



Version Control

- A Brief Introduction to Git

CS356 Object-Oriented Design and Programming

<http://cs356.yusun.io>

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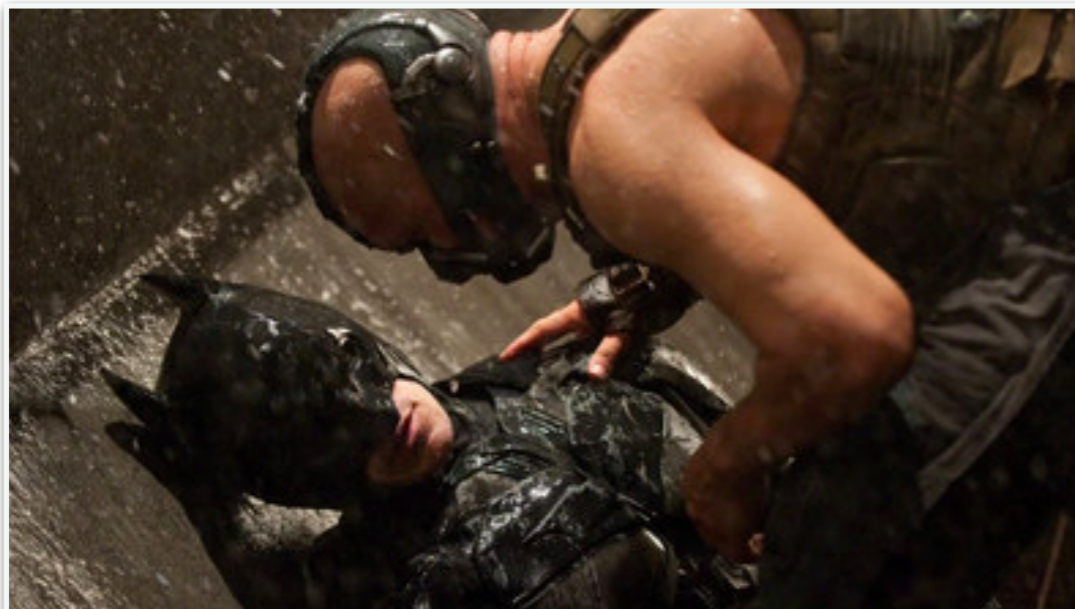


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Why Version Control?

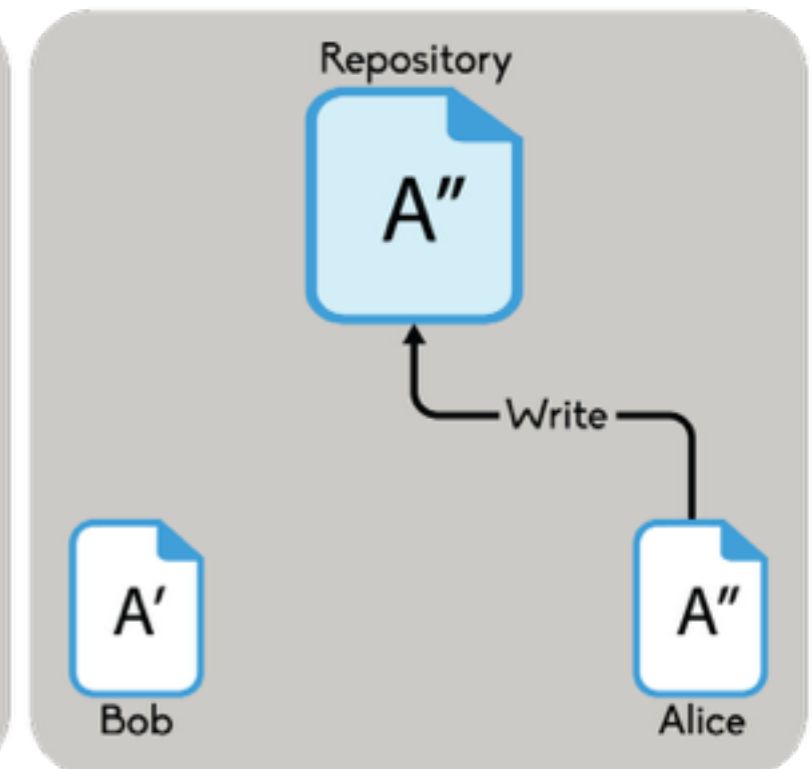
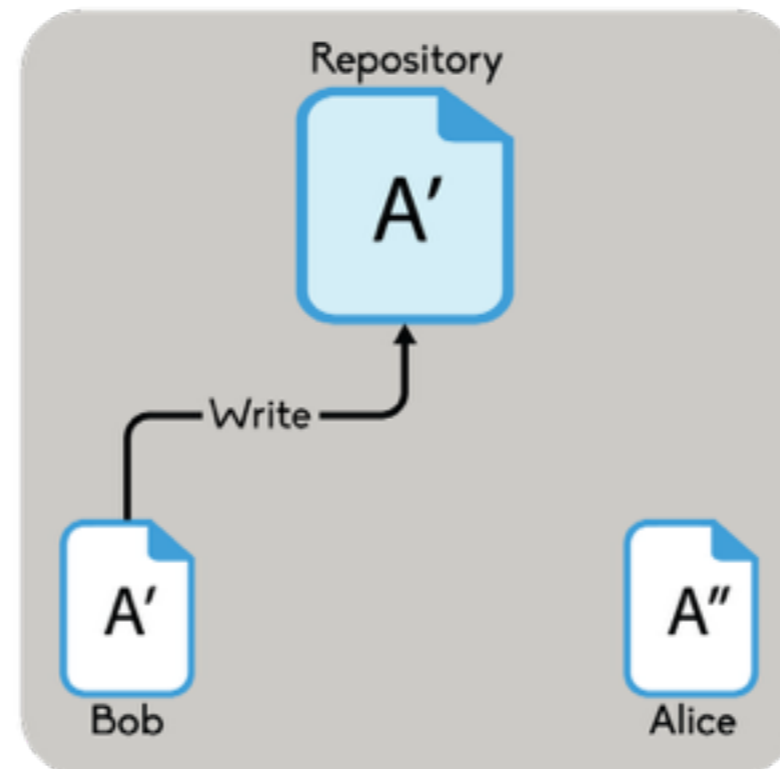
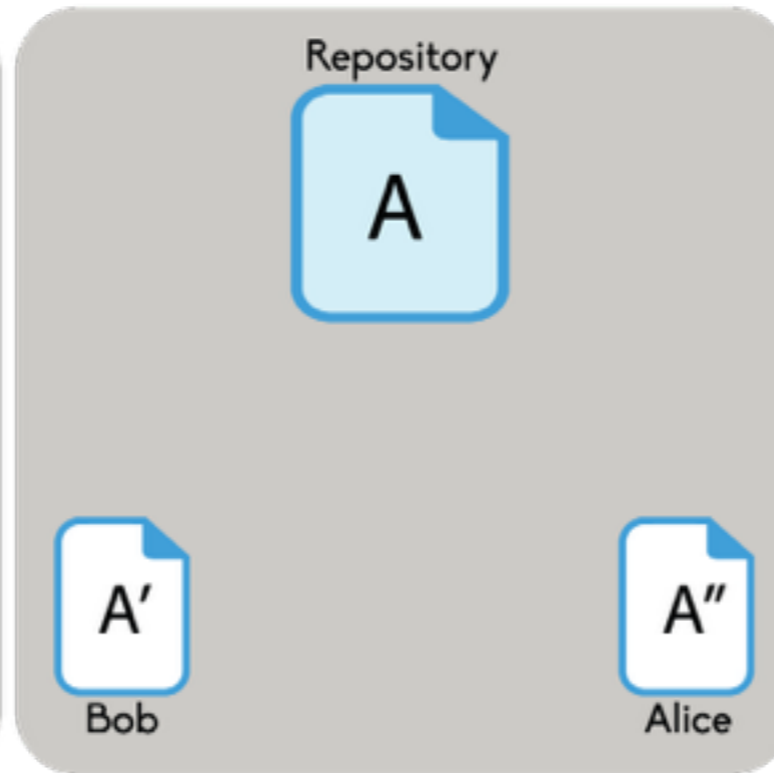
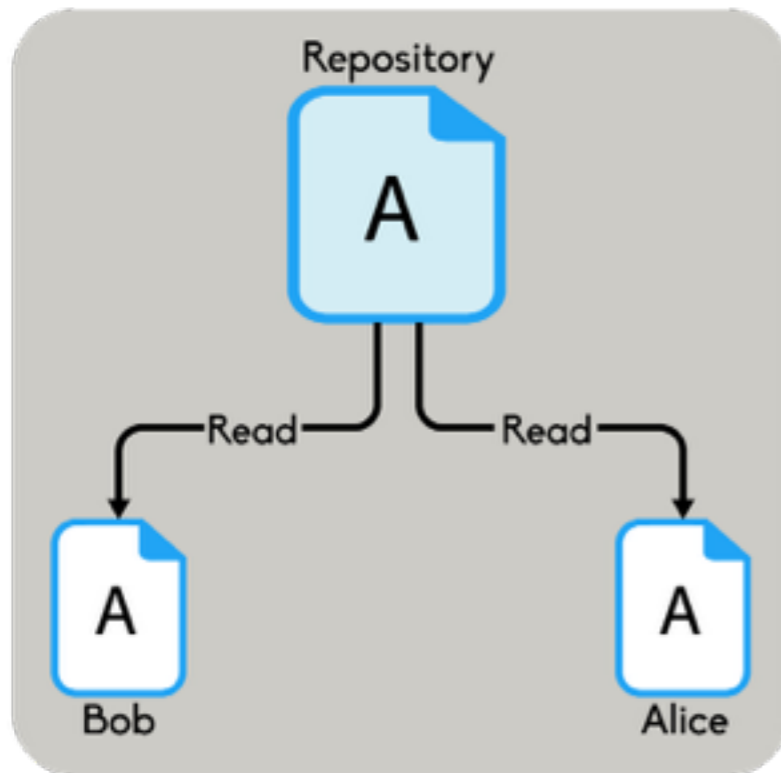
Maintain Multiple Versions

