Interacting with the UNIX File System

COMP 364 - Lecture #2
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Announcements

- TA : Javier Sanchez Galan (javier.sanchezgalan@mail.mcgill.ca)

- Office hours are now
  - Mondays 11AM - 12PM
    - -> Trottier 3130 (My office)
  - Thursdays 10AM - 11AM
    - -> Outside Trottier 3130 (common area)
    - -> Look for Javier

- Information updated on the website

Last class

- Structure of a command:

  <command> <options/flags> <arguments>

- Example of commands that we saw?

The file system: the digital universe

- **File system**: the low-level software that manages and enforces access to files and directories. Defines the "world" of objects that exist on the computer.

    - *File*: entities that have content

    - *Directory*: entities that contain other files and directories

    - *Permissions*: rules indicating what actions a user may perform on a file or directory

We will discuss these in detail and learn commands for viewing and changing them.

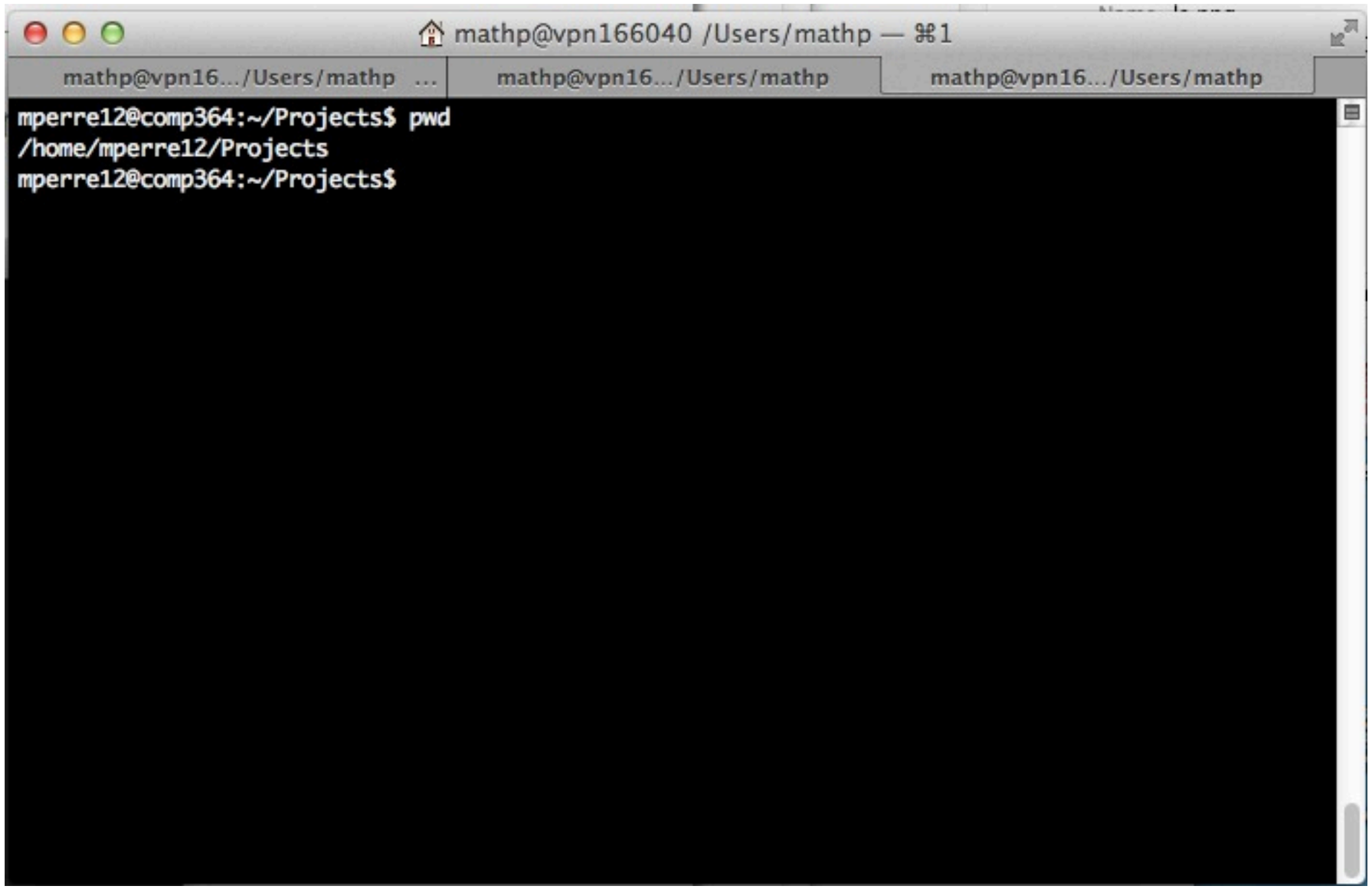
How does the file system look?

