A TUTORIAL FOR GIT AND GITHUB

What are Git and GitHub

- Git is a free and open source distributed **version control system** designed to handle everything from small to very large projects with speed and efficiency
- GitHub is a **web-based** Git repository **hosting service**, which offers all of the distributed revision control and source code management (SCM) functionality of Git as well as adding its own features.

How to setup Git and GitHub

- Download and install the latest version of GitHub Desktop. This will automatically install Git *and* keep it up- to-date for you.
- https://help.github.com/articles/set-up-git/

BASIC GIT COMMAND

Introduce yourself to Git

- On your computer, open the **Git Shell** application.
- Enter these lines (with appropriate changes):
  - git config --global user.name "Ahmmed Shaik"
  - git config --global user.email ahmmedshaik99@gmail.com
- You only need to do this once
- If you want to use a different name/email address for a particular project, you can change it for just that project
  - cdto the project directory
  - Use the above commands, but leave out the --global

The repository

- Your top-level **working directory** contains everything about your project
  - The working directory probably contains many subdirectories—source code, binaries,
    documentation, data files, etc.
  - One of these subdirectories, named .git, is your repository
- At any time, you can take a “snapshot” of everything (or selected things) in your project directory, and put it in your repository
  - This “snapshot” is called a commit object
  - Commit objects do *not* require huge amounts of memory
- You can work as much as you like in your working directory, but the repository isn’t updated until you commitsomething

Making commits

- You do your work in your project directory, as usual
- If you create new files and/or folders, they are *not tracked* by Git unless you ask it to do so
  - git add *newFile1 newFolder1 newFolder2 newFile2*
- Committing makes a “snapshot” of everything being tracked into your repository
  - A message telling what you have done is required
  - git commit –m “Uncrevulated the conundrum bar”
  - git commit
- Format of the commit message
  - One line containing the complete summary
  - If more than one line, the second line must be blank

Commits and graphs

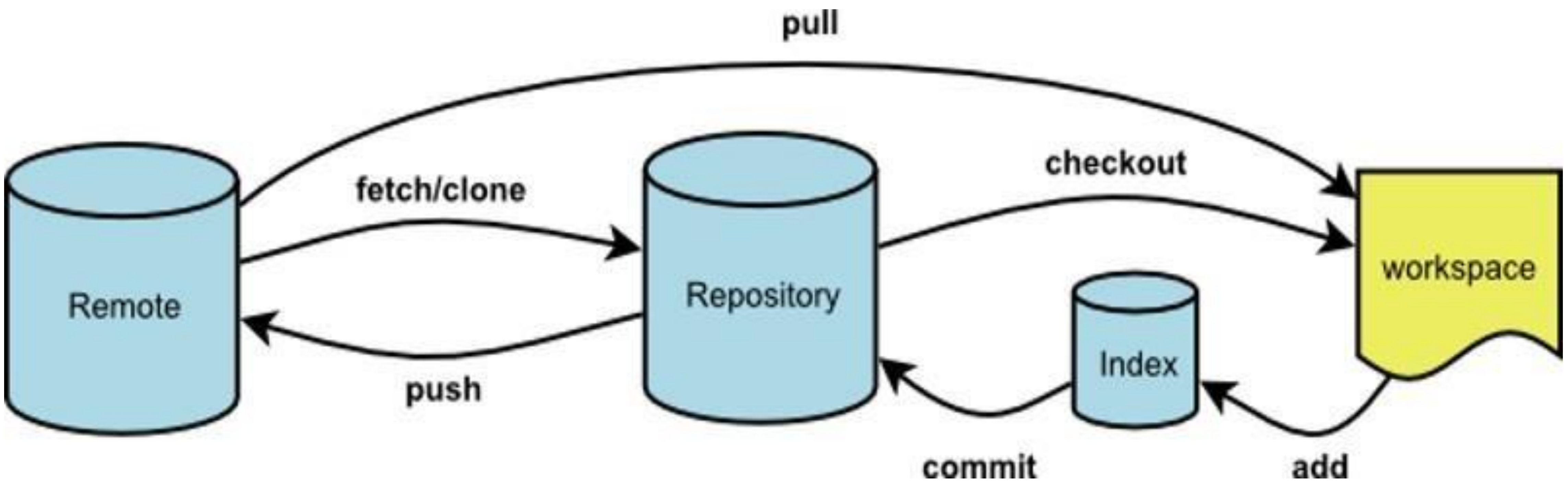
- A commit is when you tell git that a change (or addition) you have made is ready to be included in the project
- When you commit your change to git, it creates a commit object
  - A commit object represents the complete state of the project, including all the files in
    the project
  - The *very first* commit object has no “parents”
  - Usually, you take some commit object, make some changes, and create a new commit
    object; the original commit object is the parent of the new commit object
    - Hence, most commit objects have a single parent

