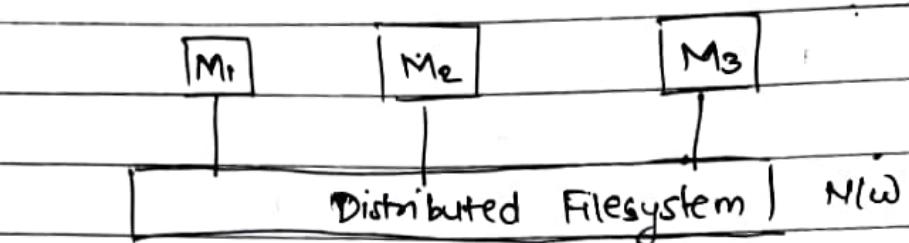


- ① **File**: File is defined as a collection of data.
- ② **File Attribute**: is defined as any entity that describes the file.
- ③ **File System**: A system software used for managing the file.

④ Distributed File System

It is a system wide common file system used for managing the file in a distributed (heterogeneous) environment.



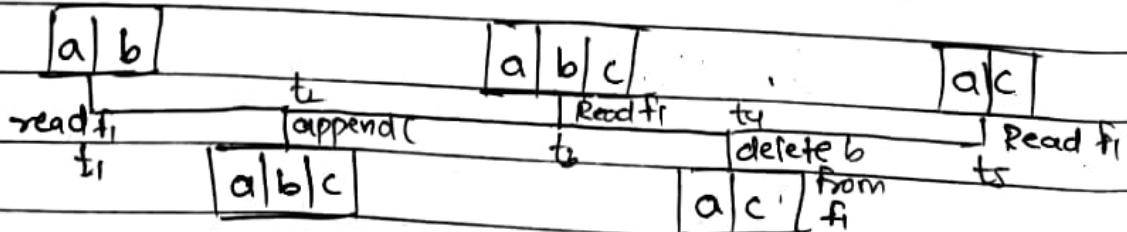
* File Models:

- 1) Structured:- Collection of data organised in a proper sequential manner
- 2) Unstructured: Collection of data organised in any manner
- 3) Index: Whenever for any specific data a proper indexing is done (required reference) is called Index
- 4) Non-Index: Whenever for any data there is no proper indexing done , it is known as Non-Index
- 5) Immutable: File used contents can be only read
- 6) Mutable: File used contents can be read or modified

* File Accessing and File Sharing Models

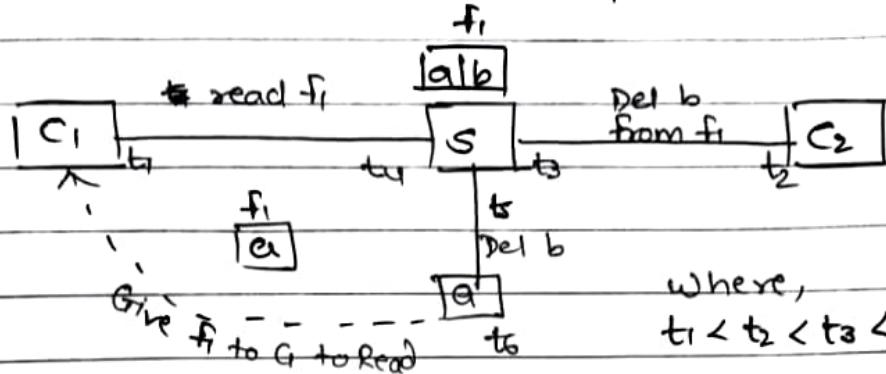
1) Unix File Sharing Symmentics:

It works on the principle of timestamp
eg:-



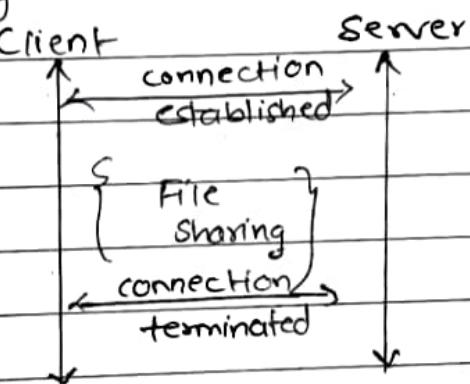
But when above implementation is on standalone

system is when implemented or distributed environment it creates a problem



As shown above, even though C1 requested first, G's request is received first by the server as because order of sending and receiving in network is never same.

