IT Club

GIT WORKSHOP

Day 1: Introduction to Git and VCS

Prerequisites

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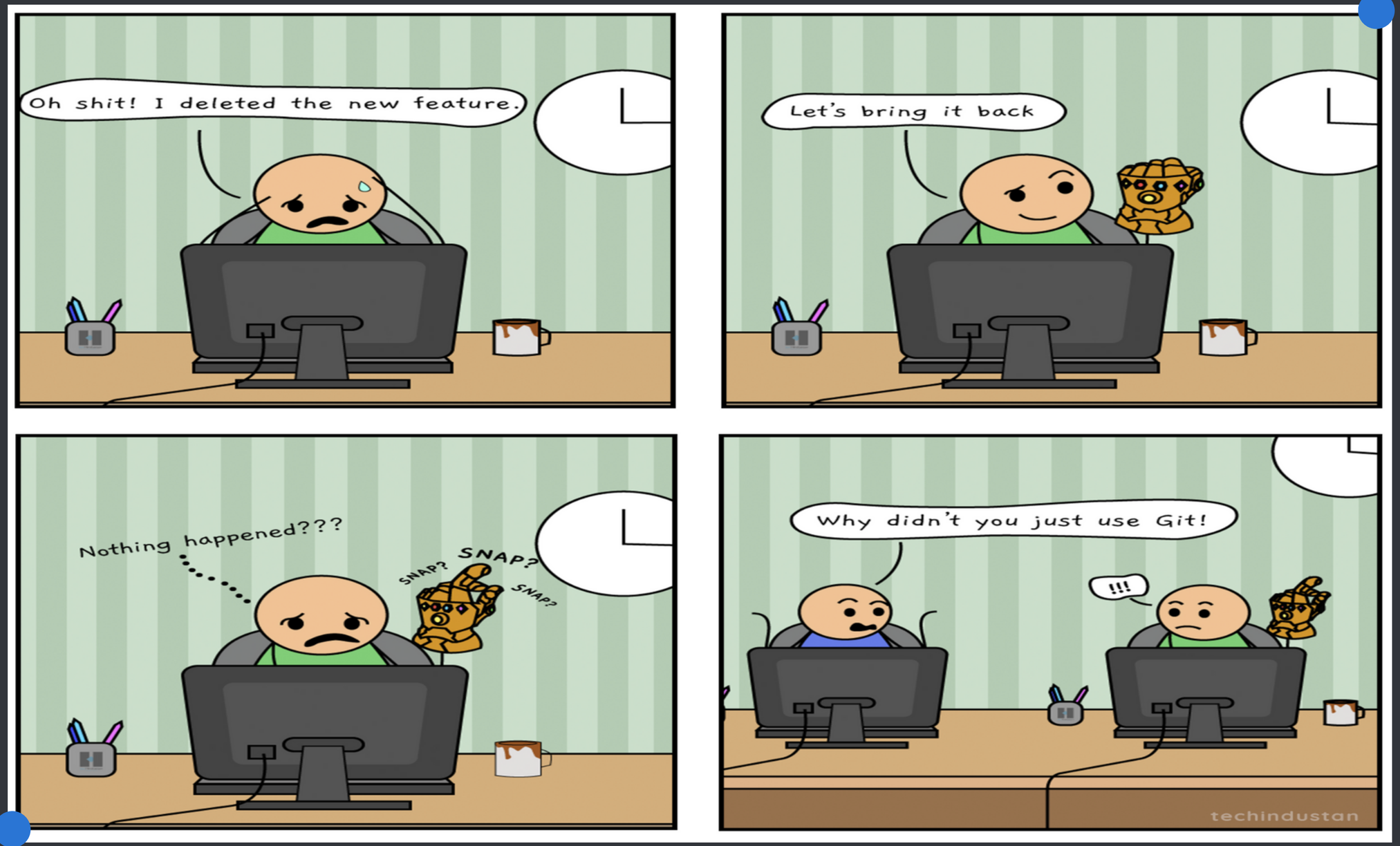
- Install Git on your computer.
- Create a Github account.
- Install IDE (VS Code recommended).

