Introduction to UNIX command line

Serghei Mangul, Ph.D
Assistant Professor of Clinical Pharmacy and Biological Sciences, University of Southern California

What we will cover

- Unix - Learning the essentials
- Unix fundamentals , syntax and usage
- Navigate within the UNIX file system
- Identify the uses of the several UNIX commands

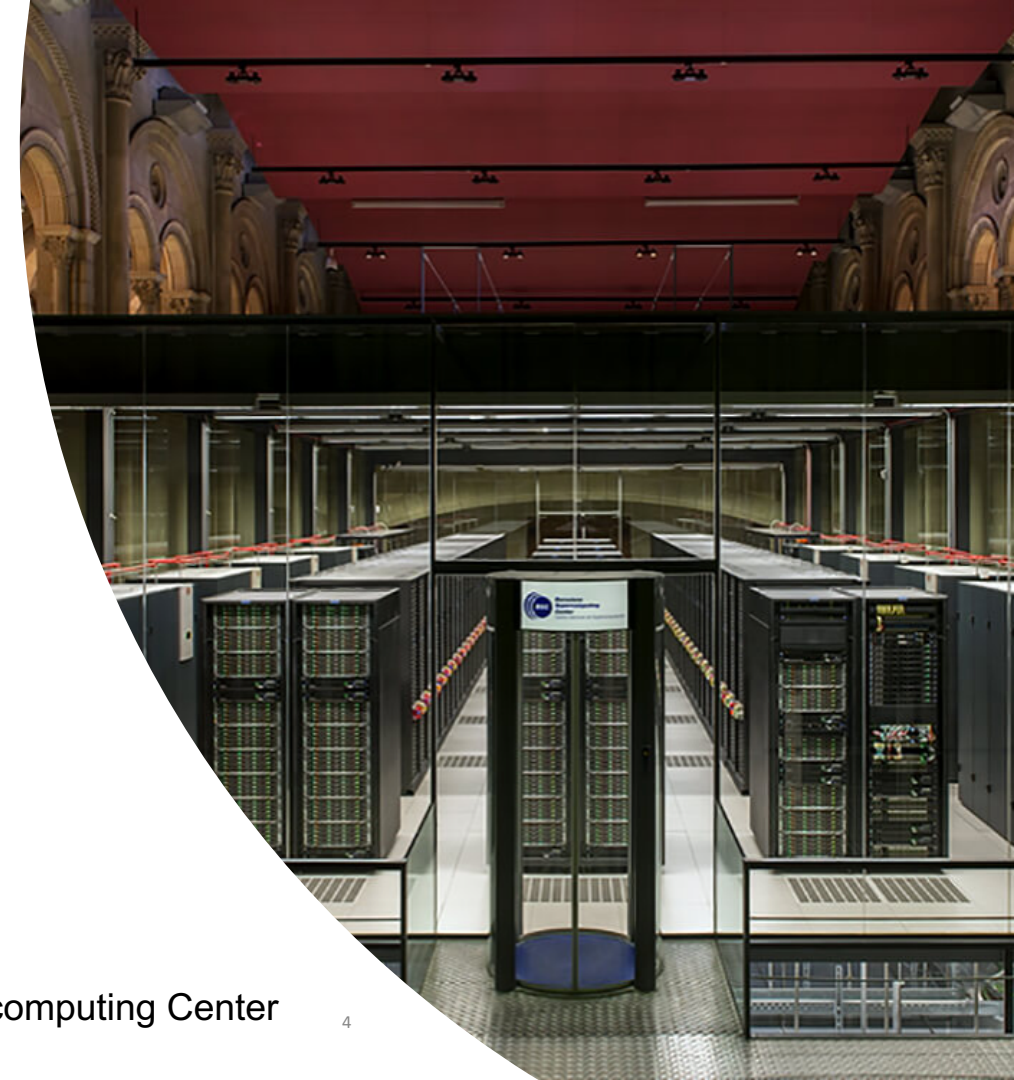
Learning Objectives

By the end of this module, you will be able to:

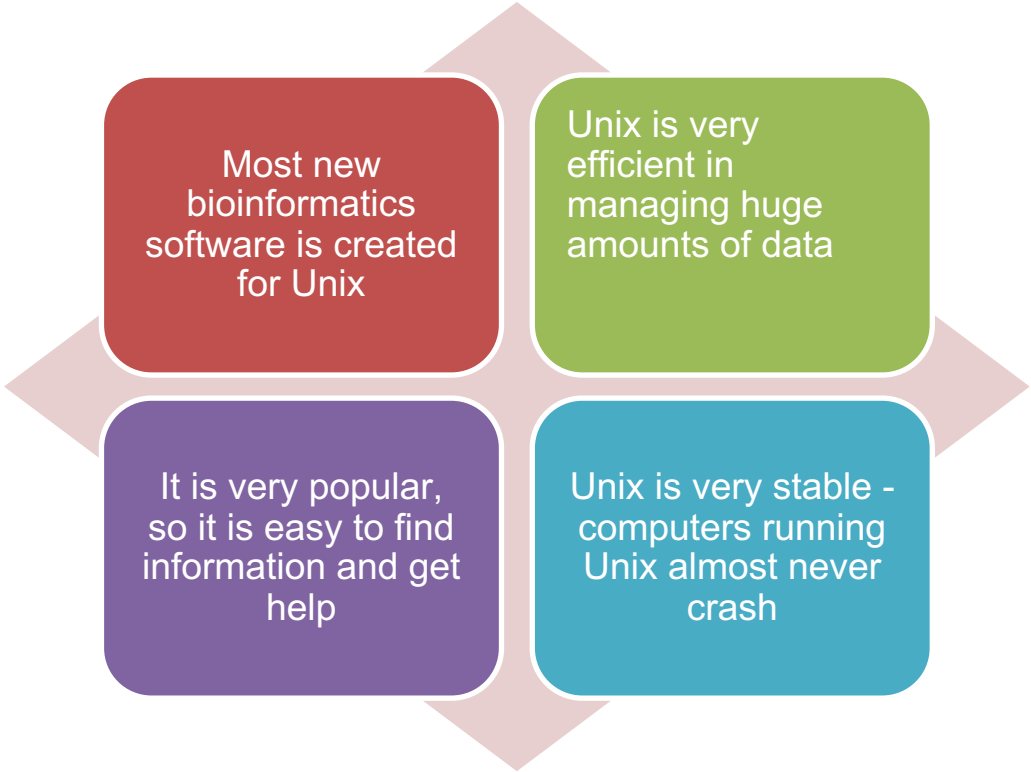
- Perform the following tasks within the UNIX environment:
  - Create a text file
  - List and reorder files
  - Display, copy, move, and delete directories and files

Why Learn Unix?

- As biological data sets have grown **larger** and biological problems have become more complex, the requirements for computing power have also grown.
- Computers that can provide this power generally use the Unix operating system

