Git and GitHub Workshop

Ali Bagheri | March 2022

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Intro to git

git

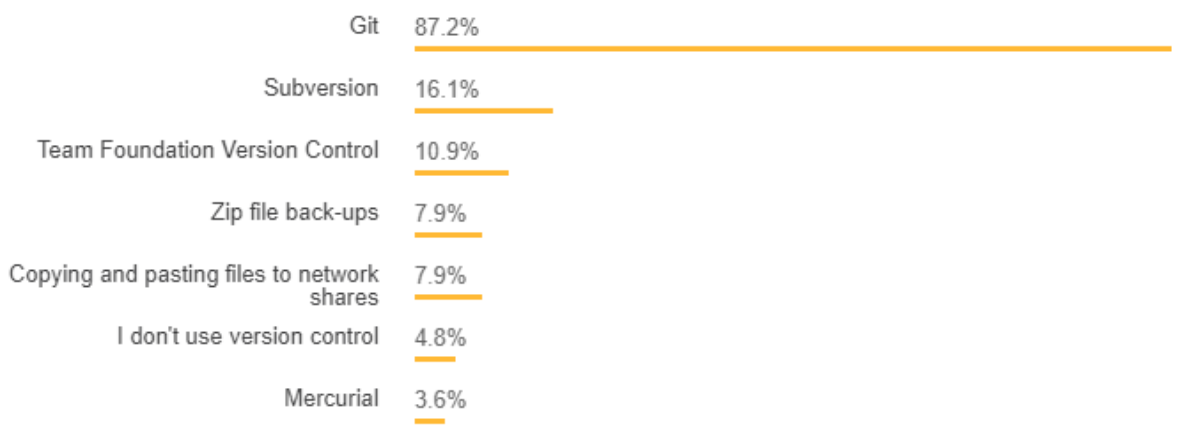
The world's most popular version control system (VSC)

Version Control

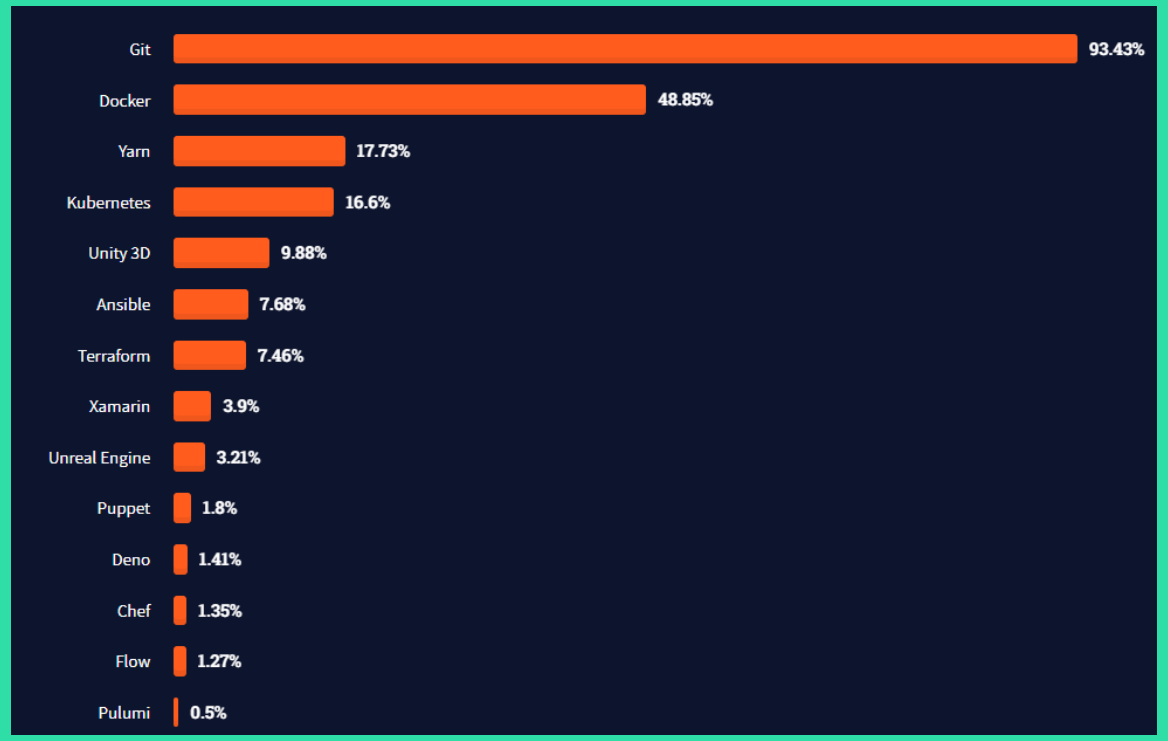
Software that tracks and manages changes

Other Options

Subversion
CVS
Mercurial



Stack overflow survey 2018
* Last year including version controls

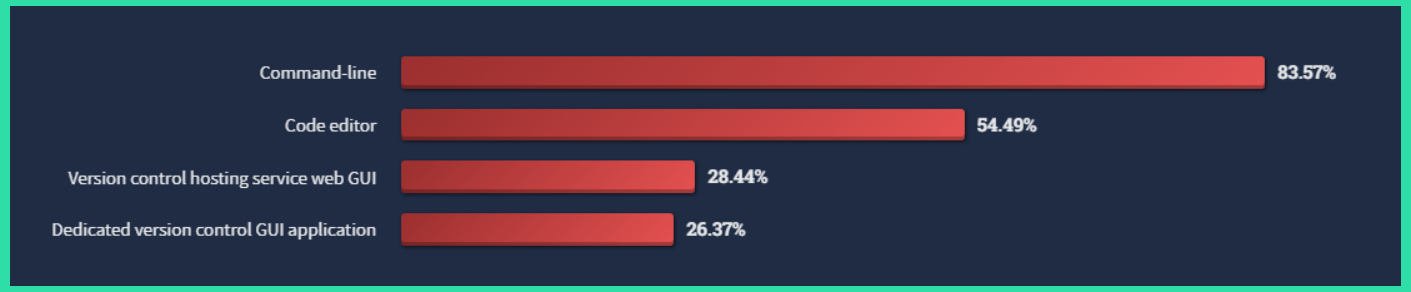


Stack overflow survey 2021 :
Over 90% of respondents use Git, suggesting that it is a fundamental tool to being a developer.

