1. git --version

2. git init

This creates a hidden folder, .git , which contains the plumbing needed for Git to work.

3. git status

Review the resulting list of files;

4. git add <file/directory name #1> <file/directory name #2> < ... >
If all files in the list should be shared with everyone who has access to the repository,

a single command will add everything in your current directory and its subdirectories:
git add .
This will "stage" all files to be added to version control, preparing them to be committed in your first commit.

Commit all the files that have been added, along with a commit message:
5. git commit -m "Initial commit"
This creates a new commit with the given message. A commit is like a save or snapshot of your entire project.

Adding a remote
To add a new remote, use the git remote add command on the terminal, in the directory your repository is stored
at.
The **git remote** add command takes two arguments:
1. A remote name, for example, origin
2. A remote URL, for example, https://<your-git-service-address>/user/repo.git
6. git remote add origin https://<your-git-service-address>/owner/repository.git

---

Clone a repository

cd <path where you would like the clone to create a directory>
git clone https://github.com/username/projectname.git

Sharing code

git init --bare /path/to/repo.git

git remote add origin ssh://username@server:/path/to/repo.git

git push --set-upstream origin master
Adding --set-upstream (or -u) created an upstream (tracking) reference which is used by argument-less Git commands, e.g. **git pull.**

Setting your user name and email

git config --global user.name "Your Name"

git config --global user.email mail@example.com

Remove a global identity

git config --global --remove-section user.name
git config --global --remove-section user.email

Learning about a command

git status –help

git help status

git checkout -h

Set up SSH for Git

Linux open your Terminal

check to see if you have any existing SSH keys. List the contents of your ~/.ssh directory:

$ ls -al ~/.ssh
Lists all the files in your ~/.ssh directory

if you already have a public SSH key. By default the filenames of the public keys
are one of the following:

id_dsa.pub
id_ecdsa.pub
id_ed25519.pub
id_rsa.pub

If you see an existing public and private key pair listed that you would like to use on your Bitbucket, GitHub (or similar) account you can **copy the contents of the id_*.pub file.**

create a new public and private key pair with the following command:

$ ssh-keygen

Add you SSH key to the ssh-agent. Notice that you'll need te replace id_rsa in the command with the name of your private key file:

$ ssh-add ~/.ssh/id_rsa

Git Installation

$ apt-get install git

Git Log

git log

will display all your commits with the author and hash in reverse chronological order – that is, the most recent commits show up first.

Prettier log:
git log --decorate --oneline --graph

Since it's a pretty big command, you can assign an alias:
git config --global alias.lol "log --decorate --oneline –graph"

To use the alias version:
history of current branch :
git lol

combined history of everything in your repo :
git lol --all

Colorize Logs:
git log --graph --pretty=format: ' %C(red)%h%Creset -%C(yellow)%d%Creset %s %C(green)(%cr)%C(yellow)<%an>%Creset '

The format option allows you to specify your own log output format:

Parameter	Details
%C(color_name)	option colors the output that comes after it
%h or %H	abbreviates commit hash (use %H for complete hash)
%Creset	resets color to default terminal color
%d	ref names
%s	subject [commit message]
%cr	committer date, relative to current date
%an	author name

Oneline log
git log --oneline
//will show all of your commits with only the first part of the hash and the commit message.

git log -2 –oneline //if you wish to list last 2 commits logs

Filter logs:
git log --after '3 days ago'

git log --after 2016-05-01

An alias to **--after is --since** .
Flags exist for the converse too: **--before and --until** .

You can also filter logs by author . e.g.
git log --author=author

Show the contents of a single commit:

git show 48c83b3
git show 48c83b3690dfc7b0e622fd220f8f37c26a77c934

Working with Remotes

Show information about a Specific Remote:
git remote show origin

Print just the remote's URL:
git remote get-url origin

Set the URL for a Specific Remote:
git remote set-url remote-name url

Get the URL for a Specific Remote
git remote get-url <name>

By default, this will be
git remote get-url origin

Changing a Remote Repository

git remote set-url <remote_name> <remote_repository_url>
Example: git remote set-url heroku https://git.heroku.com/fictional-remote-repository.git

---

Staging

Staging All Changes to Files:

git add -A
or
git add .

Show Staged Changes:
git diff --cached

Staging A Single File:

git add <filename>

Stage deleted files:
git rm filename

To delete the file from git without removing it from disk, use the --cached flag
git rm --cached filename

Ignoring Files and Folders

in a .gitignore file:

Lines starting with `#` are comments.