- You can also merge two commit objects to form a new one
  - The new commit object has two parents
- Hence, commit objects forms a **directed graph**
- Git is all about using and manipulating this graph

Commit messages

- In git, “Commits are cheap.” Do them often.
- When you commit, you must provide a one-line message stating what you have done
  - Terrible message: “Fixed a bunch of things”
  - Better message: “Corrected the calculation of median scores”
- Commit messages can be very helpful, to yourself as well as to your team members
- You can’t say much in one line, so commit often

More Commands:



FUNDAMENTALS OF GITHUB

Introduce yourself to GitHub

- Register on GitHub
  - https://github.com/
- Authenticating to GitHub Desktop
  - https://help.github.com/desktop/guides/getting-started/authenticating-to-github/
- Configuring Git for GitHub Desktop
  - https://help.github.com/desktop/guides/getting-started/configuring-git-for-github-desktop/

Create or add a repository to GitHub

- Create a new repository on GitHub
  - https://help.github.com/articles/create-a-repo/
- From GitHub Desktop, then Publish to GitHub
  - https://help.github.com/desktop/guides/contributing/adding-a-repository-from-your-local-computer-to-github-desktop/
  - Remember to Publish, otherwise your repository would not appear on the GitHub website.

Commit your changes on GitHub

- From GitHub Website
  - https://help.github.com/articles/create-a-repo/
- From GitHub Desktop
  - https://help.github.com/desktop/guides/contributing/committing- and-reviewing-changes-to-your-project/

Creating a branch for your work

- A branch is a parallel version of the main line of development in the repository, or the default branch (usually master). Use branches to
    - Develop features
    - Fix bugs
    - Safely experiment with new ideas
- From the GitHub Website
    - https://help.github.com/articles/creating-and-deleting-branches-within-your-repository/
- From the GitHub Desktop
    - https://help.github.com/desktop/guides/contributing/creating-a-branch-for-your-work/

Synchronizing your branch

- As commits are pushed to your project on GitHub, you can keep your local copy of the project in sync with the remote repository.
  - https://help.github.com/desktop/guides/contributing/syncing-your-branch/

Viewing the history of your commits

- When you click a commit on the commit timeline, you can see more details about the commit, including a diff of the changes the commit introduced.

Each commit shows:

- The commit message
- The time the commit was created
- The committer's username and profile photo (if available)
- The commit's SHA-1 hash (the unique ID)

Revert your commit

- If you change your mind about a commit after you create it, you can revert the commit.
- When you revert to a previous commit, the revert is also a commit. In addition, the original commit remains in the repository's history.
- https://help.github.com/desktop/guides/contributing/reverti ng-a-commit/

Fork & Pull: A Collaborative model

- A fork is a copy of a repository that you manage. Forks let you make changes to a project without affecting the original repository. You can fetch updates from or submit changes to the original repository with pull requests.
- A great example of using forks to propose changes is for bug fixes. Rather than logging an issue for a bug you've found, you can:
  - Fork the repository.
  - Make the fix.
  - Submit a *pull request* to the project owner.

Using GitHub in Project Implementation

In the section of project implementation in your project report, you may describe:

- How you use GitHub in your project
- How version control helps your quality management
- How you collaborate with your teammate in GitHub

References

Some content of the slides are adapted from:

- https://help.github.com/desktop/guides/getting-started/
- https://help.github.com/desktop/guides/contributing/
- https://help.github.com/categories/collaborating/