- Change version
- Safe backup



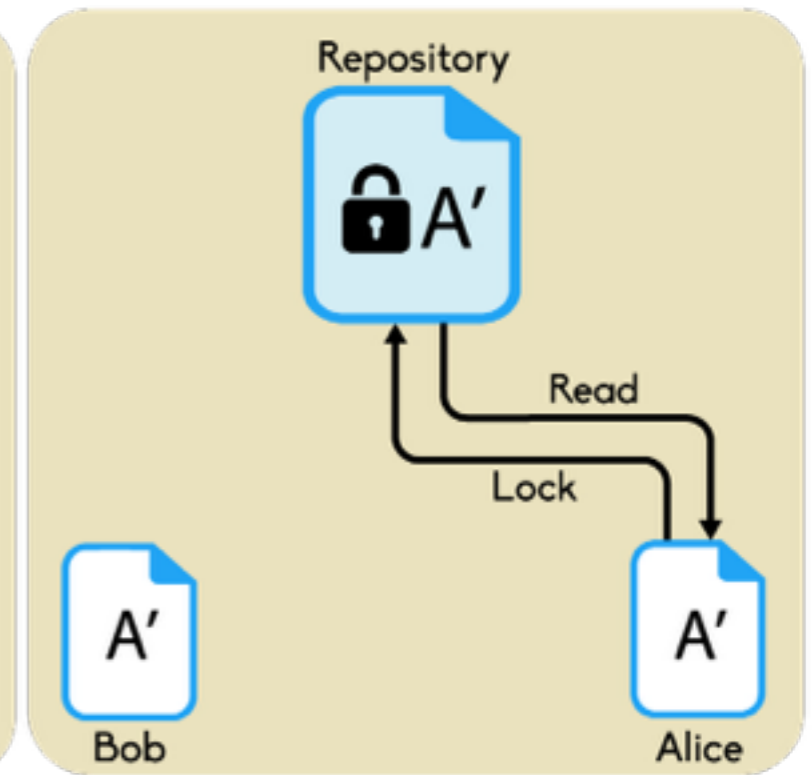
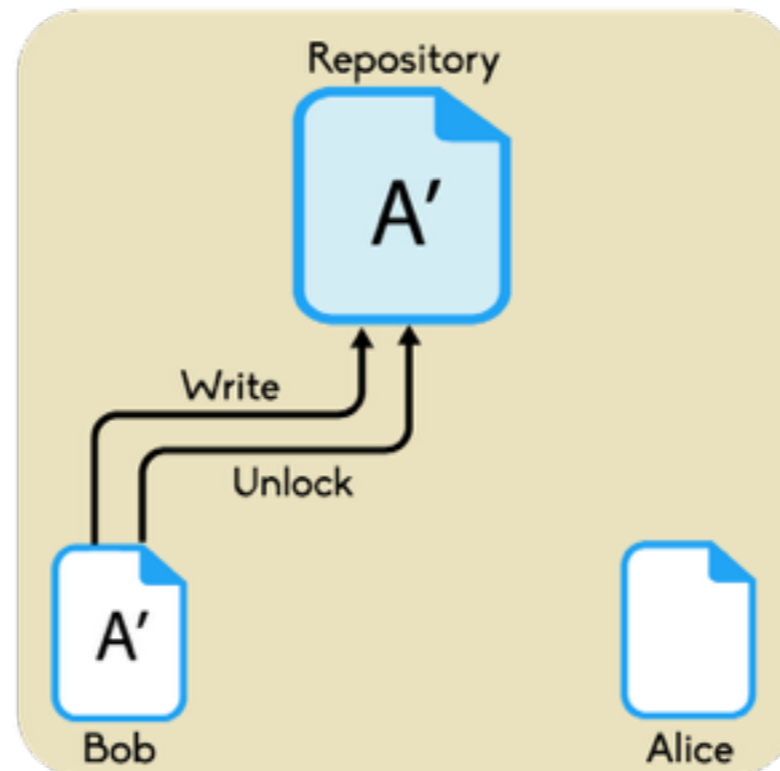
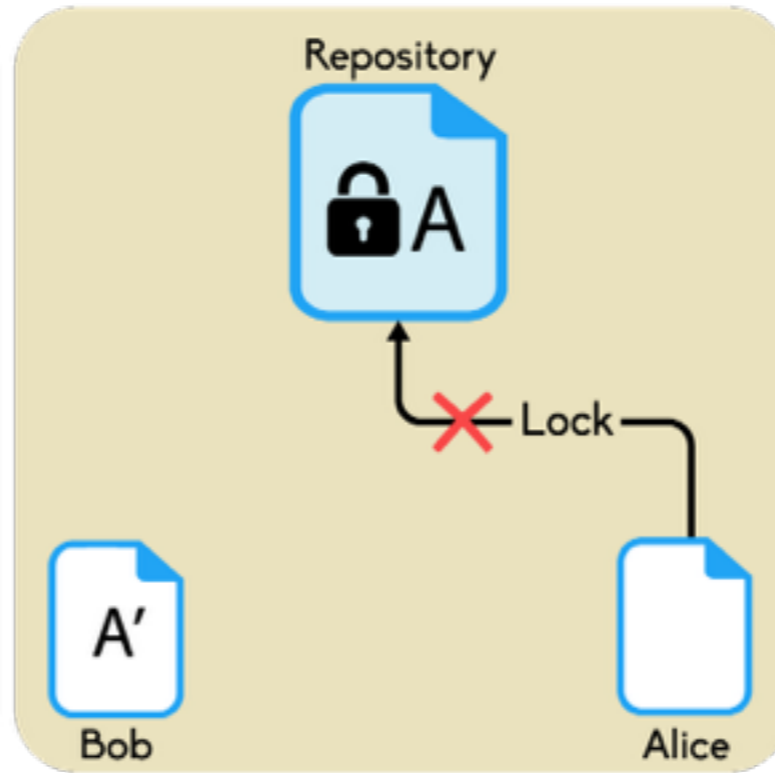
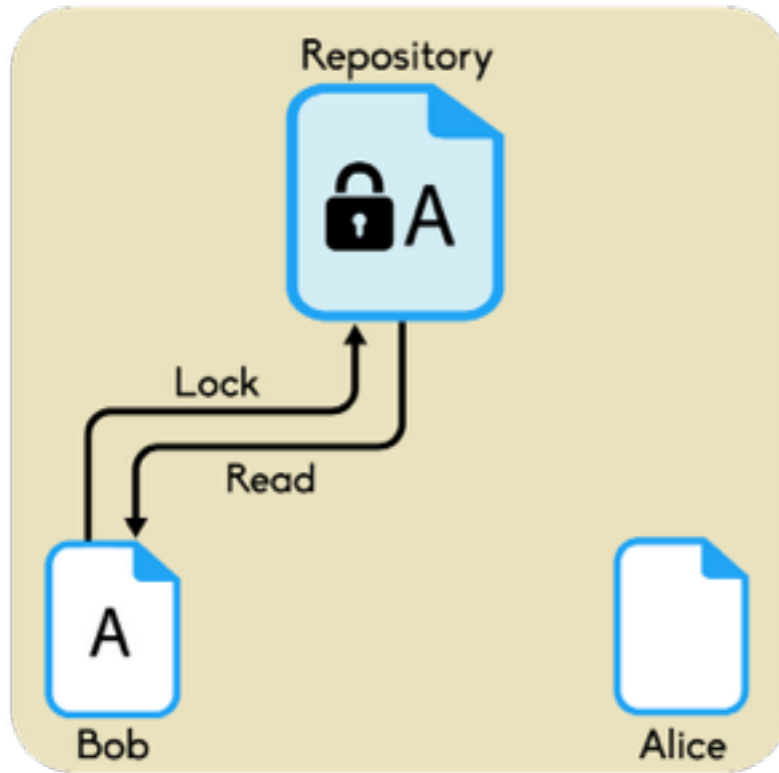
Collaboration