Ignore files called 'file.ext'
file.ext

Comments can't be on the same line as rules!
The following line ignores files called 'file.ext # not a comment'
file.ext # not a comment

Ignoring files with full path.
This matches files in the root directory and subdirectories too.
i.e. otherfile.ext will be ignored anywhere on the tree.
dir/otherdir/file.ext
otherfile.ext

Ignoring directories
Both the directory itself and its contents will be ignored.
bin/
gen/

Glob pattern can also be used here to ignore paths with certain characters.
For example, the below rule will match both build/ and Build/
[bB]uild/

Without the trailing slash, the rule will match a file and/or
a directory, so the following would ignore both a file named `gen`
and a directory named `gen`, as well as any contents of that directory
bin
gen

Ignoring files by extension
All files with these extensions will be ignored in
this directory and all its sub-directories.
***.apk**
***.class**

```
# It's possible to combine both forms to ignore files with certain
# extensions in certain directories. The following rules would be
# redundant with generic rules defined above.
java/*.apk
gen/*.class

# To ignore files only at the top level directory, but not in its
# subdirectories, prefix the rule with a `/`
/*.apk
/*.class

# To ignore any directories named DirectoryA
# in any depth use ** before DirectoryA
# Do not forget the last /,
# Otherwise it will ignore all files named DirectoryA, rather than directories
**/DirectoryA/

# This would ignore
# DirectoryA/
# DirectoryB/DirectoryA/
# DirectoryC/DirectoryB/DirectoryA/
# It would not ignore a file named DirectoryA, at any level
# To ignore any directory named DirectoryB within a
# directory named DirectoryA with any number of
# directories in between, use ** between the directories
DirectoryA/**/DirectoryB/
# This would ignore
# DirectoryA/DirectoryB/
# DirectoryA/DirectoryQ/DirectoryB/
# DirectoryA/DirectoryQ/DirectoryW/DirectoryB/

# To ignore a set of files, wildcards can be used, as can be seen above.
# A sole '*' will ignore everything in your folder, including your .gitignore file.
# To exclude specific files when using wildcards, negate them.
# So they are excluded from the ignore list:
!.gitignore

# Use the backslash as escape character to ignore files with a hash (#)
\#*#
```

Exceptions in a .gitignore file:

```
*.txt
!important.txt
```

The above example instructs Git to ignore all files with the .txt extension except for files named important.txt .

Ignore files that have already been committed to a Git repository:

git rm --cached <file>

This will remove the file from the repository and prevent further changes from being tracked by Git. The --cached option will make sure that the file is not physically deleted.

Clear already committed files, but included in .gitignore:

Remove everything from the index (the files will stay in the file system)
$ git rm -r --cached .

Re-add everything (they'll be added in the current state, changes included)
$ git add .

Commit, if anything changed. You should see only deletions
$ git commit -m 'Remove all files that are in the .gitignore'

Update the remote
$ git push origin master

Git Diff

Show differences in working branch:
git diff

Show changes between two commits:
git diff 1234abc..6789def # old new

Show the changes made in the last 3 commits:
git diff @~3..@ # HEAD -3 HEAD
Note: the two dots (..) is optional, but adds clarity.

Show differences for staged files:
git diff --staged
git diff --cached
git status -v

Show differences for a specific file or directory
git diff myfile.txt

Show di©erences between current version and last version
git diff HEAD^ HEAD

Undoing

Return to a previous commit:

git checkout 789abcd

//To temporarily jump back to that commit, detach your head

To roll back to a previous commit while keeping the changes:
git reset --soft 789abcd

To roll back the last commit:
git reset --soft HEAD~

To permanently discard any changes made after a specific commit, use:
git reset --hard 789abcd

To permanently discard any changes made after the last commit:
git reset --hard HEAD~

Undo changes to a file or directory in the working copy.
git checkout -- file.txt

Used over all file paths, recursively from the current directory, it will undo all changes in the working copy.
git checkout -- .

To only undo parts of the changes use --patch . You will be asked, for each change, if it should be undone or not.
git checkout --patch -- dir

To undo changes added to the index.
git reset --hard

Without the --hard flag this will do a soft reset.

Merging

git merge incomingBranch

git merge --abort

Committing

git commit -m "Commit message here"

git commit -am "Commit message here"
Note that this will stage all modified files in the same way as git add --all .

If your latest commit is not published yet (not pushed to an upstream repository) then you can amend your commit.

git commit –amend -m "New commit message"

Aliases

git config --global alias.ci "commit"
git ci -m "Commit message..."

Configuration

Parameter	Details
--system	Edits the system-wide configuration file, which is used for every user (on Linux, this file is located at $(prefix)/etc/gitconfig)
--global	Edits the global configuration file, which is used for every repository you work on (on Linux, this file is located at ~/.gitconfig
--local	Edits the respository-specific configuration file, which is located at .git/config in your repository; this is the default setting

Change the core.editor configuration setting.
$ git config --global core.editor nano

Auto correct typos
git config --global help.autocorrect 17

To see the current configuration.
$ git config --list

To edit the config:
$ git config <key> <value>
$ git config core.ignorecase true

If you intend the change to be true for all your repositories, **use --global**
$ git config --global user.name "Your Name"
$ git config --global user.email "Your Email"
$ git config --global core.editor vi

Branching

Goal	Command
List local branches	**git branch**
List local branches verbose	**git branch -v**
List remote and local branches	**git branch -a OR git branch --all**
List remote and local branches (verbose)	**git branch -av**
List remote branches	**git branch -r**
List remote branches with latest commit	**git branch -rv**
List merged branches	**git branch --merged**
List unmerged branches	**git branch --no-merged**
List branches containing commit	**git branch --contains [<commit>]**