2) Session Symmetries:

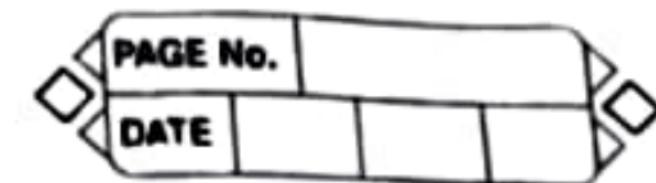


Client initially establishes connection for specific file, performs the required operation & release the overall control of the file by terminating the session

3) Transaction based Symantics:

```
Begin  
{ transactions  
} end
```

The set of instructions will be executed on a transaction like syntax.



4) Immutable:

This syntax is used for read only file. To modify create the copy of file and then only start modifying it.

* File Caching. Caching

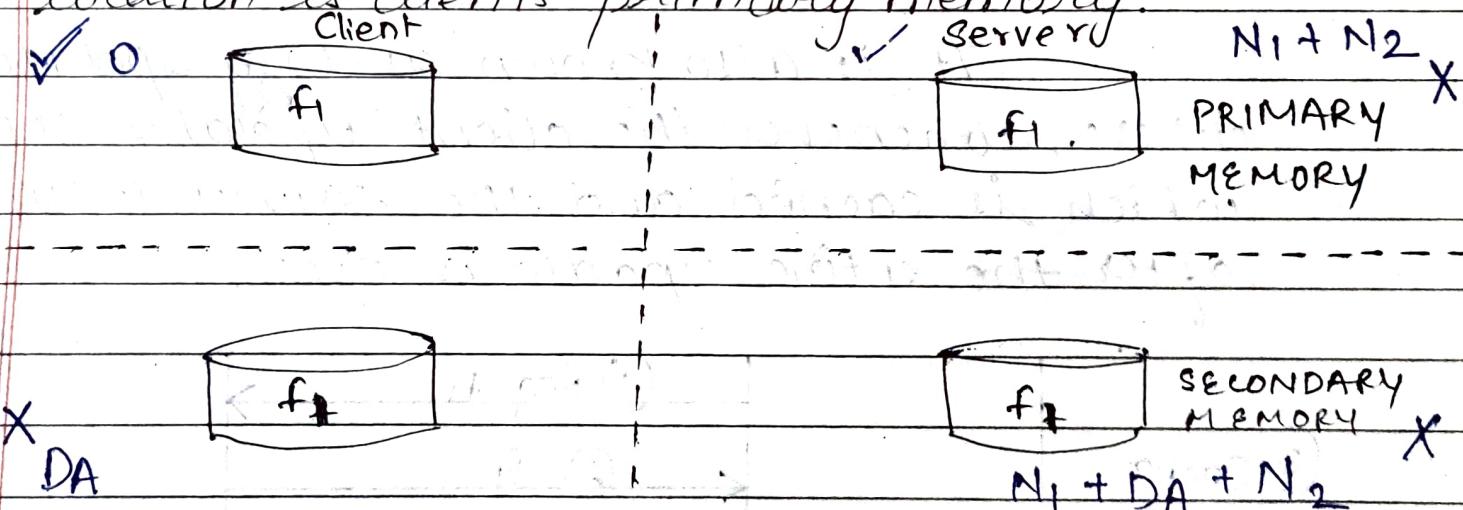
→ The process of storing frequently access data in a special memory zone as cache memory is said to be caching.

→ Caching focuses on reducing the response time whereas replicas focuses on availability increment by creating copy of data.

* Issues in cache designing in a distributed Environment.

1. Cache location.

The first thing is deciding upon the cache location, and the best suitable cache location is client's primary memory.