Stack overflow survey 2022

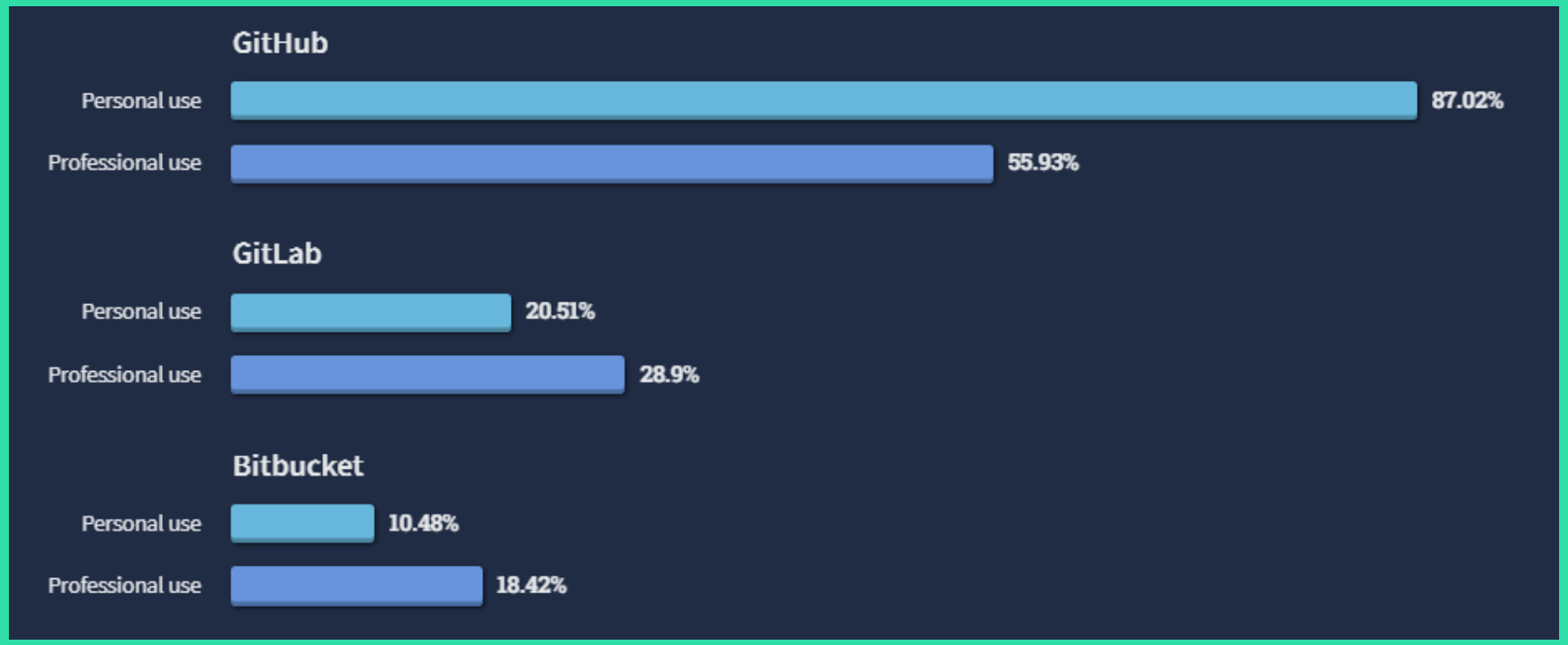
Version control systems

Interacting with version control systems



Stack overflow survey 2022

Version control platforms



git Usage

- Track changes across multiple files
- Compare versions of a project
- "Time travel" back to old versions
- Revert to a previous version
- Collaborate and share changes
- Combine changes

Installation

Windows

- Download from https://git-scm.com and continue installation

Linux

- In Debian-based distros use "sudo apt install git"
- In Fedora (or any RPM-based distros) use "sudo dnf install git-all"

MacOS

- Check for existence with "git --version"
- If was not installed download it from https://git-scm.com and continu

Configuring Identity

In Terminal or Command Prompt (CMD) type these commands :

```
> git config --global user.name "Ali Bagehri"
```

```
> git config --global user.email "AliBagehri@mail.com"
```

Git GUI

GitKraken

Syntax Highlighting, Drag and drop functionality

Sourcetree

Free

GitHub Desktop

Developed and maintained by github

git basics

First command

“git status” gives information on the current status of a git repository and its contents.