To create a new branch, while staying on the current branch, use:
git branch <name>

The branch name must not contain spaces and is subject to other specifications listed here. To switch to an existing branch :
git checkout <name>

To create a new branch and switch to it:
git checkout -b <name>

Delete a remote branch
git push origin --delete <branchName>

Delete a branch locally
$ git branch -d dev
$ git branch -D dev

Rename the branch you have checked out:
git branch -m new_branch_name

Rename another branch:
git branch -m branch_you_want_to_rename new_branch_name

Pulling

When you are working on a remote repository (say, GitHub) with someone else, you will at some point want to share your changes with them. Once they have pushed their changes to a remote repository, you can retrieve those changes by pulling from this repository.

git pull

You can pull changes from a different remote or branch by specifying their names
git pull origin feature-A

Cloning Repositories

Shallow Clone
Cloning a huge repository (like a project with multiple years of history) might take a long time, or fail because of the amount of data to be transferred. In cases where you don't need to have the full history available, you can do a shallow clone:
git clone [repo_url] --depth 1

to instead get the last 50 commits:
git clone [repo_url] --depth 50

Regular Clone
git clone <url>
git clone <url> [directory]

Clone a specific branch
git clone --branch <branch name> <url> [directory]

Renaming

Rename Folders
git mv directoryToFolder/oldName directoryToFolder/newName

Rename a local and the remote branch
git checkout old_branch
git branch -m new_branch
git push origin :old_branch
git push --set-upstream origin new_branch

Renaming a local branch
git branch -m old_name new_name

Pushing

General syntax
git push <remotename> <object>:<remotebranchname>

Example
git push origin master:wip-yourname

Will push your master branch to the wip-yourname branch of origin (most of the time, the repository you cloned from).

Delete remote branch
Deleting the remote branch is the equivalent of pushing an empty object to it.
git push <remotename> :<remotebranchname>

Example
git push origin :wip-yourname

Will delete the remote branch wip-yourname

Instead of using the colon, you can also use the --delete flag, which is better readable in some cases.
Example
git push origin --delete wip-yourname

git push --set-upstream origin master

Show

For commits:
Shows the commit message and a diff of the changes introduced.

Command	**Description**
git show	shows the previous commit
git show @~3	shows the 3rd-from-last commit

Git Remote

Display Remote Repositories:
$ git remote
$ git remote -v

Change remote url of your Git repository:
git remote set-url origin https://localserver/develop/myrepo.git

Remove a Remote Repository:
git remote rm dev

Add a Remote Repository:
git remote add <name> <url>

Rename a Remote Repository:
git remote rename dev dev1

Code with Harry Notes:

- **git status**
- **git init**
- **git add --a || git add .** (working dir ==> staging area)
- git add file1.txt file2.txt
- **git commit -m "Initial commit"** (staging area ==> repository)
- **git log** (get all commit logs)
- **git clone <url of repo> foldername**
- **rm -rf .git** (remove .git init file)
- **touch .gitignore**
- **view .gitignore** (this file contains list of file or directories to be ignored)(blank folder is by default ignored)
- **git diff** (it will be empty if no difference)
- **git diff --staged** (to compare current staged file with previous commit)
- **git rm file.txt** **(remove from staged)**
- **git mv file.txt dir/dir2/** **(move + staged)**
- **git mv file.txt newName.txt** **(rename +staged)**
- **git rm --cached file.txt** (then add that file in .gitignore) **(Untrack a file)**
- **git log** (commit hash + Author + Date + Message)
- **git log -p** (log + changes made in each commit) (log +diff)
- **git log -p -3**
- **git log --stat** (log + insert/delete info)
- **git log --pretty=oneline**
- **git log --pretty=short**
- **git log --pretty=full**
- **git log --since=2.days**
- **git log --since=2.months**
- **git log --since=2.years**
- **git log –pretty=format:"%h--%an"**
- **git commit --amend** (to amend current stage to previous commit)
- **git restore --staged file.txt** (to unstage file.txt)
- **git checkout -- file.txt** (to restore to previous commit) (to unmodify the changes)(undo)
- **git checkout -f** **(to loose all new changes)**

- **git config --global alias.last 'log -p -1'** (git last ==== git log **-**p -1)
- **git remote** (it store url)(to check stored url)
- **git remote add origin <url>**
- **git remote -v** (to get stored url and url name)
- **git remote set-url origin <new-url>**
- **git push -u origin master**

Connect PC with github (SSH)

1. **ssh -keygen -t rsa -b 4096 -c "neeraj.kumar@berylsystems.com"** (let passphrase empty)
2. **eval $(ssh-agent -s)**
3. **ssh-add ~/.ssh/id_rsa**
4. **tail ~/.ssh/id_rsa.pub** (copy this token)

   In Github:
5. Main Security ==> SSH and GPG Key ==>
   Title: Neeraj PC BS.HP_Probook
   Key: <paste the token copied>
   press Add

6. git push.....

