Java Review Session 2

CS 5004

Topics Covered

Git/Github/Terminal

- Terminal commands (basics)
- Enabling version control
- The four “states” of a file in git
  - Untracked, tracked unmodified, tracked modified unstaged, tracked modified staged
- Create, add, commit
- Collaborative git (GitHub, forking, branching)

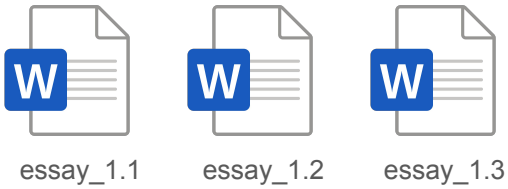
Java Syntax

- Arrays/ArrayLists (intro to generics/Java collections)
- Enhanced for loops
- Wrapper classes

Git/Github/Terminal Fundamentals

What is Git? (Under the hood)

- Version control system
- Useful for working in teams
  - (but also when working alone)



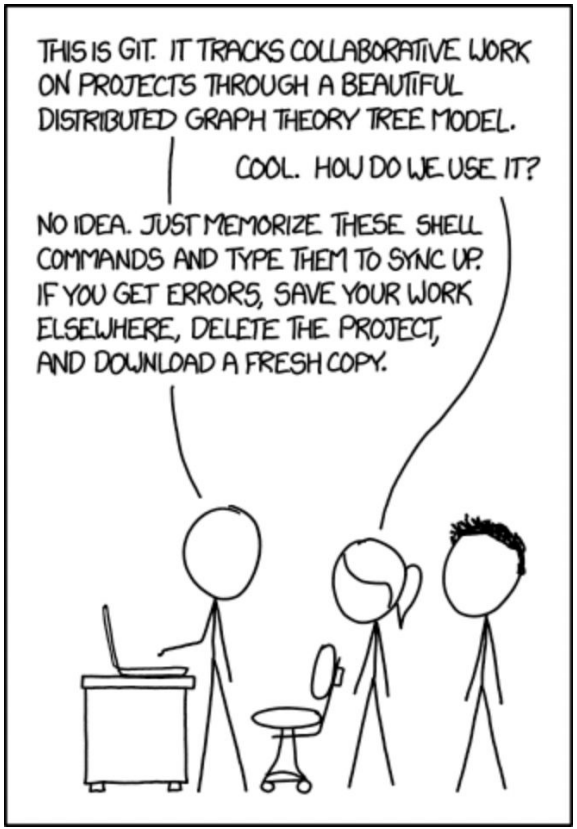


Image: xkcd

Command line fundamentals and Git

Mac	Windows dir \a
ls list files	dir
Cd - change directory	cd
/	\
mkdir	mkdir

Demo: Creating a git repository (two ways)

```
mkdir our_repo // create a brand new repository

cd our_repo // cd into that directory

git status // check the status of git

ls -alF (Windows: dir /a) // list all the files

git init // put the directory under version control

(Initialize an empty git repository)
```

There are four “states” that files can be in with Git

1) Untracked
   - Usually object/executable files / files that can be rebuilt
2) Tracked, unmodified
   - The file is in the git repo, has not been modified since the last commit, and git status will not say anything about the file
3) Tracked, modified, unstaged
   - You modified the file but didn’t “git add” it, the change has not been staged so not ready for commit yet
4) Tracked, modified, and staged
   - Modified, you did do “git add” (in the staging area), and ready to be committed

Source: Jae

Create/modify file, git add, git commit

- The flow of tracking files
  - **Create** the file (vim, etc.)
  - **Add** the file to the staging area
  - **Commit** the file(s)

- Other popular git commands
  - git log, git status, git log --graph
- git rm filename
  - Automatically staged for you but still need to commit
  - git rm --cached
- git clone (from an existing codebase)
- git diff (shows unstaged changes)
  - git diff --cached to show staged changes

Image: xkcd

Collaboration: GitHub, Forking, and Branching

Github - hosts remote git repositories

Remote repository - a github repository hosted on a server that is separate from your local machine

Upstream branch - a remote branch that your local branch is tracking

Local branch - the copy on our local machine

git clone creates a copy of an existing repository on your local machine

Forking creates a copy of the repository under your own account (but still maintains a connection to the original repo so that you can open pull requests)

git checkout -b new-feature

Java Syntax - Arrays, ArrayLists, and Enhanced For Loops

Arrays

Arrays - collects a sequence of values of the same type (fixed size)

