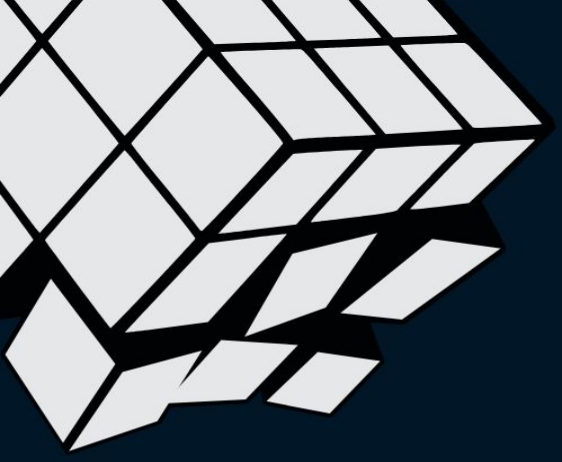

# INTRODUCTION TO GIT & GITHUB

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# About the book

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This is an open-source introduction to Git and GitHub guide that will help you learn the basics of version control and start using Git for your SysOps, DevOps, and Dev projects. No matter if you are a DevOps/SysOps engineer, developer, or just a Linux enthusiast, you can use Git to track your code changes and collaborate with other members of your team or open source maintainers.

The guide is suitable for anyone working as a developer, system administrator, or a DevOps engineer and wants to learn the basics of Git and GitHub.

Note: we only need to add the `-b` argument when creating new branches

Check that you've actually switched to the correct branch:

```
git branch
```

Output:

```
  main
* newFeature
```

Now let's create a new file with some demo content. You can do that with the following command:

```
echo "<h1>My First Feature Branch</h1>" > feature1.html
```

The above will echo out the `<h1>My First Feature Branch</h1>` string and store it in a new file called `feature1.html`.

After that, stage the file and commit the change:

```
git add feature1.html
git commit -m "Add feature1.html"
```

The new `feature1.html` file will only be present on the `newFeature` branch. If you were to switch to the `main` branch and run the `ls` command or check the `git log`, you will be able to see that the file is not there.

You can check that by using the `git log` command:

```
git log
```

With that, we've used quite a bit of the commands that we've covered in the previous chapters!

### Compare branches

You can also compare two branches with the following commands.

- Shows the commits on `branchA` that are not on `branchB`:

```
git log BranchA..BranchB
```

- Shows the difference of what is in `branchA` but not in `branchB`:

```
git diff BranchB...BranchA
```

### Renaming a branch

In case that you've created a branch with the wrong name or if you think that the name could be improved as it is not descriptive enough, you can rename a branch by running the following command:

```
git branch -m wrong-branch-name correct-branch-name
```

If you want to rename your **current branch**, you could just run the following:

```
git branch -m my-branch-name
```

After that, if you run `git branch` again you will be able to see the correct branch name.

### Deleting a branch

If you wanted to completely delete a specific branch you could run the following command:

```
git branch -d name_of_the_branch
```

This would only delete the branch from your local repository, in case that you've already pushed the branch to GitHub, you can use the following command to delete the remote branch:

```
git push origin --delete name_of_the_branch
```

If you wanted to synchronize your local branches with the remote branches you could run the following command:

```
git fetch
```

### Conclusion

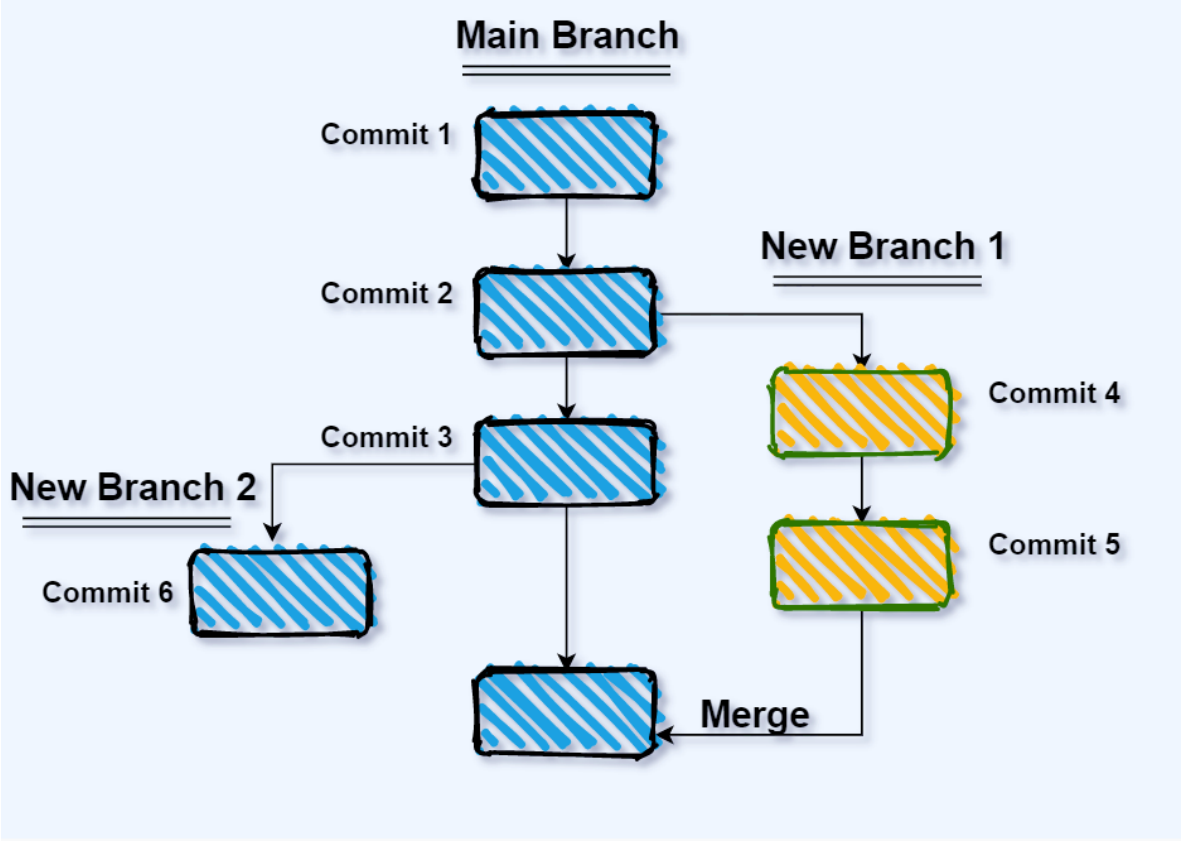
With that, our `newFeature` branch is now ahead of the main branch with 1 commit. So in order to get that new changes over to the main branch, we need to merge the `newFeature` branch into our `main` branch.