Part 1

The Need of Version Control


Oh shit! I deleted the new feature.
Let's bring it back
Nothing happened???
SNAP?
SNAP?
SNAP?
Why didn't you just use Git!
!!!
techindustan

Version Control Systems

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Version control systems (VCSs) are tools used to track changes to source code (or other collections of files and folders).

Version Control Systems

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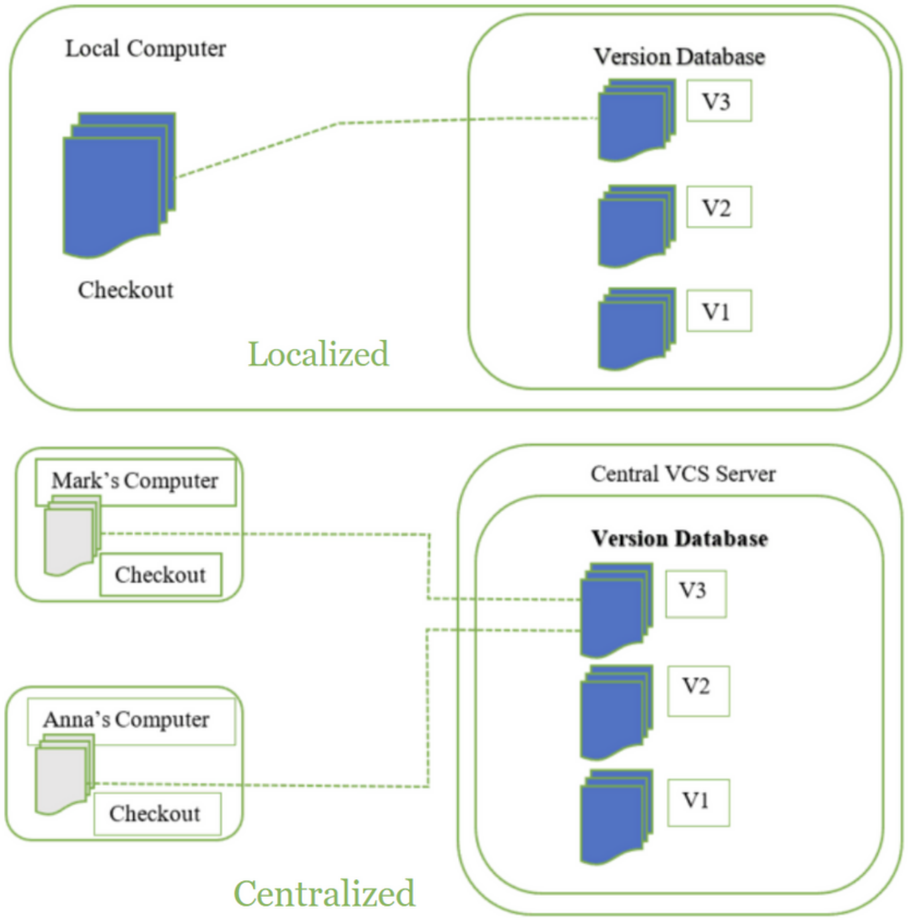
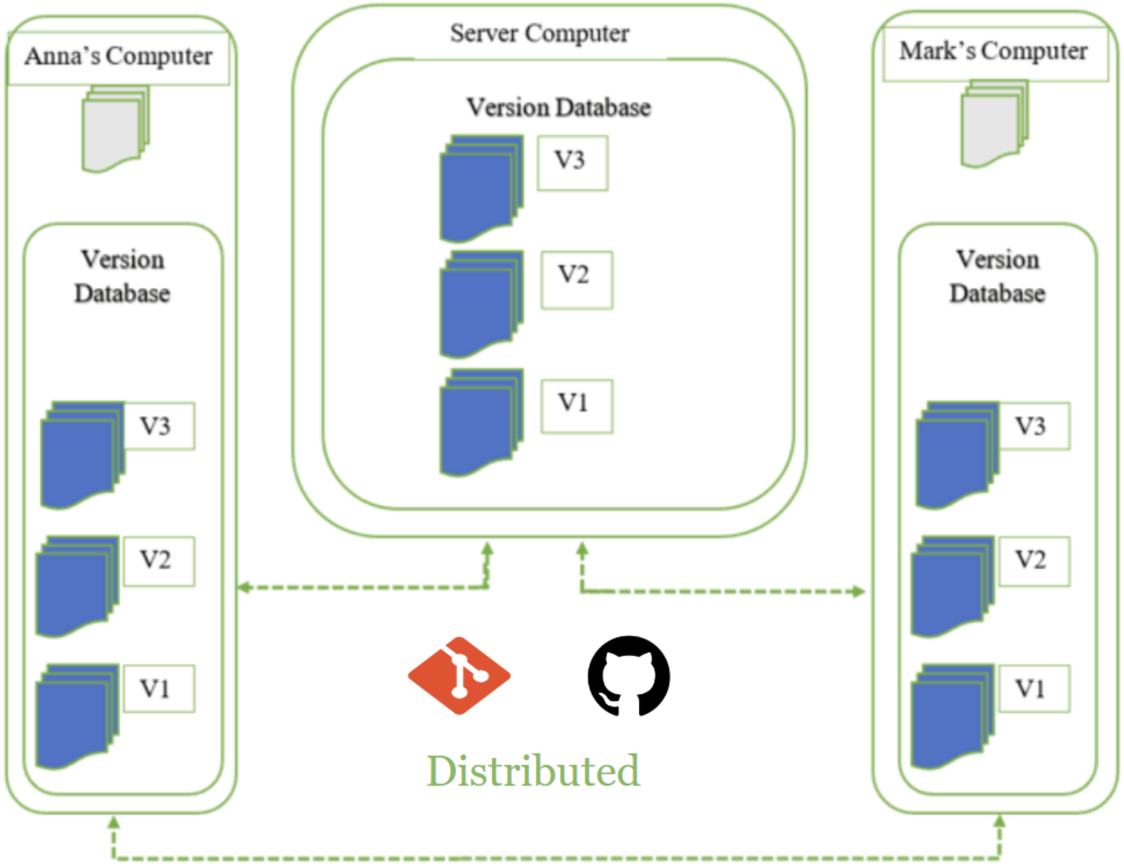
- **managing changes:** versions of files over time
- **collaborate:** multiple users to on a project
- **history:** track of the changes made
- **revert:** go back to previous versions
- **conflict management:** multiple users working on same files
- **branching:** multiple features at the same time