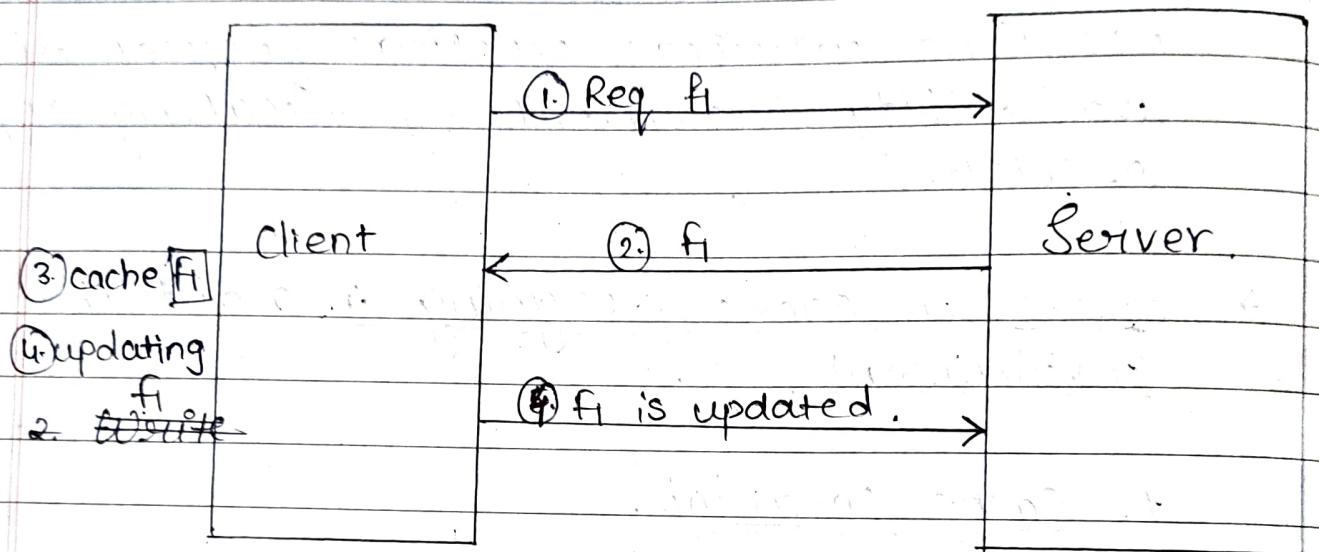


2. Modification Propagation.

The process of updating the server when the file is cached at the client's end and client has modified it.

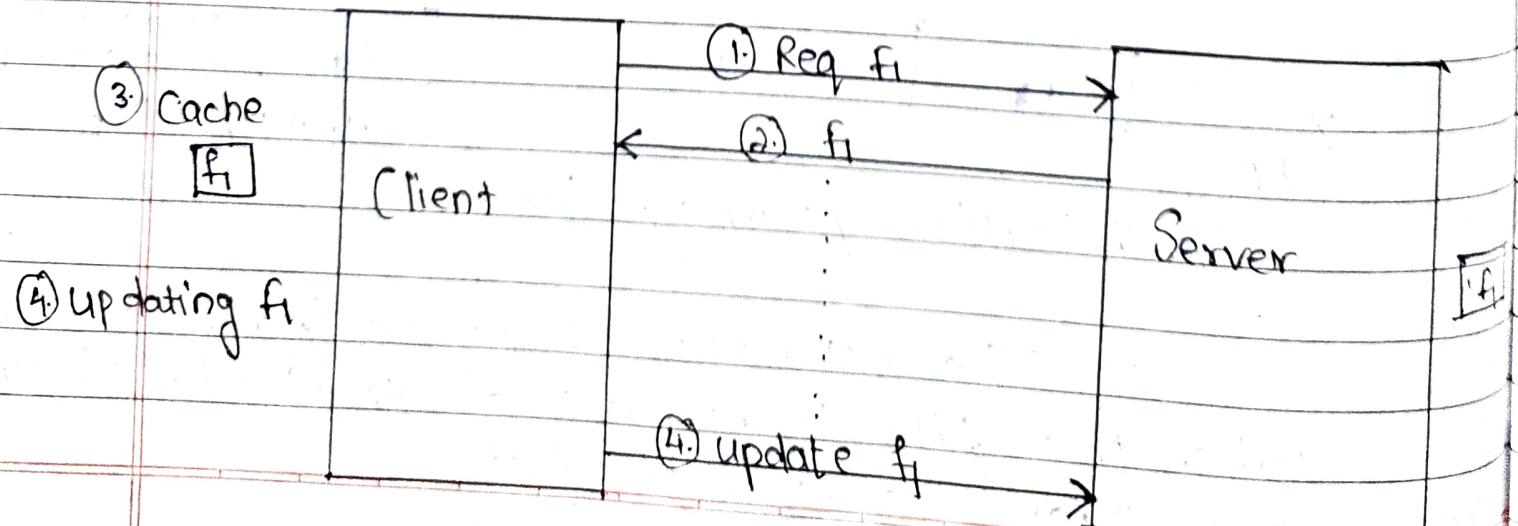
i.) Write through

Client will request for the file, server will give the file to the client and client caches it. whenever the client updates that file, it will parallelly update the server.



ii.) Write back

It is also known as lazy update where, whenever the client updates the file which is cached and the server is updated after the entire update is over.