The problem to avoid



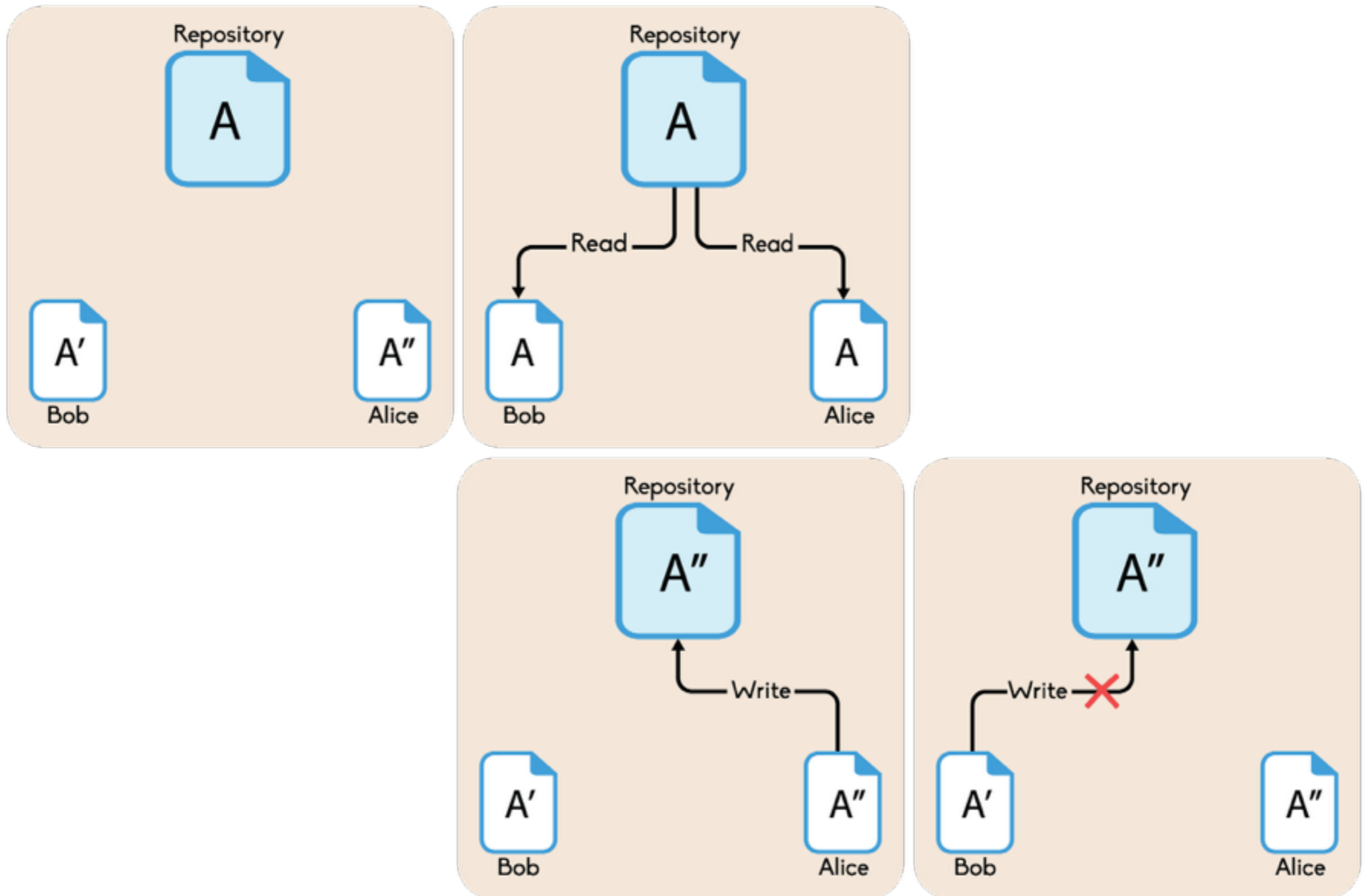
Collaboration

The lock-modify-unlock solution



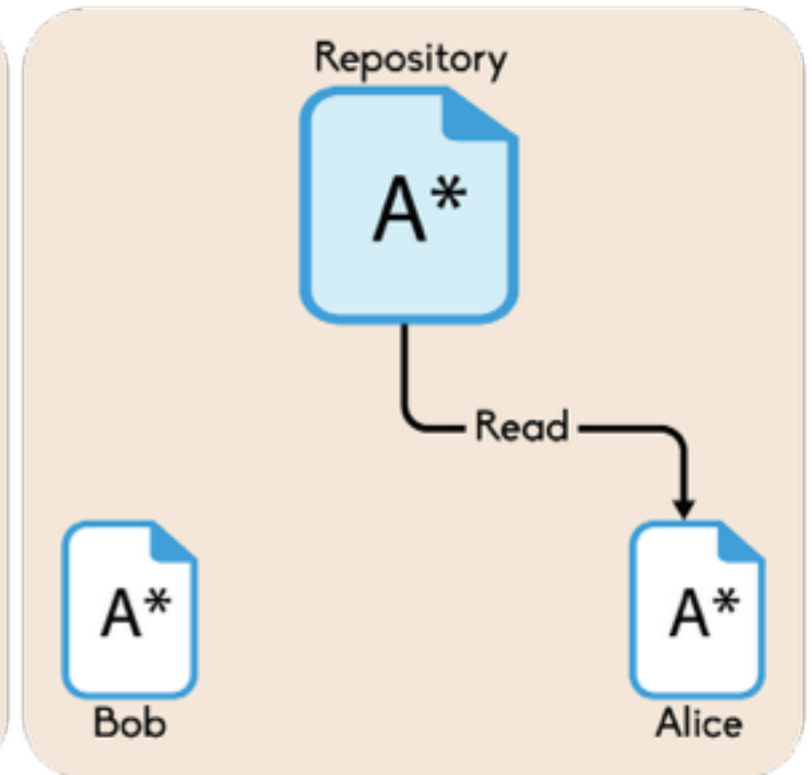
