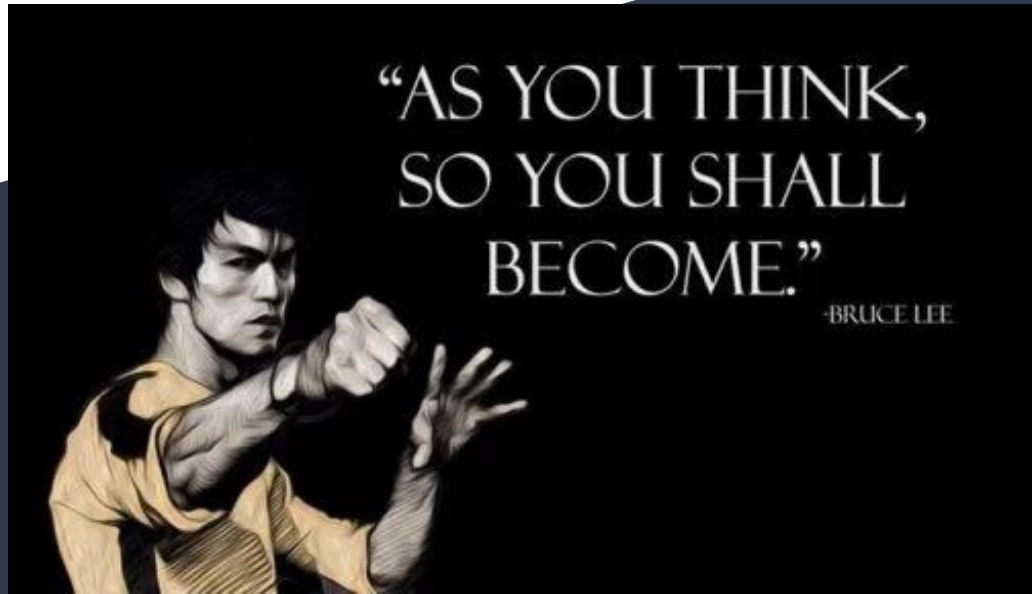
# Git Fu



# Version Control? Git?

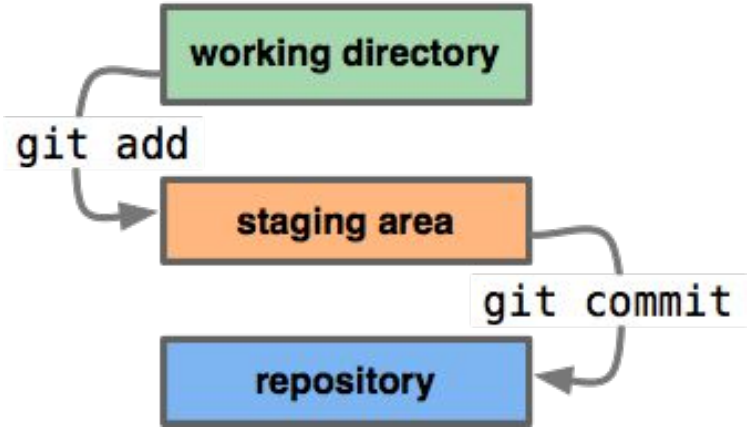

**Version Control:**

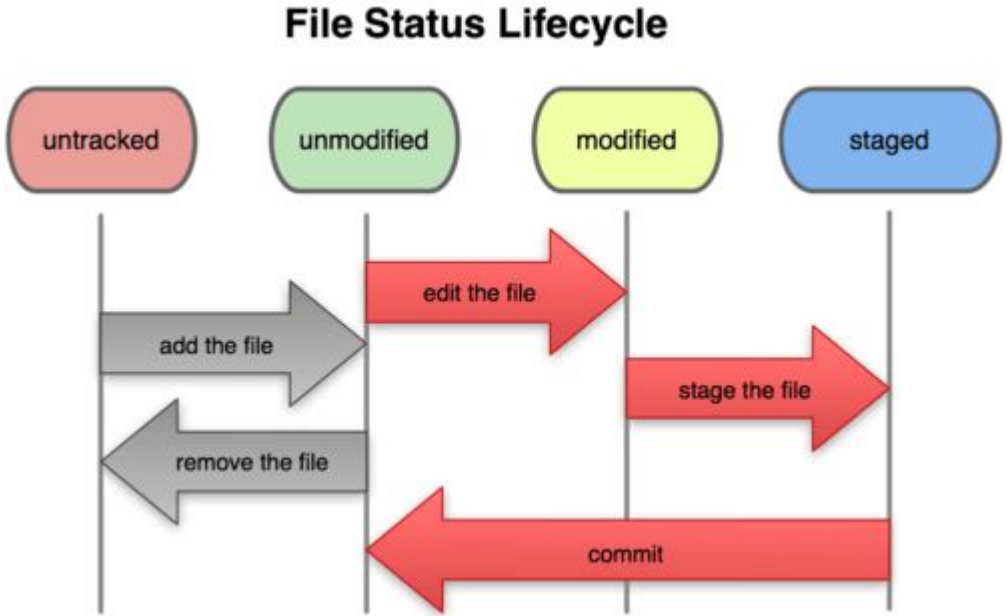
- A complete record of all changes
- Can roll back to a previous version

**Git:**

- An open-source Version Control system
- Git is used to maintain the core linux kernel

