Topics for Today:

- Merge Conflict
- Web Architecture

Merge Conflict:

Two people Rohan & Mohammad, working on the same project. They pulled a file named a.txt from the cloud repository. It's an empty file and both have added a one line in Line No.1. since the changes are in the same line, git will show error.

A merge conflict happens when two branches have in a file changes on the same line. The error would be shown as

>>>>>>>>

Rohan's Line

========

Mohammed's Line

<<<<<<<<<

We need to fix this by modifying the file and then commit it again.

NOTE: This change can be made by Rohan or Mohammed whoever is merging both the branches.

Using Git:

Let's add a new file.

touch a.txt → adds a new file to the folder

git add . → to add the new file to the staging area.

git commit – m "adding a.txt".

We are in the main branch since we have not created any other branches yet. So, when we give command,

git branch → it would show us the output as "* master"

Now, let's create two new branches, one named as *Rohan* and the other named as *Mohammad*

git branch mohammad

git branch kunal

We have created two branches. We can check using *git branch* command.

~/Desktop/folder (master)

$ git branch

* master

~/Desktop/folder (master)

$ git branch mohammad

~/Desktop/folder (master)

$ git branch kunal

~/Desktop/folder (master)

$ git branch

kunal

* master

mohammad

Now, checkout to Kunal branch.

git checkout kunal

The file a.txt is empty. So lets add a line, “my name is Kunal” using echo.

echo “my name is Kunal” >> a.txt

If we give cat command, we can see the content as “*my name is Kunal*” and using ***git status*** we can see that the file a.txt has been modified.

modified: a.txt

So, lets add this file.

git add .

git status

modified: a.txt

git commit -m “Kunal adding a single line”.

Now, if we see the log, we can see two commits. The first one shows us the commit we did before creating a branch and just adding a.txt file and the second commit is by Kunal which is done after adding a new line.

git log

```
commit 8792aa0f43f329a2d16cbb83ffd6e519191e81c3 (HEAD -> kunal)

    kunal adding a single line

commit b1c85833c964ca18221bae4c34a3e0a688d69ee9 (mohammad, master)

    adding new file a.txt
```

Let's checkout to Mohammad's branch. As Mohammad has not made any changes in the a.txt file, it will be empty. So lets say Mohammad is writing "My Name is Mohammad" using the echo command. He will also add the file and commit.

```
~/Desktop/folder (mohammad)
$ echo My Name is Mohammad >> a.txt
~/Desktop/folder (mohammad)
$ git status
On branch mohammad
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
        modified:   a.txt
```

git add .

```
~/Desktop/folder (mohammad)
$ git commit -m "Mohammad adding a line in a.txt"
[mohammad 2dcdd8c] Mohammad adding a line in a.txt
 1 file changed, 1 insertion(+)
```

git log

$ git log

commit 2dcdd8c7075479444392ca6c4b9c42ded78fb39d (HEAD -> mohammad)

Mohammad adding a line in a.txt

commit b1c85833c964ca18221bae4c34a3e0a688d69ee9 (master)

adding new file a.txt

Both Mohammad and Kunal have added a single line. Now let's do git merge from Mohammad's branch. The command is;

git merge kunal → If Kunal wanted to merge Mohammad's branch then the command would be ***git merge mohammad.***

~/Desktop/folder (mohammad)

$ git merge kunal

Auto-merging a.txt

CONFLICT (content): Merge conflict in a.txt

Automatic merge failed; fix conflicts and then commit the result.

Now, do ***cat a.txt***

~/Desktop/folder (mohammad|MERGING)

$ cat a.txt

<<<<<<< HEAD

My Name is Mohammad

=======

my name is kunal

>>>>>>> kunal

Git shows the error and wants us to clear the issue and then merge it again.

Open the file make the changes and save the file in GUI. Then come back to git, check git status; it will show both modified: a.txt

~/Desktop/folder (mohammad|MERGING)

$ git status

On branch mohammad

You have unmerged paths.