“/” separates the levels in a file system

- / (the “root” of the file system - your hard drive)
- /home
- /home/mperre12 (my home directory)
- /home/mperre12/Projects
- /home/mperre12/Test
- /home/mperre12/Test/bar.txt

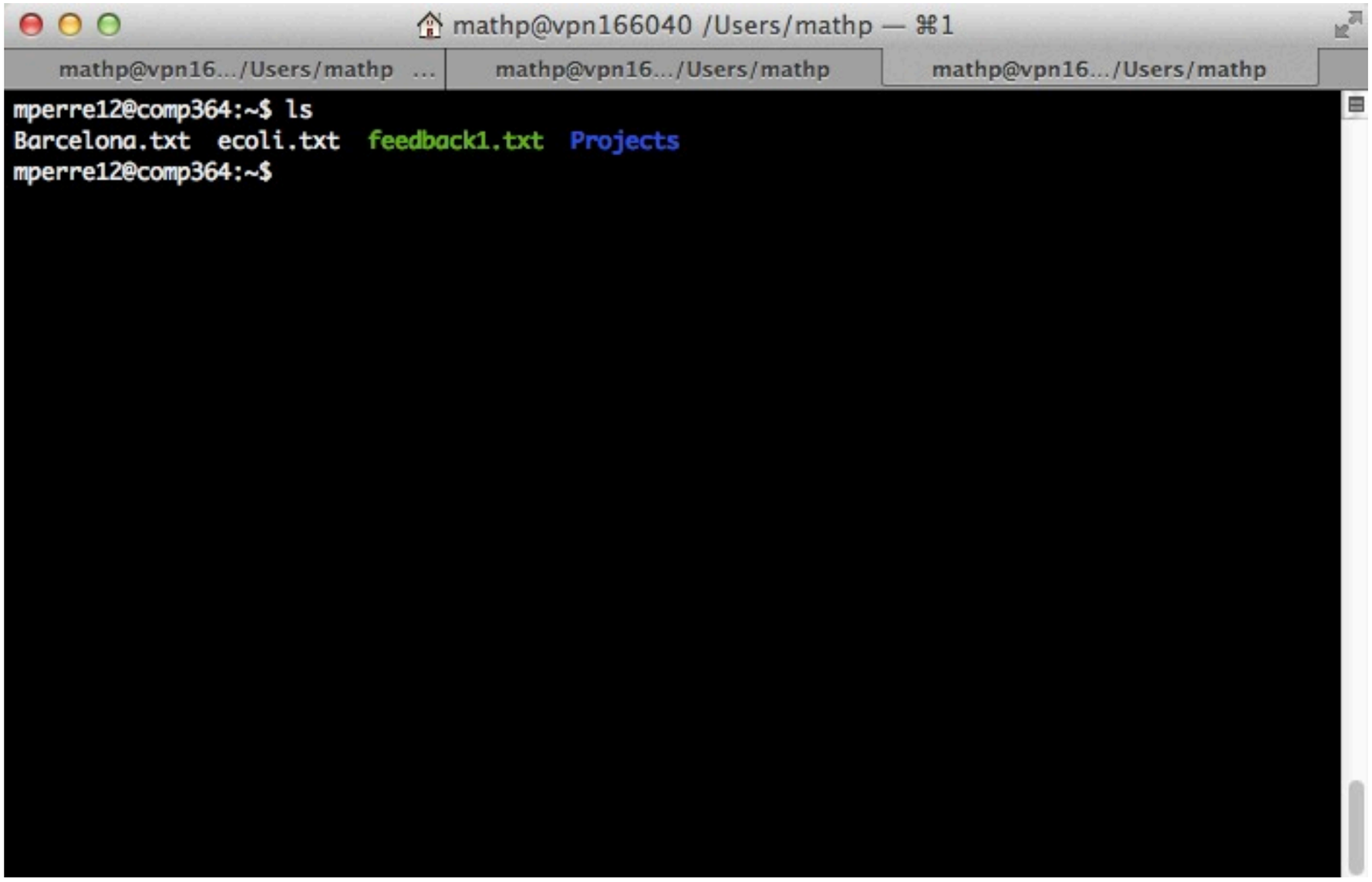
pwd: where am I?