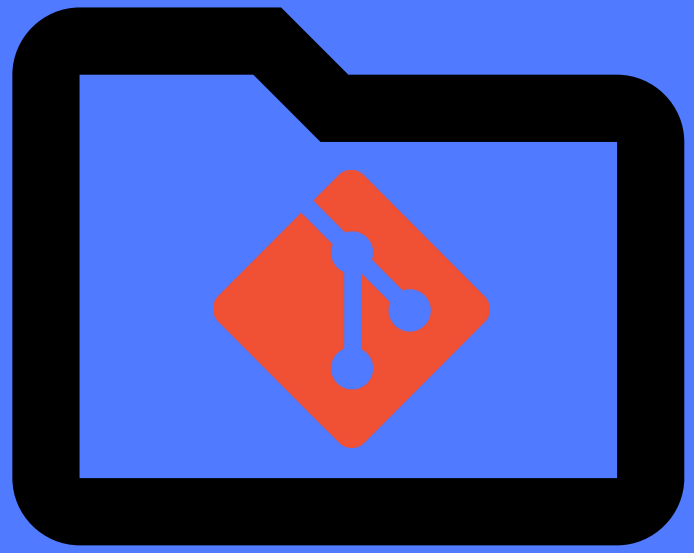
```
> git status
```

```
> git status
fatal : not a git repository
```

Repository

A git “Repo” is a workspace which tracks and manages files within a folder.

```
> git init
```



Warning:
Do not init a repo inside of a repo!

Always check existence of a repo before initializing one with “git status”

git workflow

Working directory

- modified index.html
- created style.css
- deleted html/about.html
- modified html/team.html
- modified script.js

Staging area

Repository

git add

Adds specified files to staging area

```
> git add <file1> <file2> <folder1>
```

```
> git add .
```

Adds all changes to staging area

```
> git add index.html
```

Working directory	Staging area	Repository
created style.css	modified index.html	
deleted html/about.html		
modified html/team.html		
modified script.js		

```
> git add style.css script.js
```

Working directory	Staging area	Repository
deleted html/about.html	modified index.html	
modified html/team.html	created style.css	
	modified script.js	

git commit

Commits all staged changes.

```
> git commit
```

```
> git commit -m "commit message"
```

-m specifies commit message

```
> git commit -m "updating main files"
```

Working directory	Staging area	Repository
deleted html/about.html modified html/team.html		adding main files

```
> git add html
```

Working directory	Staging area	Repository
	deleted html/about.html modified html/team.html	adding main files

```
> git commit -m "updating html folder
> about.html and team.html"
```

Working directory

Staging area

Repository

adding main files

updating html folder

git log

Logs all commit

```
> git log
commit e66256e3556f8ac38765b85a116304f98f580cfd (HEAD -> master)
Author: Ali Bagheri <alibagheri@gmail.com>
Date:   Mon Mar 14 16:23:01 2022 +0330

    updating html folder
    about.html and team.html

commit 120ed1b549f2bbb3900cd9a41551cbbeb8c47f70
Author: Ali Bagheri <alibagheri@gmail.com>
Date:   Mon Mar 14 16:21:55 2022 +0330

    updating main files
```

git log

```
> git log --oneline

e66256e (HEAD -> master) updating html folder about.html and team.html

120ed1b updating main files
```

Forgotten changes

```
> git commit -m 'some commit'
> git add forgotten_file
> git commit --amend
```

Some Basic Guidelines

- Commit early and often

- Make commits atomic (group similar changes together, don't commit a million things at once)

- Write meaningful but short commit messages

Commits text

Git Docs:
“Describe your changes in imperative mood, e.g. "make xyzzy do frotz" instead of "[This patch] makes xyzzy do frotz" or "I changed xyzzy to do frotz", as if you are giving orders to the codebase to change its behavior.”

Note: It’s not mandatory but only a suggestion

Atomic Commits

When possible, a commit should encompass a single feature, change, or fix. In other words, try to keep each commit focused on a single thing.

This makes it much easier to undo or rollback changes later on. It also makes your code or project easier to review.

Ignoring Files

We can tell Git which files and directories to ignore in a given repository, using a .gitignore file. This is useful for files you know you NEVER want to commit, including:

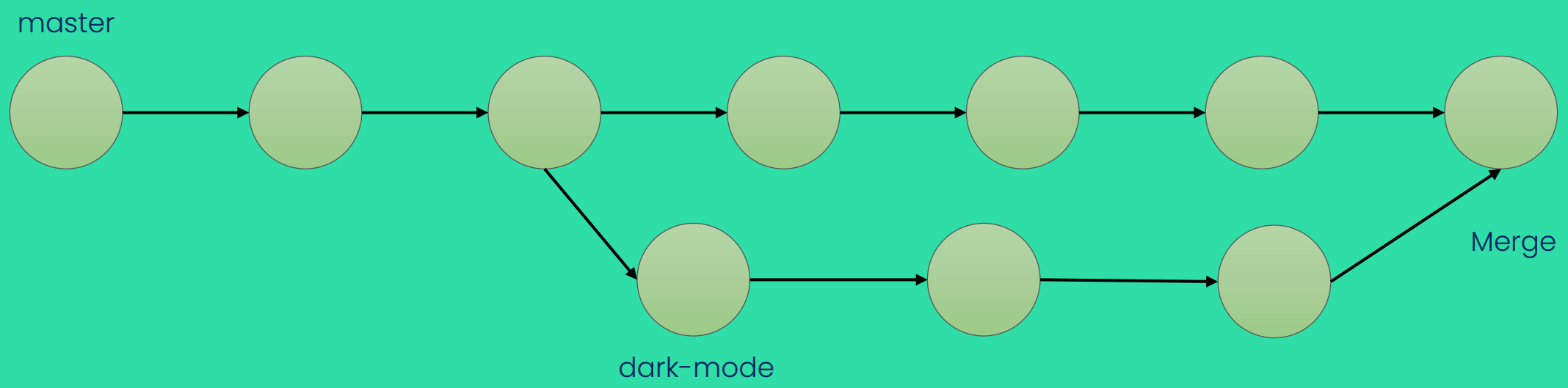
- Secrets, API keys, credentials, etc.
- Operating System files (.DS_Store on Mac)
- Log files
- Dependencies & packages

Create a file called .gitignore in the root of a repository. Inside the file, we can write patterns to tell Git which files & folders to ignore.

```
node_modules
configs
.idea
logs
package-lock.json
.env*
```

git branch and merge

Branch



Some people say master is “source of truth”.