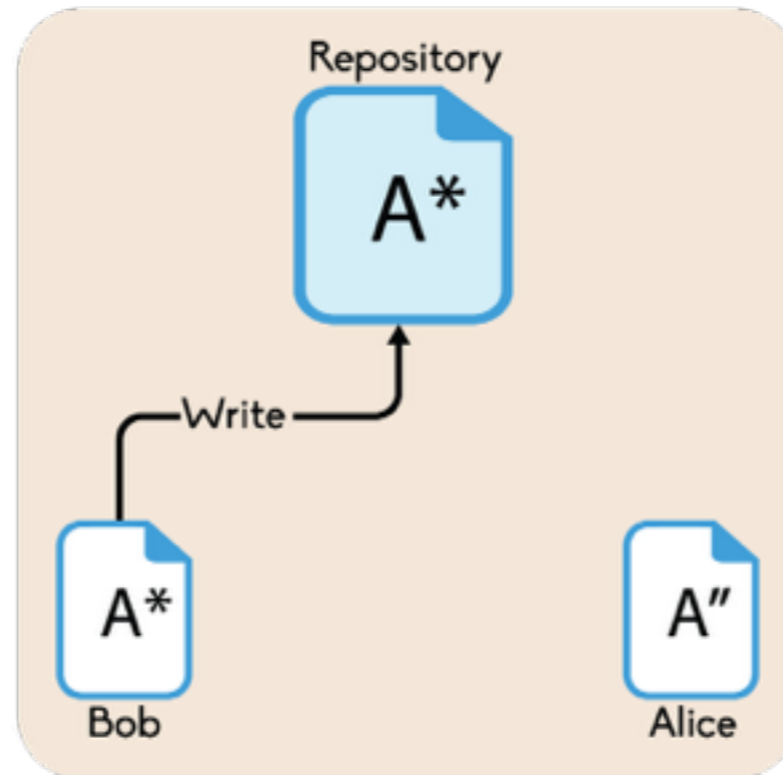
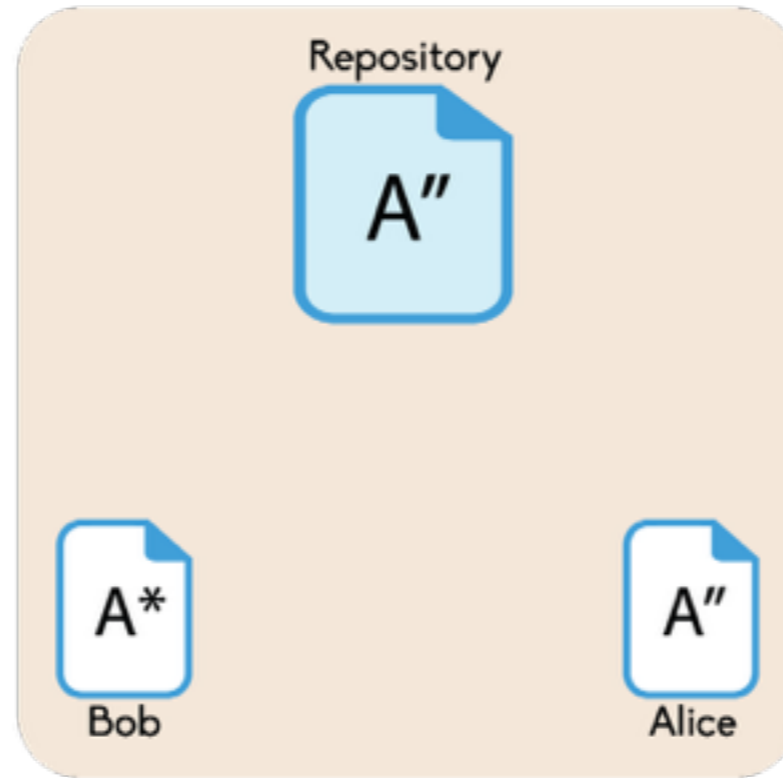
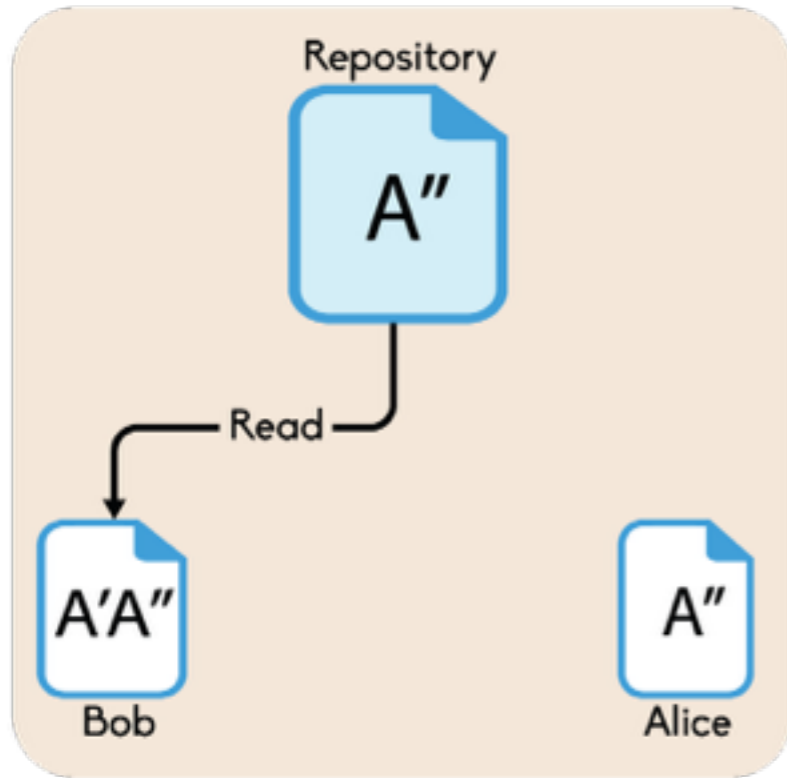
Collaboration