- *pwd* - prints the directory you are currently in (“print working directory”)



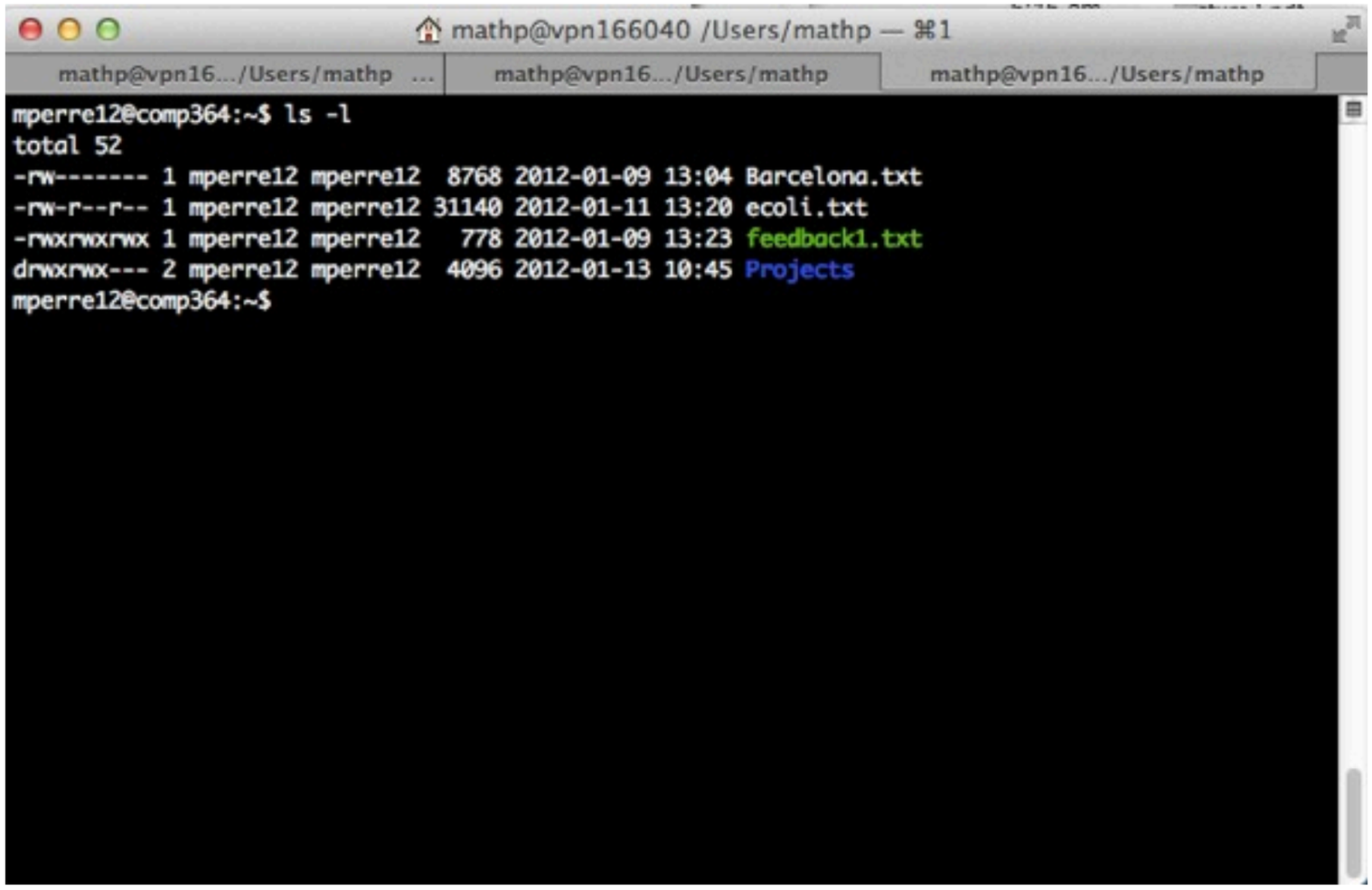
ls: viewing the file system

- Lists the contents of the directory you are “in”