# Staging and Commits



# Forking and Branching

Take **someone else's** *open-source* code and **modify it** for your own purposes

Source code **owner** can **approve** a **Pull Request**

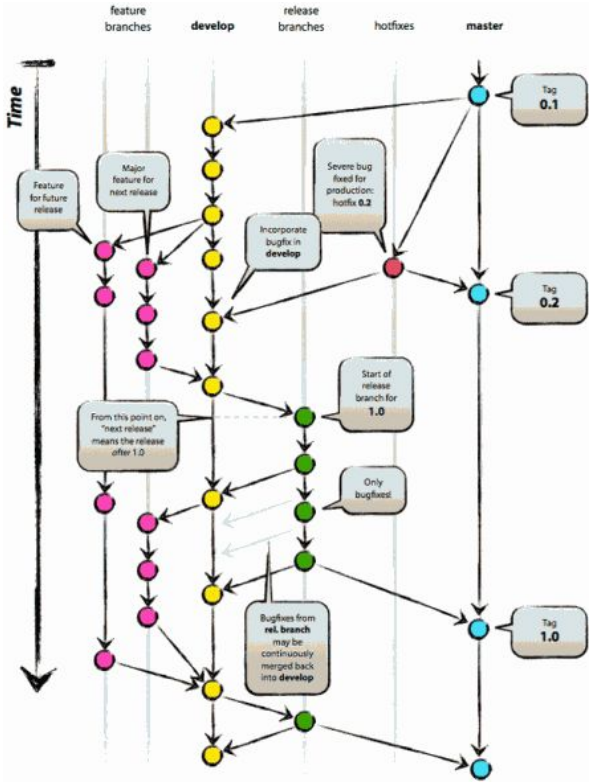
**Internal developers** can "branch off" into another **side project** without affecting the production code

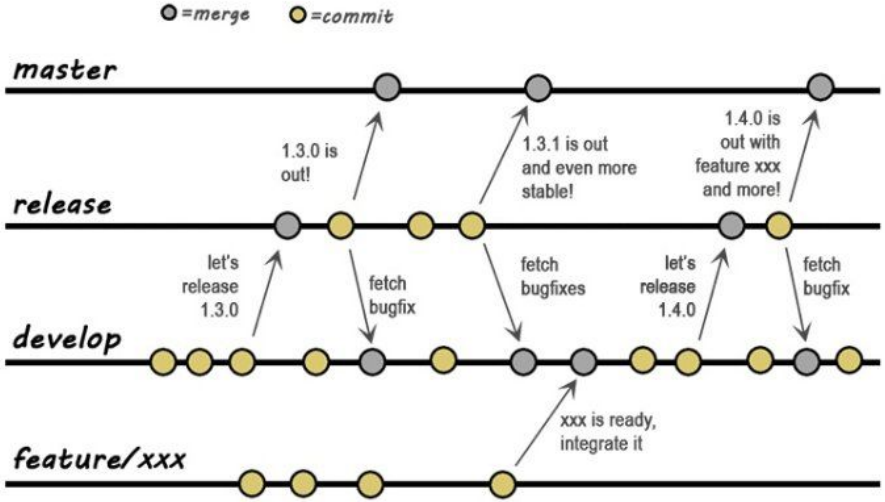
Is **mainly** used to **fix issues** and **bugs**

