

# Git part 1

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## ##Key Points Automated Version Control

Version control is like an unlimited 'undo'.  
Version control also allows many people to work in parallel.

## Setting Up Git

Use `git config` with the `--global` option to configure a user name, email address, editor, and other preferences.

## Creating a Repository

`git init` initializes a repository.  
Git stores all of its repository data in the `.git` directory.

## Tracking Changes

`git status` shows the status of a repository.  
Files can be stored in a project's working directory (which users see), the staging area (where the next commit will be made), or the local repository.  
`git add` puts files in the staging area.  
`git commit` saves the staged content as a new commit in the local repository.  
Write a commit message that accurately describes your changes.

## Exploring History

`git diff` displays differences between commits.  
`git checkout` recovers old versions of files.

## Ignoring Things

The `.gitignore` file tells Git what files to ignore.

## Remotes in GitHub

A local Git repository can be connected to one or more remote repositories.  
Use the HTTPS protocol to connect to remote repositories until you have learned how to set up SSH.  
`git push` copies changes from a local repository to a remote repository.  
`git pull` copies changes from a remote repository to a local repository.

## Collaborating

`git clone` copies a remote repository to create a local repository with a remote called origin automatically.

## Conflicts

Conflicts occur when two or more people change the same lines of the same file.

The version control system does not allow people to overwrite each other's changes blindly, but highlights

## Open Science

Open scientific work is more useful and more highly cited than closed.

## Licensing

People who incorporate General Public License (GPL'd) software into their own software must make their

The Creative Commons family of licenses allow people to mix and match requirements and restrictions on

People who are not lawyers should not try to write licenses from scratch.

## Citation

Add a CITATION file to a repository to explain how you want your work cited.

## Hosting

Projects can be hosted on university servers, on personal domains, or on public forges.

Rules regarding intellectual property and storage of sensitive information apply no matter where code is

## Supplemental: Using Git from RStudio

Using RStudio's Git integration allows you to version control a project over time.

## Git Cheatsheets for Quick Reference

Printable Git cheatsheets in several languages are available [here](#)

Links to an external site.

<https://training.github.com/downloads/github-git-cheat-sheet.pdf>

More material is available from the GitHub training website [Links to an external site..](#)

<https://docs.github.com/en/get-started/quickstart/set-up-git>

An interactive one-page visualization

<http://ndpsoftware.com/git-cheatsheet.html#loc=index;>

Links to an external site. about the relationships between workspace, staging area, local repository, upstream repository, and the commands associated with each (with explanations). Both resources are also available in other languages (e.g. Spanish, French, and more). "Happy Git and GitHub for the useR [Links to an external site.](#)"

<https://happygitwithr.com/>

is an accessible, free online book by Jenny Bryan on how to set up and use Git and GitHub with specific references on the integration of Git with RStudio and working with Git in R. Open Scientific Code using Git and GitHub

<https://open-source-for-researchers.github.io/open-source-workshop/>

Links to an external site. - A collection of explanations and short practical exercises to help researchers learn more about version control and open-source software.

##Glossary

changeset - A group of changes to one or more files that are or will be added to a single commit in a version control repository.  
commit - record the current state of a set of files (a changeset) in a version control repository. As a  
conflict - A change made by one user of a version control system that is incompatible with changes made by another user.  
HTTP - The Hypertext Transfer Protocol used for sharing web pages and other data on the World Wide Web.  
merge - (a repository): To reconcile two sets of changes to a repository.  
protocol - A set of rules that define how one computer communicates with another. Common protocols on the Internet include HTTP, FTP, and SSH.  
remote - (of a repository) A version control repository connected to another, in such a way that both can be used to manage the repository.  
repository - A storage area where a version control system stores the full history of commits of a project.  
resolve - To eliminate the conflicts between two or more incompatible changes to a file or set of files.  
revision - A synonym for commit.  
SHA-1 - SHA-1 hashes is what Git uses to compute identifiers, including for commits. To compute these, use the `git hash-object` command.  
SSH - The Secure Shell protocol used for secure communication between computers.  
timestamp - A record of when a particular event occurred.  
version control - A tool for managing changes to a set of files. Each set of changes creates a new commit in the repository.

Links to an external site. of the files; the version control system allows users to recover old commits reliably, and helps manage conflicting changes made by different users.

## Setting up Git

```
PS1="$"
```

```
$git config --global user.name "Gulnaz Shalgumbayeva"
```

```
$git config --global user.email "gshalgum@uci.edu"
```

```
$git config --global user.core.autocrlf input
```

```
$git config --global user.editor "nano -w"
```

```
$git config --global init.defaultBranch main
```

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

## Creating a Repository

Questions

Where does Git store information?

Objectives

Create a local Git repository.

>Describe the purpose of the `.git` directory.

## Key Points

\$ git init initializes a repository.

Git stores all of its repository data in the .git directory

\$cd desktop

\$pwd

/Users/gulnazshalgumbayeva/desktop

\$mkdir planets

\$cd planets

\$pwd

/Users/gulnazshalgumbayeva/desktop/planets

\$git init

Initialized empty Git repository in /Users/gulnazshalgumbayeva/Desktop/planets/.git/

\$ls -a

. .. .git

Comment: You see this hidden directory that tracks the history of your project, if you ever delete this directory .git then you will lose all the project history!!!

\$git checkout -b main

Switched to a new branch 'main' \$git status

Warning: By running git init in the moons subdirectory, you are telling Git to start tracking the files in that subdirectory and create a new repository that is independent of the main repository in the planets directory.

Exercise: Wolfman explains to Dracula how a nested repository is redundant and may cause confusion down the road. Dracula would like to remove the nested repository. How can Dracula undo his last git init in the moons subdirectory?

But be careful! Running this command in the wrong directory, will remove the entire Git history of a project you might want to keep. Therefore, always check your current directory using the command pwd

pwd git rm -r moons

##Questions

How do I record changes in Git?

How do I check the status of my version control repository?

How do I record notes about what changes I made and why?

##Objectives

Go through the modify-add-commit cycle for one or more files.

Explain where information is stored at each stage of that cycle.

Distinguish between descriptive and non-descriptive commit messages.