ls -l: the detailed list option

- ls -l shows details about each object in the directory



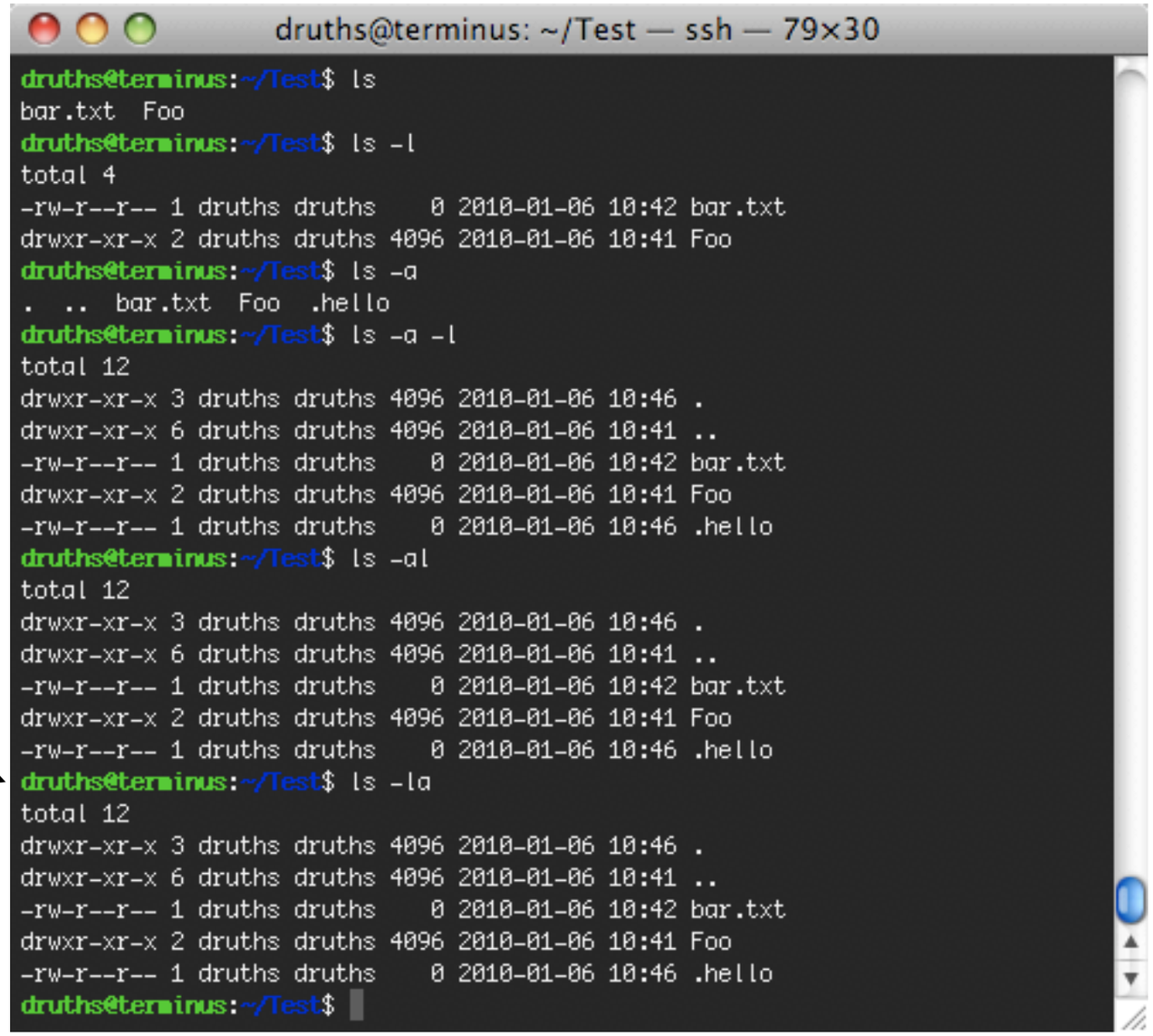
<file mode> <# links> <owner> <group> <size> <date last modified> <name>