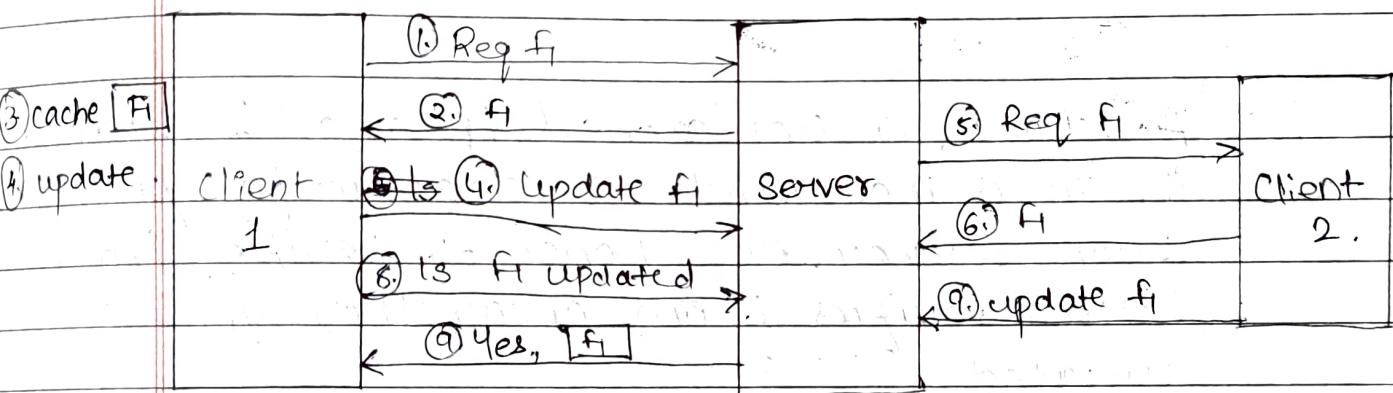


3. Cache Validation

The process of confirming whether client and server has latest copy of file is known as cache validation.

i.) Client validation.

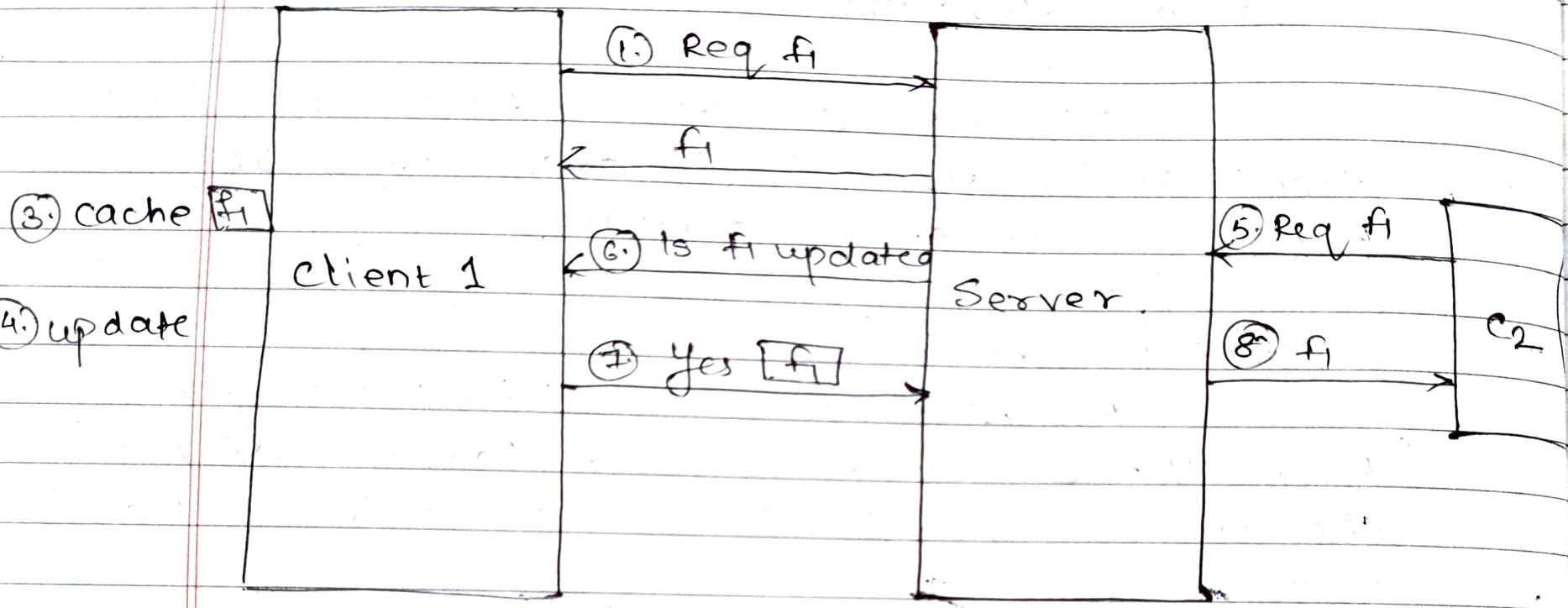
The process where client verifies from the server about the latest copy of the cached file is known as client validation.