Branches can be **merged together**

Git has **one master branch** (the origin) where every other branch **originates from**

# Branching visuals



# Git Workflows: Basic

- **Always** the **start** of product development
- **Simple** and **quick** to set up


Image courtesy of https://buddy.works/blog/5-types-of-git-workflows

# Git Workflows: Feature Branch

- The **basic** workflow **is limited** in workflow freedom
- For each **new feature**, create a **new branch**
- **Merge** the feature branches **back into** the **main**

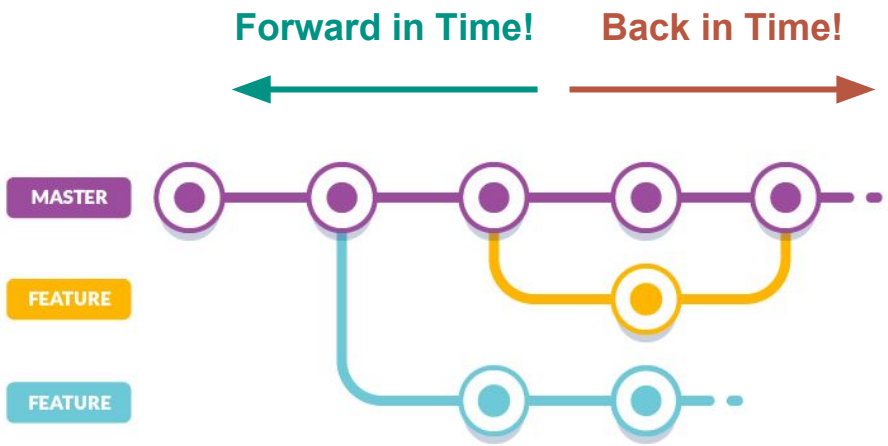



Image courtesy of https://buddy.works/blog/5-types-of-git-workflows

# Git Workflows: Gitflow

- Invented by **Vincent Driessen** in 2010
- **Two** parallel **branches**: **Master** and **Develop**
- **Features** are still on **their own branches**