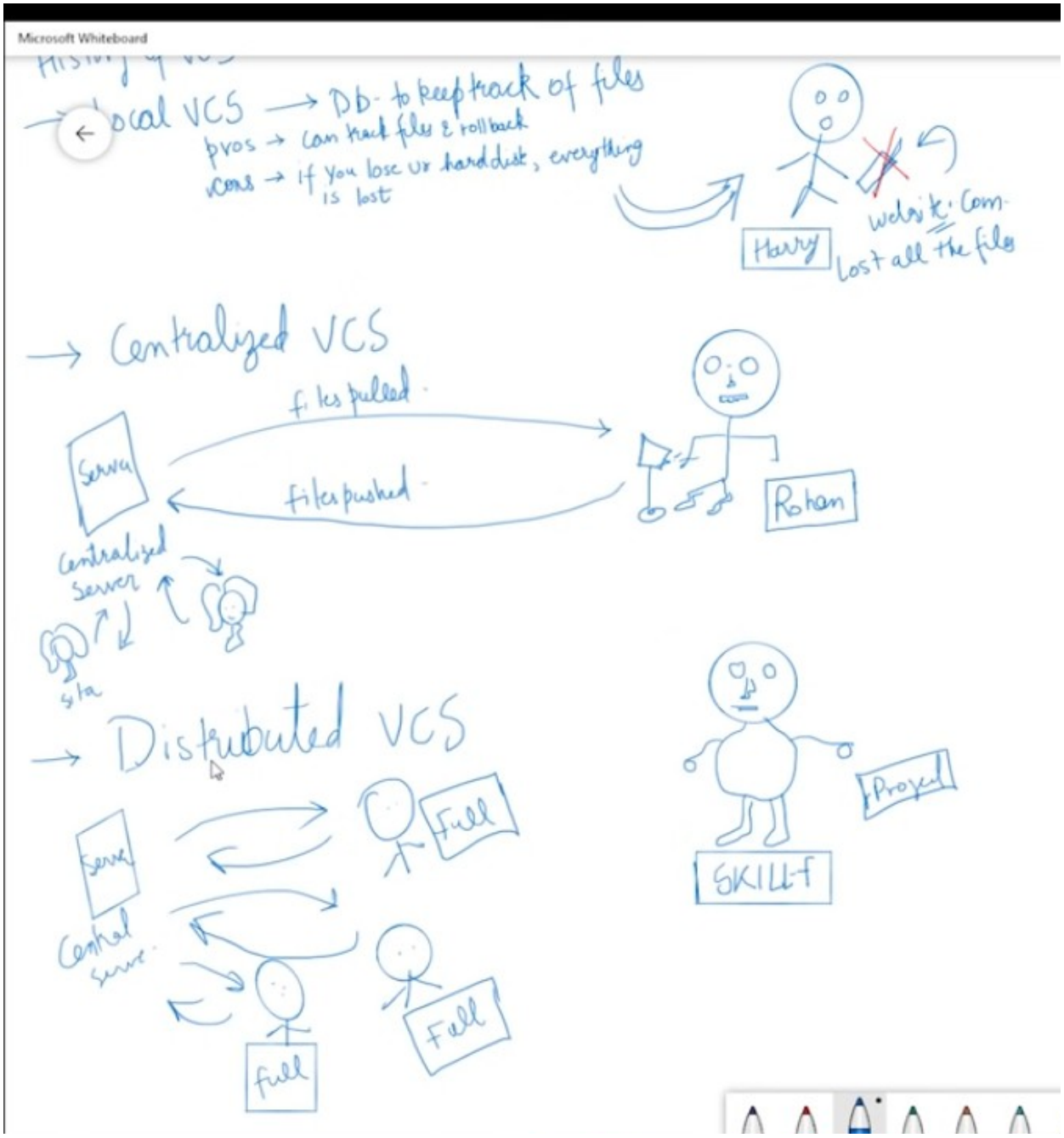
- **git checkout -b branch_name** (it will create new branch & switch to it)
- **git checkout master** (to switch to master branch from current branch)
- **git branch** (to check all available branches)
- **git branch -v** (branch name + last commit hash code + messgae)
- **git branch --merged** (list of merged branches)
- **git branch --no-merged** (list of unmerged branches)
- **git branch -d branch_name** (to delete a merged branch)
- **git branch -D branch_name** (to delete a unmerged branch)

- **git merge branch_name** (it will merge the given branch to master)

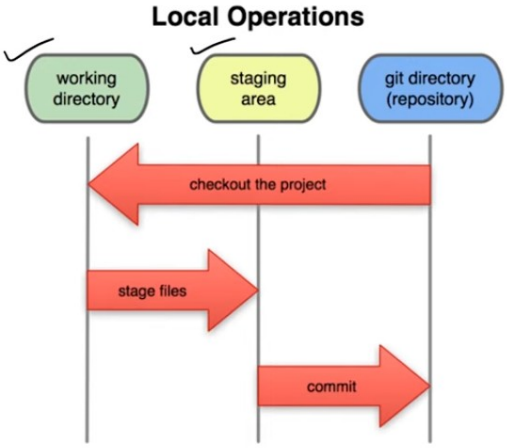
- **Conflicts to be handled Manually ==> then git add . And commit it**