In the next chapter, you will learn how to merge your changes from one branch to another!

One thing that you might want to keep in mind is that in the past when creating a new GitHub repository the default branch name was called `master`. However, new repositories created on GitHub use `main` instead of `master` as the default branch name. This is part of GitHub's effort to remove unnecessary references to slavery and replace them with more inclusive terms.

# Git Merge

Once the developers are ready with their changes, they can merge their feature branches into the main branch and make those features live on the website.




If you followed the steps from the previous chapter, then your `newFeature` branch is now ahead of the main branch with 1 commit. So in order to get that new changes over to the main branch, we need to merge the `newFeature` branch into our `main` branch.

### Merging a branch

You can do that by following these steps:

- First switch to your `main` branch:

```
git checkout main
```

- After that, in order to merge your `newFeature` branch and the changes that we created in the last chapter, run the following `git merge` command:

```
git merge newFeature
```

Output:

```
Updating ab1007b..a281d25
Fast-forward
 feature1.html | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 feature1.html
```

As you were on the `main` branch when you ran the `git merge` command, Git will take all of the commits from that branch and merge them into the `main` branch.

Now, if you run the `ls` command, you will be able to see the new `feature1.html` file, and if you check the commit history with the `git log` command, you will see the commit from the `newFeature` branch present on your `main` branch.

Before doing the merge, you could again use the `git diff` command to

The benefit here is that you can now clone the forked repository under your account, make the changes to that repository as normal, and then once you are ready, you can submit a pull request to the original repository contributing your changes.

As we've now mentioned submitting pull requests a few times already, let's go ahead and learn more about pull requests in the next chapter!

# Git Workflow

Now that you know the basic commands, let's put it all together and go through a basic Git workflow.

Usually, the workflow looks something like this:

- First, you clone an existing project with the `git clone` command, or if you are starting a new project, you initialize it with the `git init` command.

- After that, before starting with your code changes, it's best to create a new Git branch where you would work on. You can do that with the `git checkout -b YOUR_BRANCH_NAME` command.

- Once you have your branch ready, you would start making the changes to your code.

- Then, once you are ready with the changes, you need to stage them with the `git add` command.

- Then, to commit/save the changes to your local Git repository, you need to run the `git commit` command and provide a descriptive commit message.

- To push your local changes to your remote GitHub project, you would use the `git push origin YOUR_BRANCH_NAME` command

- Finally, once you've pushed your changes, you would need to submit a pull request (PR) from your branch to the main branch of the repository.

- It is considered good practice to add a couple of people as reviewers and ask them to review the changes.

- Finally, once the changes have been approved, the PR would get merged into the main branch taking all of your changes from your branch into the main branch.

The overall process will look like this:

My advice is to create a new repository and go over this process a few times until you feel completely comfortable with all of the commands.

# Pull Requests

You already know how to merge changes from one branch to another on your local Git repository.

To do the same thing on GitHub, you would need to open a Pull Request (or a Merge Request if you are using GitLab) or a PR for short and request a merge from your feature branch to the `main` branch.

The steps that you would need to take to open a Pull Request are:

- If you are working on an open-source project that you are not the maintainer of, first fork the repository as per chapter 21. Skip this step if you are the maintainer of the repository.
- Then clone the repository locally with the `git clone` command:

```
git clone git@github.com:your_user/your_repo
```

- Create a new branch with the `git checkout` command:

```
git checkout -b branch_name
```

- Make your code changes

- Stage the changes with `git add`