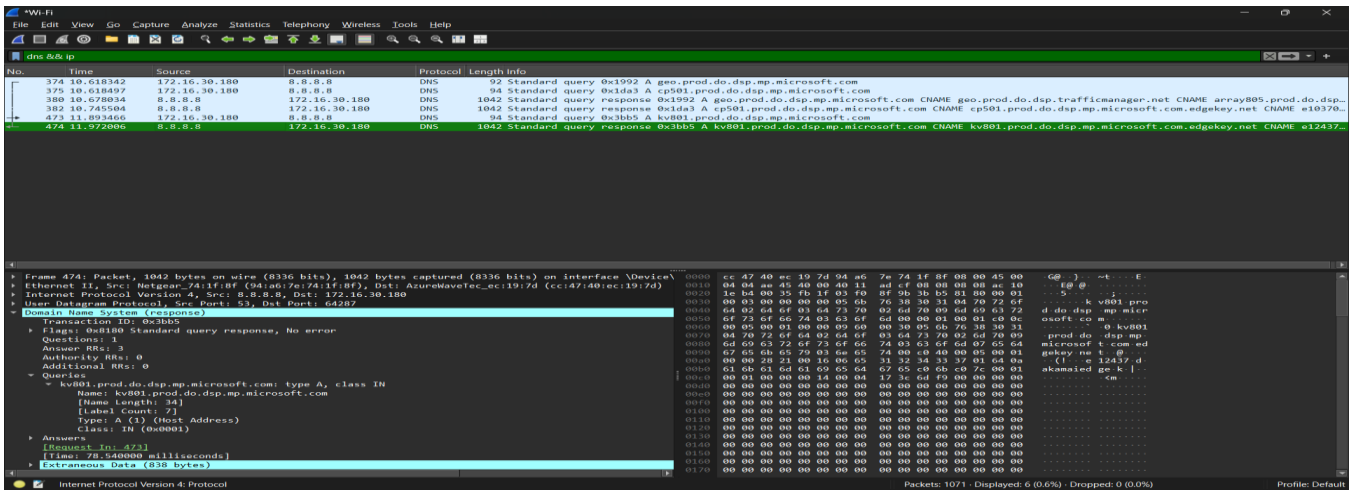
Task 1.1 How many DNS queries are sent from your browser (host machine) to DNS Server(s)?

DNS/Query-Response:

Topic / Item	Count	Average	Min Val	Max Val	Rate (ms)	Percent	Burst Rate	Burst Start
Total	27		0.0003	100%	0.0300	13.444		

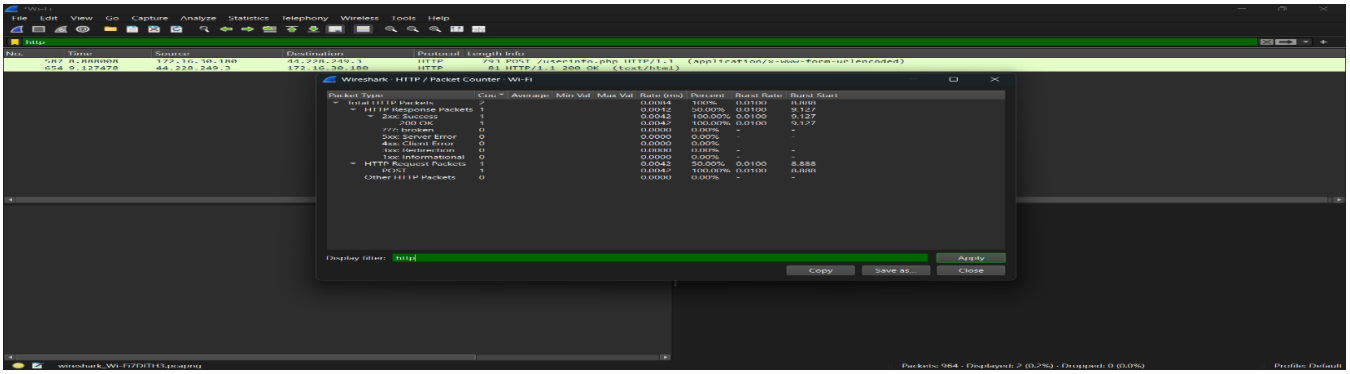
1.2 How many DNS servers are involved ?