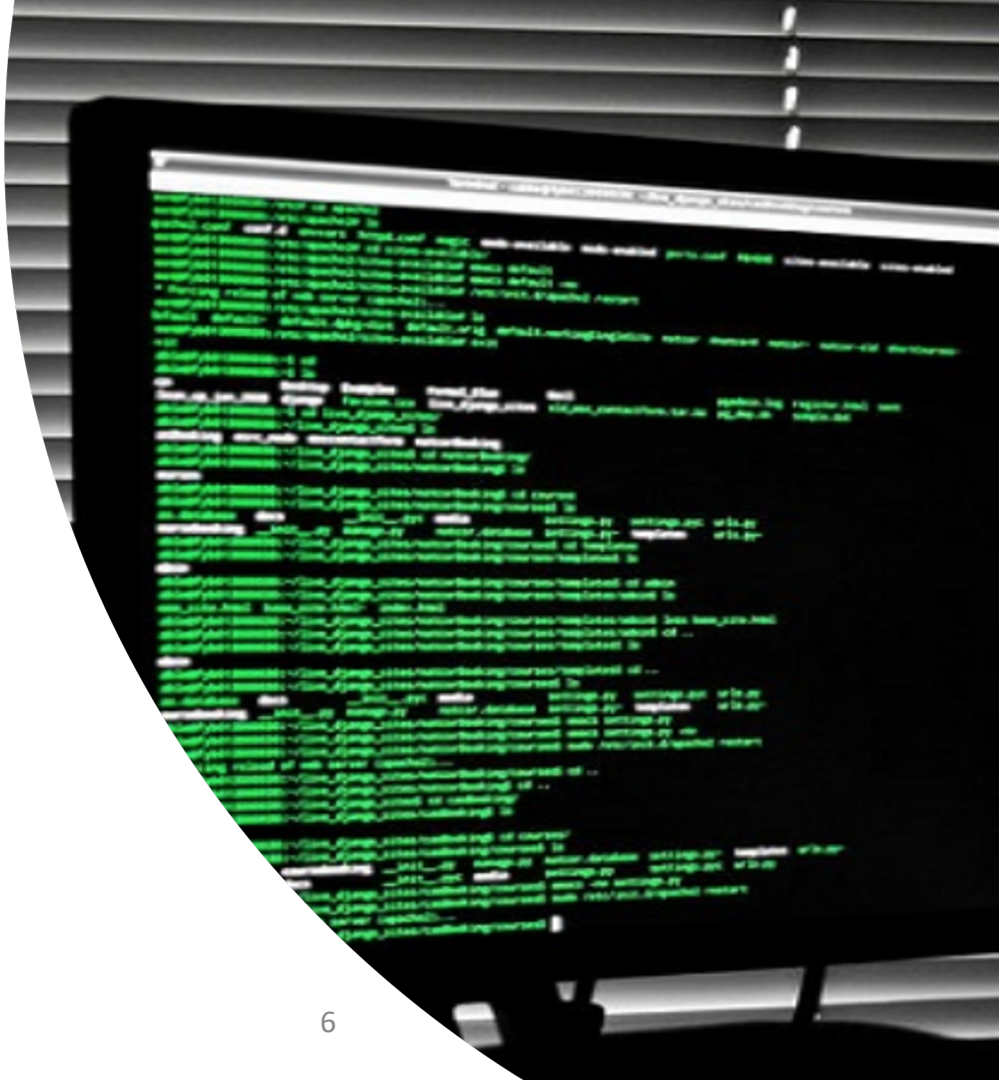


Why Learn Unix?



What is Unix?

- UNIX-like system (e.g Linux, Ubuntu) is a type of operating system that lack a **graphical interface** and require inputting code.
- UNIX environment is often is referred as command line interface opposed to graphical interface, which is common for Windows and MacOS.