~~i)~~ As shown, C₁ takes f₁ caches it parallelly update server. C₂ now takes f₁ ^{and} parallelly updates f₁ and as well as update server. C₁ now before using f₁ will verify it from server.

ii.) Server Validation.

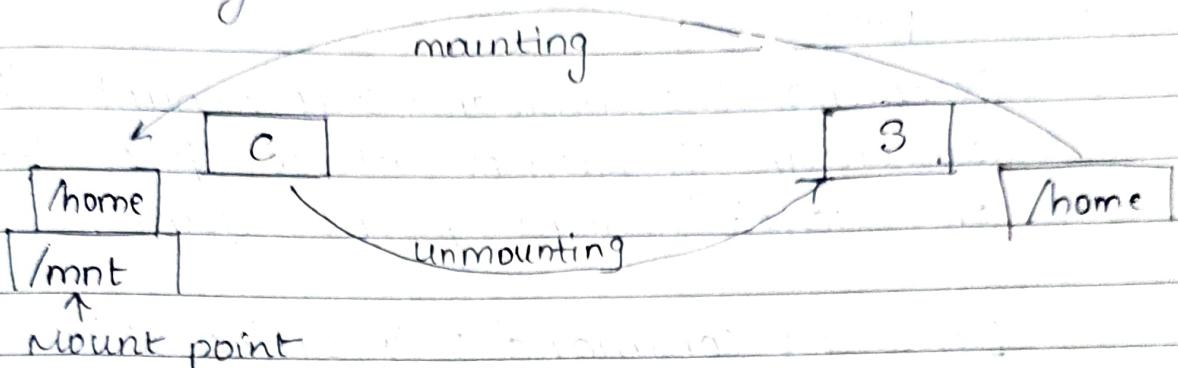
The process where the server verifies from the client whether it has latest copy of file is known as server validation.



As shown, C₁ has cached f_1 and is updating it. In a meanwhile C₂ request for ~~f_1~~ f_1 from server. And hence, C₁ verifies from server verifies from C₁ whether f_1 is updated.

* Network file system (NFS).

It is a distributed file system in Linux, used for mounting the file system and unmounting it.



Mounting : The process of getting the file system of the server temporary on client is known as mounting.

Mount point : The place on a client where file system is mounted is known as Mount point.

Unmounting : The process of returning mounted file system back to server is known as unmounting.

Mount command : Executing this command will mount the required file system.

Eg: [root@client ~]# mount 1.2.3.4:/home /mnt

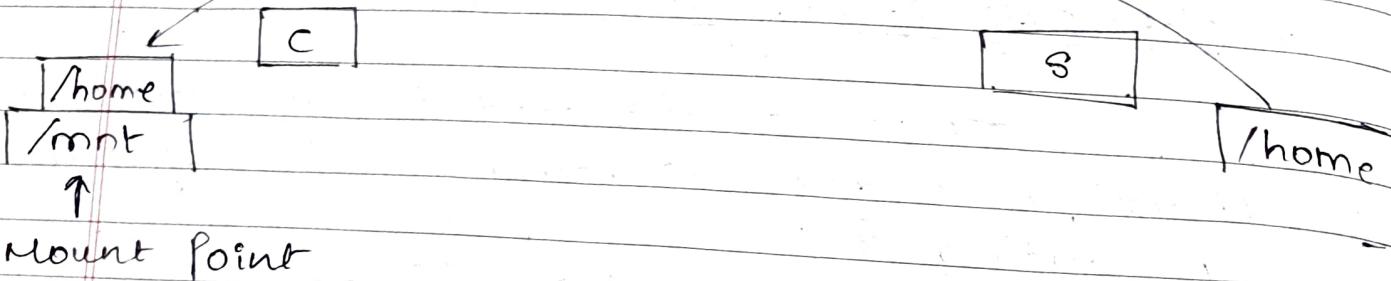
server ka IP
 ↓
 1.2.3.4:/home
 kaha kya de

client ka
 mount point
 ↗
 /mnt ←

kihua

O/P :

