Introduction to Version Control with `Git`

Why do I need version control?

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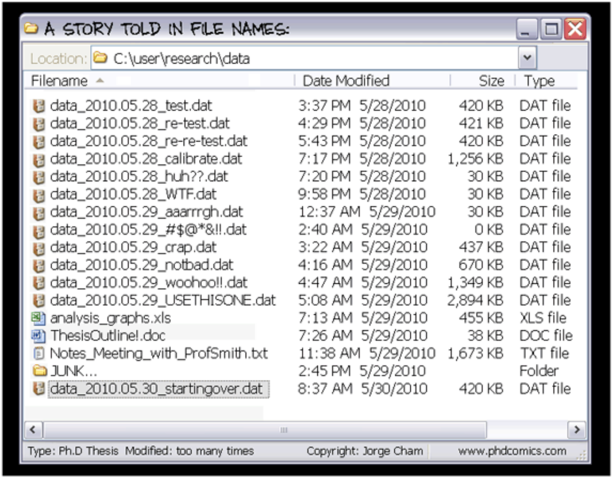

A STORY TOLD IN FILE NAMES:

Location: C:\user\research\data

Filename	Date Modified	Size	Type
data_2010.05.28_test.dat	3:37 PM 5/28/2010	420 KB	DAT file
data_2010.05.28_re-test.dat	4:29 PM 5/28/2010	421 KB	DAT file
data_2010.05.28_re-re-test.dat	5:43 PM 5/28/2010	420 KB	DAT file
data_2010.05.28_calibrate.dat	7:17 PM 5/28/2010	1,256 KB	DAT file
data_2010.05.28_huh??.dat	7:20 PM 5/28/2010	30 KB	DAT file
data_2010.05.28_WTF.dat	9:58 PM 5/28/2010	30 KB	DAT file
data_2010.05.29_aaarrrgh.dat	12:37 AM 5/29/2010	30 KB	DAT file
data_2010.05.29_#$@*&!!.dat	2:40 AM 5/29/2010	0 KB	DAT file
data_2010.05.29_crap.dat	3:22 AM 5/29/2010	437 KB	DAT file
data_2010.05.29_notbad.dat	4:16 AM 5/29/2010	670 KB	DAT file
data_2010.05.29_woohoo!!.dat	4:47 AM 5/29/2010	1,349 KB	DAT file
data_2010.05.29_USETHISONE.dat	5:08 AM 5/29/2010	2,894 KB	DAT file
analysis_graphs.xls	7:13 AM 5/29/2010	455 KB	XLS file
ThesisOutline!.doc	7:26 AM 5/29/2010	38 KB	DOC file
Notes_Meeting_with_ProfSmith.txt	11:38 AM 5/29/2010	1,673 KB	TXT file
JUNK...	2:45 PM 5/29/2010		Folder
data_2010.05.30_startingover.dat	8:37 AM 5/30/2010	420 KB	DAT file

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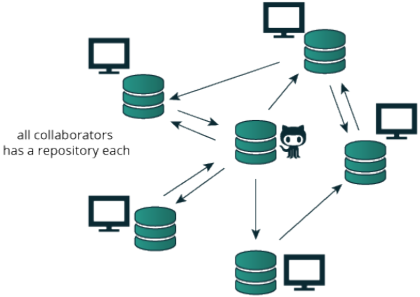
- The list goes on...

Git

In the scientific world, Git (and Github) is the most widely used version control system.



http://invistruct.com/

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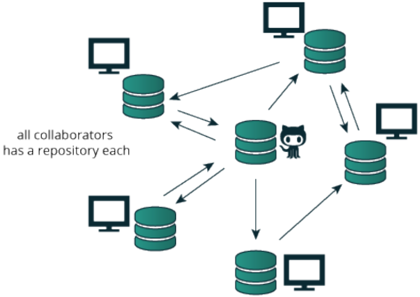

repository: A central storage area where a version control system stores old revisions of files and information about who changed what, when.

http://invistruct.com/

How do you get your own repository?