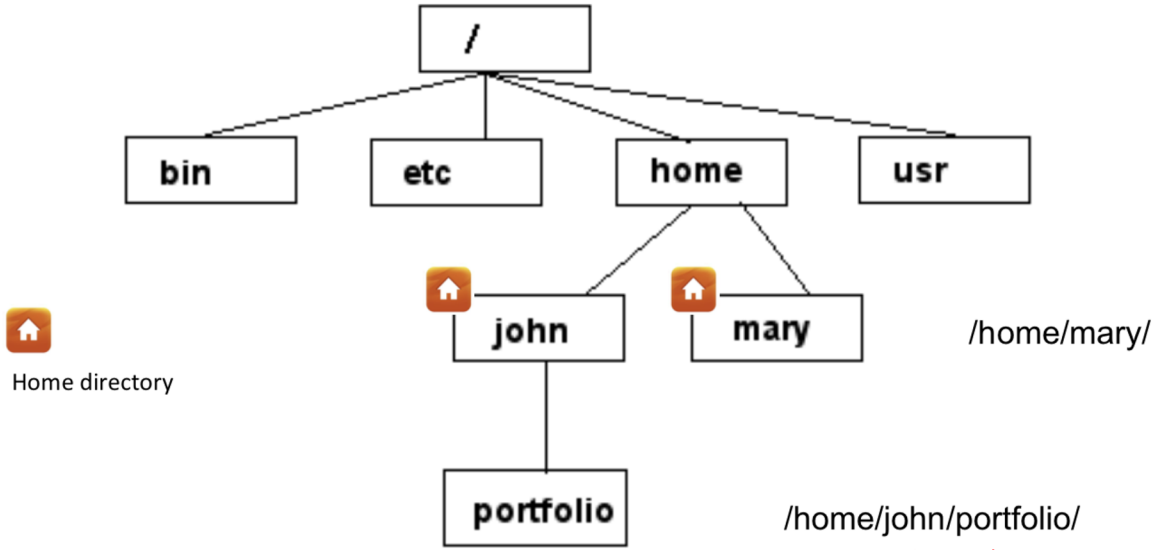


The Unix Shell

- A shell is a program that waits for you to type a command and then executes it.
  - type the command, then “return”

Unix File System

Unix is cAsE sEnsItiVe !

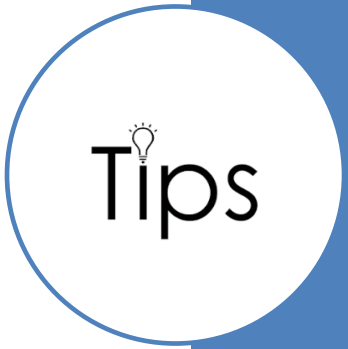


my home directory

My laptop : `/Users/serghei`

Project directory

- Create sub-directories in your Drive to store specific projects or groups of information



Do **not** accumulate thousands of files with cryptic names in your Home directory

How to run UNIX in Google Collab

- We need to mount Drive first
- We need to add !

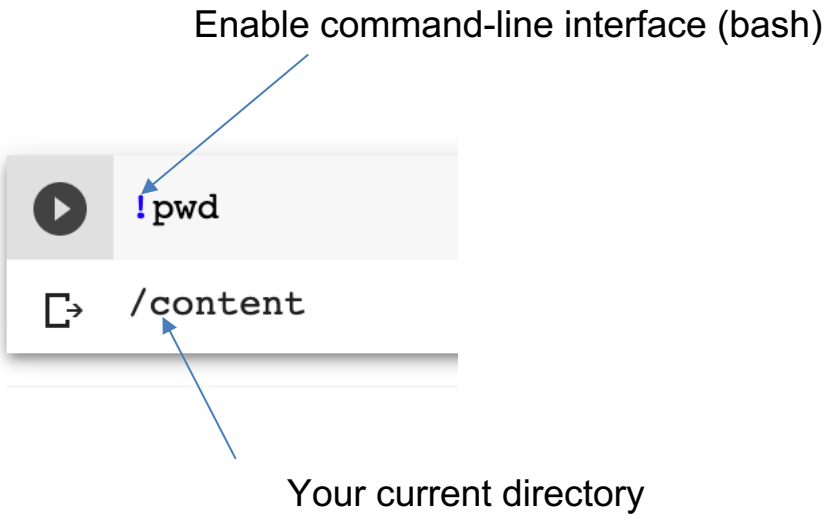
```
[6] from google.colab import drive
    drive.mount('/content/drive')

    Go to this URL in a browser: https://accounts.goc

    Enter your authorization code:
    ··········
    Mounted at /content/drive
```

Command: pwd

- To display current directory

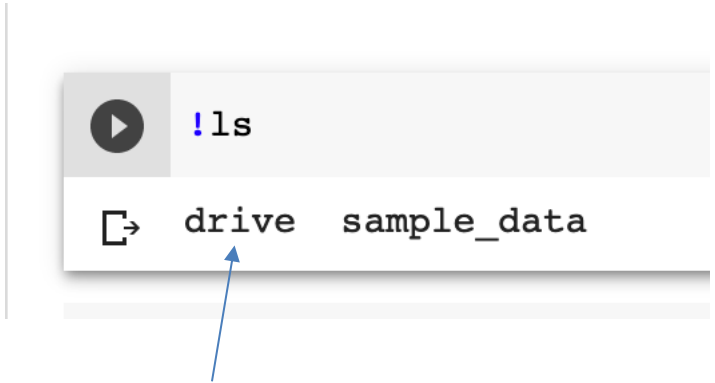


Command : ls

list the files in the current directory

- **ls** has many options
  - -l long list (displays lots of info)
  - -t sort by modification time
  - -S sort by size
  - -h list file sizes in human readable format
  - -r reverse the order
- Options can be combined: “ls -lh”