Types


Local Computer
Checkout
Version Database
V3
V2
V1
Localized
Mark's Computer
Checkout
Anna's Computer
Checkout
Central VCS Server
Version Database
V3
V2
V1
Centralized


Anna's Computer
Version Database
V3
V2
V1
Server Computer
Version Database
V3
V2
V1
Mark's Computer
Version Database
V3
V2
V1
Distributed

Heard of these?

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Distributed

mercurial

Centralized

SUBVERSION

Heard of these?

IT Club

Distributed

mercurial

And of course

GIT

Centralized

SUBVERSION

Git it?

Fully Distributed

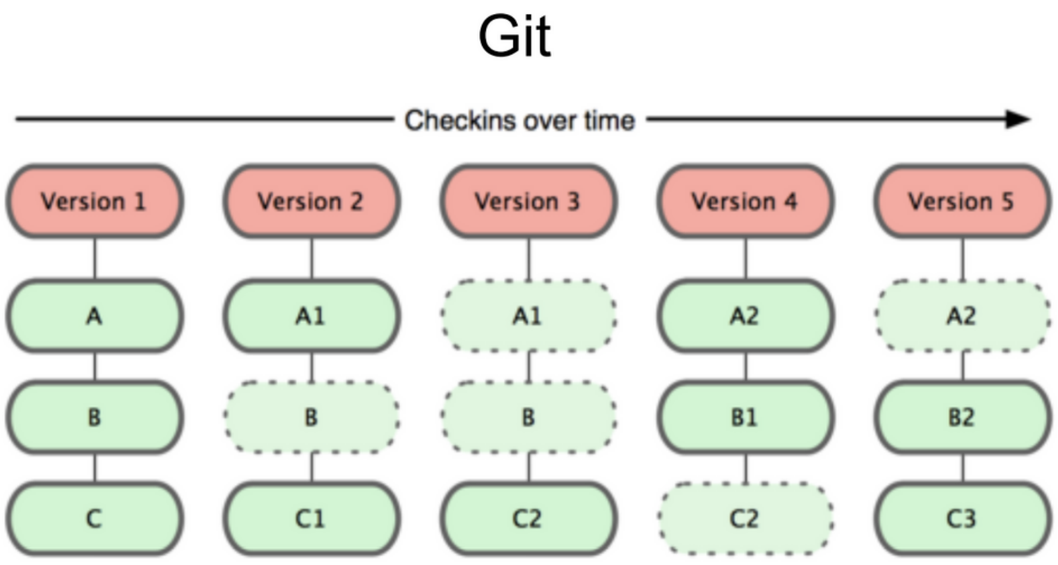
Speed

Open Source

Large Projects

Non Linear Development

Git Snapshots



Reduntant but fast

Snapshots of entire state

SVN? You mean revision?

What's in the demos

Overview

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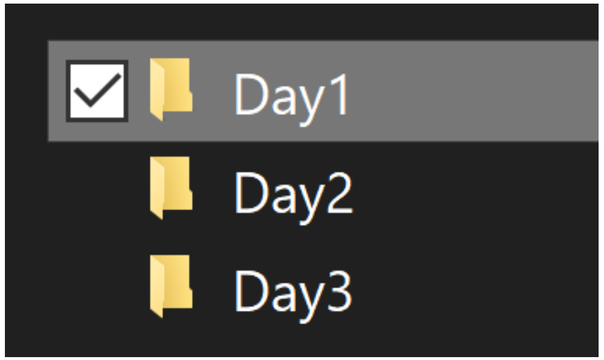
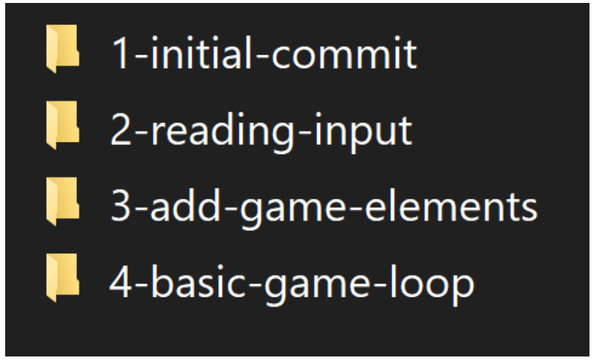
Let's create a hangman game





Building

Windows

```
.\build.bat
build\hangman.exe
```

Linux

```
./build.sh
/build/hangman
```

Overview

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It'll look something like this.

```
C:\Users\aditi\Downloads\demos\Day1\1-initial-commit>.\build.bat

C:\Users\aditi\Downloads\demos\Day1\1-initial-commit>build\hangman.exe
Hello World!
```

You can build the game for all the stages and see for yourself.

Overview

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We'll be doing the following things today.

- **Initial commit**: Printing a simple Hello World message
- **Reading input**: Reading input and checking its validity through get_input function
- **Adding game elements**: Defining Word and Game structs, and GameState enum
- **Basic Game Loop**: Writing functions for initialising and updating the game, basically we will be tying all things together

Part 2

Gitting Started

Setting Up Git

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Checking installation of git

```
$ git version
```

Setting Up Git

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Configuring Git with username and email

`git config --global user.name “[firstname lastname]”`
set a name that is identifiable for credit when review version history
`git config --global user.email “[valid-email]”`
set an email address that will be associated with each history marker

Example:

```
$ git config --global user.name "John Doe"
$ git config --global user.email johndoe@example.com
```

Checking your Settings

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```
$ git config --list
```

list all the settings Git can find at that point

```
$ git config user.name
```

check specific key value for a setting

Setting Up Git

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Creating a new git repository

