CS601: Principles of Software Development

Git/Github Basics.
File Processing.

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Parts of this presentations are based on the Java Solftware Solutions book by Lewis&Loftus.

What is Version Control?

- Management of multiple revisions of the same information
  - Code, documents, ...

Have You Ever:

- Made a change to the code, and then wanted to go back to the previous working version?
- Lost code
- Had to maintain multiple versions of the project
- Wanted to experiment with the new feature without breaking the old code?
- Worked in a team on the same code?

Reference:
http://stackoverflow.com/questions/1408450/why-should-i-useversion-control

Version Control System

- Keeps a record of every change ever committed
- Allows you to look at previous versions of the code

Solo Programmer - One Machine

- Do I need git?
- Yes: can keep track of changes, compare different versions, etc..

Sharing Across Machines

- Work at the lab, then work at home
- 1)"commit&push" your code when you are done at the lab,
- 2) "pull"/ update the code when you move to your home computer

Working in a Team

- Multiple people working on the same code need revision control
  - All IT companies use revision control

Version Control Systems

- CVS (older technology)
- SVN
- Git
- Mercurial
- ...

Centralized vs Distributed Version Control Systems

- CVS, SVN: Central Repository
  - All changes stored in a database
  - If server dies, you loose all history
- Git, Mercurial:
  - Copy the whole repo & database when clone
  - Sync working copies by exchanging "patches"
  - If we use github, it seems like "central control"

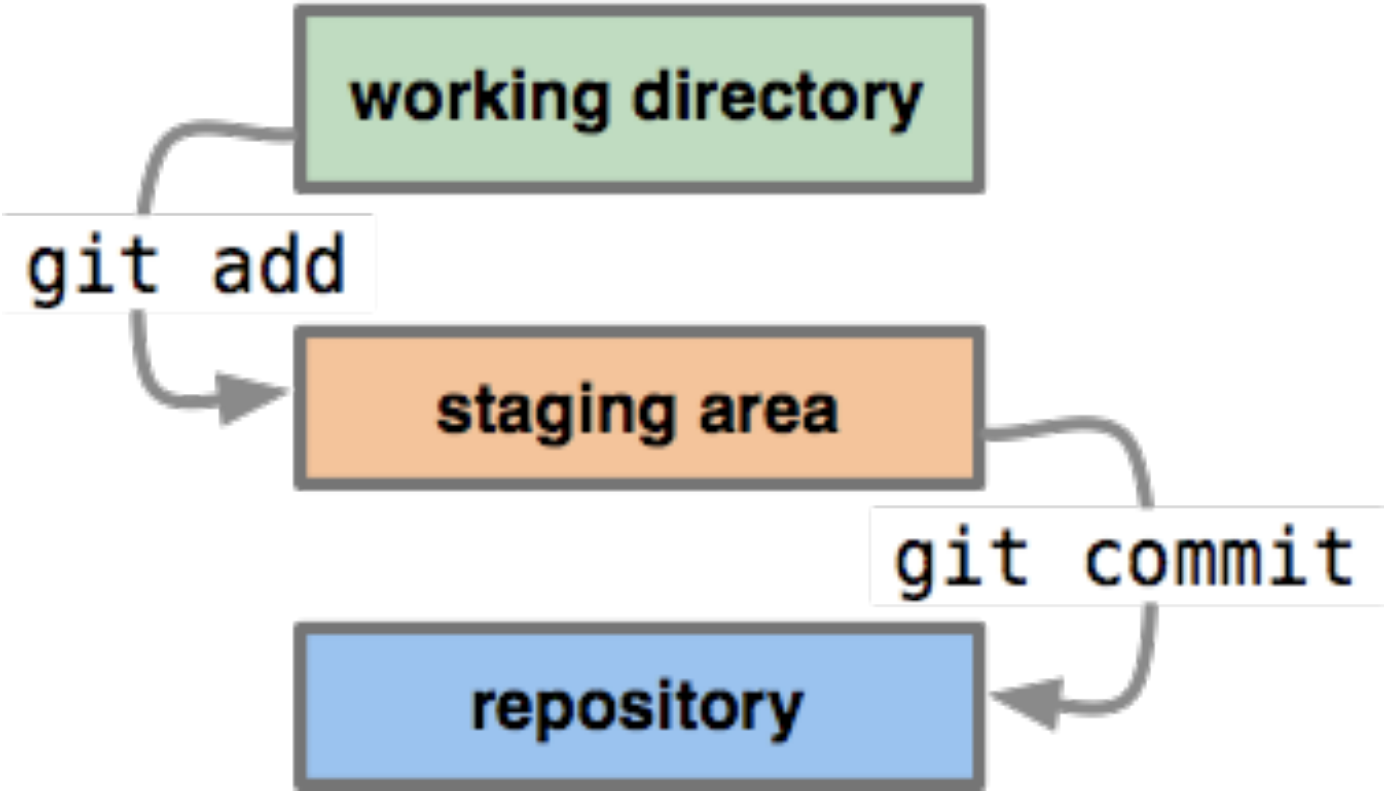
Git

- An open-source version control system
- Started by Linus Trovalds

How to use git

- A git repository is a directory on your disk
  - Has .git directory that stores all info about what happened to this repo
- Create repository with `git init`
- Create files in it, then `git add` to add them
- Added and previously added & modified files are in *staging area*
- Commit them: `git commit –a –m "message"`

Staging Area (Index)



http://stackoverflow.com/questions/676450/eclipse-git-what-does-staged-mean

Reading

- Prof. Parr's lecture notes on git:
  - https://github.com/parrt/cs601/blob/master/lectures/git-basics.md#why-use-revision-control
- More Git Commands
  - https://services.github.com/kit/downloads/github-git-cheat-sheet.pdf

Github

- A web-based Git repository hosting service
  - A place where one can store projects / documents
- Social Network for developers?

Working with Github via Command Line

- Cloning a github repo:

```
git clone https://github.com/USF-CS601-Fall2016/lab1
```

- Set the new remote:

```
git remote add origin githubURL
```

- Check what remote is set to:

```
git remote –v
```

- Push changes in your local repo *to* github:

```
git push –u origin master
```

- Get the changes *from* github

```
git pull origin master
```

File Processing in Java

Relevant Classes from Java 8 API

From java.io.*

- File
- Scanner
- BufferedReader
- PrintWriter

From java.nio

- Path
- Paths
- Files
- FileSystem

The slide is based on the materials of Prof. Engle.

Path

- In java.nio package
- Represents a “path” in the file system
  - getRoot()
  - getParent()
  - getFileName()
  - isAbsolute()
  - toAbsolute()
  - normalize()

Paths

- Has static methods to create Path objects

```
Path p = Paths.get("myfile.txt");

Path p = Paths.get("/Users/okarpenko/
Documents/", "hotelsSanDiego");
```

Files

- In java.nio.file
- Includes helper methods
  - To get attributes of Path objects
  - To list the files within a directory
  - To read lines from the file
  - …

Example

- See `PathExample.java`

DirectoryStream

- An Interface
- If Implemented, enables iteration through the contents of a directory

DirectoryStream: Example

```
Path p = Paths.get(”MyFolder");

DirectoryStream<Path> filesList =
Files.newDirectoryStream(p);

for (Path file: filesList) {

   // process the file

}
```

- See `DirectoryListingExample.java`

References

- http://docs.oracle.com/javase/tutorial/essential/io/index.html