Syntax 7.1 Arrays

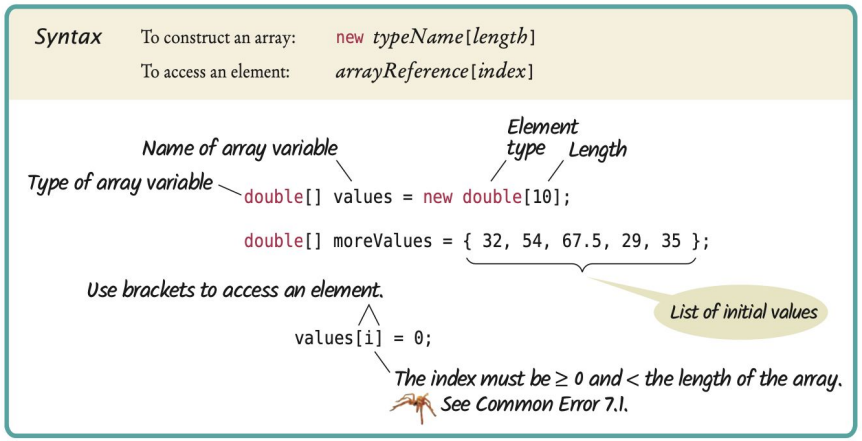


Image: Cay Horstmann

Enhanced for loops (for each loops)

- Used for iterating over arrays and collections in Java
- The loop body is executed once for each element in the array
- For each element in values

Syntax 7.2 The Enhanced for Loop

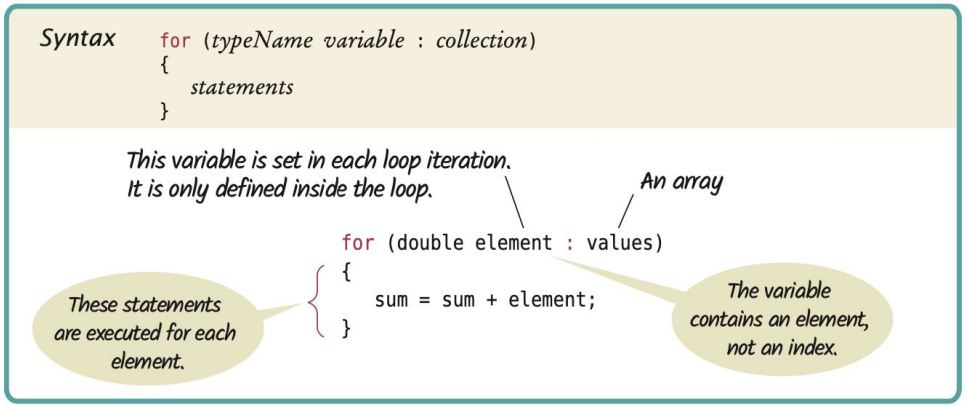


Image: Cay Horstmann

Array references/implications for copying arrays

- The variable holds a reference to the array
- The reference denotes the location of the array in memory
- If you copy the reference, you just get another reference to the same array

What happens here?

```
double[] array1 = new
double[6];
    // fill the array
double[] array2 = array1;
```

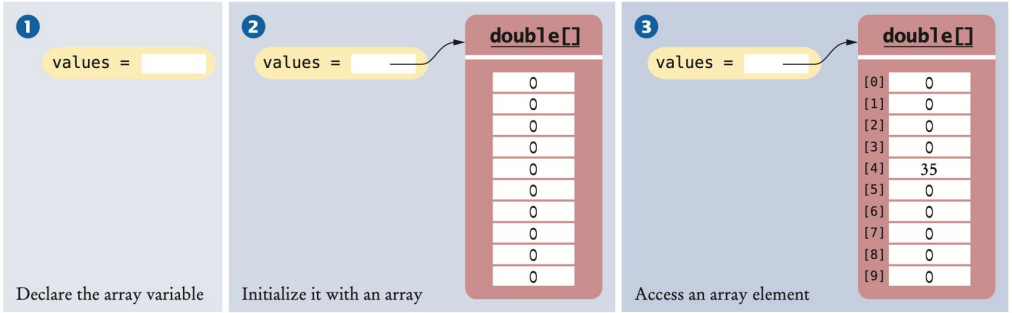


Figure 1 An Array of Size 10

Image: Cay Horstmann

Making a true copy of an array

Arrays.copyOf(values, n)