The copy-modify-merge solution



Collaboration

The copy-modify-merge solution



Monitor and Track Progress

Legend: ■ = added, ■ = deleted, ■ = changed,

HelloWorld.cs (revision 24)

```
01 // Hello1.cs
02 public class Hello1
03 {
04 // I am adding this line so that I
05 public static void Main()
06 {
07 System.Console.WriteLine("Hello,
08 }
09 }
10
```

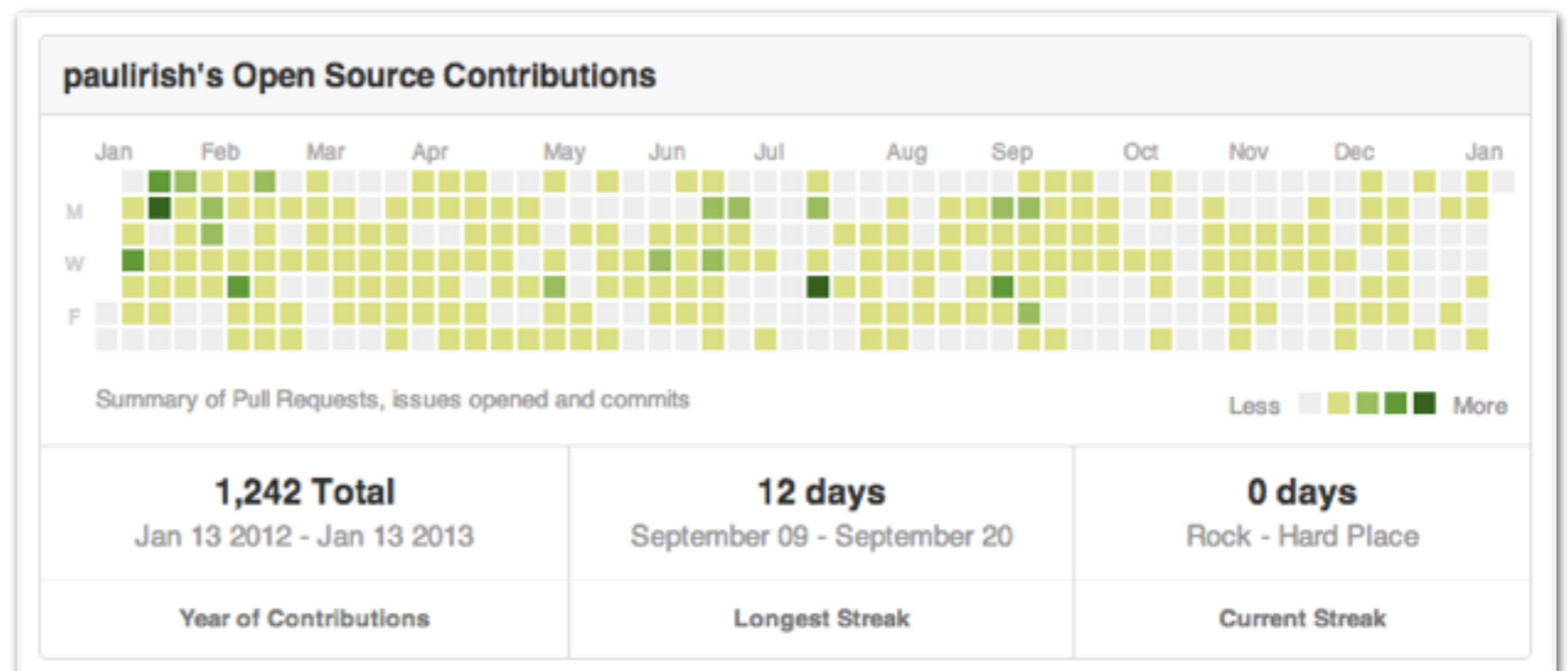
HelloWorld.cs (revision 25)

```
01 // Hello1.cs
02 public class Hello1
03 {
04 public static void Main()
05 {
06 System.Console.WriteLine("Hello,
07 }
08 // Adding here
09 }
10
```

Code Difference



Code Contribution



Why Git?

Why Git?

- Performance
- Github
- Popular



Companies & Projects Using Git

Google

facebook

Microsoft

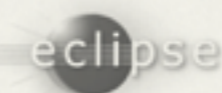
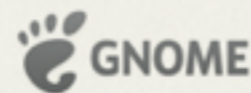
twitter