Ans:3



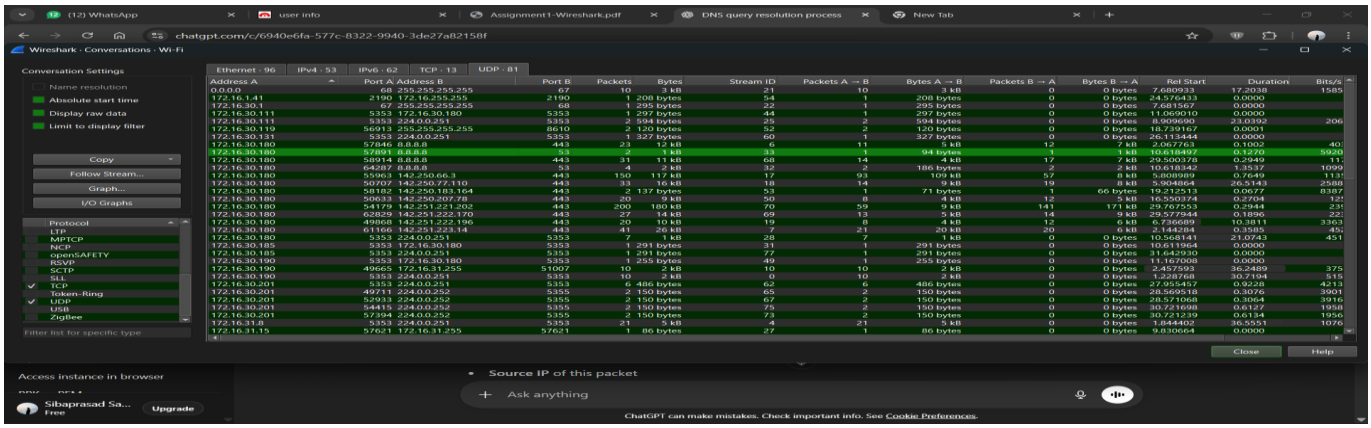
1.3 NO

2.1 How many HTTP requests (Type and respective count of requests), responses(status and phrase of each of the responses) did the browser send and receive ?

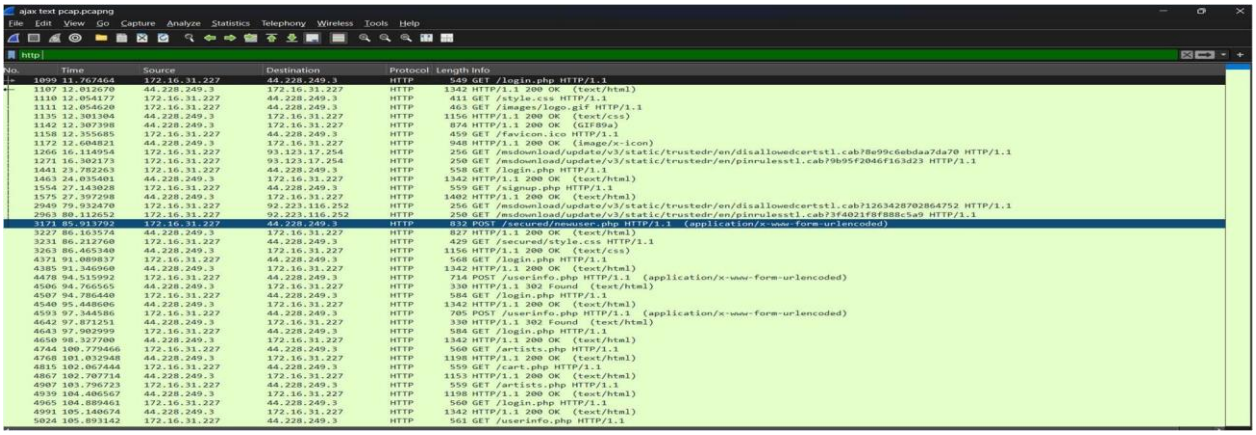


3 and 4) How many TCP Connections has the browser established overall ?