mounting

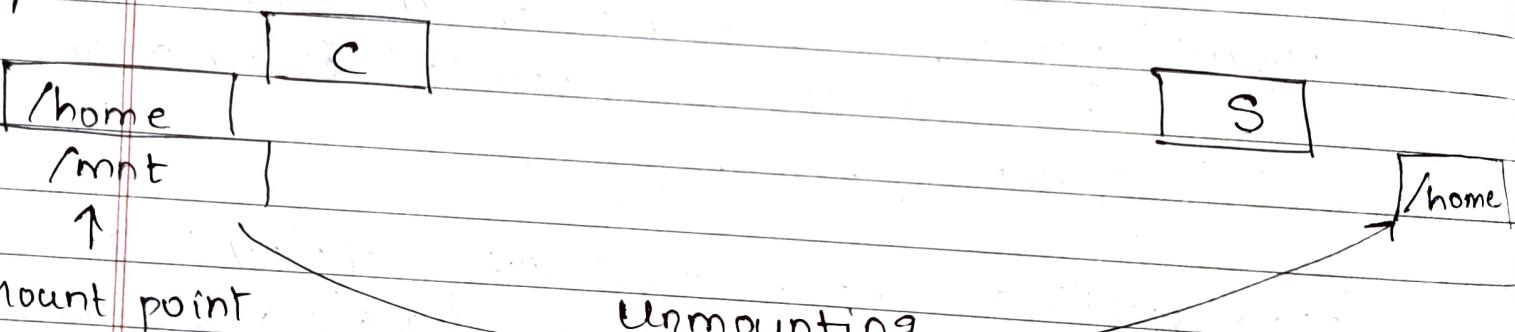


Executing the command will mount /home directory of server whose IP is 1.2.3.4 on client's mount point /mnt.

Umount command :- Executing this command will perform unmounting.

Eg :

[root@client ~]# umount /mnt ↴

O/P :

Note : Ek mount pe at a time ek hi directory mount hogा.

FS Hints

File system

Mount points

File

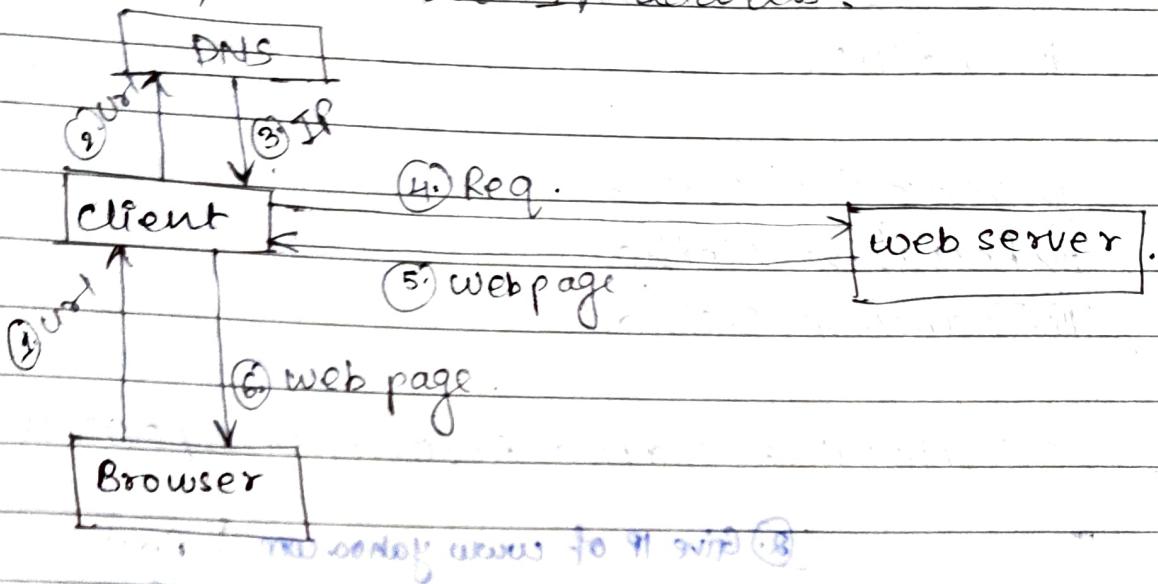
File

Data

Part B : Naming.