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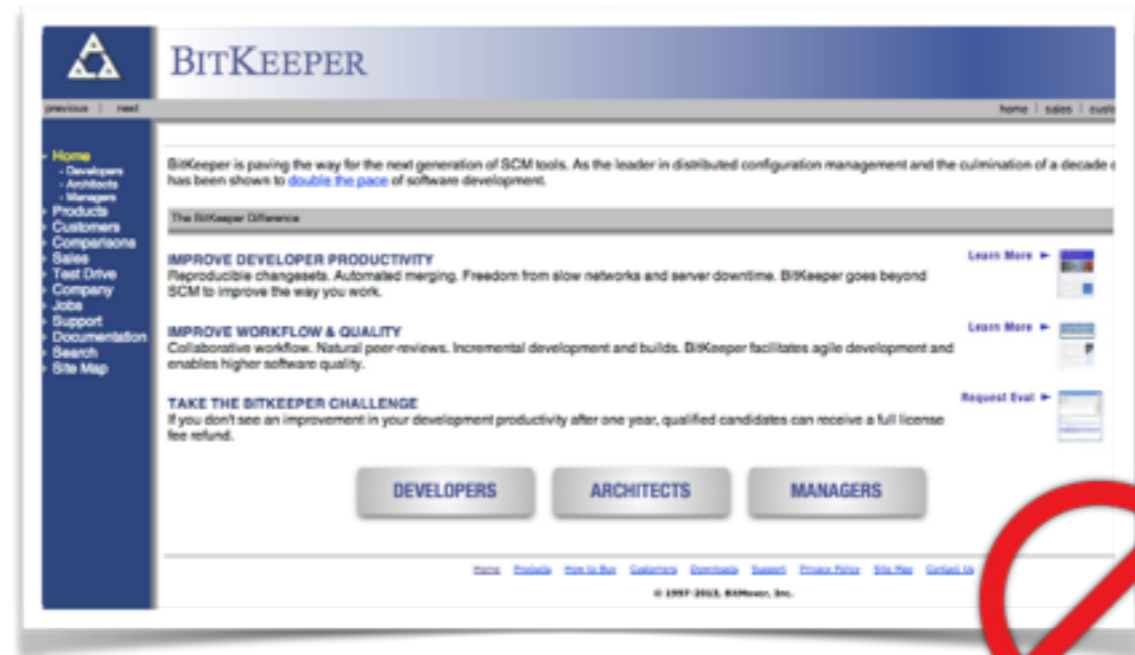
NETFLIX



PostgreSQL



Git History





"I'm an egotistical
bastard, and I name
all my projects after
myself.

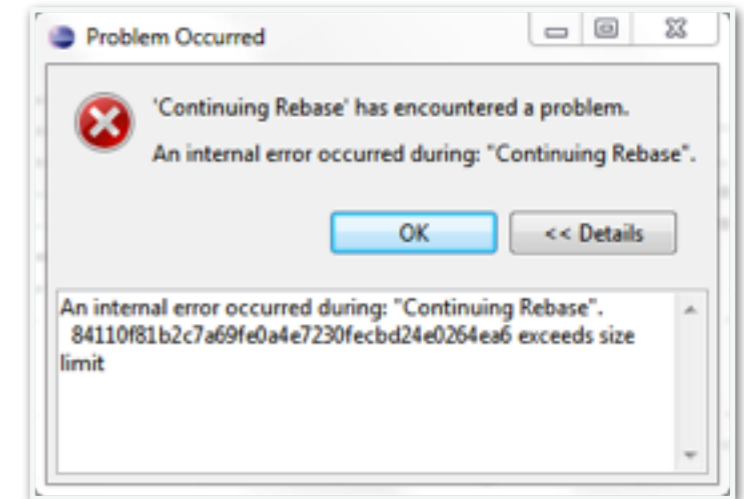
First *Linux*, now *git*."

— Linus Torvalds

Why Command-Line?

Why Git Command-Line?

- Graphical clients are based on CLT
- Graphical clients could cause problems
- Integrated with shell scripts
- Graphical clients not always available



```
#!/bin/bash
# Tamer's Development Server Backup Script
# BACKUP CVS, BUG TRACKING and WEBSITE with one command
# SCRIPT MUST BE RUN BY USER tamer
# Precondition: directory ~/backup should exist
# Author: Tamer

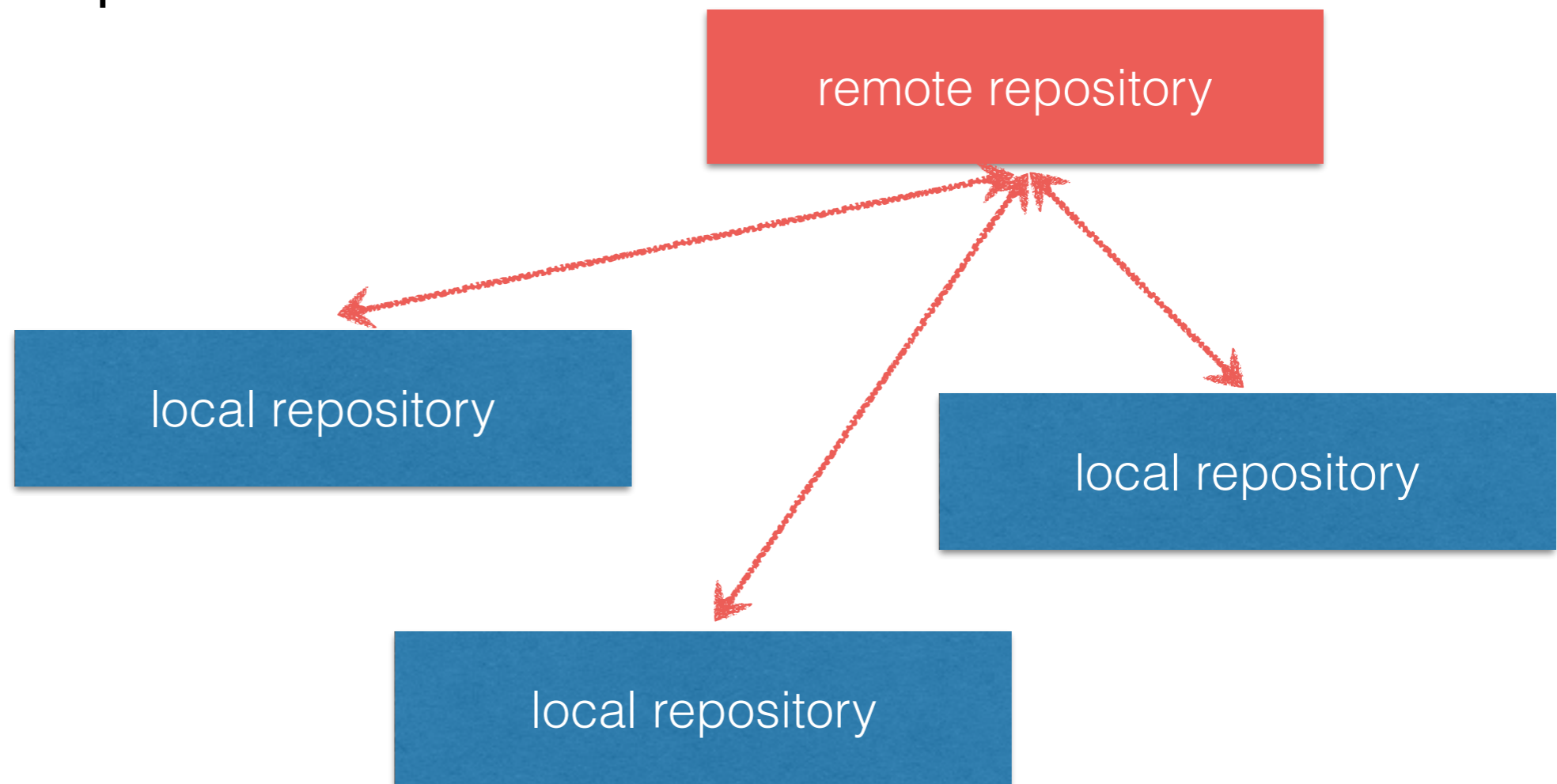
echo
echo "This script will backup the internal website, "
echo "cvs repository and bug database"
choice=""

# This function is simply to get a yes or no from the user
# keeps looping until the user enters a valid value
inputYesOrNo() {
    choice=""
    read choice
    if [ -z $choice ]
    then
        inputYesOrNo
    fi
    if [ $choice = 'y' ] || [ $choice = 'Y' ]
    then
        choice='y'
    fi
    if [ $choice = 'n' ] || [ $choice = 'N' ]
    then
        choice='n'
    fi
    if [ $choice != 'n' ] && [ $choice != 'y' ]
    then
        echo "Please enter 'y' or 'n'"
        inputYesOrNo
    fi
}
```