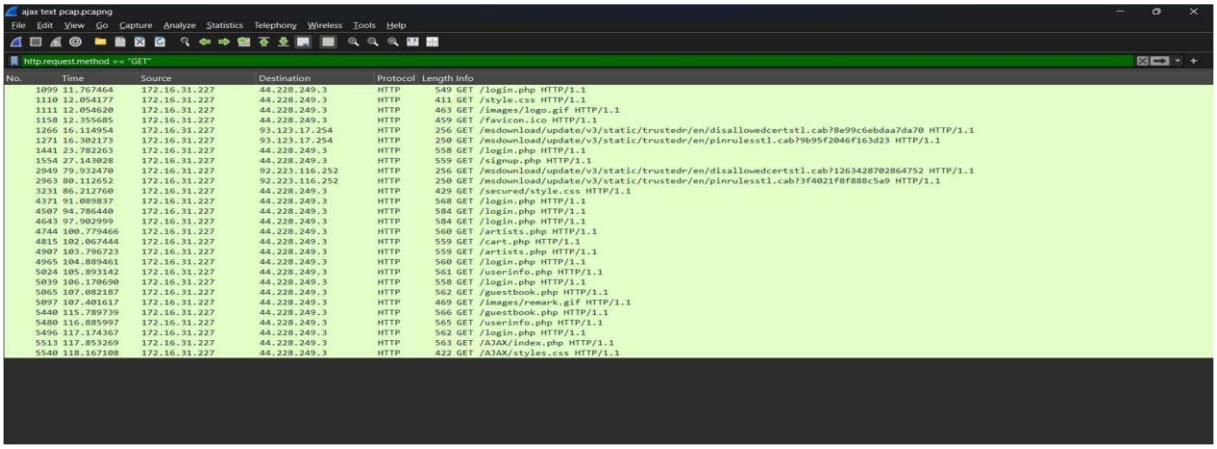
4) What is thetimetakentoestablishTCPconnection(s)?.List thistimetakenvaluefor each of the TCP connection(s).



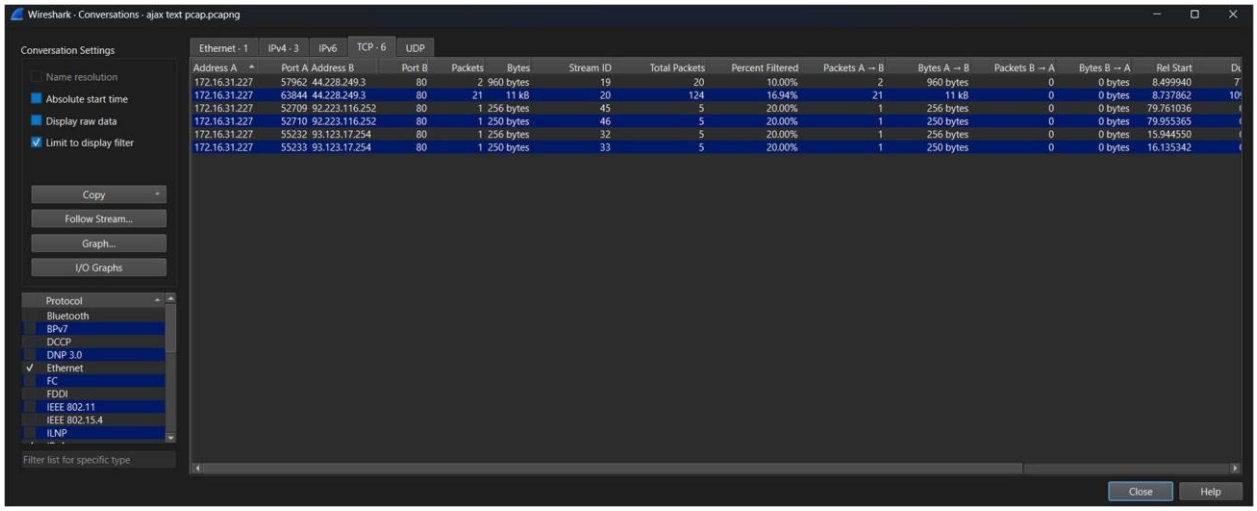
5) Browse the website by moving to various sub links, embedded objects listed in the site.