If your username isn't here, the file isn't yours!

ls -a: showing all contents

- Hidden files and directories have names that start with “.”
- Many configuration files are hidden files

3 different ways to write it

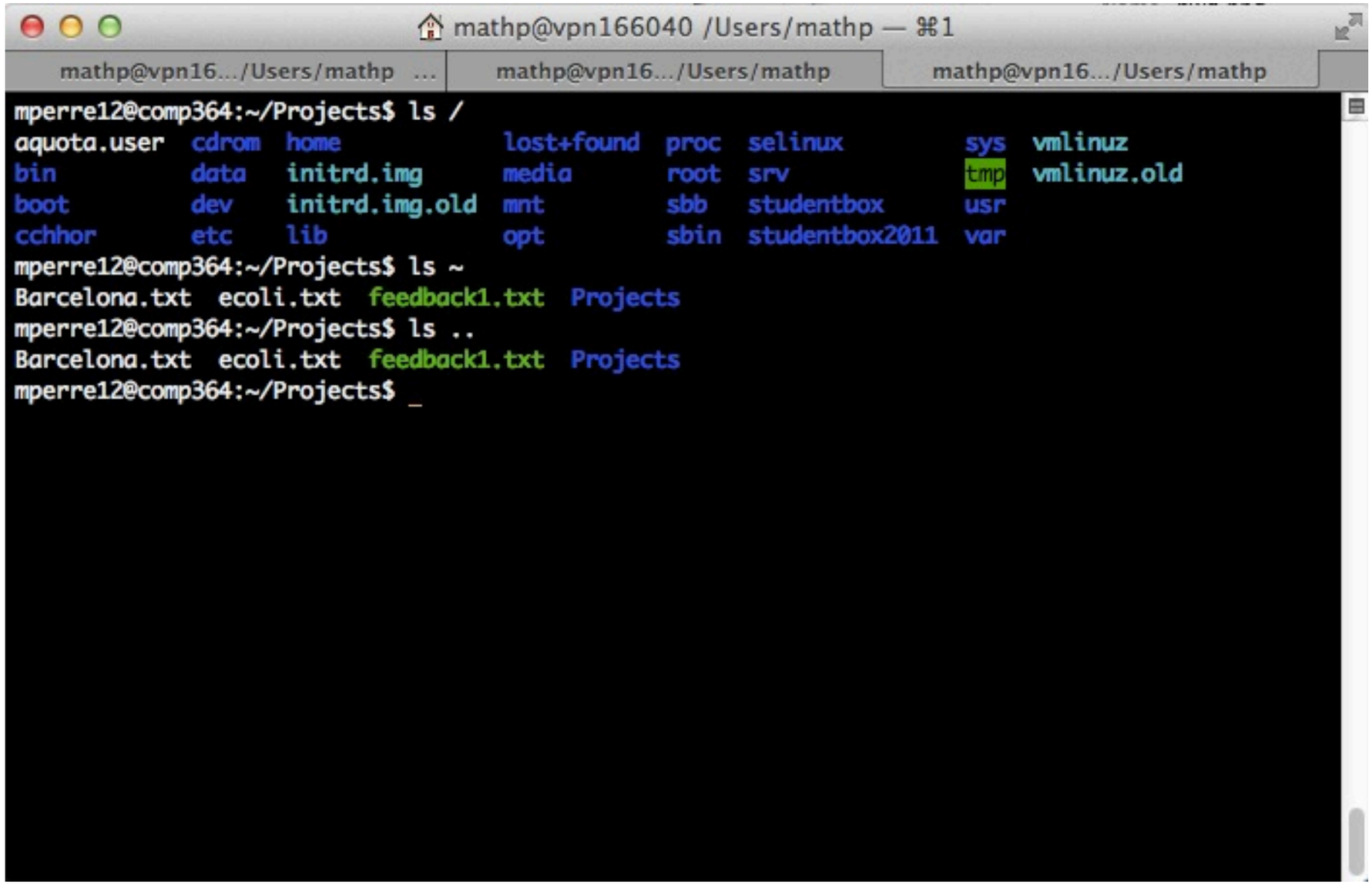


Special directories: . and .. (but not ...)

