Source Control

Kendra Wannamaker and Jarrett Spiker

https://github.com/JarrettSpiker/GitProblems.git

If you Don't know:

- What source control is
- How to create a repo
- How to clone a Repo
- How to push and pull

There is an introductory workshop

What is source control

A method of collaboration and recollection.

Assumption: you all have a basic understanding of the recollection part. How to push different version of your software and how to go back to these versions if you mess up. Today we will cover collaboration.

Who we are and Our Experience with git

Kendra Wannamaker

Jarrett Spiker

Understanding Git

- Git thinks of its data as a set of filesystem snapshots
- Local history means that most operations seem almost instantaneous.
- Git checksums every commit with a SHA-1 hash
- Takes the danger out of coding

Branching

Work on a project without affecting the main version.

Multiple developers make incremental changes without affecting one another

```
git branch testing
```

```
git checkout testing
```

```
git checkout -b testing
```

```
git branch -v (the last commit on every branch)
```

```
git branch -D
```

Branching Best Practices

Case insensitive

Naming conventions

Delete Complete Branches

Avoid adding certain file types

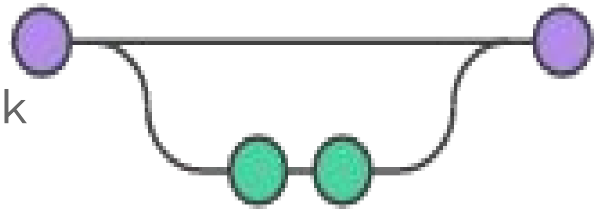
Warm Up!

https://github.com/JarrettSpiker/GitProblems.git

```
git checkout Names

git checkout -b Names_<your name>
```

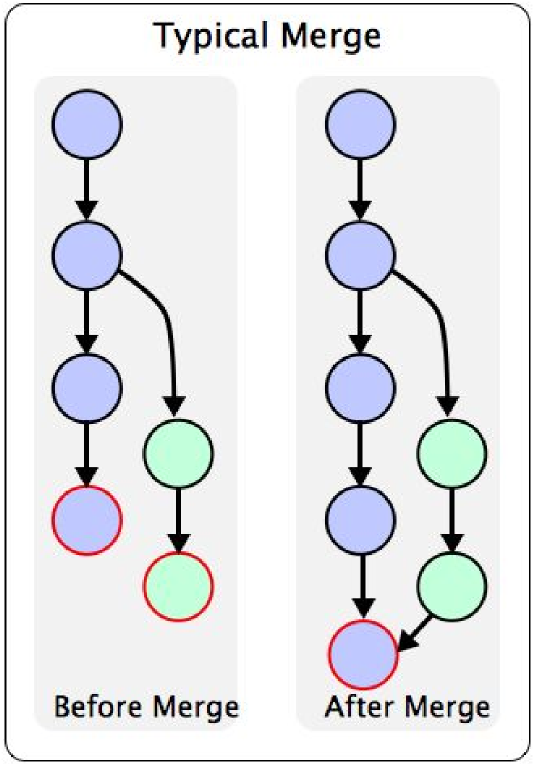
Modify the function that corresponds to your initials!

Merging



Incorporate your work with that of others

```
git fetch

git merge <branch>


git merge <branch1> <branch2>
```



Merging Exercise

Fetch everyone else’s branches, and merge them into yours!

Contest:

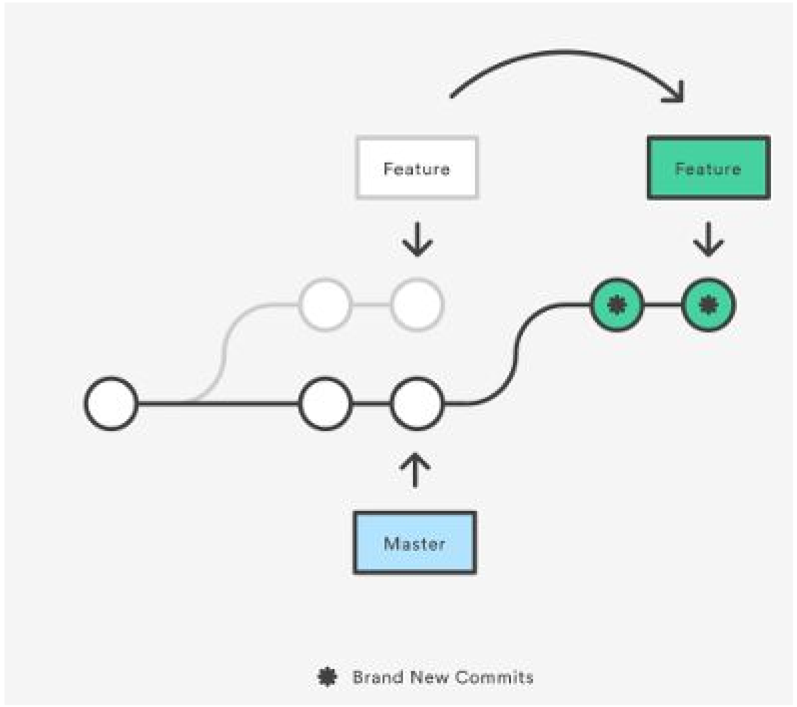
Who can get everyone’s names printing first?

Rebasing

Alternative to merging. Add all the existing changes before yours/ fix your commits

ebase <branch>

Rebase -i HEAD~<n>



GOLDen RULE of Rebasing!!!!

Dont rebase public branches. If a branch contains multiple people’s work, or other people are working off of it DO NOT REBASE IT.

REBASING EXERCISE

https://open.kattis.com/problems/busyschedule

Checkout RebaseFestival

REBASING EXERCISE

Fix lines 18 and 20

Should be “AM” not “A.M.”

REBASING EXERCISE

Fix lines 28 and 30

Should be “AM” not “A.M.”

Rebasing Exercise

Rebase your changes onto Rebase_Jarrett

Cherry Picking

Given one or more existing commits, apply the change each one introduces, recording a new commit for each. This requires your working tree to be clean (no modifications from the HEAD commit).

```
Git cherry-pick [--edit] [-n] [-m parent-number] [-s] [-x] [--ff] [-S[<keyid>]]
<commit>…
git cherry-pick --continue
git cherry-pick --quit
git cherry-pick --abort
```

Git Config

```
~/.gitconfig or ~/.config/git/config
```

```
$ git config --global user.name "John Doe" $ git config
--global user.email johndoe@example.com
```

```
 git config --global core.editor emacs
```

```
 git config --list
```

```
$ git help $ git --help $ man git-
```

Git Ignore

Should ignore:

Pictures, Jars, Etc

automatically generated files

Example: .gitignore file:

```
doc/server/arch.txt

doc/

doc/**/*.pdf
```

Git log

When you run git log in this project, you should get output that looks something like this: $ git log