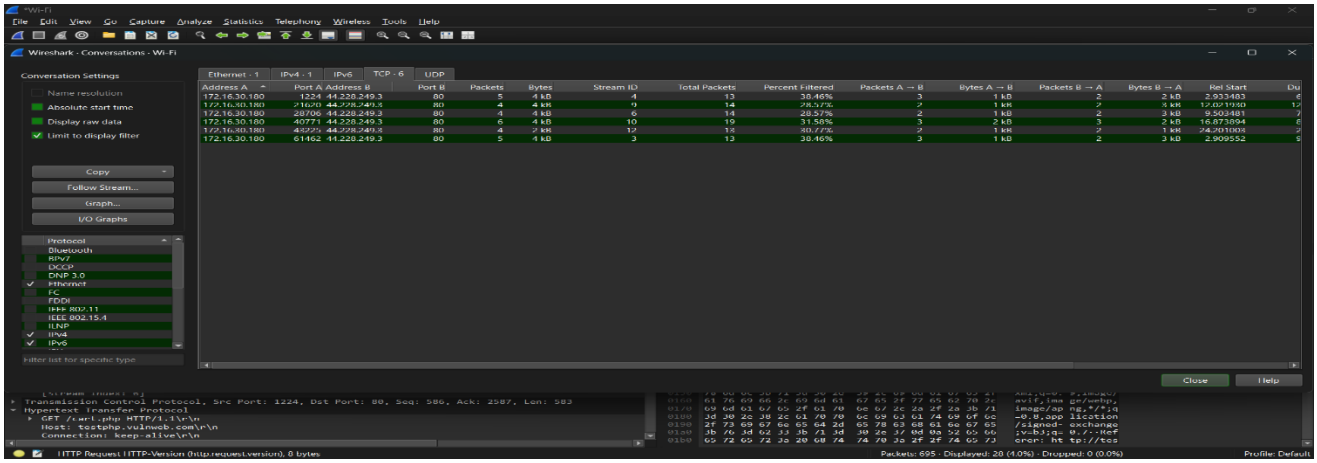
6) How many objects/files are downloaded?



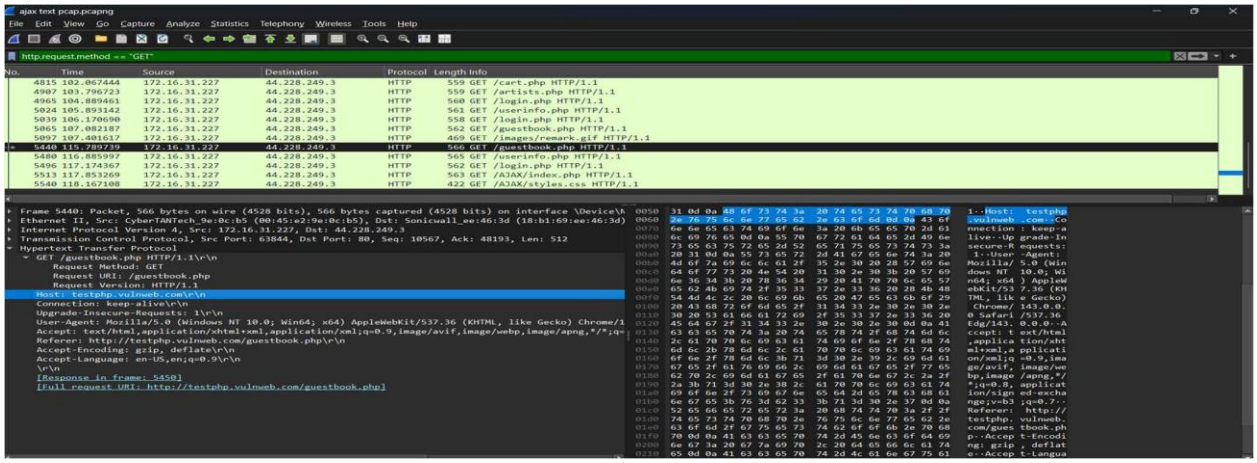
7) Makeadetailedlist includingforeachobject/filedownloadedwhat isthetimetakenfor downloadingtheobjects, thesizeof theobjectdownloaded,objectname, lastmodified time at the server.