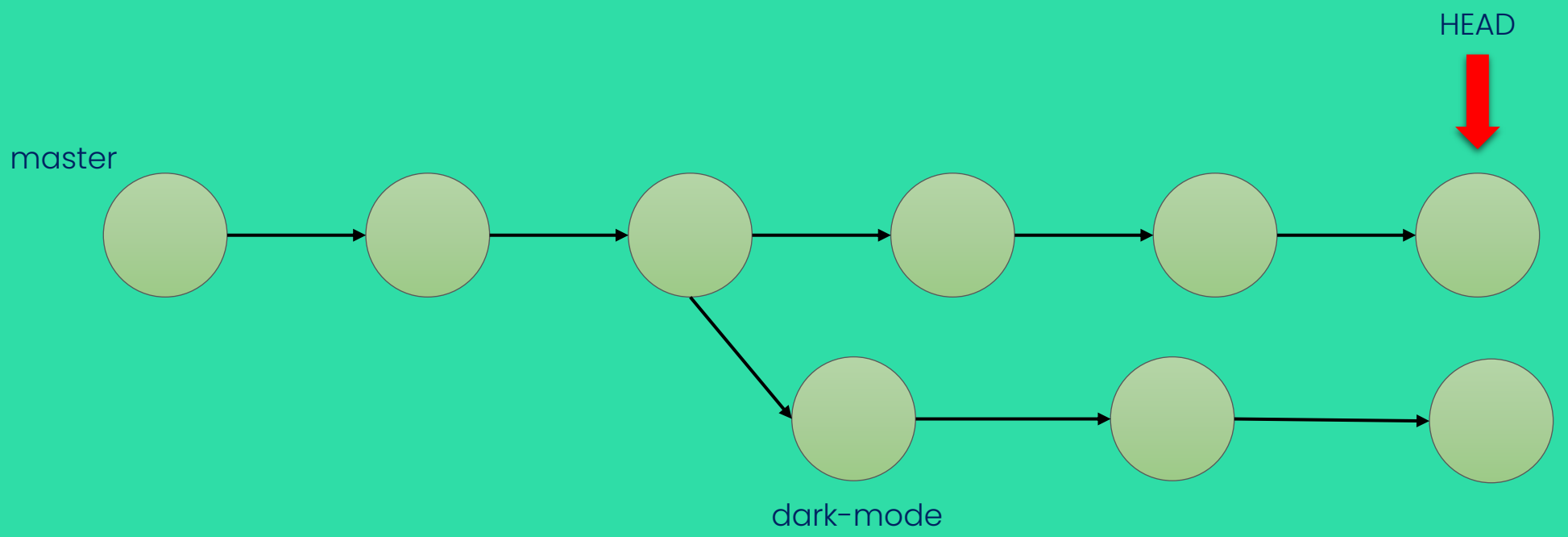
Branch

HEAD is our current location

```
> git log
commit e66256e3556f8ac38765b85a116304f98f580cfd (HEAD -> master)
Author: Ali Bagheri <alibagheri@gmail.com>
Date:   Mon Mar 14 16:23:01 2022 +0330

    updating html folder
    about.html and team.html

commit 120ed1b549f2bbb3900cd9a41551cbbeb8c47f70
Author: Ali Bagheri <alibagheri@gmail.com>
Date:   Mon Mar 14 16:21:55 2022 +0330

    updating main files
```