Git Exercises

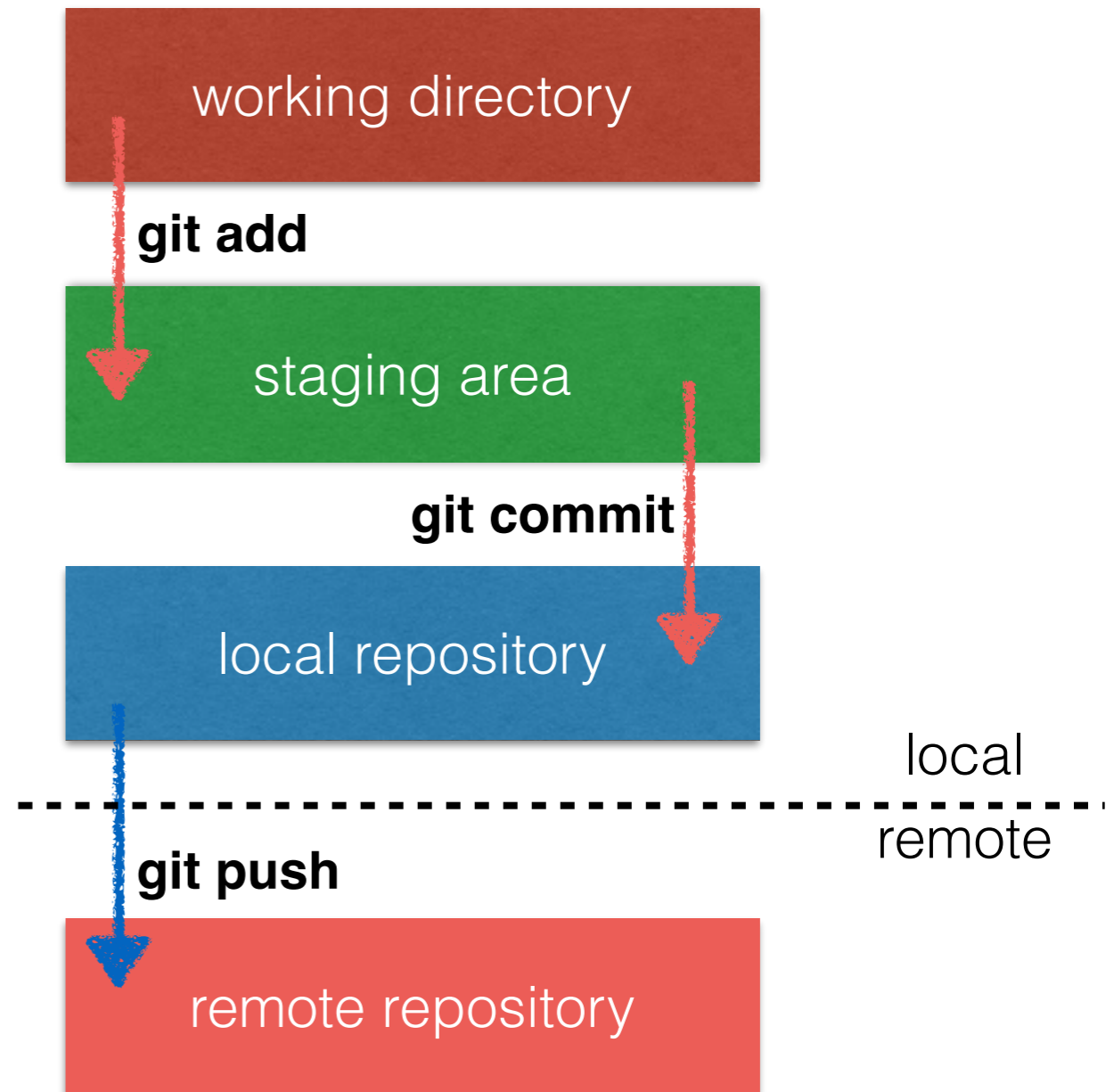
1. Create Git Repositories

- `git clone <repo>`
- `git init <repo>`



2. Add/Commit/Push

- `git add <path>`
- `git commit`
- `git push`



3. Check Status

- `git status`
- `git log`
- `git branch`

```
|gh-pages x| → git status
On branch gh-pages
Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)


    new file:   images/boxes.png
    new file:   images/empty.png
    new file:   images/ignored.png
    new file:   images/pallet.png
    new file:   images/push.png
    new file:   images/truck.png
    new file:   images/untracked.png

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

    modified:   index.html
    modified:   init.md

Untracked files:
  (use "git add <file>..." to include in what will be committed)

    fork.md
```