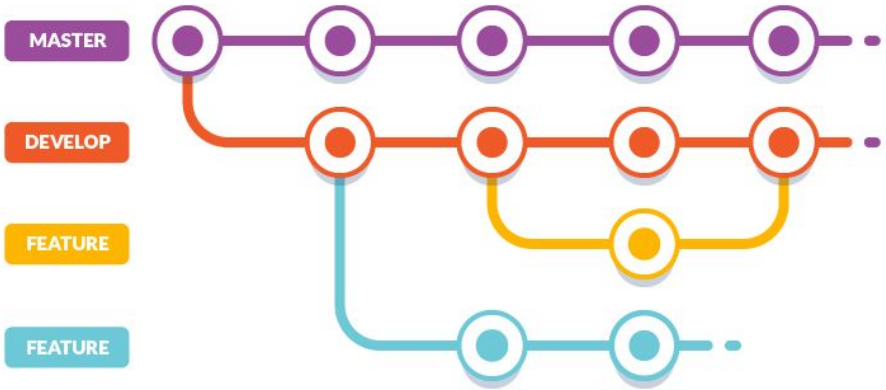
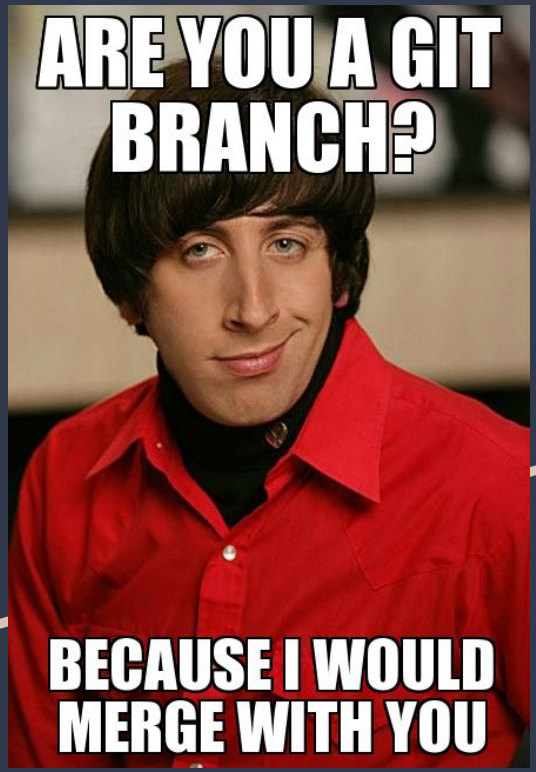



Image courtesy of https://buddy.works/blog/5-types-of-git-workflows

# Let’s Git Goin’
## (a proper introduction)


1. Create a GitHub repository using their website
   **Don’t create a README file just yet!**
2. On your local machine, `mkdir` a folder and `cd` there
3. Initialize a local repository with `git init`
4. Don’t forget to *introduce* yourself :)
5. Now you can create a *README.md* file:
   - Use your favorite text editor and put some descriptive text in there
6. Start tracking and commit your changes:
   - `git status` (see what needs to be done)
   - `git add .` (notice the “dot”, it adds folder files)
   - `git status` (check again...)
   - `git commit -m “My first repo! Woohoo!”`
   - `git status` (and last time...)
7. Time to upload your local repo to your remote:
   - `git remote add origin <GitHub repo URL>`
   - `git remote -v` (verify! verify!)
   - `git push --set-upstream origin master` (publish)
8. Check out your handiwork online!

# Branching




1. Create a new branch with whatever name you like:
   - `git branch development`
     (I called mine “development”)
   - `git branch` (see what branches you now have)
   - `git checkout development` (switch to branch)
2. Add another file and see what happens:
   - `git add “new-file-name”`
   - `git commit -m “Added a new file to branch”`
   - `git push` (update the remote repo)
   - `ls` (print your files for a quick check)
   - `git checkout master` (switch to first branch)
   - `ls` (spot the difference...)
3. Let’s Merge:
   - `git merge development` (it’s that easy)
   - `git push origin master` (update the remote repo)
4. Rename a branch:
   - `git branch -mr development dev-work`
   - `git push origin dev-work` (upload the new)
   - `git push -d origin development` (delete the old)

# Generating SSH Keys
(you're a pro now)


1. That wasn't so bad was it? Well, we can make the process easier by not having to type our username and password for every push
2. Introduciiing... SSH Keys!
   - `ssh-keygen -t rsa -b 2048`
     (note that this will name your key files to the default names of ~/.ssh/id_rsa and ~/.ssh/id_rsa.pub)
3. Save your SSH Key profile to GitHub
   - Use your favorite text editor to open ***id_rsa.pub***
     **WARNING! Look for .pub, we don't want to share the private key!**
   - Copy all of the keyfile text
   - Go to your GitHub settings page (click your profile picture in the upper-right corner and select "Settings" from the drop-down menu)
   - Click the "SSH and GPG keys" tab on the left
   - Click "New SSH key"
   - Enter a good title (e.g. "CSE-lab-computers")
   - Paste your copied PUBLIC key
   - Click "Add SSH key" and go try a push!

# Git Made Easy (no command line!)

- It's totally **up to you**
- Each has its **pros** and **cons**