- Some special directories:
  - / = the root of the file system
  - . = the current directory
  - .. = the directory containing the current directory (one level “up”)
  - ~ = your home directory

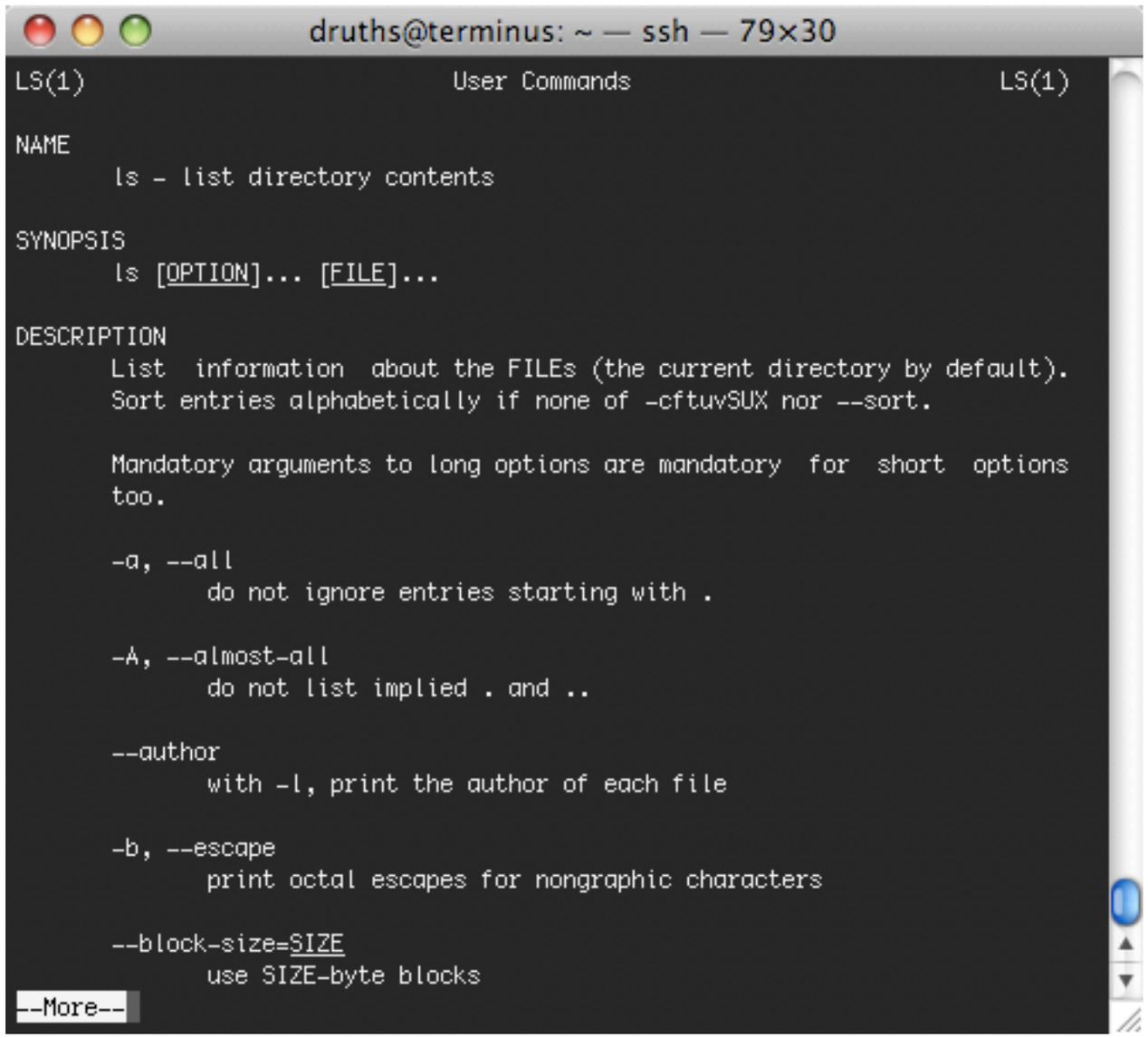
ls <dir>: inspecting specific directories