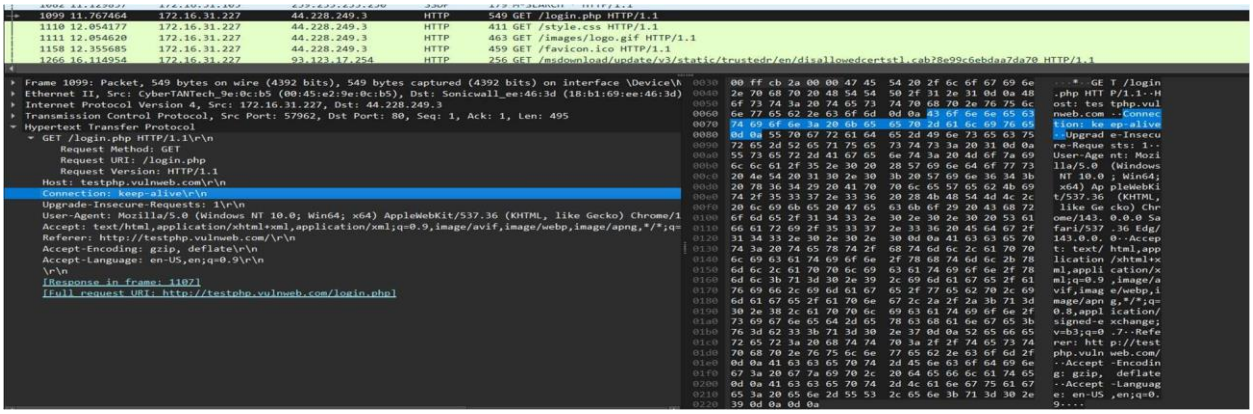
8) Howmanyotherwebsitesarevisitedfromthissite,byclickingontovariouspossible links which take you to the other sites (other than http://goidirectory.nic.in/)



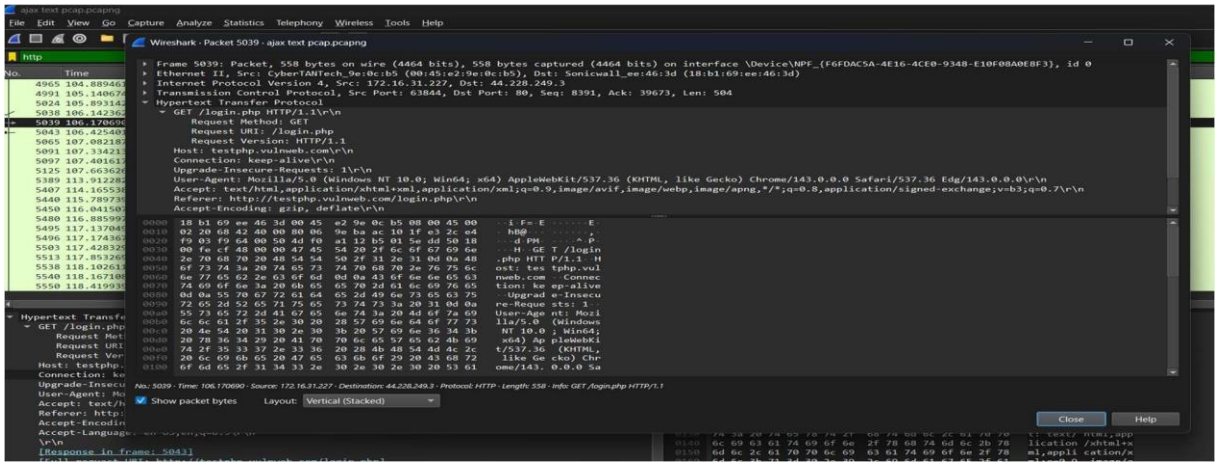
9) When http://goidirectory.nic.in/ is entered, is there any embedded object shown/downloaded from different site(s) (other than http://goidirectory.nic.in/) ?



10) How many times does the browser ask the site to keep the connection alive ?