Let’s practice

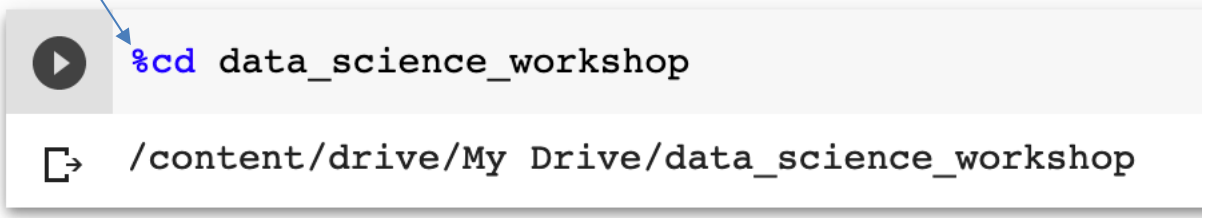


This becomes available after Drive is mounted

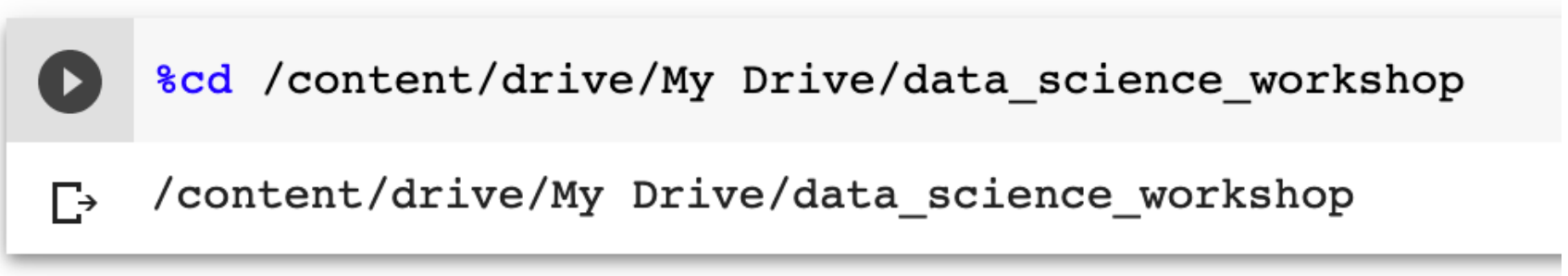
Command: cd

- cd changes your current working directory

This will make the location permanent when you move blocks



If you know the full path



Command: mkdir

- To create a new directory use “mkdir”

```
mkdir test
```

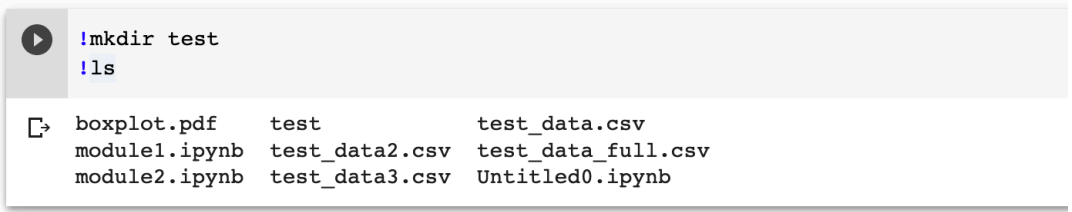
Tips

If no error message is displayed means the command was run successfully

Use ls command to check if directory was created

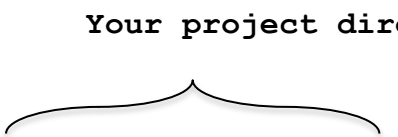
```
!mkdir test
!ls

boxplot.pdf
test test_data.csv
module1.ipynb
test_data2.csv
test_data_full.csv
module2.ipynb
test_data3.csv
Untitled0.ipynb
```



Command: cd

- “~” is the location of your home directory
- “..” is the location of the directory above the current one



/content/drive/My Drive/data_science_workshop

Let’s practice

```
%cd /content/drive/My\ Drive/data_science_workshop/test
%cd ..
```

How to know more?