- *ls <dir>*: lists the contents of the directory <dir>



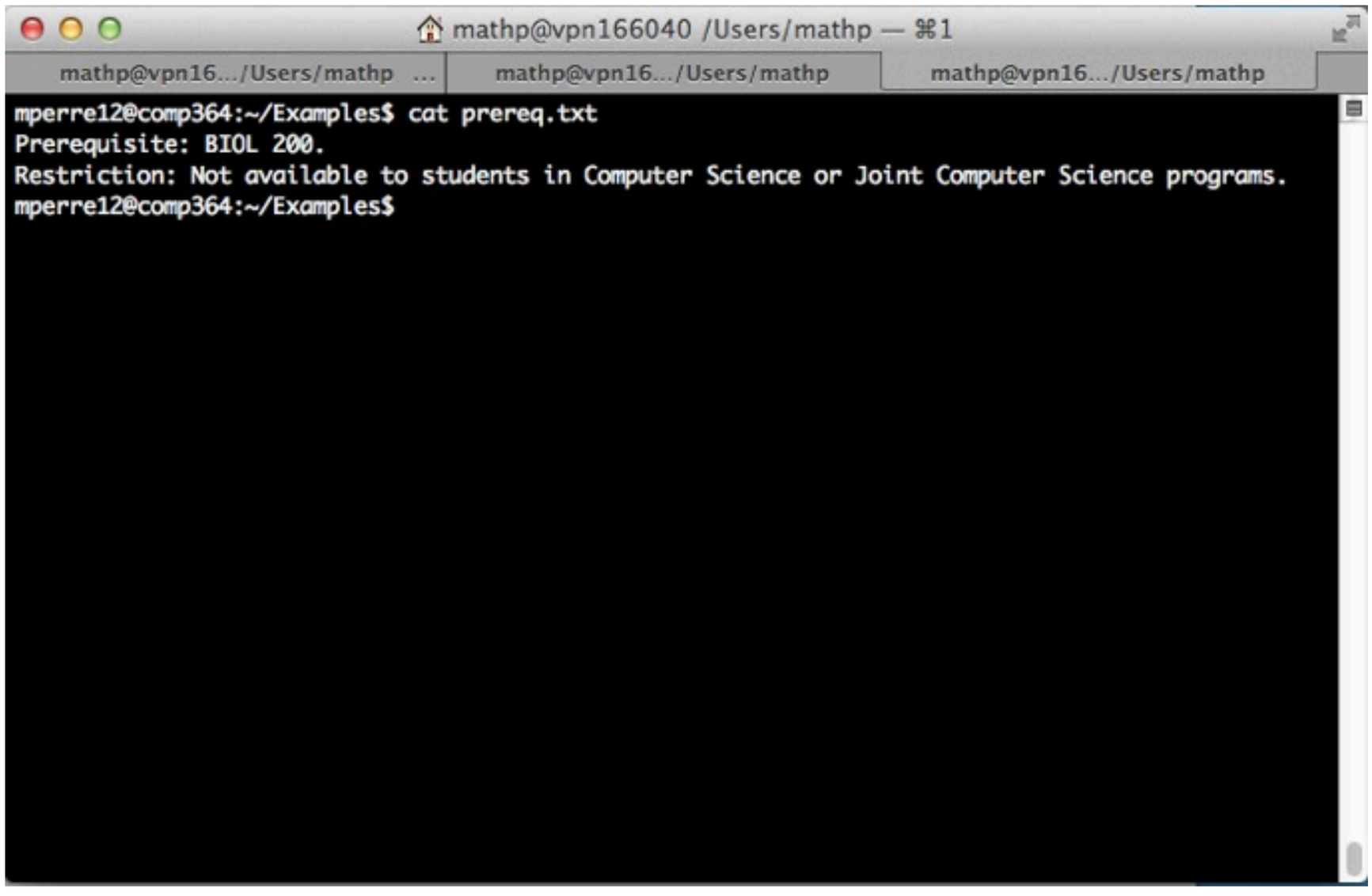
man: when you need help

- *man*: pulls up the manual entry for a given command
  - *man ls*
  - *man chmod*
  - *man pwd*
  - *man grep*



cat: Display the contents of a file

- cat <path to file>
  - Will send the contents of the file to the output.



cd: moving around the file system ("change directory")

- *cd <directory>*
  - cd /
  - cd ~
  - cd .
  - cd ..
  - cd /home/mperre12

Paths: locating and navigating the file system

- **Path**: the chain of directories specifying the location of an object (file/directory)
  - *Absolute path*: the chain of directories from the file system root (“/”) to the object of interest
    - /home/mperre12/Test/bar.txt
    - /bin/ls
  - *Relative path*: the chain of directories from the current directory to the object of interest
    - ../Projects
    - ../../../bin/ls
    - mperre12/feedback1.txt (when in /studentbox, for example)