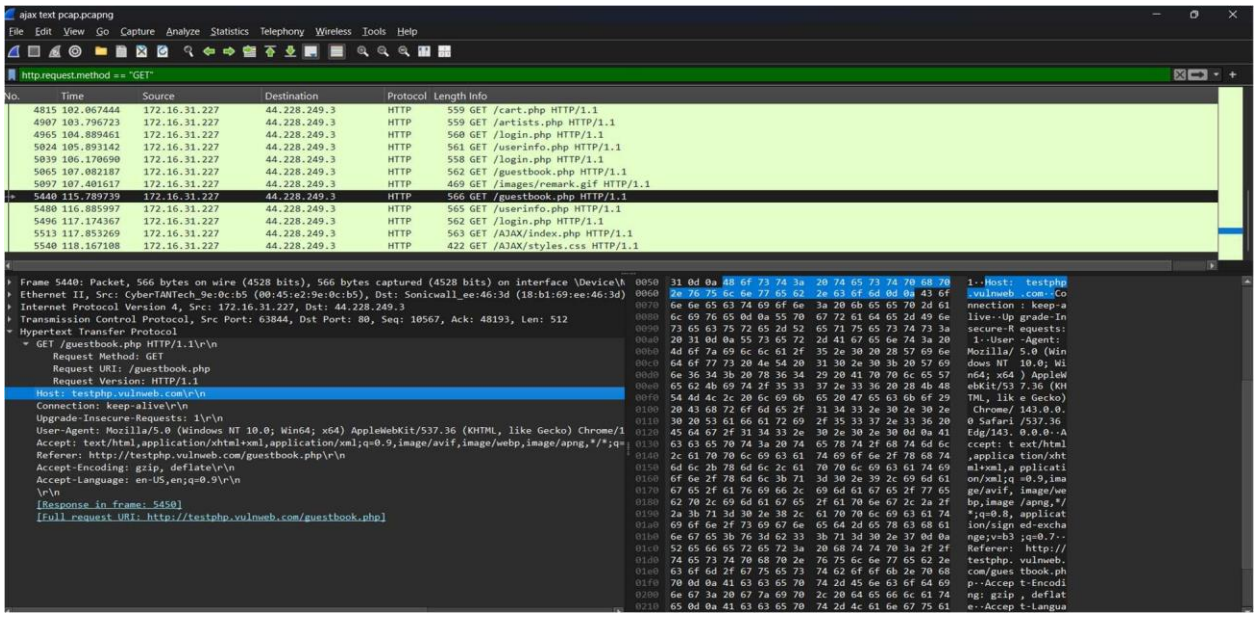


11) Which version of the HTTP is your browser running ?

