

Handout: Introduction to GitHub

1. Introduction to GitHub

What is GitHub?

- GitHub is a web-based platform for version control and collaboration using Git.
- It allows developers to share code, work together on projects, and track changes.

Analogy: Think of GitHub as a social networking site for developers, where they can share code, collaborate on projects, and keep track of changes.

2. Creating a GitHub Account

Steps to Create an Account:

1. Go to [GitHub](#) and click "Sign up".
2. Follow the instructions to create an account.
3. Verify your email address.

3. Setting Up GitHub Authentication

Generating a Personal Access Token (PAT):

1. Log in to GitHub.
2. Navigate to **Settings > Developer settings > Personal access tokens**.
3. Click **Generate new token**.
4. Select the required scopes (permissions), such as `repo` for full control of private repositories.
5. Click **Generate token** and copy the token.

Configuring Git to Use the Token:

```
git config --global credential.helper cache
```

- When prompted for your username and password while pushing changes, use your GitHub username and the personal access token.

4. Creating a Repository

Steps to Create a Repository:

1. Log in to GitHub and click on the "+" icon at the top right.
2. Select "New repository".
3. Name the repository (e.g., "my-first-repo") and add a description.
4. Initialize the repository with a README file.
5. Click "Create repository".

5. Forking a Repository

What is Forking?

- Forking is making a personal copy of someone else's repository to propose changes or use it as a starting point for your own project.

Steps to Fork a Repository:

1. Find a public repository on GitHub.

2. Click the "Fork" button at the top right of the repository page.
3. This creates a copy of the repository under your GitHub account.

6. Cloning a Repository

What is Cloning?

- Cloning is downloading a copy of a repository from GitHub to your local machine.

Steps to Clone a Repository:

1. Copy the repository URL from GitHub.
2. Use the following Git command to clone the repository:

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

7. Making Changes and Pushing to GitHub

Steps to Make Changes and Push to GitHub:

1. Navigate to the cloned repository:

```
cd my-first-repo
```

2. Create a new file and add some content:

```
echo "Hello, GitHub!" > hello.txt
```

3. Stage and commit the changes:

```
git add hello.txt  
git commit -m "Add hello.txt"
```

4. Push the changes to GitHub:

```
git push origin main
```

Note: If prompted for authentication, use your GitHub username and the personal access token.

8. Creating and Merging Pull Requests

What is a Pull Request?

- A pull request allows you to propose changes to a repository and have them reviewed before they are merged into the main project.

Steps to Create and Merge a Pull Request:

1. Create a new branch:

```
git checkout -b feature-branch
```

2. Make changes, commit, and push the branch:

```
echo "Some new features" > feature.txt
git add feature.txt
git commit -m "Add feature.txt"
git push origin feature-branch
```

3. Go to the repository on GitHub and create a pull request from `feature-branch` to `main`.
 4. Review and discuss the changes.
 5. Merge the pull request.
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Quick Reference / Cheat Sheet

GitHub Basics

Create a Repository:

1. GitHub: "+" icon > "New repository" > Fill details > "Create repository"

Fork a Repository:

1. GitHub: Navigate to repository > "Fork" button

Clone a Repository:

```
git clone https://github.com/username/repo.git
```

Create and Push Changes:

1. Create a new file and add content:

```
echo "Hello, GitHub!" > hello.txt
```

2. Stage and commit the changes:

```
git add hello.txt
git commit -m "Add hello.txt"
```

3. Push the changes:

```
git push origin main
```

Create a Branch and Push Changes:

1. Create a new branch:

```
git checkout -b feature-branch
```

2. Make changes, commit, and push the branch:

```
echo "New feature" > feature.txt
git add feature.txt
git commit -m "Add feature.txt"
git push origin feature-branch
```

Create a Pull Request:

1. GitHub: Navigate to repository > "Pull requests" tab > "New pull request" > Select branches > "Create pull request"

Authentication

Generate Personal Access Token (PAT):

1. GitHub: Settings > Developer settings > Personal access tokens > Generate new token

Configure Git to Use Token:

```
git config --global credential.helper cache
```

Common Commands

Check Git Status:

```
git status
```

View Git Log:

```
git log
```

Fetch and Merge Changes:

```
git fetch origin
git merge origin/main
```