# Exercise: Git Branching

This document defines and describes hands-on exercises to practice **Git branching**, **SSH authentication**, and **branch management** in real-world scenarios.

## Problem 1: Verifying and Configuring SSH for Git

### Problem Description

A developer is unsure whether SSH authentication is set up correctly for Git. They need to check the configuration and make necessary adjustments.

### Task

1. Check if an SSH key already exists (ls -al ~/.ssh/).
2. If an SSH key does not exist, generate one using ssh-keygen.
3. Configure the SSH agent to use the key (eval "$(ssh-agent -s)" and ssh-add ~/.ssh/id\_rsa).
4. Retrieve the SSH public key (cat ~/.ssh/id\_rsa.pub) and add it to a Git hosting service.
5. Verify the SSH connection using ssh -T git@github.com.
6. Change the existing repository’s remote URL from HTTPS to SSH.

## Problem 2: Creating and Switching Between Multiple Branches

### Problem Description

A developer is working on multiple features at once and needs to manage different branches effectively.

### Task

1. Create a new branch called feature-authentication.
2. Create another branch called feature-logging based on main.
3. Switch between the branches using both git checkout and git switch.
4. Make changes in feature-authentication and commit them.
5. Switch to feature-logging and ensure changes from feature-authentication are not present.

## Problem 3: Renaming and Moving Branches

### Problem Description

A developer realizes they have named a branch incorrectly and wants to rename it without losing progress.

### Task

1. Rename feature-authentication to feature-user-auth locally.
2. Push the renamed branch to the remote repository.
3. Delete the old branch remotely.
4. Verify the changes.

## Problem 4: Recovering Deleted Branches

### Problem Description

A developer accidentally deletes a branch containing important changes and needs to recover it.

### **Task**

1. Create a new branch feature-dashboard and make some commits.
2. Delete the branch.
3. Recover the branch.
4. Verify that the lost changes have been restored.