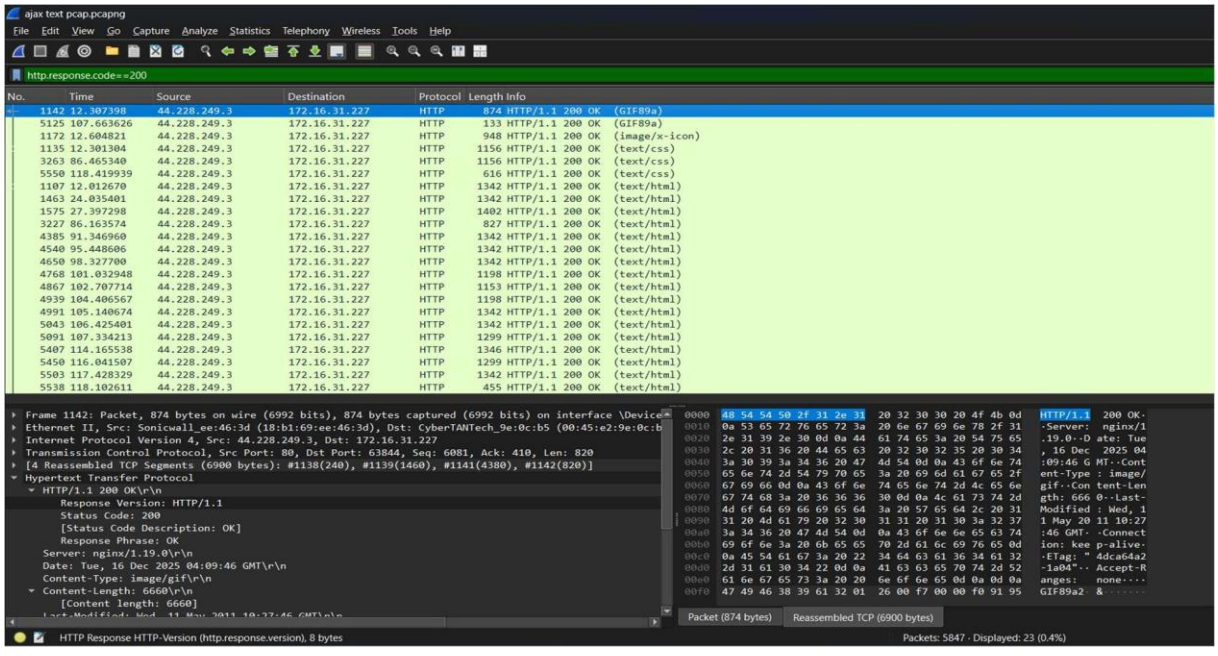


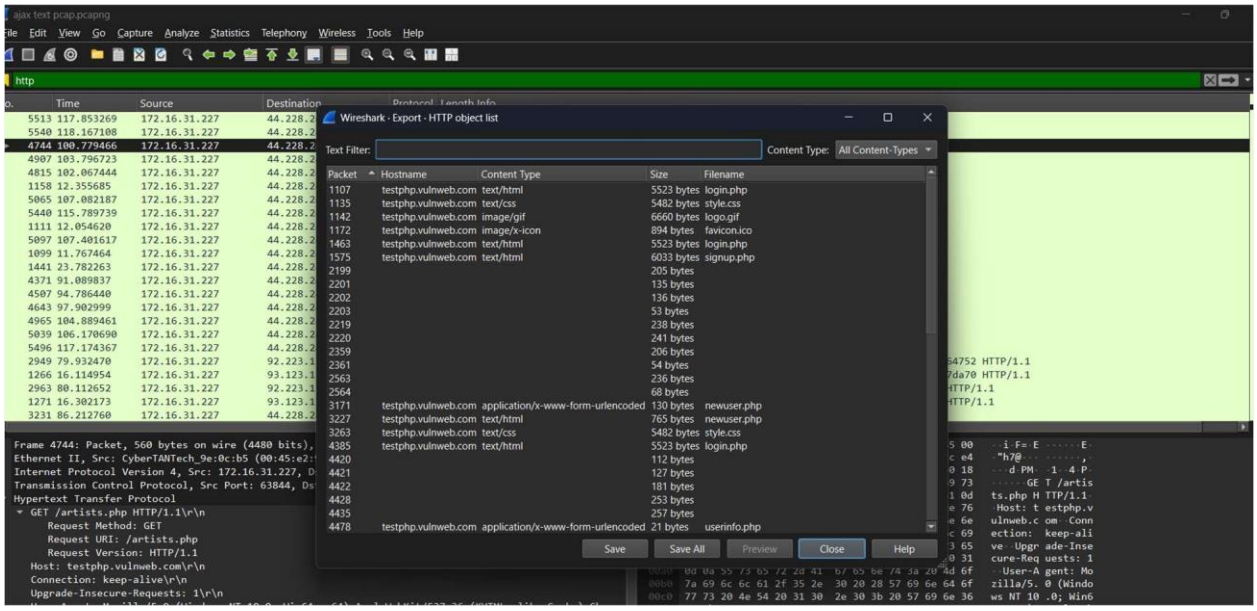
TASK 2

1) How many conditional GETs are sent by browser to the server ?



2) Make a list for each of the file/object downloaded, how many times the server sends the full contents of the respective file/object ?





3) Explain in detail what is the difference in server's behaviour between first and second request/browsing ?

4) List the headers of HTTP which influence this functionality.

First Request (Cold Cache)

- **Browser:**
  Sends a normal **HTTP GET** request because it does not have a cached copy of the file.
- **Server:**
  Responds with **HTTP 200 OK** and sends the **entire file payload**.
  The response includes caching metadata such as:
    - **Last-Modified** (timestamp of last change)
    - **ETag** (unique identifier for the file version)

2. Second Request (Warm Cache)

- **Browser:**
  Detects that a cached copy of the file exists and sends a **Conditional GET** request.
  It includes validation headers such as:
    - **If-Modified-Since** (based on Last-Modified)
    - **If-None-Match** (based on ETag)
- **Server:**
  Compares the conditional headers with the current file state:
    - **If unchanged:**
      Responds with **HTTP 304 Not Modified** and sends **no file data**, saving bandwidth.
    - **If modified:**
      Responds with **HTTP 200 OK** and sends the **updated file**.