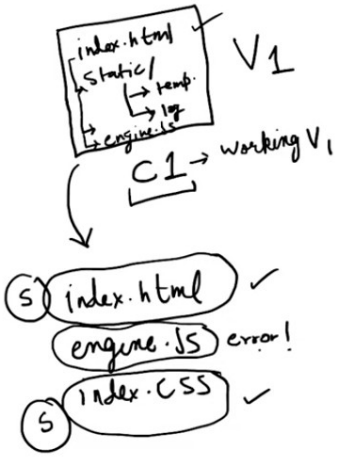
- **git push -u origin branch_name** (to push the branch on github)
- **git push origin branch_name: newBranch** (it will create a new branch newBranch & start tracking from branch_name ON GITHUB)
- **git push -d origin branch_name** (to delete a branch on github)

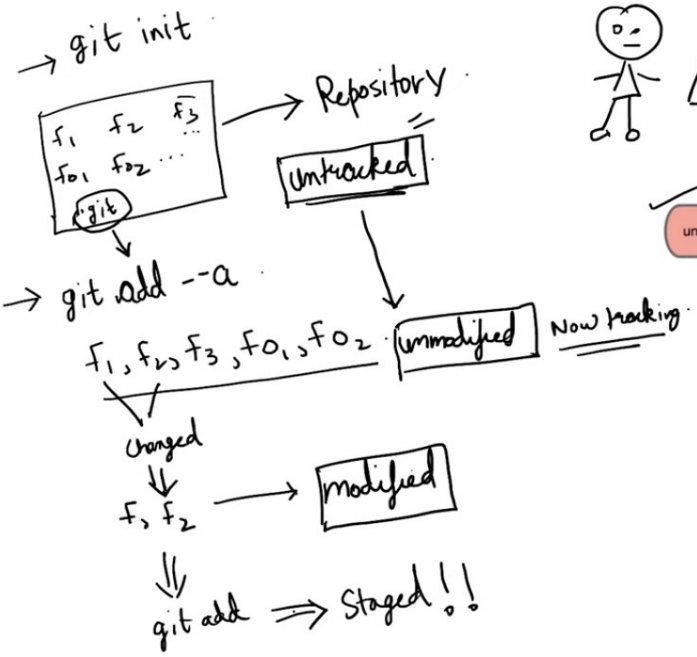
PIC Notes

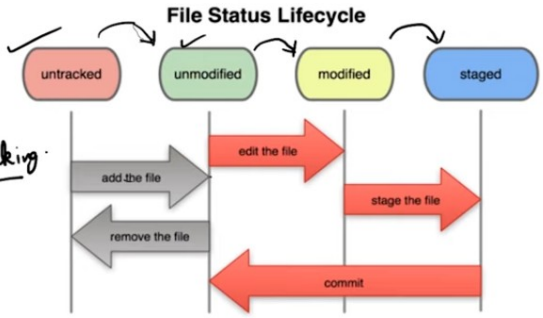

Microsoft Whiteboard
Local VCS → DB - to keep track of files
pros → can track files & rollback
cons → if you lose ur harddisk, everything is lost
Harry
Lost all the files
→ Centralized VCS
files pulled
files pushed
Server
Rohan
centralized server
→ Distributed VCS
Full
Full
full
SKILL-f

Git – Three stage architecture









https://www.youtube.com/watch?v=InigFUSiPl8&list=PLu0W_9lII9aiL0kysYlfSOUgY5rNlOhUd