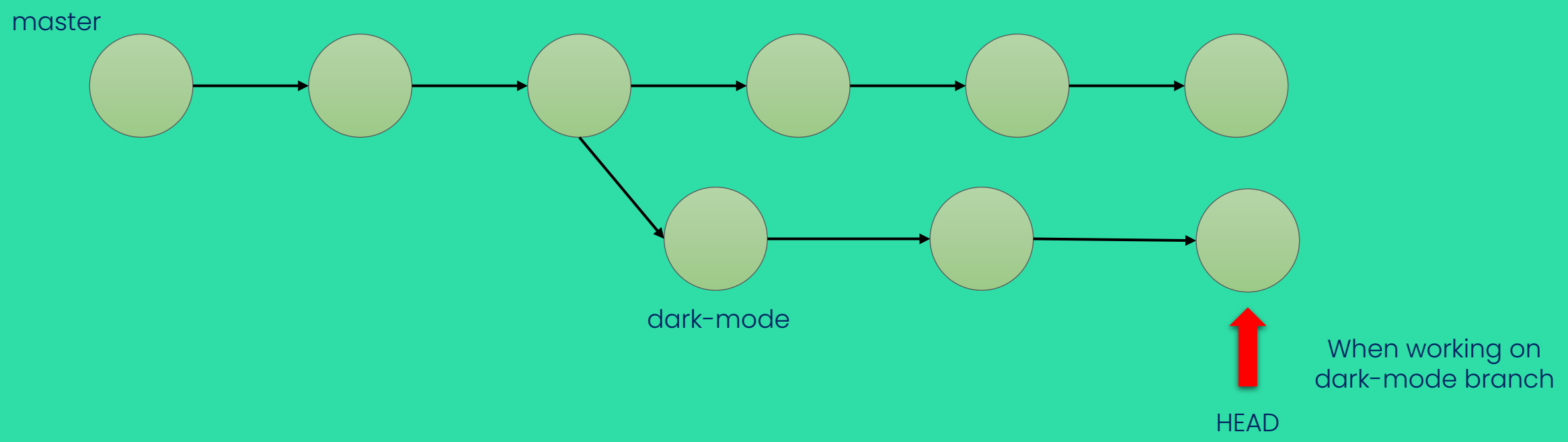
master is a branch

Branch



When working on master branch

Branch



Branch

```
> git branch
```

To see all and current branch

```
> git branch <branch-name>
```

Creates a new branch

```
> git switch <branch-name>
```

Switches to another branch

Branch

```
> git checkout <branch-name>
```

Another way of switching branch

```
> git switch -c <branch-name>
```

Creates a branch and switch to it

```
> git checkout -b <branch-name>
```

Another way of creating and switching

Branch

```
> git branch -v
```

More info about branches

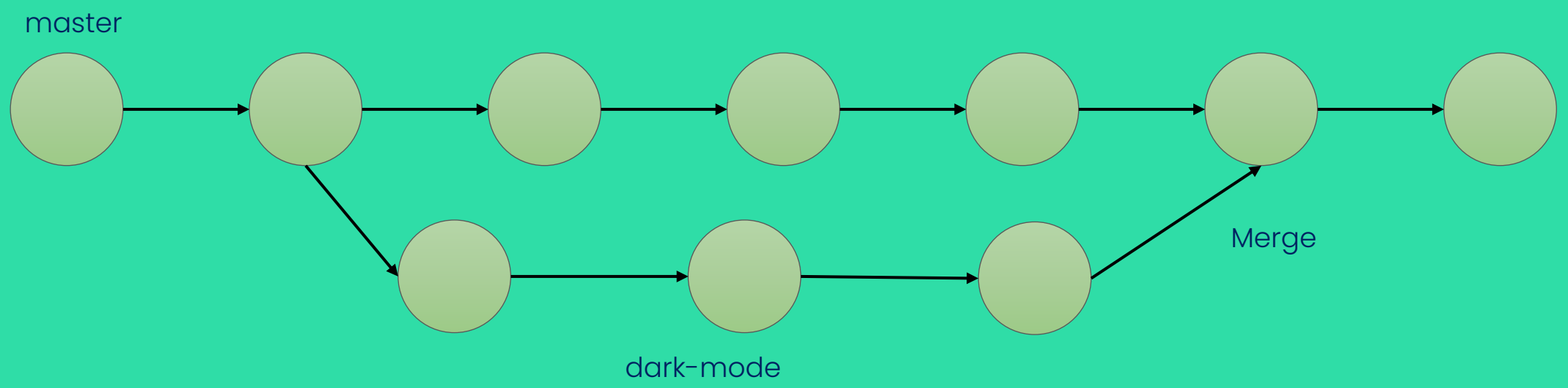
```
> git branch -a
```

Listing all branches

```
> git branch -d <branch-name>
```

Delete a branch

Merge



All changes will be added to destination branch.

Merge

```
> git switch master

> git merge dark-mode
```

Merge dark-mode to master

Merge

```
> CONFLICT (content): Merge conflict in blah.txt

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

Some times new commits in destination branch, will prevent auto merge !

Merge

```
<<<<<<< HEAD
color: #FFFFFF;
border: 1px solid red;
=======
color: #000000;
>>>>>>> dark-mode
```

Section of code that was changed in both branch

Merge

```
color: #000000;
border: 1px solid red;
```

To fix this just delete markers, and resolve conflicts.
Then commit it.

GitHub

What is GitHub?

Github is a hosting platform for git repositories. You can put your own Git repos on Github and access them from anywhere and share them with people around the world.

Beyond hosting repos, Github also provides additional collaboration features that are not native to Git (but are super useful). Basically, Github helps people share and collaborate on repos.

Git is the version control software that runs locally on your machine. You don't need to register for an account. You don't need the internet to use it. You can use Git without ever touching Github.

Github is a service that hosts Git repositories in the cloud and makes it easier to collaborate with other people. You do need to sign up for an account to use Github. It's an online place to share work that is done using Git.

Other Options

GitLab

BitBucket

Your own Git Server

Founded in 2008, Github is now the world's largest host of source code. In early 2020, Github reported having over 40 million users and over 190 million repositories on the platform.

Other benefits of Github:

- It's Free!
- Collaboration
- Open Source Projects
- Exposure
- Stay Up To Date

Getting a repo from Github

```
> git clone <url>
```

It will clone a repo from a git server to your current directory.

Alert:
You should setup your remote account first.

Connecting a repo to remote server

The default name of remote is usually “origin”.

```
> git remote add <name> <url>
```

You can view remotes using this command.

```
> git remote -v
```

Other remote commands

Renaming a remote

```
> git remote rename <old> <new>
```

Removing a remote

```
> git remote remove <name>
```

Pushing commits to remote

Pushes all of your commits of named branch to named remote repository

```
> git push <remote> <branch>
```

The -u option allows us to set the upstream of the branch we're pushing You can think of this as a link connecting our local branch to a branch on Github.

```
> git push -u <remote> <branch>
```

After that on this branch you can use this short form

```
> git push
```

Push in details

When you push to a branch with different name.

```
> git push <remote> <local-branch> <remote-branch>
```

Fetch

```
> git fetch <remote> <branch>
```

Fetching allows us to download changes from a remote repository, BUT those changes will not be automatically integrated into our working files.

Pull

```
> git pull <remote> <branch>
```

git pull is another command we can use to retrieve changes from a remote repository. Unlike fetch, pull actually updates our HEAD branch with whatever changes are retrieved from the remote.

git pull = git fetch + git merge

Alert: pulls can result in conflicts!!

In this short form default remote is origin and default branch is your current branch.