(fix conflicts and run "git commit")

(use "git merge --abort" to abort the merge)

Unmerged paths:

(use "git add <file>..." to mark resolution)

both modified: a.txt

Once modified, add the file and then commit (fixing merge conflict).

```
~/Desktop/folder (mohammad|MERGING)
$ git commit -m "fixing merge conflict"
[mohammad 81dab61] fixing merge conflict
```

Now when you do git log, you can see the commits made by kunal as well.

```
~/Desktop/folder (mohammad)
$ git log
commit 81dab61f4aeda699acf725912a7d4a0ba1a13145 (HEAD -> mohammad)
    fixing merge conflict
commit 2dcdd8c7075479444392ca6c4b9c42ded78fb39d
    Mohammad adding a line in a.txt
commit 8792aa0f43f329a2d16cbb83ffd6e519191e81c3 (kunal)
    kunal adding a single line
commit b1c85833c964ca18221bae4c34a3e0a688d69ee9 (master)
    adding a.txt
```

Web Architecture

Any two people, Gaurav and Laxmi are two friends. Laxmi came up with an idea of sweet shop. Gaurav became partner with him and they have started working on this venture. They are earning good (Rs. 1000/-). This is a local shop. Laxmi wants to expand the business and informs

the same to Gaurav. So, Gaurav suggested that we can put our Shop online as www.halwai.com. They can put there menu online so that customers can order online by which they can reach more people and earn more money.

First thing Gaurav did was, he wrote CSS, then HTML, Javascript and backend on Node.JS. Laxmi got confused on what he was doing. To clear up Laxmi's confusion, Gaurav explains to him as such.

Human body has:

- Bones →gives structure like HTML(Hyper Text Makeup Language) (buttons, texts and dropdown)
- Skin → colours, font, formats all this in CSS (Cascading Style Sheet)
- nervous system → JavaScript
- brain →server-side language.

and website is also like a human body because, CSS, HTML is like bones of a website. They give structure to the whole website. CSS is like skin, it helps us to give colour, style, fonts, formats etc. In websites the nervous system is JavaScript and the brain, just like a memory, it is called server-side language called Node.JS.

let's suppose, Gaurav has written all the code and the website is working in his local computer. Now he needs to make this website accessiable to millions of people on web so that customers can reach it and order.

Let's understand this before we move forward with the story.

What happens when you type www.google.com?

Every must have heard about IP address. It is like a location of a computer in the cloud or web. Everyone has an IP address (ex. 5.0.0.2). If anyone knows the IP address of your computer, given permission, he can explore your computer.

IP address is just like locality like lets say you stay in Lakshmi Nagar. But where in Lakshmi Nagar? We need house number, in the same way we need a PORT. An IP address along with a PORT denotes a website. IP Address is address of a computer and at a particular PORT, a website is running. In a computer you can have ports from 1 to 65353.

In the same way, google.com is running at some IP address and at a particular port. Any website runs on a particular IP address and a particular port. It is represented as

192.123.125.14: *6500*

IP ADDRESS *PORT*

How to check IP address on any website?

The command is ***ping www.google.com***

Copy the IP address and paste it in browser. It will take you to google.com straight away. If you write the IP address of a particular website you can go to the website.

".com" are called domain name. it is just like another name of an IP address. It is hard to remember so many IP addresses so we use the domain names as it is easy to remember.

Two types of IP Addresses: Dynamic IP Addresses change, but Static are constant.

The domain names is for humans and IP address is for computers. They do not know what is facebook.com or google.com.

(Coming back to the question) What happens when you type www.google.com?

We enter the domain name in the browser. The browser needs to know the IP address. There is an entity known as DNS. It means Domain Name Server. IT has the mapping of domain name to IP address. There is IETF which manages internet. Airtel, Act, Hathway etc have hosted IETF services to us. IETF has Domain Name servers. If they have an entry of google.com, they know the IP address of google.com. It will have all the IP addresses of google.com and in same way for other domains (. com's) as well.

So google.com is entered in browser, the web browser asks DNS to give it a valid IP address. The browser first contacts DNS and then it fetches the website of any website. Computer only understand IP addresses.

Now, lets go back to the start up. So Gaurav has written the code and is working in his computer. So, he contacted some cloud providers, people who give you servers on rent, Ex: Amazon, Azure etc. The give servers on rent.

Before the servers walked-in people had to maintain huge number of computers and they were supposed to keep running. People used to buy computers to run the website. There were many cons in maintaining the system. Power failures or weather issues so on and etc. So you have replace them. You have to maintain the system and keep it up to date. Amazon is the first with this idea. It is easy for most of the companies.

NOTE: Point to remember → there are cloud providers who give us computers on rent.

Gaurav rented few computers from cloud provides and got an IP address for his website. He informs Lakshmi that their website is 8.8.8.8. But Lakshmi wanted to have a easy name so that it is remembered and shared as well. Then, Gaurav goes to godaddy.com or namecheap.com. he selects a domain name from godaddy.com. *Higher the demand of the domain, higher the price.*