Configuration

System

/etc/gitconfig

Program Files\Git\etc\gitconfig

User

~/.gitconfig

$HOME\.gitconfig

Project

my_project/.git/config

Configuration

System

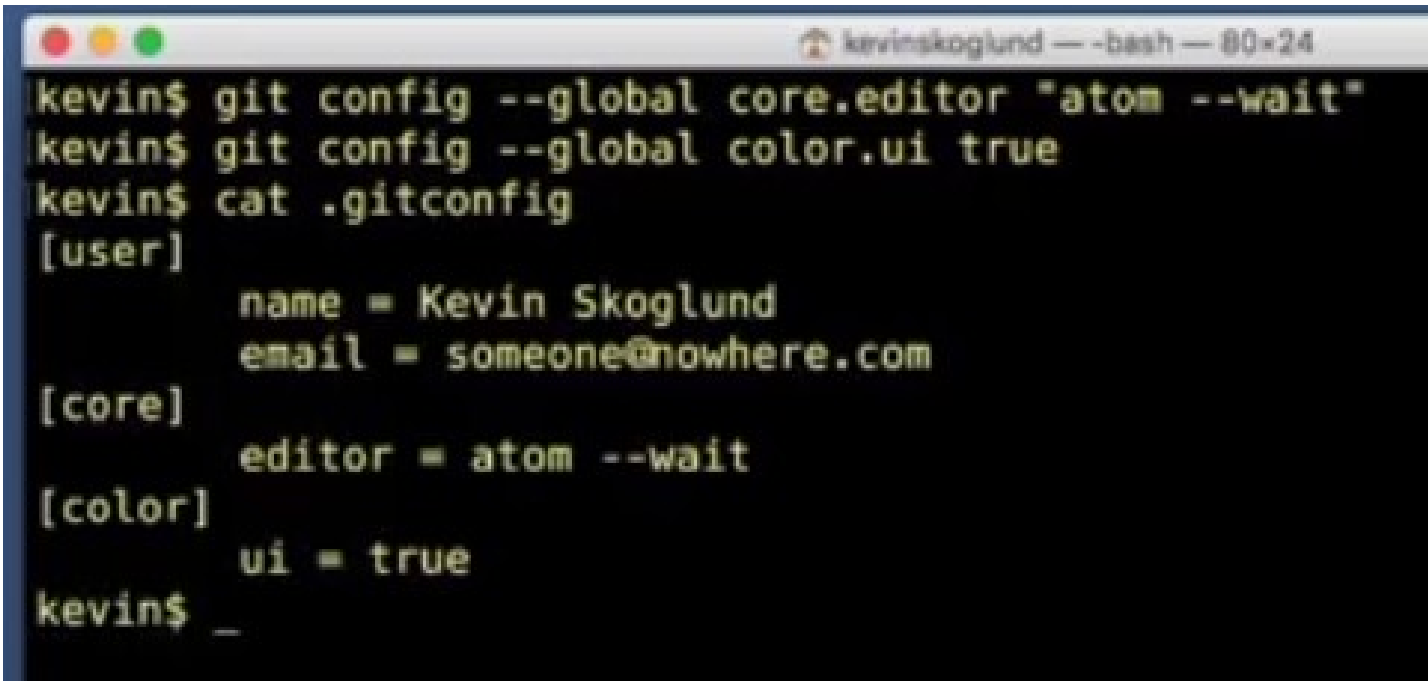
git config --system

User

git config --global

Project

git config



Commit Message Best Practices

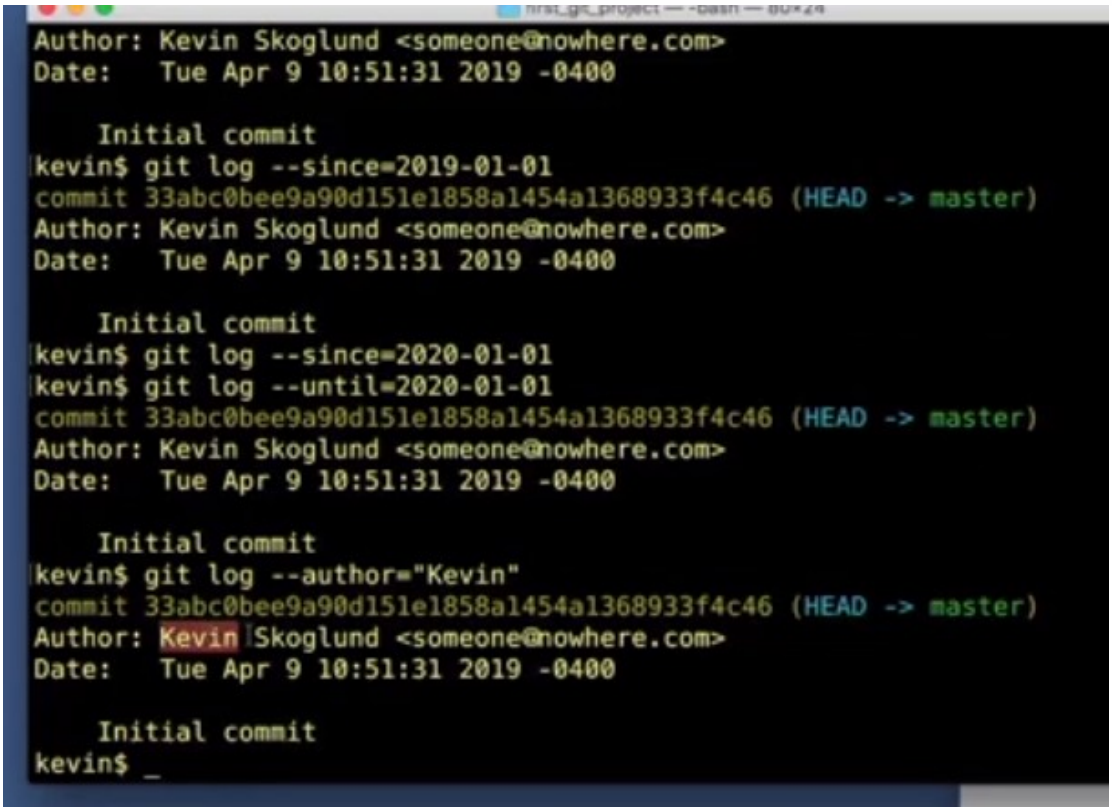
A short single-line summary (less than 50 characters)