```
> git pull
```

git fetch

- Gets changes from remote branch(es)
- Updates the remote-tracking branches with the new changes
- Does not merge changes onto your current HEAD branch
- Safe to do at anytime

git pull

- Gets changes from remote branch(es)
- Updates the current branch with the new changes, merging them in
- Can result in merge conflicts
- Not recommended if you have uncommitted changes!

Extra

- Comparisons via tools
- Stashing

Git workflows

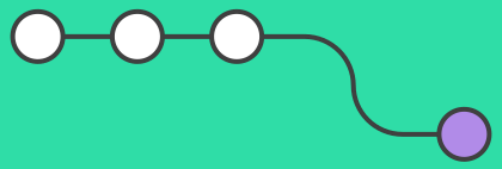
Workflows with 1 protected branch

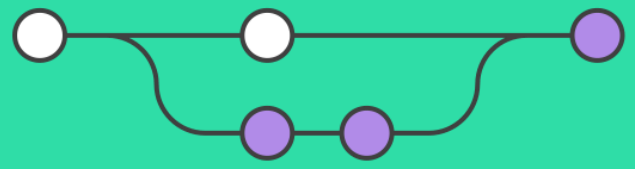
- master/main

Workflows with 2 protected branch

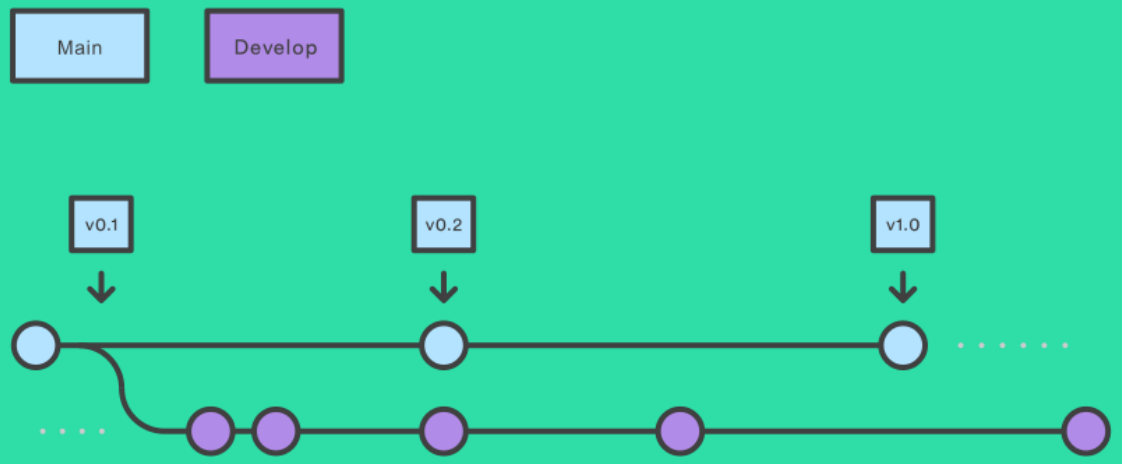
- master/main
- develop

Feature Branch Workflow

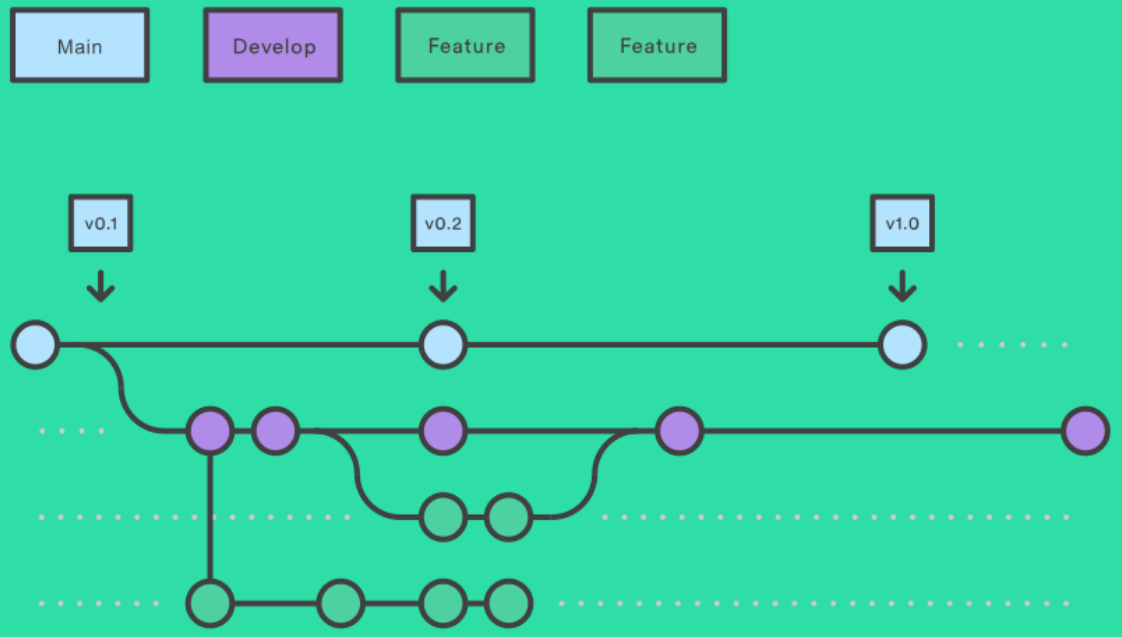




Gitflow Workflow



Gitflow Workflow



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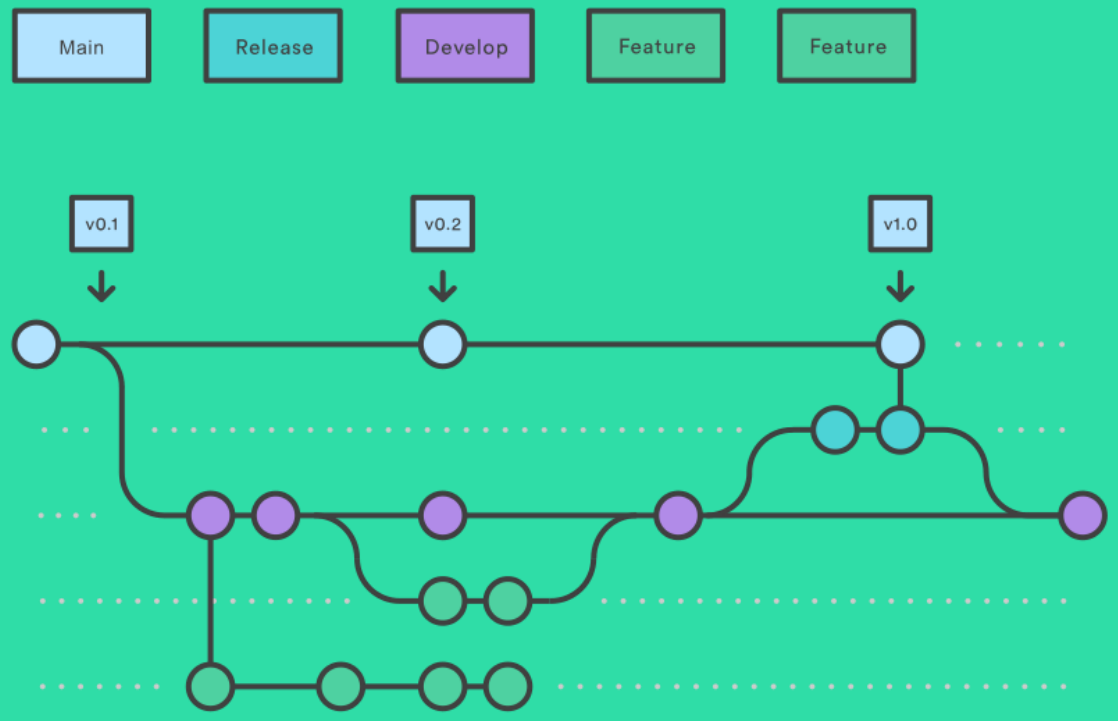

