Git and Github

"A git without sauce is lost, but one may also get lost in too much sauce."

-Somebody, somewhere

Overview:

- What is Git?
- What is Github?
- Basic Github techniques
- Github example *(in class)*

What is Git?

- **distributed version control system (VCS)**
- Manages and tracks changes in source code
- unlike others, Git allows every developer to have a complete local copy of the project
    - This means that developers can work independently of the network and still have full access to the version history, even without an internet connection
- changes are recorded as “commits:”
    - Unique hash identifier
    - log message describing the commit
    - references to previous commits
- Git also supports branching, which enable developers to work on different features or bug fixes simultaneously, without interfering with the main codebase
- Makes it easy to collaborate and synchronize work between teams

A History of Git (Created by GPT)

Git was created by Linus Torvalds in 2005 to support the development of the Linux kernel, one of the most complex open-source software projects in the world. Before Git, the Linux kernel project used a proprietary VCS called BitKeeper, which was licensed freely for open-source projects. However, a licensing dispute between the open-source community and BitKeeper's developers in 2005 led to the Linux project losing access to BitKeeper.

In response to this, Torvalds decided to develop a new version control system that would meet the needs of the Linux kernel's development workflow. He set out with three key goals for Git:

Speed – Git needed to handle large repositories with thousands of files quickly.

Non-linear development – The system had to support branching and merging for developers to work on multiple things simultaneously.

Distributed architecture – Developers needed to be able to work independently and share changes without relying on a central server.

Within a few weeks, Torvalds had a functional version of Git, and the Linux project quickly adopted it. Over time, Git evolved into one of the most widely used version control systems in the world, favored by both open-source projects and commercial development teams. Platforms like GitHub, founded in 2008, built on Git to provide hosting and collaboration features, further boosting its popularity. Today, Git is considered the standard tool for version control and is integral to modern software development practices such as continuous integration and continuous delivery (CI/CD).

What is Github?

- **GitHub** is a web-based platform that provides hosting for Git repositories
- Allows uses to store, manage, track, and collaborate on code projects
- Also provides additional tools and features that enhance collaboration, project management, and community engagement.

GitHub allows users to upload their Git repositories to a remote server, where other developers can access, clone, contribute, and even propose changes via pull requests.

A History of Github (Created by GPT)

GitHub was founded in 2008 by Tom Preston-Werner, Chris Wanstrath, PJ Hyett, and Scott Chacon as a way to provide a user-friendly interface for Git repositories and to facilitate easier collaboration among developers. It began as a project to simplify the way developers shared and contributed to code, making Git's powerful features more accessible to a wider audience.

When GitHub first launched, Git itself was already widely used among open-source developers, especially in the Linux community. However, the command-line interface and decentralized nature of Git posed a learning curve for many developers. GitHub offered an easy-to-use platform with a web interface that made interacting with Git repositories much simpler.

One of the primary reasons GitHub grew in popularity so quickly was its strong focus on social coding. It allowed developers to easily contribute to open-source projects by forking repositories and submitting pull requests. It also introduced profiles, stars, and followers, making coding more collaborative and community-driven. The site essentially turned code collaboration into a more social experience, making it easier to share projects and attract contributors.

GitHub's commitment to open-source projects also played a key role in its growth. In 2012, GitHub reached 1 million users, and by 2018, it had over 28 million users and 85 million repositories. This exponential growth caught the attention of Microsoft, which acquired GitHub in 2018 for $7.5 billion. Despite concerns about Microsoft's involvement, GitHub has continued to thrive, and the acquisition has led to the integration of new tools and features such as GitHub Actions (CI/CD), better security features like Dependabot, and GitHub Copilot, a tool that uses AI to assist developers in writing code.

Today, GitHub is the largest and most popular Git-based platform in the world, with millions of repositories hosted. It plays a central role in both open-source software development and commercial projects, and it has become an essential part of the modern software development workflow.

Github Vocabulary

- **Repository:** A storage space for project files, including code and version history.
- **Fork:** A copy of a repository that allows independent changes without affecting the original.
- **Pull Request:** A proposal to merge changes from one branch or fork into another.
- **Issue:** A way to track tasks, enhancements, or bugs in a project.
- **Action:** Automated workflows triggered by events in a repository (e.g., CI/CD).
- **Clone:** A local copy of a remote repository.
- **Push:** Uploading local commits to a remote repository.
- **Pull:** Downloading changes from a remote repository to a local one.
- **Commit:** Saving changes to the version control system with a description.

Let’s look at an example!

VSCode is actually a github repo!They make use of all of the features github has to offer. Check them out here as an example of the power of Github:

https://github.com/microsoft/vscode