Let's configure Git first:

```
$ git config --global user.name "Your name goes here"
$ git config --global user.email you@yourdomain.com
$ git config --global core.editor vim
$ git config color.ui auto
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Then initialize your first repository:

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You Try (10 minutes):

Exercises (1) - 2

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  - the date the snapshot was taken
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- There is metadata associated with each commit (snapshot):
  - the date the snapshot was taken
  - who took it
  - what files were modified
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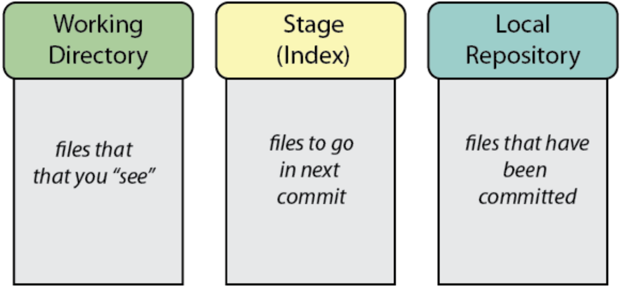
  - etc.
- `Git` will enable you to:
  - track the changes made to files in your directory
  - revert the entire project to a previous snapshot
  - review changes made over time
  - view who modified a file
  - etc.

A little more vocabulary:

There are three main *trees* or *collections of files (and metadata)* in `Git`:



Working Directory

files that that you "see"

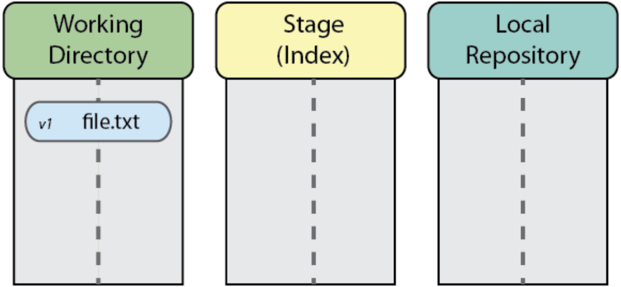
Stage (Index)

files to go in next commit

Local Repository

files that have been committed

How to save snapshots with Git