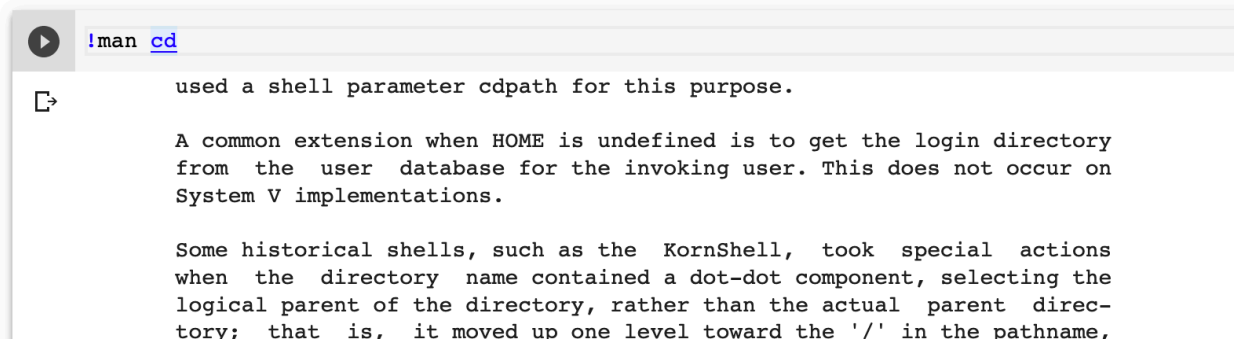
MANUAL

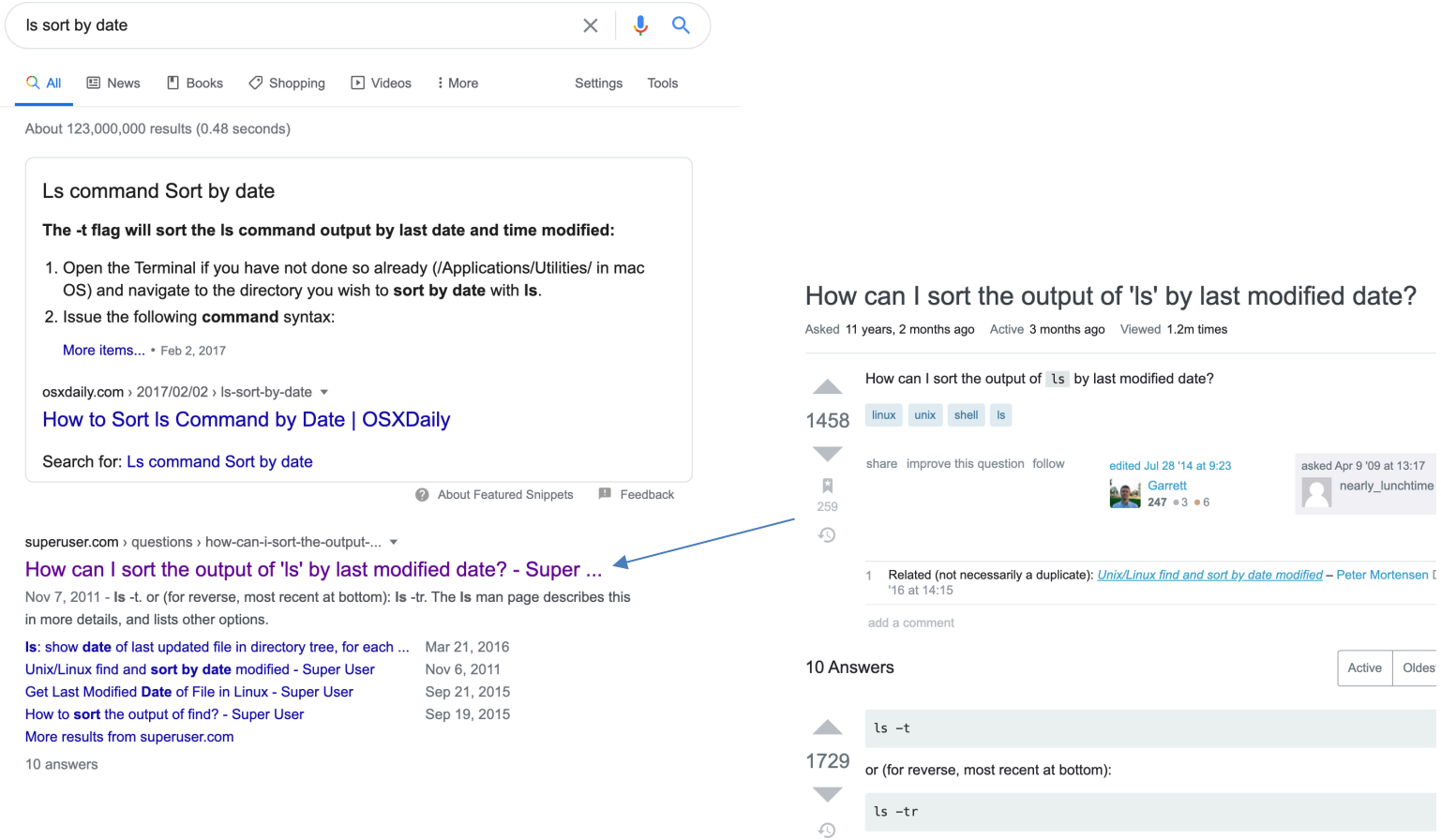
GOOGLE

Command : man

- displays manual pages

```
!man cd
```




ls sort by date
All
News
Books
Shopping
Videos
More
Settings
Tools
About 123,000,000 results (0.48 seconds)
Ls command Sort by date
The -t flag will sort the ls command output by last date and time modified:
1. Open the Terminal if you have not done so already (/Applications/Utilities/ in mac OS) and navigate to the directory you wish to sort by date with ls.
2. Issue the following command syntax:
More items... • Feb 2, 2017
osxdaily.com › 2017/02/02 › ls-sort-by-date
How to Sort ls Command by Date | OSXDaily
Search for: Ls command Sort by date
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superuser.com › questions › how-can-i-sort-the-output-...
How can I sort the output of 'ls' by last modified date? - Super ...
Nov 7, 2011 - ls -t. or (for reverse, most recent at bottom): ls -tr. The ls man page describes this in more details, and lists other options.
ls: show date of last updated file in directory tree, for each ... Mar 21, 2016
Unix/Linux find and sort by date modified - Super User Nov 6, 2011
Get Last Modified Date of File in Linux - Super User Sep 21, 2015
How to sort the output of find? - Super User Sep 19, 2015
More results from superuser.com
10 answers
How can I sort the output of 'ls' by last modified date?
Asked 11 years, 2 months ago Active 3 months ago Viewed 1.2m times
How can I sort the output of ls by last modified date?
linux unix shell ls
1458
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Garrett
247 3 6
asked Apr 9 '09 at 13:17
nearly_lunchtime
1 Related (not necessarily a duplicate): Unix/Linux find and sort by date modified – Peter Mortensen
'16 at 14:15
add a comment
10 Answers
Active
Oldes
1729
ls -t
or (for reverse, most recent at bottom):
ls -tr

General Syntax: *

- “*” can be used as a wildcard in Unix

```
ls *csv
ls t*
ls *txt
ls: cannot access '*txt': No such file
or directory
```

