Open Source Software Development

Homework assignment 3

Exercise 1 Practice Git Basics

1. **Create a New Repository**
   - Create a new directory called `git-homework`.
   - Initialize a Git repository inside it using `git init`.
2. **Add and Commit Files**
   - Create a file called `notes.txt` and add some text about what Git is.
   - Use `git add` and `git commit` to save the changes.
   - Modify the file again and commit the change.
   - Use `git status` and `git diff` before each commit.
   - Submit:
     - A screenshot or text copy of `git log` and `git status` after your last commit.
     - The `notes.txt` file at each stage.

Exercise 2 Branching and Merging

1. **Create and Switch Branches**
   - Create a new branch called `feature` using `git branch` or an alternative command..
   - In the `feature` branch, create a file named `feature.txt` and write about a Git feature you learned.
   - Commit the new file.
2. **Fast Forward Merge**
   - Switch back to the `main` branch.
   - Merge the `feature` branch into `main` using a fast-forward merge.
   - Submit:
     - Output of `git branch`, `git log --oneline --graph`.
     - The `feature.txt` file.
3. **3-Way Merge with Conflict**

   (Note: We haven't touched this topic yet but nevertheless try to do it and note down any problems you might experience. We can use this as an input for discussion in our next class.)

   - In the `main` branch, edit `notes.txt` (e.g., change the first sentence).
   - Create a new branch `experiment` from `main` and also edit the same line of `notes.txt` differently.
   - Commit changes in both branches.

- Merge `experiment` into `main` and resolve the conflict manually.
- Submit:
  - Screenshot or text of the conflict and your resolution.
  - Final `notes.txt`.
  - Output of `git log --oneline --graph`.
  - Optional: A summary of problems you might have experienced.

Exercise 3 Reflect on Questions

Answer the following briefly (2-3 sentences each):

1. What is the difference between a fast-forward merge and a 3-way merge?
2. Explain what version control is and why it is essential in software development (and other collaborative projects).
3. Describe how Git stores data. What is a SHA hash, and how does Git use it? Explain the concept of snapshots versus diffs in Git.
4. Explain the concept of branching in Git. Why is branching useful in software development? Give at least three different use cases for branching.