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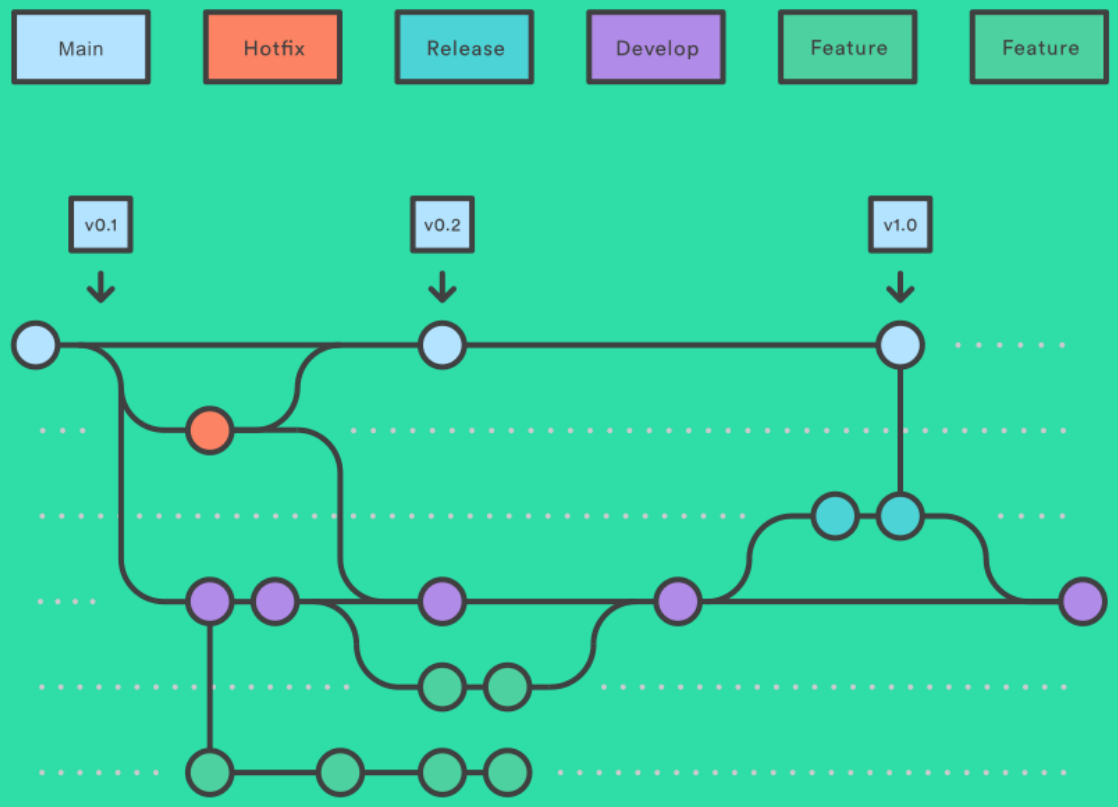
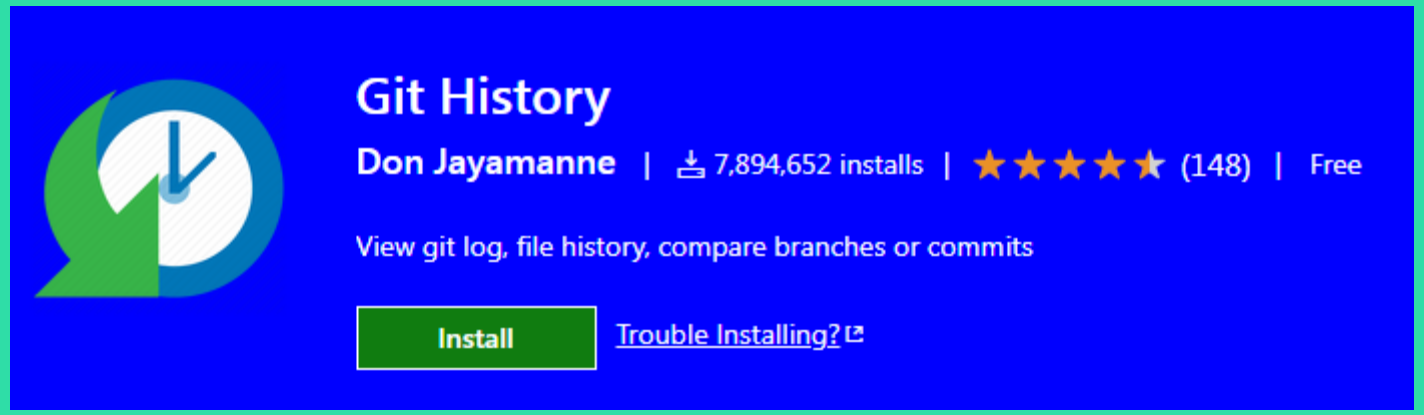


Some VSCode Extensions



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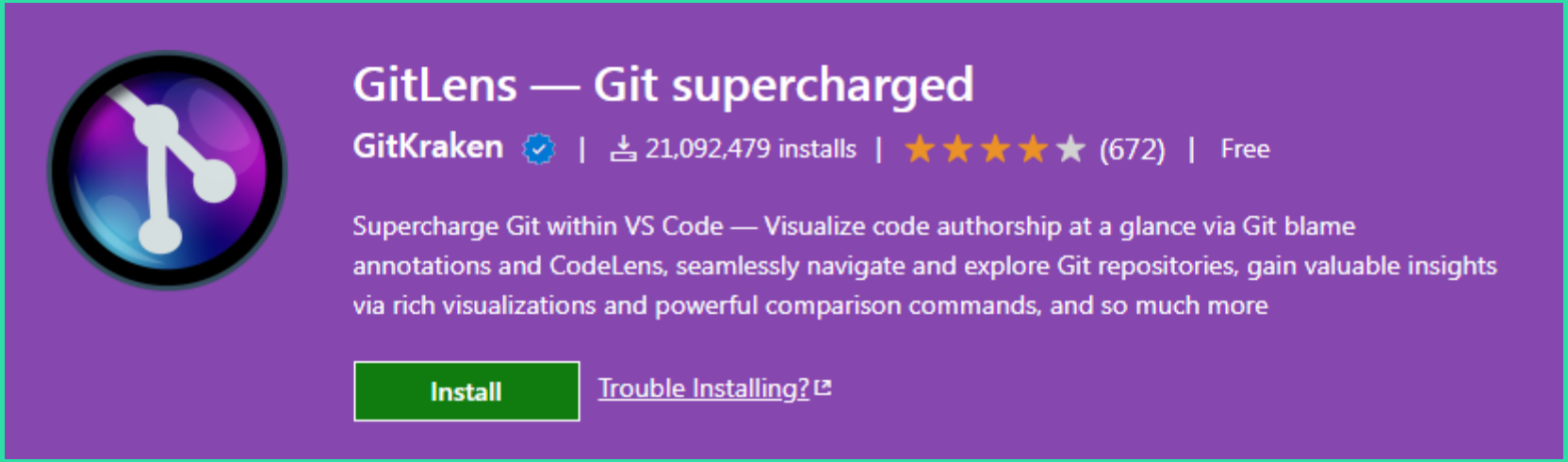

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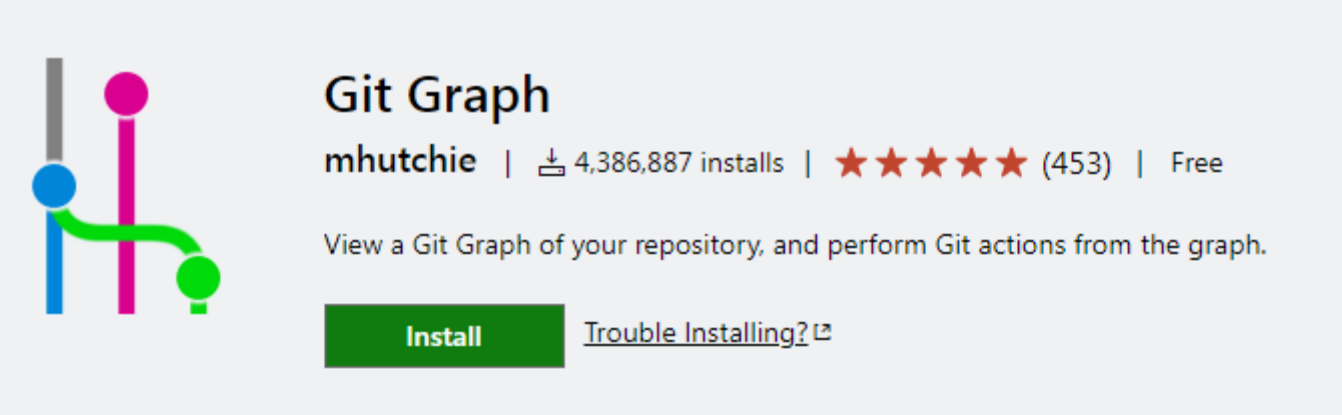

Some VSCode Extensions

You can download this slides in link below:

https://bagheriali.dev/files/workshops/git/slides.pdf