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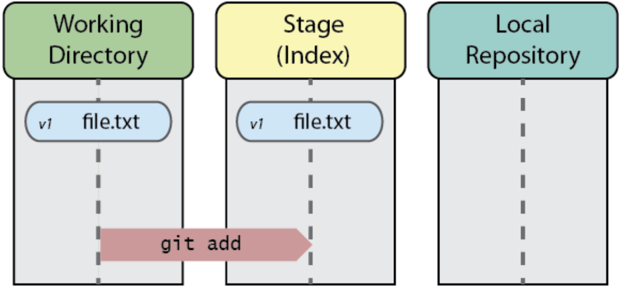

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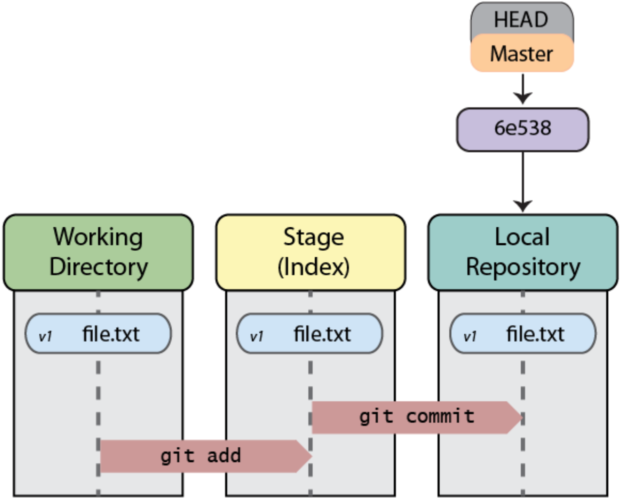
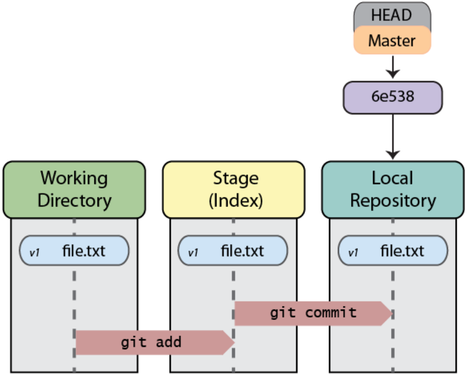


How to save snapshots with `Git`

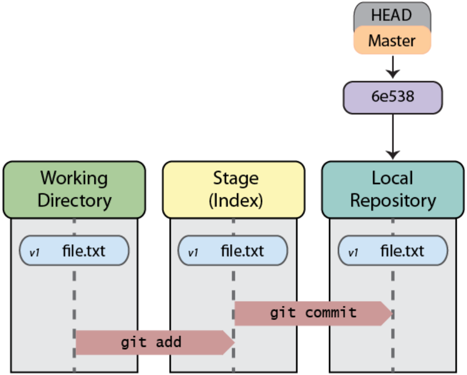
SHA-1 hash: unique 40-digit computer-generated identifier for each revision (or commit)



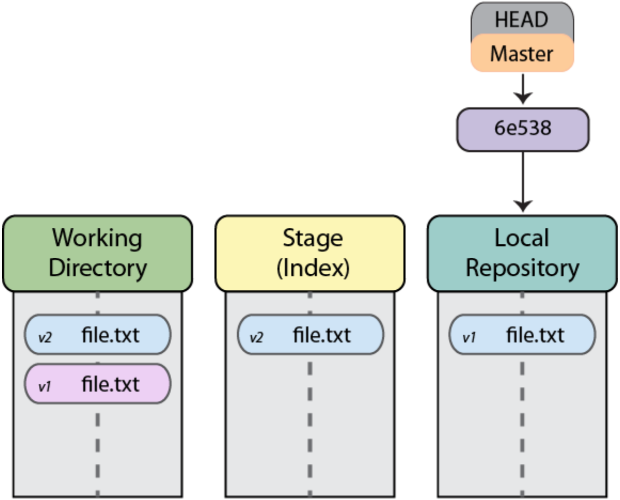
How to save snapshots with `Git`

SHA-1 hash: *unique* 40-digit computer-generated identifier for each revision (or commit)

HEAD: reference to the current branch or commit



How to save snapshots with `Git`: Keep working!



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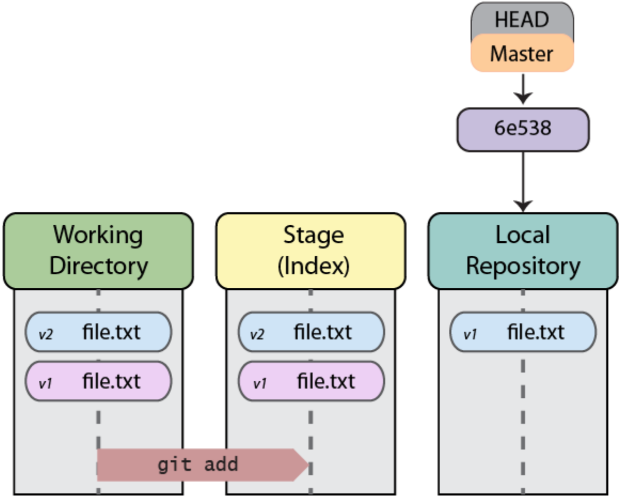

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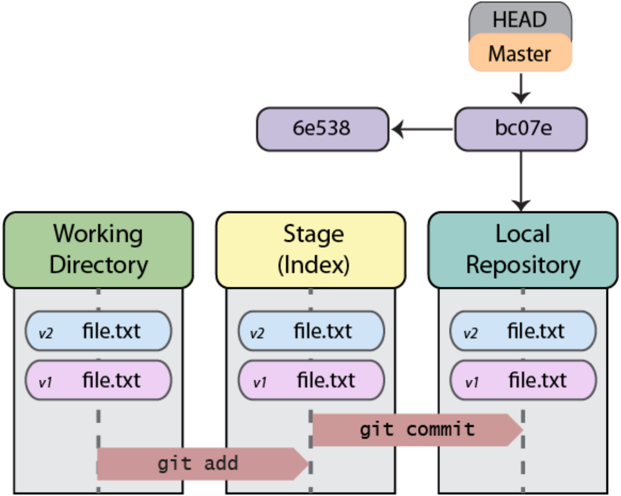
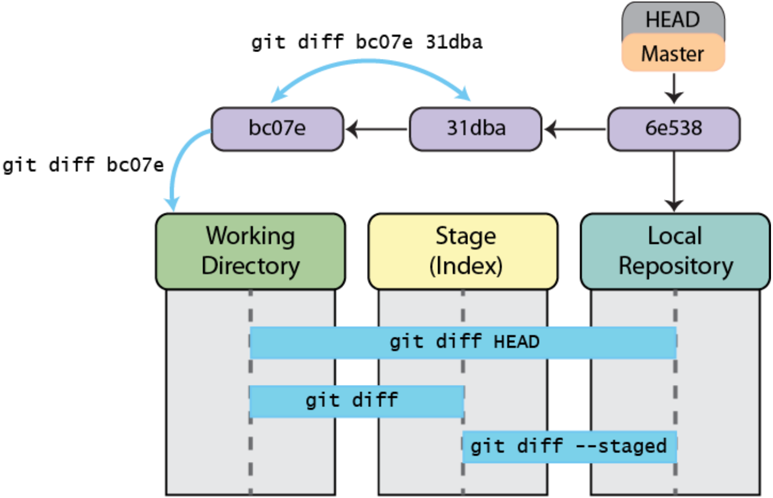


A simple story so far: what else can we do?!

`git log`: view the change history (commits) of the current repository.

A simple story so far: what else can we do?!

`git diff`: view changes between files and commits



How do we do this for real?

An Example

Now it's your turn.

Questions?

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Questions?

You Try (15 minutes):
Exercises 3