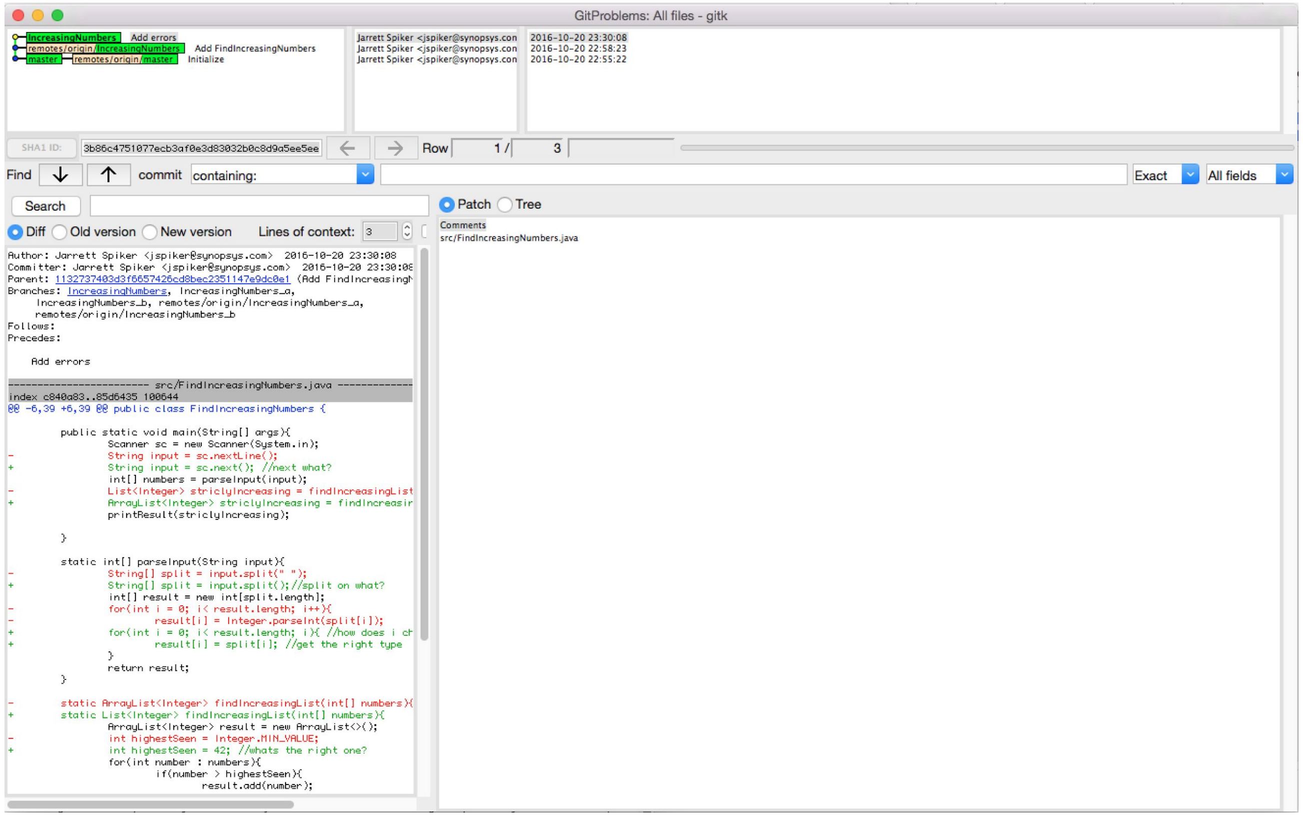
```
git log --pretty=oneline
```

```
 git log --pretty=format:"%h - %an, %ar : %s"
```

Git Diff

```
git diff

git diff --staged

git diff a (a could be branch or hash)
```

GITK



GitProblems: All files - gitk

```
IncreasingNumbers  Add errors                               Jarrett Spiker <jspiker@synopsys.con   2016-10-20 23:30:08
remotes/origin/IncreasingNumbers  Add FindIncreasingNumbers Jarrett Spiker <jspiker@synopsys.con   2016-10-20 22:58:23
master  remotes/origin/master  Initialize                   Jarrett Spiker <jspiker@synopsys.con   2016-10-20 22:55:22
```