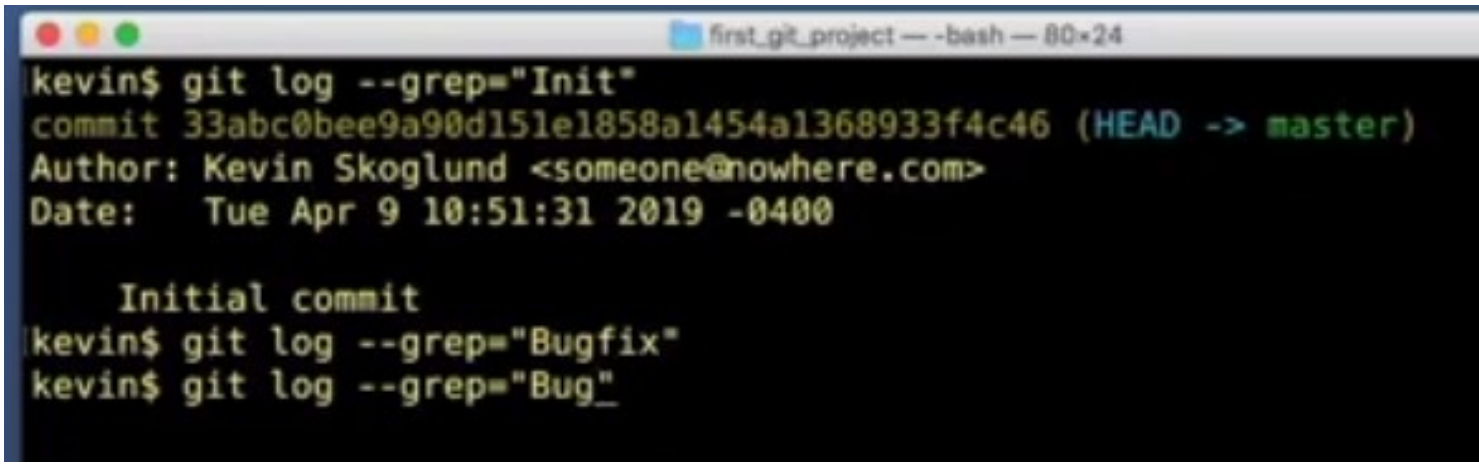
Optionally followed by a blank line and a more complete description

Keep each line to less than 72 characters

Write commit messages in present tense, not past tense

"Fix for a bug" or "Fixes a bug," not "fixed a bug"





Revert a commit:

git revert <Commit SHA Code>

Retrieve old version

git checkout <Commit SHA Code> -- file.txt (it will retrive the file.txt from old commits)

To delete untracked file in work directory
git clean [options]

-i == informative
-n== it will not delete but it will list files which can be deleted
-f == force it will remove that files

List of last commited files and directories
git ls-tree HEAD

To add empty directory to github
create a new file with name .gitkeep in the empty directory

---

which git // path of git will be shown ==> /usr/bin/git

NOTE: We cannot push file of size more than 100 mb on github using git
if we require to upload a file of size greater than 100mb we have to install
git lfs install

Remove a Remote:
git remote remove remote_name

Rename a Remote
git remote rename current_name new_name

Disable Auto correct in Config
```
git config --global help.autocorrect 0
```

GIT Advance

- **git stash,** which makes a temporary, local save of your code
- **git reset,** which lets you tidy up your code before doing a commit
- **git bisect**, a function that allows you to hunt out bad commits
- **git squash**, which allows you to combine your commits
- **git rebase**, which allows for applying changes from one branch onto another

---

Git Stash

When you run `git stash`, the uncommitted code disappears without being committed. Stashing is like saving a temporary local commit to your branch. It is not possible to push a stash to a remote repository, so a stash is just for your own personal use.

```
git stash
git stash list              //you'll see a list of stashes
git stash apply      //reapply the stashed content
git stash apply stash@{1}     //if you have stashed more than once
```

If you decide not to commit your work once you have restored the stash, you can run
```
git checkout .       // which resets all uncommitted code.
```

You can also carry over your stashed commits to a new feature branch or debugging branch by using
```
git stash branch
```

Note that when you have applied a stash, the stash is not deleted.
```
git drop stash@{1}       //remove stashes individually
git stash clear       //remove all stashes
```

Create stash

Save the current state of working directory and the index (also known as the staging area) in a stack of stashes.
```
git stash
```

To include all untracked files in the stash use the --include-untracked or -u flags.
```
git stash --include-untracked
```

To include a message with your stash to make it more easily identifiable later
git stash save "<whatever message>"

Git Reset

If you do find yourself in the situation where you've accidentally committed some messy code, you can do a "soft" reset.

```
git reset --soft HEAD~1  //This will reset the most recent commit
git reset --soft HEAD~2  //You can reset back more than one commit
                             by changing the number after ~
git reset --hard HEAD~1   //perform a hard reset.This type of
                          reset essentially erases your last commit.
```

You should be very careful about performing hard resets, especially if you push your branch, as there is no way to restore your commit.

Git Bisect

git bisect essentially performs a binary search between two given commits and then presents you with a specific commit's details. You first need to give Git a good commit, where you know your functionality was working, and a bad commit.

Now we start the bisect and tell Git we have a bad commit.

```
$ git bisect start
$ git bisect bad 8d4615b9a963ef235c2a7eef9103d3b3544f4ee1
```

Now we go back in time to try and find a commit where the text was not bad.

```
$ git log
$ git checkout 1cdbd113cad2f452290731e202d6a22a175af7f5

The text is no longer red, so this is a good commit!
$ git bisect good 1cdbd113cad2f452290731e202d6a22a175af7f5
```

git bisect automatically checks out a commit in the middle of your good and bad commits.