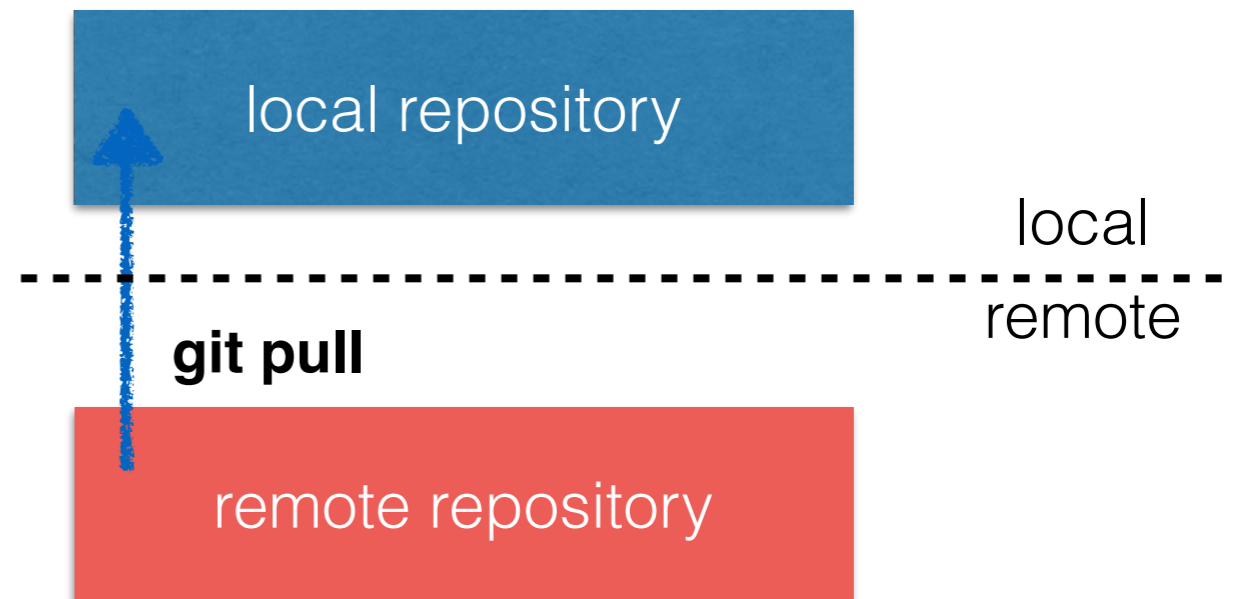


4. Sync Changes & Resolve Conflicts

- `git pull --rebase` (referred approach)
- `git pull`

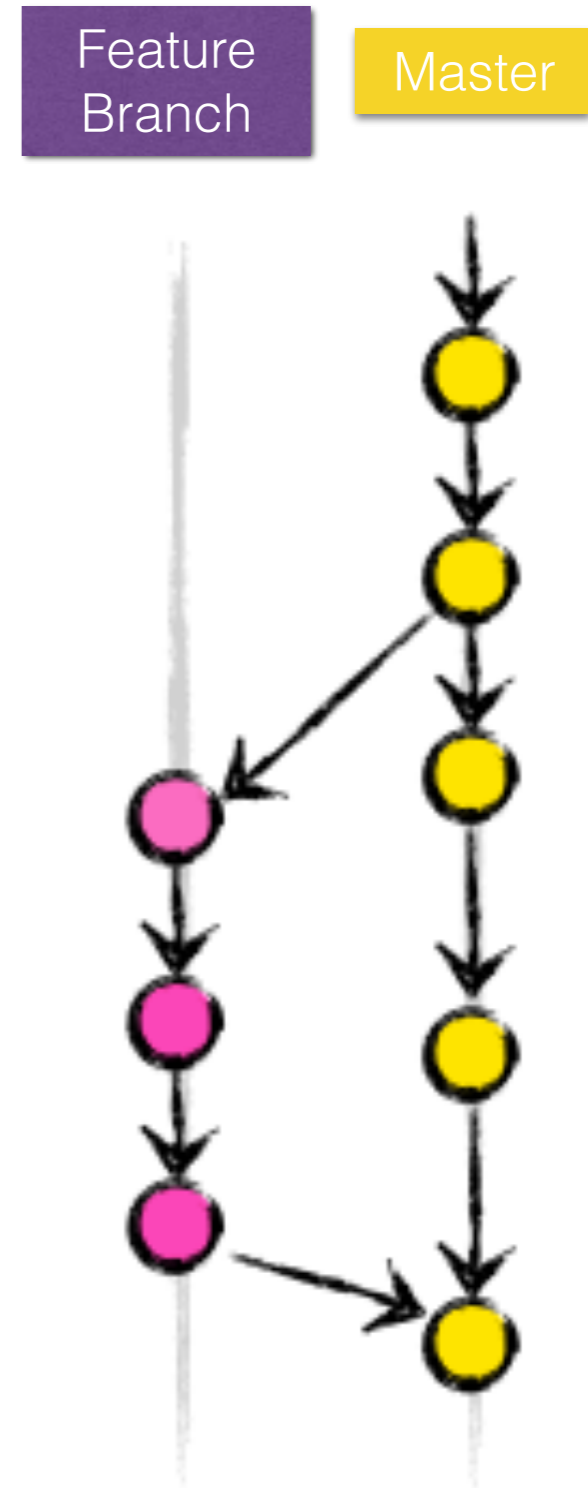
- `git status`
- clean up conflicts
- `git add <conflicted file>`
- `git rebase --continue`

- `git push`



5. Branches

- `git checkout -b <branch>`
- `git checkout <branch>`
- `git merge <branch>`



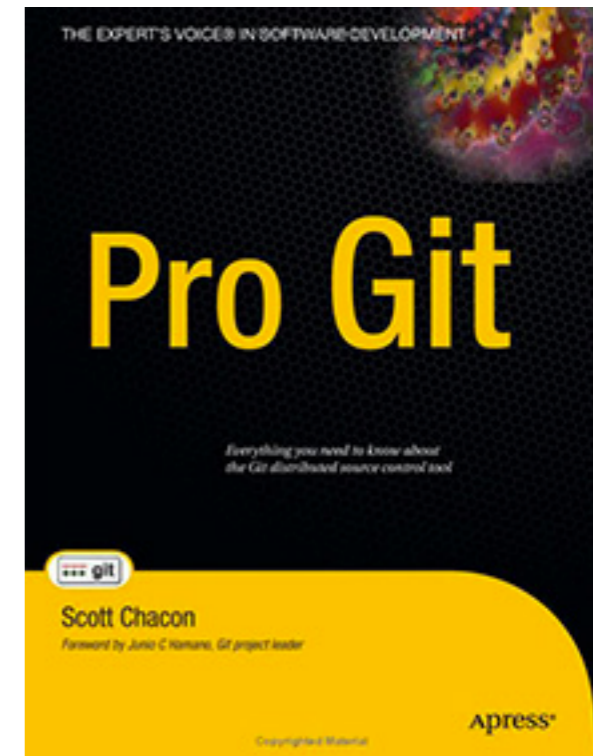
6. Git Undo

- Always backup first
- Google the solution



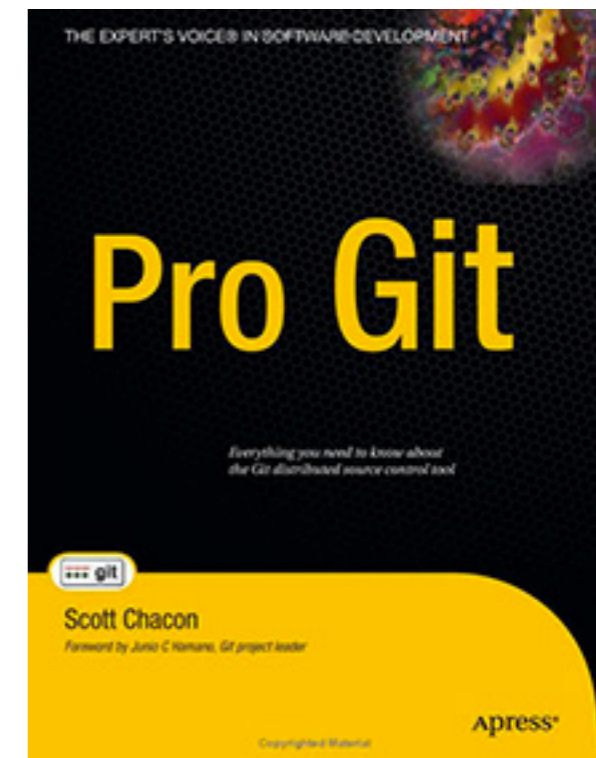
Git Learning Resources

- <http://git-scm.com/>
- <https://www.youtube.com/user/GitHubGuides>
- **Google it!**



Inclass Exercises

- Checkout git-exercise project
- Complete Exercise 1, 2, 3
- Finish Assignment 2



Git Basics Overview