Allocates an array of length n

And copies the first n values

New syntax:

```
double[] array1 = new
double[6];
    // fill the array
double[] array2 =
Arrays.copyOf(array1,
array1.length)a;
```

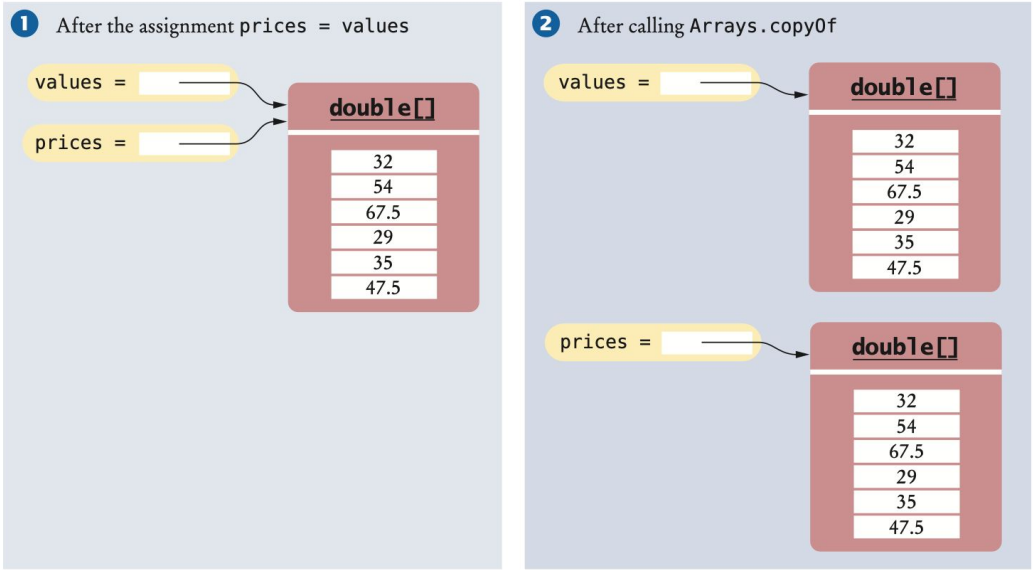


Figure 11 Copying an Array Reference versus Copying an Array

Image: Cay Horstmann

ArrayLists

- Stores a sequence of values whose size can change
- Closer to what we think of as lists in Python
  - Support dynamic sizing
- Are a generic class
  - ArrayList<Type>
- String is a type parameter (can be replaced by any type)
- Handy methods: add, remove, set, size

Syntax 7.4 Array Lists

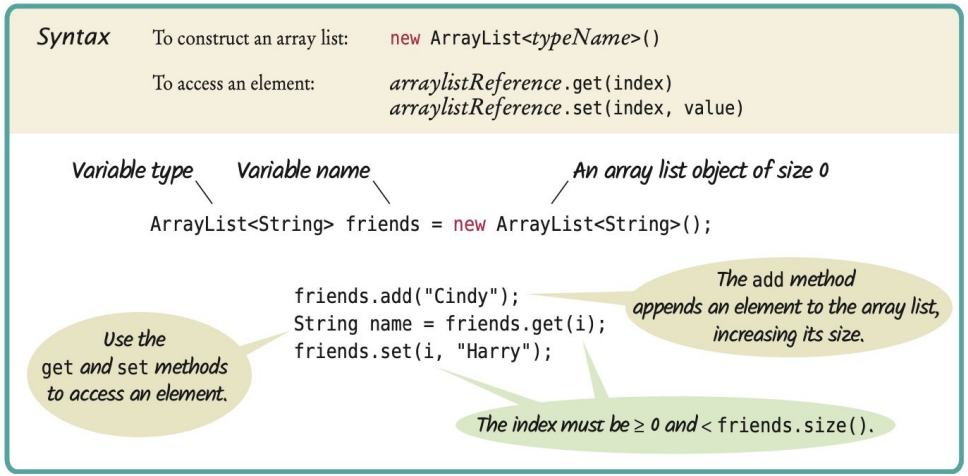


Image: Cay Horstmann

Wrapper Classes?

- You cannot insert primitive types into ArrayLists
- Conversion between the primitives and the wrapper classes is automatic (called auto-boxing)
- Java collections work with objects (not primitives)
- Generics allow you to specify the type at compile time

Primitive Type	Wrapper Class
byte	Byte
boolean	Boolean
char	Character
double	Double
float	Float
int	Integer
long	Long
short	Short

Image: Cay Horstmann