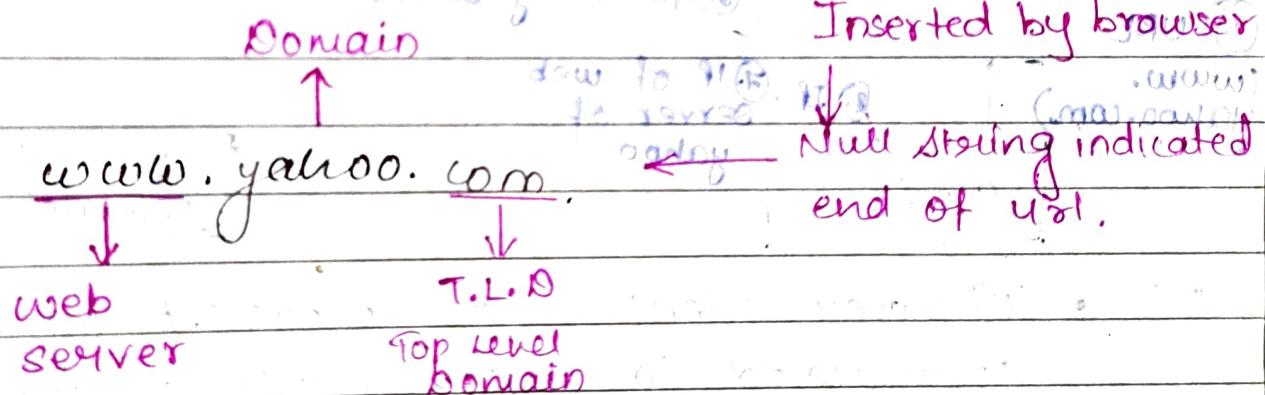
* DNS [Domain Name System].

It is an application layer service which maps URL to IP address.



Humans are comfortable working with names whereas systems are comfortable working with numbers and hence such mapping is required.

Note :



FQDN : Fully qualified Domain Name.

www.yahoo.com.

www.yahoo.

www.

PQDN : Partially qualified Domain Name.

www.yahoo.com.

www

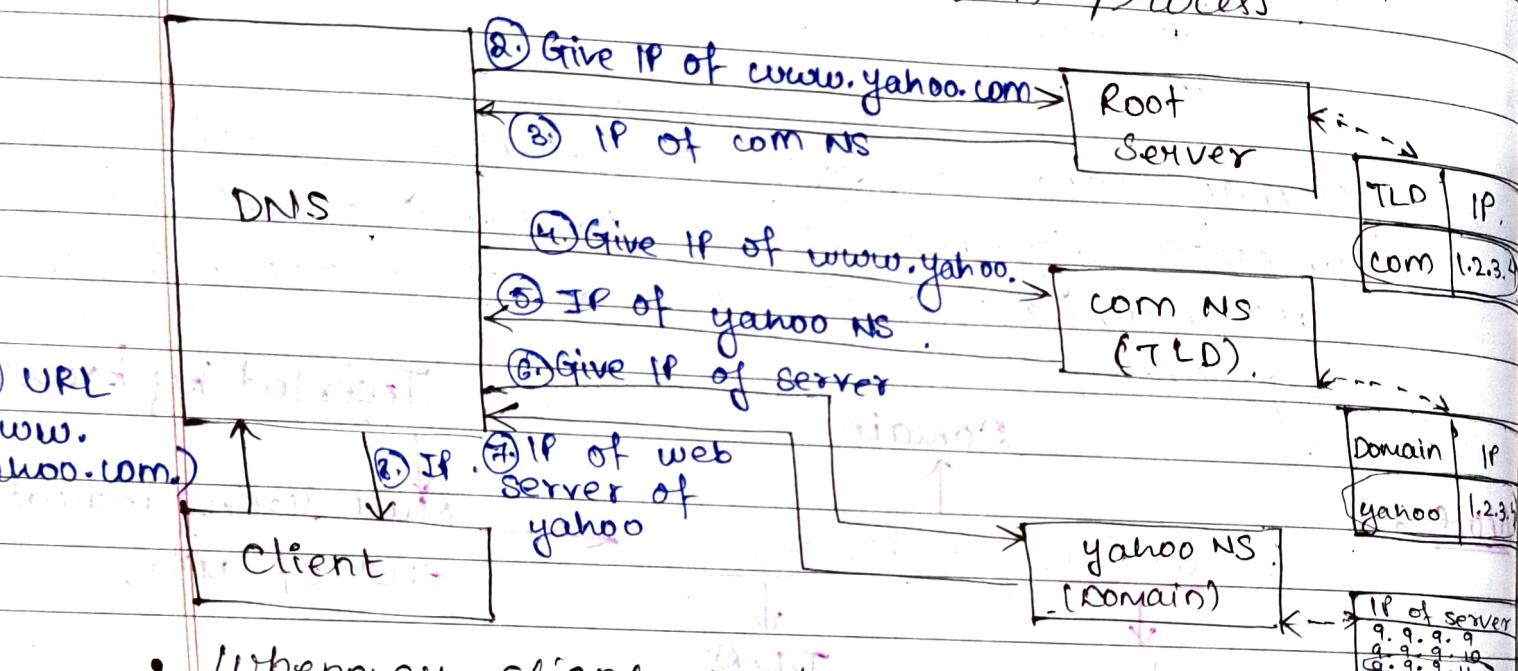
www.yahoo

* DNS Name Resolution Process

There are following 3 Name Resolution processes used by DNS, and all are distributed in nature.

