Git & GitHub: Share/Sync Files Quickly and Securely

What is Git?

- **Version control system** (like "Track Changes" but smarter)
- Runs on **your computer**
- Tracks **changes in your code**
- Works **offline**

What is GitHub?

- **Online platform** for Git repositories
- **Cloud storage** for your code
- **Collaboration** with others
- **Portfolio** for your projects

Most of the code and documentation for ASE courses are stored in GitHub.

For example, common ASE course material can be accessed in https://github.com/nkuase/ASE.

Installation of Git (Windows)

Step 1: Download Git

- Go to the official Git website: https://git-scm.com
- Click **Download**.
- The website automatically detects your OS (Windows, macOS, or Linux).

Step 2: Install on Windows

1. Run the downloaded installer (`.exe`).
2. Follow the setup wizard:
    - Use **default options** unless you know you need changes.
    - Make sure *"Add Git to PATH"* is selected.
3. Finish and restart your terminal/command prompt.

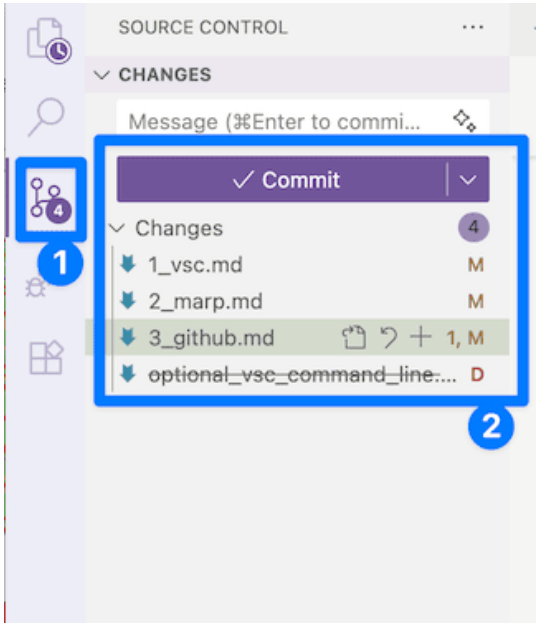
Installation of Git (Mac)

1. Install brew (https://brew.sh)
2. Use brew to install `git`.

```
brew install git
```

VSCode as the Git Tool

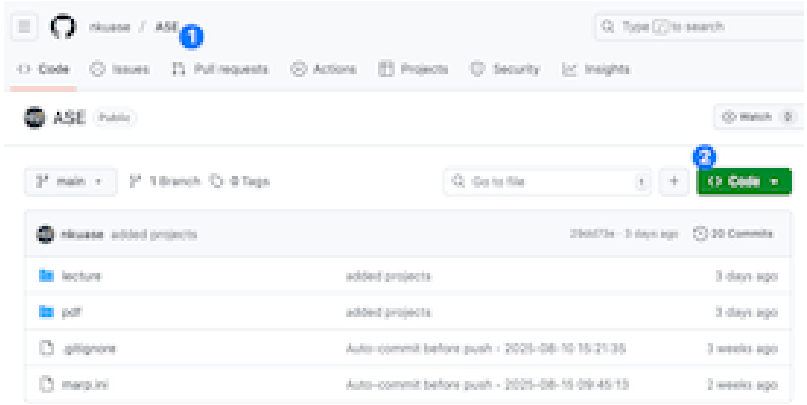
- You can think of Git as a client to access the Server (GitHub).
- VSCode knows how to deal with git, and we can use git in VSCode.



Download files from GitHub

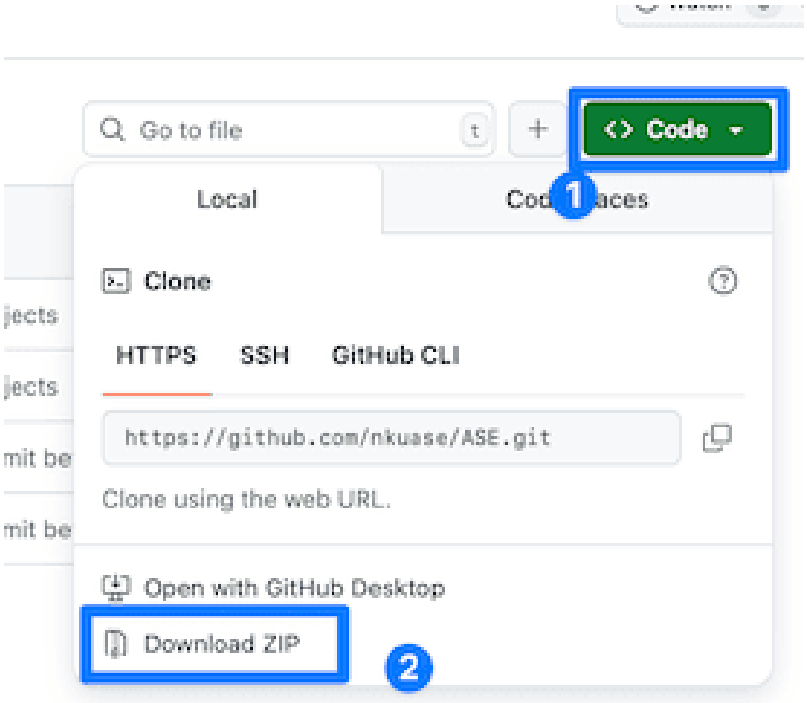
1. You can go to the GitHub repository to access the files.
2. In this example, you can visit the ASE repository https://github.com/nkuase/ASE to download common files.