3. Request Headers (Sent by Browser)

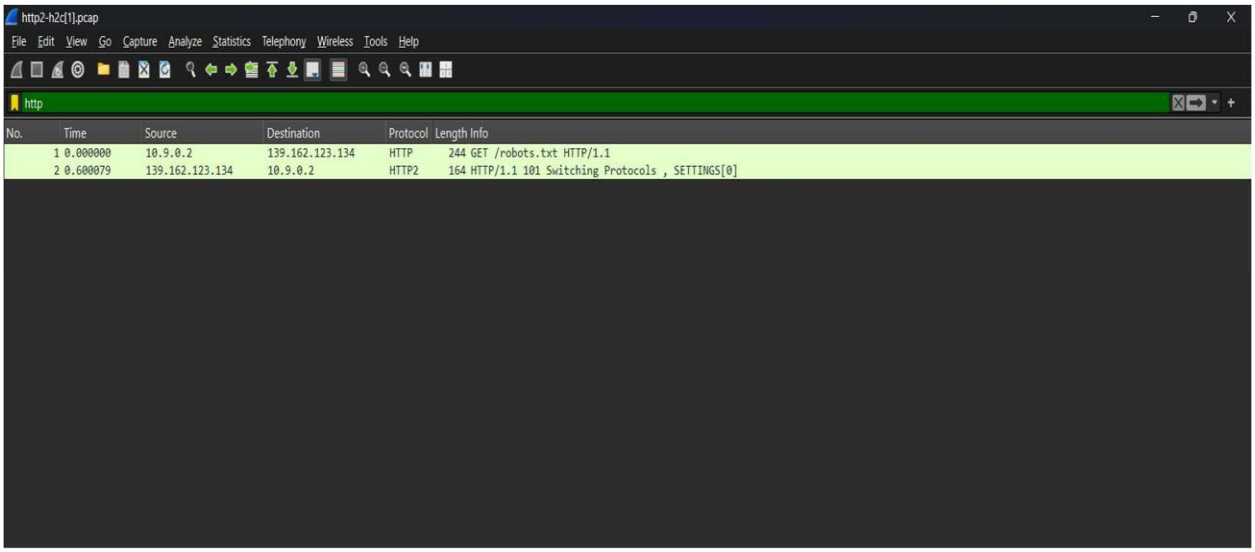
- **If-Modified-Since:** Date of the cached file version.
- **If-None-Match:** ETag value of the cached version.
- **Cache-Control:** (e.g., max-age=0 forces revalidation).

4. Response Headers (Sent by Server)

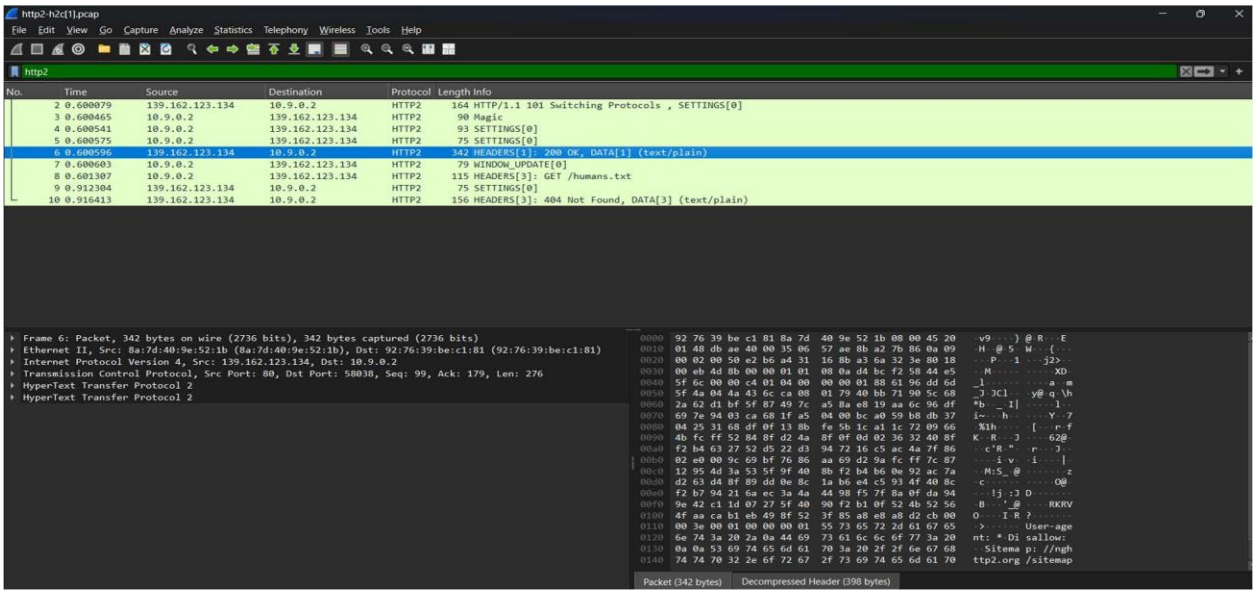
- **Last-Modified:** Last modification time of the file.
- **ETag:** Unique identifier for the file version.
- **Expires:** Time after which the cached copy becomes stale.

TASK 3

1) How many HTTP/2 and HTTP/1.1 packets are present?



2How many HTTP/2 packets are exchanged between client and server here before the first object is fetched ?



2) What main difference do you observe in headers of HTTP/2 packets displayed here, compared to the headers of HTTP/1.1 packets ?