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LAB 1

**GIT**

Git is a free open-source version control system. A version control system is a system that helps programmers track changes made to code. This is very useful especially if a group is involved and they are working on the same project. A version control system will help record changes made to the code to avoid it being overwritten by other members. It also helps us know the time and date changes were made. When changes are made, they are stored in special database known as repository.

Repository is a centralized location where data is stored and managed. This is where one’s project is kept. Git falls under the distributed control version system, where if people are working on a project every team member has a copy of the project on their machine and a snapshot of the project can be saved on each of the members machine. It also allows for synchronization of one’s work with others especially when server is offline. This acts as an advantage since in a centralized version control system once the server goes offline no one can be done. Git is most preferred as it is free, open source, super-fast, scalable and allows for merging or branching.

**GIT WORKFLOW**

There are four fundamental elements in the git workflow:

1. Workspace – This is considered your local directory

A file can be in three possible states; 1. Committed, which means changes are safely stored in the local repository, 2. Modified, means the fie can be changed and not saved to the local repository,3. Staged, means the file is basically a part of the index which means it has been tagged to be considered in the next commit.

2. Index which is also called the state.

3.Local repository also referred to as head.

4. Remote repository.

Commands in git

For committing files to the repository.

1. Git clone command – Creates a local copy of the repository in one’s workspace.

2. Add command – Adds a file that is in workspace to the index. After which the file is staged.

3. Push command – It pushes changes that are in the local repository to the remote repository, at this point all your changes are visible to anyone who has access to the remote repository.

For getting files from repository.

1. Fetch command – Gets files from emote repository to one’s local repository

2. Merge command – Will take changes in local repository to one’s local workspace

3. Pull command – Used if one wants to get the changes directly to your workspace. Changes will be then collected from the remote repository and go to your local repository and finally one’s workspace.

4. Diff head command – Used to get the difference between local files and files in the local repository.

**GITHUB**

GitHub is a platform which helps people solve problems especially programmers by building software together. GitHub is a git repository hosting service which provides a web based graphical interface. GitHub also tracks changes made and saves snapshots of the project

In GitHub everyone has the copy of the project so one can make changes

GitHub has a few features that enable this:

1. Connecting people in different parts of the world and enabling them to work on the same project. GitHub allows collaboration with any developer all over the world. Open-source solutions enable developers to contribute and share their knowledge to benefit the global community.

2. There is also an issue platform on GitHub. Issues are usually discussion threads in which people can ask questions, report bugs and Request features.

3. Easy project management – Developers coordinate, track and update work easily. This makes it transparent.

4. Branching – An alternate timeline where a programmer can make changes safely in the project. This enables the developer to make changes and experiment before reaching out to the project. When a develop is ready to share the changes he or she uses a pull request to show changes that they are proposing so that it can be reviewed by others.

5. Increased safety- Packages can be published privately or within a group. Packages can be used and reused by downloading it from GitHub.

6. Code safety- GitHub uses tools to identify and analyze vulnerabilities to the code that other tools tend to miss.