```
git init
```

initialize an existing directory as a Git repository

or you can clone a repository but we'll get into it later.

- A hidden folder named **.git** is created which contains all the information of the repository such as change history, settings, compressed version of each file, etc.

Tracking your files

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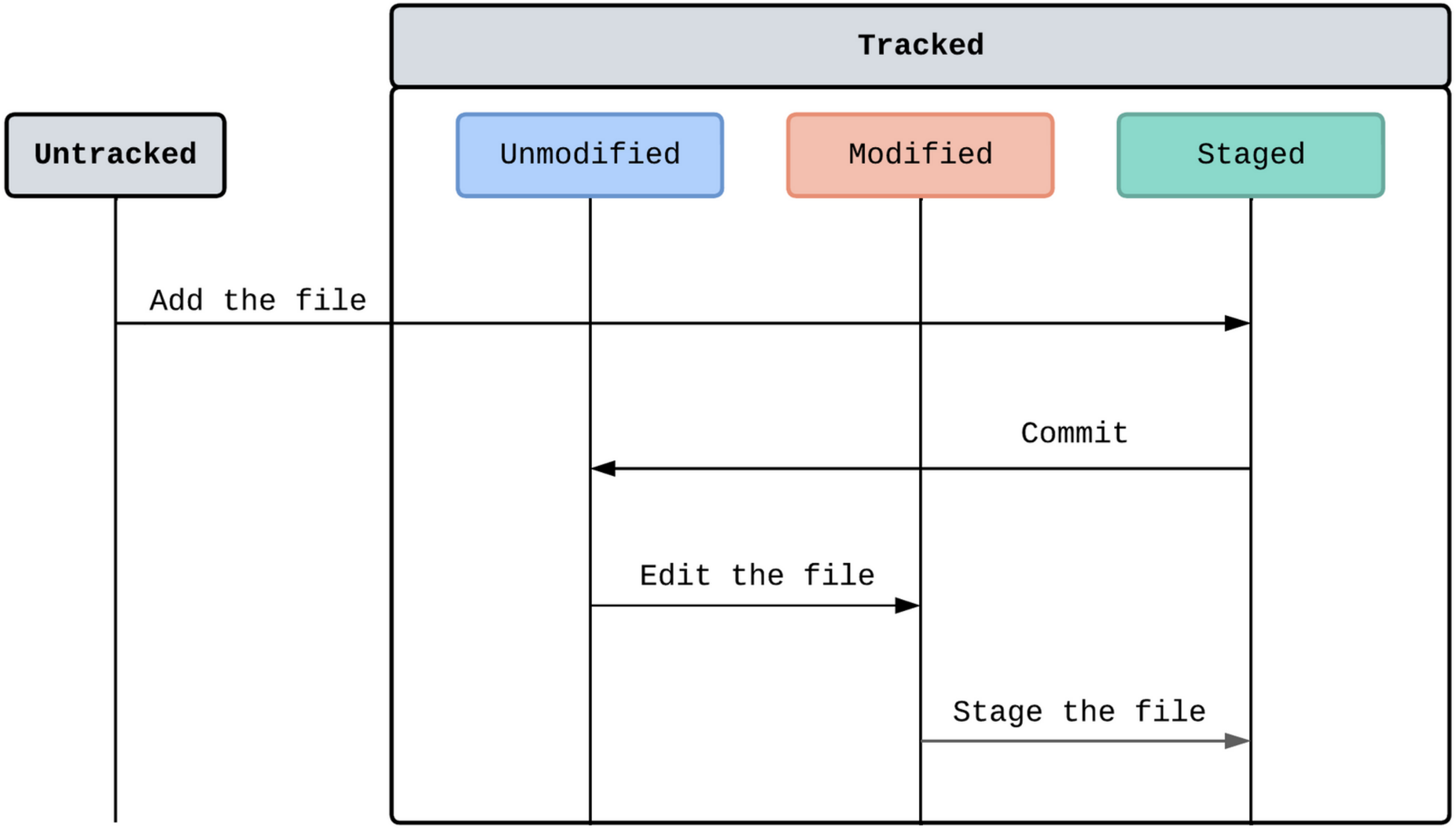
```
$ git add <filepath>
```

- Stage ***changes*** in the specified file(s), preparing them for the next commit
- Place the ***changes*** to the so called "staging area"

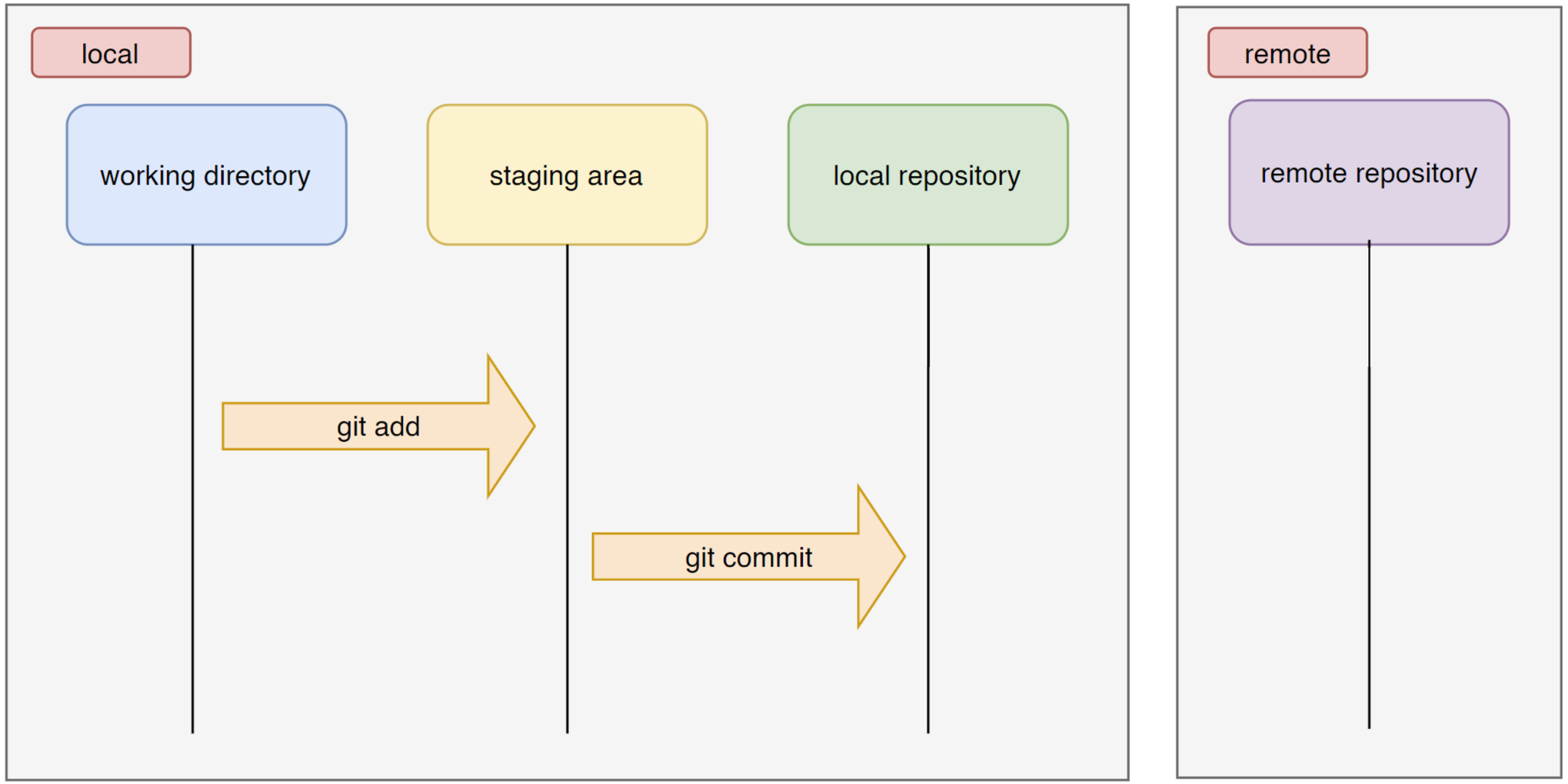
Example:

```
$ git add hangman.c
```

Lifecycle of status of file



Git Workflows



Checking the Status of Your Files

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```
$ git status
```

- Shows the current status of your git repo
- Displays the information about tracked and untracked files in the current working directory
- Tracked files are files that Git is aware of and are already being version controlled.
- Untracked files are files that are not yet added to the Git repository.

Batch staging

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```
$ git add .
```

- Stage ***changes*** in all the files in the current directory and its subdirectories.
- where **.** specifies the current working directory

```
$ git add *.c
```

- Stage ***changes*** in all files with the ".c" extension in the current directory and its subdirectories.

Some more batch staging

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```
$ git add file1.txt file2.c file3.py
```

Stage ***changes*** in "file1.txt", "file2.c", and "file3.py".

```
$ git add my_folder/
```

Stage ***changes*** in an "entire" folder.

Taking snapshots

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```
git commit -m “[descriptive message]”
```

commit your staged content as a new commit snapshot

- **Atomic commits** - It's a best practice to make commits atomic, meaning each commit should represent a single logical change

- The commit message should be ***descriptive***, explaining the changes made in the commit.

Viewing Changes

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```
$ git diff
```

- Shows the changes between the working directory and the staging area (or the last commit)
- Displays the differences in a line-by-line format, highlighting additions and deletions with "+" and "-" signs, respectively.

Viewing the Commit History

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```
$ git log
```

- Displays the list of commits in reverse chronological order, showing the latest commits first

- Each commit in the log includes information such as the commit hash (SHA-1 checksum), author name, author email, commit date, the commit message, and the commit description (if any).

- Pressing the **Enter** key scrolls down through the log, displaying more commits if available. Press **q** to exit the log view.

Ignoring files

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.gitignore

- **.gitignore** is a configuration file used by Git to specify which files and directories should be ignored and not tracked by version control.

- useful for files that are generated automatically by the build process, temporary files, IDE-specific files, compiled binaries, and sensitive data that should not be shared.

Ignoring files

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.gitignore

```
# ignore a specific file
main.exe

# ignore all .a files (ignore files with specific extension)
*.a

# but track lib.a, even though you're ignoring .a files above
!lib.a

# ignore a specific directory and its content
build/

# ignore doc/notes.txt, but not doc/server/arch.txt
doc/*.txt

# ignore all .pdf files in the doc/ directory and any of its subdirectories
doc/**/*.pdf
```

Some useful commands

Undoing things with git restore

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```
$ git restore <filepath>
```

- discard changes made to a specific file in the working directory and revert it to the state of the last commit
- **Important:**
  Don't ever use this command unless you absolutely know that you don't want those unsaved local changes.
  Please use with caution.

```
$ git restore hangman.c
```

- Revert changes in *hangman.c* to the last commit

Some useful commands

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```
$ git diff --staged
```

- shows the changes between your staged changes and your last commit
- used when we want to see what we've staged that will go into our next commit

Some useful commands

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```
$ git diff --name-only
```

- shows only the names of the files which have changed between the working directory and the staging area (or the last commit)
- useful when you only need to know which files have been modified, added, or deleted, without showing the actual content changes.

Some useful commands

```
$ git reset
```

- Move staged changes back to the working directory.
- can be used when we mistakenly stage (add) files to the staging area
- The **git reset** command comes with different options that can be used to achieve different outcomes, which we'll discuss in later days of the workshop.

Limiting Log Output

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```
$ git log --oneline
```

- Shows each commit as a single line, displaying only the abbreviated commit hash and the first line of the commit message.

`$ git log -<n>` Show only the last n commits.

Example:

`$ git log -5` Show only the last 5 commits.

Getting Help

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```
$ git help
```

- To get general help and see a list of common Git commands

```
$ git help <command>
```

- To get help for specific Git command

Example:

`$ git help log` To get help for the command **git log**

Questions?

Quiz Time

Who is the original author of Git?

Linus Torvalds

Principal author of the largest open-source OS Linux

What command is used to create an existing copy of Git repositery from remote location to local machine?

Answer:

git clone

```
git clone <repo> <directory>
```

How can you limit number of commits displayed with git log command?

A. Use the "--max-commits" flag followed by the desired number.

B. Include the "-<n>" option where `n` is the desired number.

C. Use the "git log --limit" command.

D. There is no way to limit the number of commits displayed.

Answer:

B

Thank you