- The lecture directory has all the markdown source files.
- The PDF directory has all the converted PDF files.



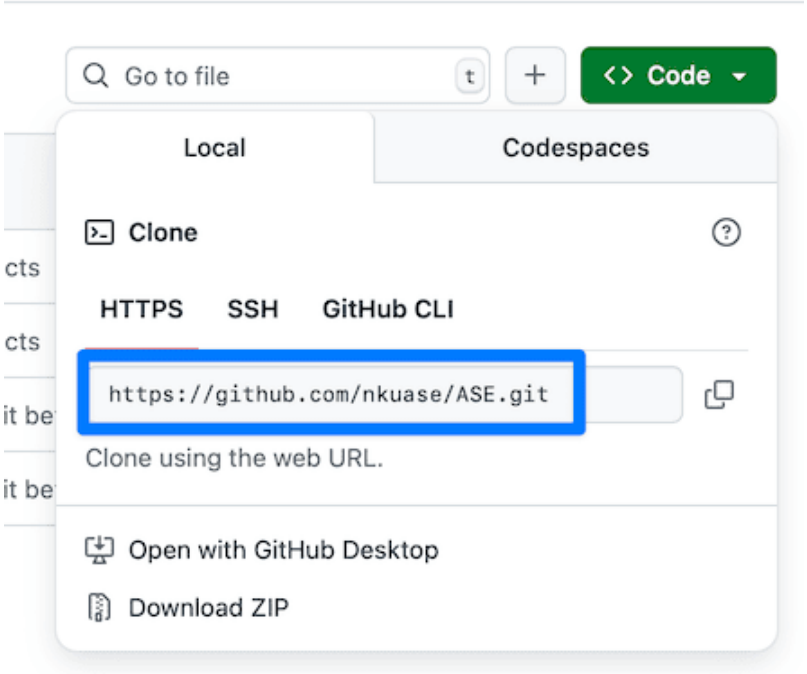
Download the ZIP file

We can download the whole repository using the "Download ZIP" menu.



Clone (sync) with `git clone` command

- In a command line (terminal), we can use the `git clone` command to clone (sync) the repository.
- You can get the repository location from the menu.



In this example, we clone the ASE repository; however, we can clone any repository from GitHub.

```
git clone https://github.com/nkuase/ASE.git
```

- Open the cloned directory using VSCode and use the content (code, lecture MD source, PDF) for the course.

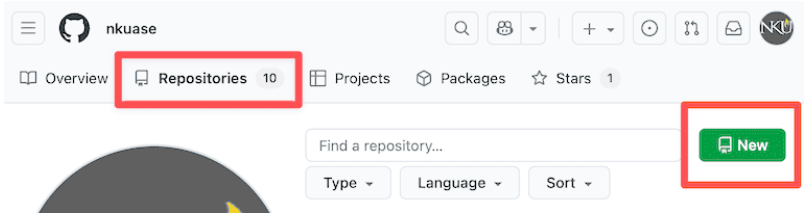
Creating a Public Repository

Step 1: Login to GitHub

1. Go to github.com
2. Sign in to your account
3. If you don't have an account, create one (free)

Step 2: Create New Repository

1. Click the **Repositories Tab**.
2. Select **"New"**



Step 3: Repository Settings

- **Repository name**: `my-first-repo` (example)
- **Description**: "Learning Git and GitHub basics"
- **Visibility**: Select **"Public"** ✅
- **Initialize**: Check **"Add a README file"** ✅
- **Add .gitignore**: Select appropriate template (optional)
- **License**: Choose a license (optional)

Step 4: Create Repository

1. Click **"Create repository"** button
2. **Repository URL**:
   `https://github.com/yourusername/my-first-repo`

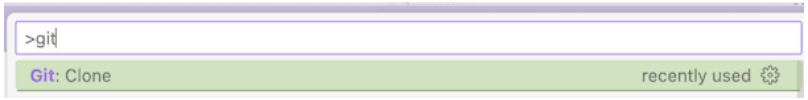
What you get:

- Public repository accessible to everyone
- README.md file for documentation
- Git history tracking

Cloning with VSCode 1

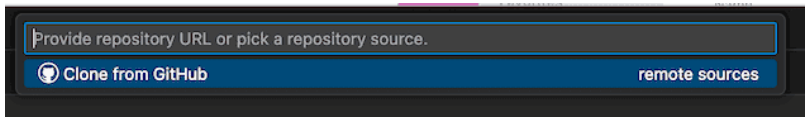
Step 1: Using VSCode Command Palette

1. Open **VSCode**
2. Press `Ctrl+Shift+P` (Windows/Linux) or `Cmd+Shift+P` (Mac)
3. Type: **"Git: Clone"**
4. Press Enter



Step 2: Enter Repository URL

1-1. (Recommended) In the menu, click "Clone from GitHub" and select the repository you made.



1-2. Paste your repository URL:

```
https://github.com/YOUR_ID/my-first-repo.git
```

2. Press **Enter**
3. Choose a **local folder** where you want to save the project

Step 3: Open Cloned Repository

1. VSCode will ask: **"Would you like to open the cloned repository?"**
2. Click **"Open"**
3. Your repository files will appear in the Explorer panel

What you see:

- README.md file
- .git folder (hidden - contains version history)
- .gitignore file (hidden - if you chose to make one)

Cloning with VSCode 2: Using Terminal

1. Open **Terminal** in VSCode (`Ctrl+``)
2. Navigate to desired directory:

```
cd /path/to/your/projects
```

3. Clone repository:

```
git clone https://github.com/yourusername/my-first-repo.git
```

4. Open folder in VSCode:

```
code my-first-repo
```

Making Your First Changes

1. Open `README.md` file in VSCode
    i. Create `README.md` if you did not make one.
2. Add any content (for example):

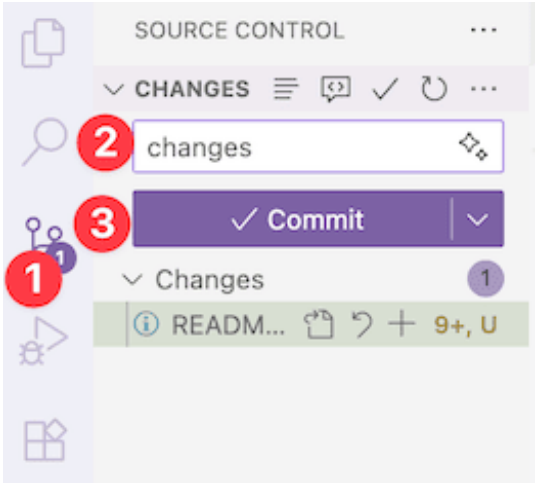
```
# My First Repository

This is my learning project for Git and GitHub!

## What I learned:
- Creating repositories
- Cloning repositories
- Making commits
- Pushing changes
```

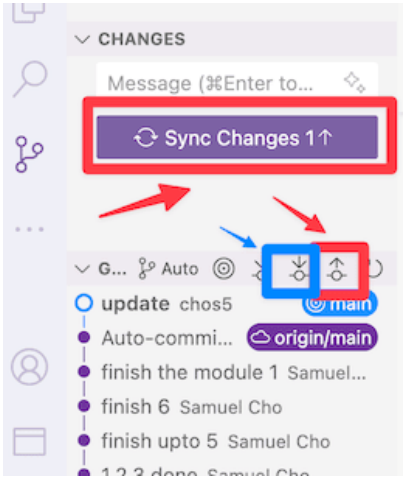
Commit

1. Click the **Source Control** icon in sidebar (or `Ctrl+Shift+G`)
2. You'll see **"Changes"** section with modified files
3. **Commit**: Enter commit message and click **"Commit"**



Push

1. When you push your changes to GitHub, click "Sync Change" or "push" button (red rectangles).



2. When you pull others' changes to your local repository click the "pull" button (blue rectangle).

Multiple GitHub Ids

When you have multiple GitHub Ids, you may have the following error:

```
remote: Permission to nkuase/my-first-repo.git denied to prosseek.
fatal: unable to access 'https://github.com/YOURID/my-first-repo.git/': The requested URL returned error: 403
```

In the terminal, use this command. Change YOURID and YOUR_REPOSITORY accordingly.

```
git remote set-url origin https://YOURID@github.com/YOURID/YOUR_REPOSITORY.git
```

Git is one of the most essential tools

- In the real world, Git/GitHub are used for sharing information everywhere.
- It is essential to use Git/GitHub.
    - Clone the repository.
    - Make a repository.
    - Upload (push) or Download (pull) repository.
- In the ASE program, Git/GitHub is widely used for projects, and we learn ASE 285 in detail.