Refresh the page, and see if your problem is gone. The issue is still there, so we tell Git that this is still a bad commit. No need to reference the commit hash this time since Git will use the commit you have checked out.

```
$ git bisect bad
```

We'll need to repeat this process until Git has traversed all the possible steps.

Refresh the page, and our issue is gone again, so this is a good commit:
`$ git bisect good`

```$ git bisect good
ce861e4c6989a118aade031020fd936bd28d535b is the first bad commit
commit ce861e4c6989a118aade031020fd936bd28d535b
Author: Ursula Clarke <email@example.com>
Date:   Tue Jan 11 10:52:57 2021 +0100

    Add CSS styles

:000000 100644 0000000000000000000000000000000000000000 092bfb9bdf74dd8cfd22e812151281ee9aa6f01a M      css
```

Now we can use `git show` to show the commit itself and identify the issue
`$ git show ce861e4c6989a118aade031020fd936bd28d535b`
When you're finished, you can run **`git bisect reset`** to reset your branch to its normal working state.

Git Rebase

rebase can be used to permanently delete files from your codebase.

Parameter	Details
--continue	Restart the rebasing process after having resolved a merge conflict.
--abort	Abort the rebase operation and reset HEAD to the original branch. If branch was provided when the rebase operation was started, then HEAD will be reset to branch. Otherwise HEAD will be reset to where it was when the rebase operation was started.
--keep-empty	Keep the commits that do not change anything from its parents in the result.
--skip	Restart the rebasing process by skipping the current patch.
-m, --merge	Use merging strategies to rebase. When the recursive (default) merge strategy is used, this allows rebase to be aware of renames on the upstream side. Note that a rebase merge works by replaying each commit from the working branch on top of the upstream branch. Because of this, when a merge conflict happens, the side reported as ours is the so-far rebased series, starting with upstream, and theirs is the working branch. In other words, the sides are swapped.
--stat	Show a diffstat of what changed upstream since the last rebase. The diffstat is also controlled by the configuration option rebase.stat.
-x, --exec	Perform interactive rebase, stopping between each commit and executing command

Rebasing reapplies a series of commits on top of another commit.
To rebase a branch, checkout the branch and then rebase it on top of another branch.

git checkout topic
git rebase master # rebase current branch onto master branch

These operations can be combined into a single command that checks out the branch and immediately rebases it:
git rebase master topic # rebase topic branch onto master branch

The first thing a rebase does is resetting the HEAD to master ; before cherry-picking commits from the old branch topic to a new one (every commit in the former topic branch will be rewritten and will be identified by a different hash).

Interactive Rebase
This example aims to describe how one can utilize **git rebase** in interactive mode. It is expected that one has a basic understanding of what **git rebase** is and what it does.

Interactive rebase is initiated using following command:
git rebase -i

The -i option refers to interactive mode. Using interactive rebase, the user can change commit messages, as well as reorder, split, and/or squash (combine to one) commits.

Say you want to rearrange your last three commits. To do this you can run:
git rebase -i HEAD~3

After executing the above instruction, a file will be opened in your text editor where you will be able to select how your commits will be rebased. For the purpose of this example, just change the order of your commits, save the file, and close the editor. This will initiate a rebase with the order you've applied. If you check git log you will see your commits in the new order you specified.

Rebase down to the initial commit
Since Git 1.7.12 it is possible to rebase down to the root commit. **The root commit is the first commit ever made in a repository**, and normally cannot be edited.
Use the following command:
git rebase -i --root

Pushing after a rebase
Sometimes you need rewrite history with a rebase, but git push complains about doing so because you rewrotehistory.
This can be solved with a **git push --force** , **but consider git push --force-with-lease** , indicating that you want the push to fail if the local remote-tracking branch differs from the branch on the remote, e.g., someone else pushed to the remote after the last fetch. **This avoids inadvertently overwriting someone else's recent push.**

Squashing Your Commits

to squash—or combine—your commits.

Squash Recent Commits Without Rebasing
If you want to squash the previous x commits into a single one, you can use the following commands:
git reset --soft HEAD~x
git commit

Replacing x with the number of previous commits you want to be included in the squashed commit.

Squashing Commit During Merge
You can use git merge --squash to squash changes introduced by a branch into a single commit. No actual commit will be created.
git merge --squash <branch>
git commit

Squashing Commits During a Rebase
Commits can be squashed during a **git rebase** . It is recommended that you understand rebasing before
attempting to squash commits in this fashion.
1. Determine which commit you would like to rebase from, and note its commit hash.
2. Run git rebase -i [commit hash] .
Alternatively, you can type **HEAD~4** instead of a commit hash, to view the latest commit and 4 more commits
before the latest one.
3. In the editor that opens when running this command, determine which commits you want to squash.
Replace pick at the beginning of those lines with squash to squash them into the previous commit.
4. After selecting which commits you would like to squash, you will be prompted to write a commit message.