SHA1 ID: 3b86c4751077ecb3af0e3d83032b0c8d9a5ee5ee Row 1 / 3

Find commit containing: Exact All fields

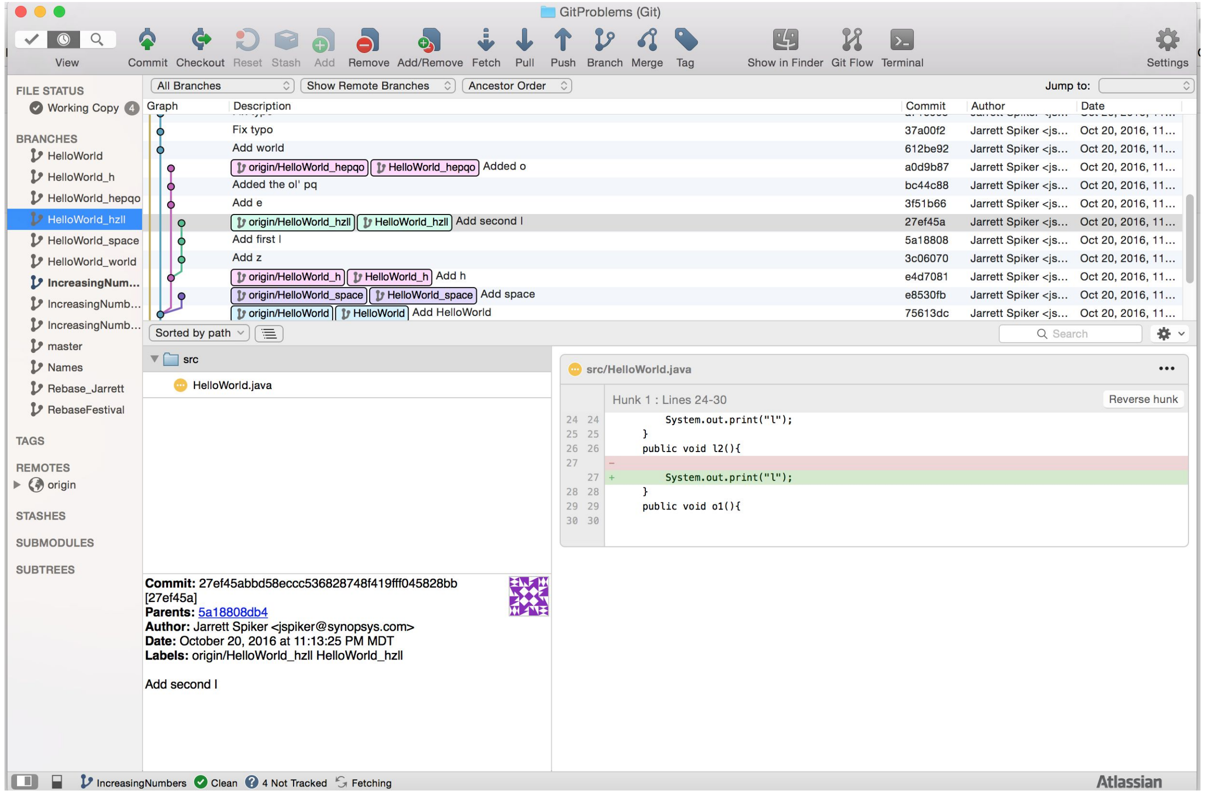
Search [✓ Patch] Tree

[✓ Diff] Old version New version Lines of context: 3

```
Author: Jarrett Spiker <jspiker@synopsys.com>  2016-10-20 23:30:08
Committer: Jarrett Spiker <jspiker@synopsys.com>  2016-10-20 23:30:08
Parent: 1132737403d3f6657426cd8bec2351147e9dc0e1 (Add FindIncreasingN
Branches: IncreasingNumbers, IncreasingNumbers_a,
     IncreasingNumbers_b, remotes/origin/IncreasingNumbers_a,
     remotes/origin/IncreasingNumbers_b
Follows:
Precedes:

    Add errors

------------------------ src/FindIncreasingNumbers.java -------------
index c840a83..85d6435 100644
@@ -6,39 +6,39 @@ public class FindIncreasingNumbers {

         public static void main(String[] args){
                 Scanner sc = new Scanner(System.in);
-                String input = sc.nextLine();
+                String input = sc.next(); //next what?
                 int[] numbers = parseInput(input);
-                List<Integer> striclyIncreasing = findIncreasingList
+                ArrayList<Integer> striclyIncreasing = findIncreasir
                 printResult(striclyIncreasing);

         }

         static int[] parseInput(String input){
-                String[] split = input.split(" ");
+                String[] split = input.split();//split on what?
                 int[] result = new int[split.length];
-                for(int i = 0; i< result.length; i++){
-                        result[i] = Integer.parseInt(split[i]);
+                for(int i = 0; i< result.length; i){ //how does i ch
+                        result[i] = split[i]; //get the right type
                 }
                 return result;
         }

-        static ArrayList<Integer> findIncreasingList(int[] numbers){
+        static List<Integer> findIncreasingList(int[] numbers){
                 ArrayList<Integer> result = new ArrayList<>();
-                int highestSeen = Integer.MIN_VALUE;
+                int highestSeen = 42; //whats the right one?
                 for(int number : numbers){
                         if(number > highestSeen){
                                 result.add(number);
```