- i) Iterative Method
- ii) Recursive Method
- iii) Transitive Method

→ Iterative Name Resolution Process



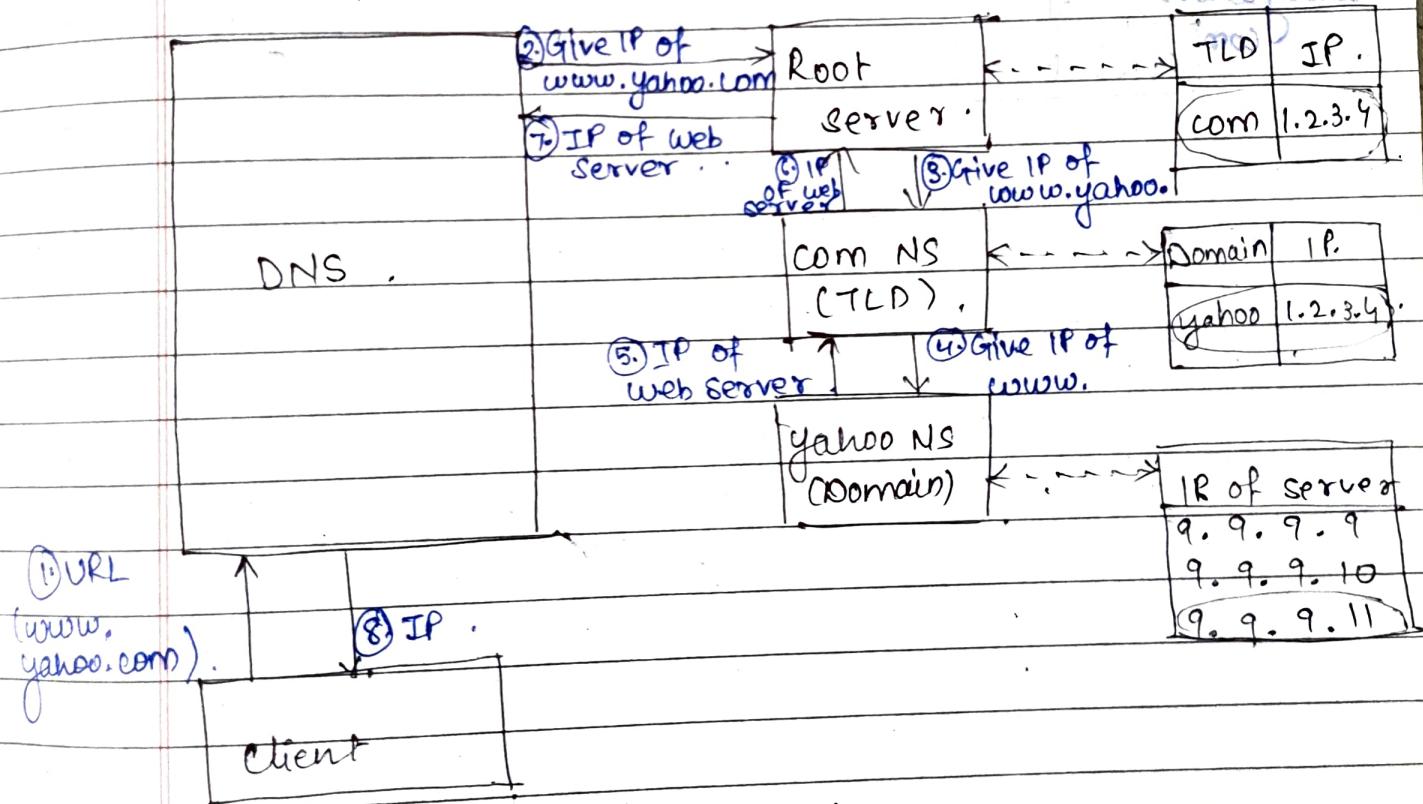
- Whenever client sends request to DNS, it is forwarded to Root server, which is responsible to give IP address of TLD (Top level Domain) NS (Name server). for eg : com NS.

- Once DNS gets the IP of com NS, now it further request com NS to resolve the remaining address.

- com NS now returns IP domain NS ie. yahoo NS.
- DNS now request yahoo NS to give the IP of yahoo NS.
- yahoo NS now returns the IP of web server to DNS which is further forwarded to client.

→ Recursive Name Resolution Process.

It is same as iterative method, but the only difference is DNS server is not continuously involved for request and reply purpose.



As compared to iterative, here the server would directly send request to other NS.

→ Transitive

It is very similar to recursive method, the only difference is the last server (i.e. yahoo NS) would directly send the reply to DNS.