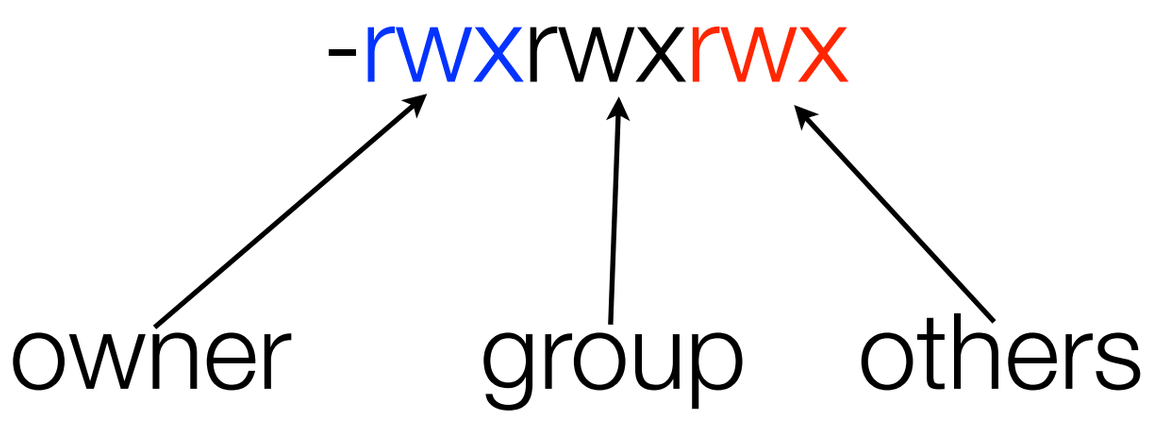
Paths work wherever a file/directory is accepted

- *ls ~ = ls /home/mperre12*
- *ls /usr/bin*
- *ls /home/mperre12/Projects*

- *cd ~ = cd /home/mperre12*
- *cd /usr/bin*
- *cd /home/mperre12/Projects*
- *cat /home/mperre12/Test/bar.txt*

Permissions (on UNIX)

- The three main actions a user may perform on a file/directory: *read (r), write/modify (w), execute (x)*
- The file system enforces permissions on every file and directory: permissions indicate whether a user may perform each of these actions
- A separate rule exists for the owner of the object (u), the group owning the object (g), and everybody else (o).
- *Can only change permissions if you are the owner of the file!*



chmod: changing permissions

- *chmod <a/u/g/o><+/-><r/w/x> <file/directory name>*

- Adding a permission:
  - *chmod u+w foo.txt*
  - *chmod u+wx bar*
- Removing a permission:
  - *chmod o-r foo.txt*
  - *chmod o-rwx bar*