Comments
src/FindIncreasingNumbers.java

Source Tree



Description	Commit	Author	Date
Fix typo	37a00f2	Jarrett Spiker <js...	Oct 20, 2016, 11...
Add world	612be92	Jarrett Spiker <js...	Oct 20, 2016, 11...
origin/HelloWorld_hepqo HelloWorld_hepqo Added o	a0d9b87	Jarrett Spiker <js...	Oct 20, 2016, 11...
Added the ol' pq	bc44c88	Jarrett Spiker <js...	Oct 20, 2016, 11...
Add e	3f51b66	Jarrett Spiker <js...	Oct 20, 2016, 11...
origin/HelloWorld_hzll HelloWorld_hzll Add second l	27ef45a	Jarrett Spiker <js...	Oct 20, 2016, 11...
Add first l	5a18808	Jarrett Spiker <js...	Oct 20, 2016, 11...
Add z	3c06070	Jarrett Spiker <js...	Oct 20, 2016, 11...
origin/HelloWorld_h HelloWorld_h Add h	e4d7081	Jarrett Spiker <js...	Oct 20, 2016, 11...
origin/HelloWorld_space HelloWorld_space Add space	e8530fb	Jarrett Spiker <js...	Oct 20, 2016, 11...
origin/HelloWorld HelloWorld Add HelloWorld	75613dc	Jarrett Spiker <js...	Oct 20, 2016, 11...

src/HelloWorld.java

Hunk 1 : Lines 24-30

```
24 24          System.out.print("l");
25 25      }
26 26      public void l2(){
27    -
   27 +        System.out.print("l");
28 28      }
29 29      public void o1(){
30 30
```

Commit: 27ef45abbd58eccc536828748f419fff045828bb [27ef45a]
Parents: 5a18808db4
Author: Jarrett Spiker <jspiker@synopsys.com>
Date: October 20, 2016 at 11:13:25 PM MDT
Labels: origin/HelloWorld_hzll HelloWorld_hzll

Add second l

Merge Conflict Exercise

checkout IncreasingNumbers

IncreasingNumbers_a and IncreasingNumbers_b have the fixes, but they conflict

Diff against the second to last commit in IncreasingNumbers for reference

Reset

Git reset moves where you are pointing in the tree:

```
git reset --hard <commit>:
```

Keeps all the work as modified files:

```
git reset --soft <commit>
```

Commit amend

Allows you to fix up your most recent commit instead of creating an entirely new snapshot

```
git commit -amend
```

Squash

This is a great way to group certain changes together before sharing them with others.

1. git rebase -i HEAD~x
2. This will open up an editor with a list of commits
3. Change the word “pick” to “squash”

FIX the Tree Exercise!!!!

You want to print “hello world”...but you are forbidden from writing code!

Checkout HelloWorld

The HelloWorld_ prefixed branches have all changes you’ll need

Helpful Links

https://www.atlassian.com/git/tutorials/comparing-workflows/gitflow-workflow

http://gitready.com/advanced/2009/01/17/restoring-lost-commits.html

https://git-scm.com/book/en/v2

Photo Cred

https://blog.spotchemi.com/wp-content/uploads/2015/02/Merger.jpg

http://www.bogotobogo.com/cplusplus/images/Git/Fast_Forward_Merge/TypicalMerge.png

https://www.atlassian.com/git/tutorials/comparing-workflows/forking-workflow

http://www.bogotobogo.com/cplusplus/images/Git/Rebase/RebasePic.png