Displaying a file

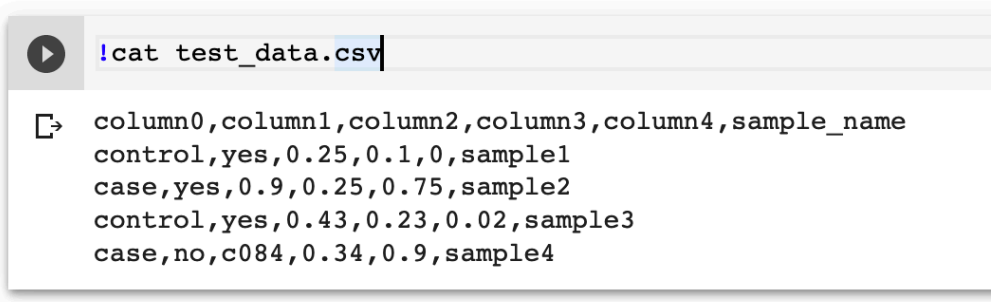
Various ways to display a file in Unix

- cat
- head
- tail

Command: cat

- dumps an entire file to standard output
- good for displaying short, simple files

```
!cat test_data.csv
```



Command: head

- displays the top part of a file

by default it shows the first 10 lines

  - **-n** option allows you to change that

Command: tail

- Same as head, but shows the last lines

Let’s practice!

```
!head -n 2 test_data.csv
!tail -n 1 test_data.csv
```

```
!head -n 2 test_data.csv
```

```
column0,column1,column2,column3,column4,sample_name
control,yes,0.25,0.1,0,sample1
```

File Commands

- Copying a file: **cp**

- Move or rename a file: **mv**

- Remove a file: **rm**

Copy

`cp <source> <destination>`

- to copy a file use **cp**
- to copy a directory use **cp -r**

Let’s practice

```
!cp test_data.csv test_data_new.csv

!cp test_data.csv test/

!cp -r test test2

!cp test_data.csv test/test_data_new.csv
```

Command: mv

`mv <source> <destination>`

- moves a file/directory to a different location
- renames a file/directory

Let’s practice


```
!mv test_data_new.csv test2/
```

```
!mv test_data.csv test_DATA.csv
```

Rename file

```
!mv test_DATA.csv test/TEST_DATA.csv
```

Move and rename file

Command: rm

- to remove a file use **rm**
- to remove a directory use **rm -r**

```
!rm test.log
!rm -r new2
!ls
```

Files and directories deleted with **rm** are gone forever and cannot be recovered!!!

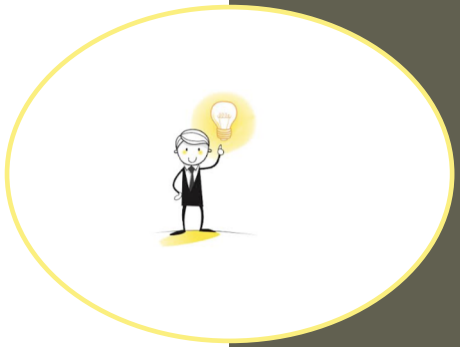
Good to know

- **cp/mv/rm** can work on many files at once:

```
cp file1 file2 new/
rm file1 file2 file27
```

- **cp/mv/rm** can work with *:

```
mv f* new/
rm f*
rm l*s
rm *txt
```



Summary Commands UNIX

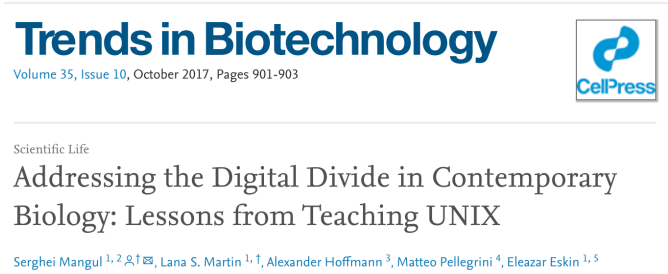
Directory commandline	
pwd	display current directory
mkdir	create a new directory
cd	change current working directory
cp-r	copy a directory
File commandline	
ls	list files in the current directory
cat	display the entire file
less	display part of the file
tail	display the end of the file
head	display the head of the file
cp	copy a file
mv	move a file
rm	remove a file

More about UNIX

9 hours of detailed tutorial

Intro to Unix Workshop taught by Serghei Mangul at UCLA's Collaboratory; parts 1, 2, and 3:

http://www.sergheimangul.com/video/



https://www.sciencedirect.com/science/article/abs/pii/S0167779917301567