

Introduction to Computing for Biologists (BIOL 4800)

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This Week

In Class:

- Syllabus
- Computer time!
- Intro Survey
- Virtual Machine – what is it? How do I use it?
- All the basic questions

Homework: (this is all on the syllabus)

- Github account - Due Fri noon
- Read/sign syllabus - Due Thurs class
- Access textbook

Operating Systems

- Purpose?
- What does it do???

Operating Systems

- Purpose?
- What does it do???
- Resource manager
 - hardware, software, memory, applications, graphical interface, user input, etc..
 - Interface between user and machine

Operating Systems

- Microsoft / Windows
- Apple Mac / OS X, Unix
- Ubuntu, Mint, Fedora / Linux

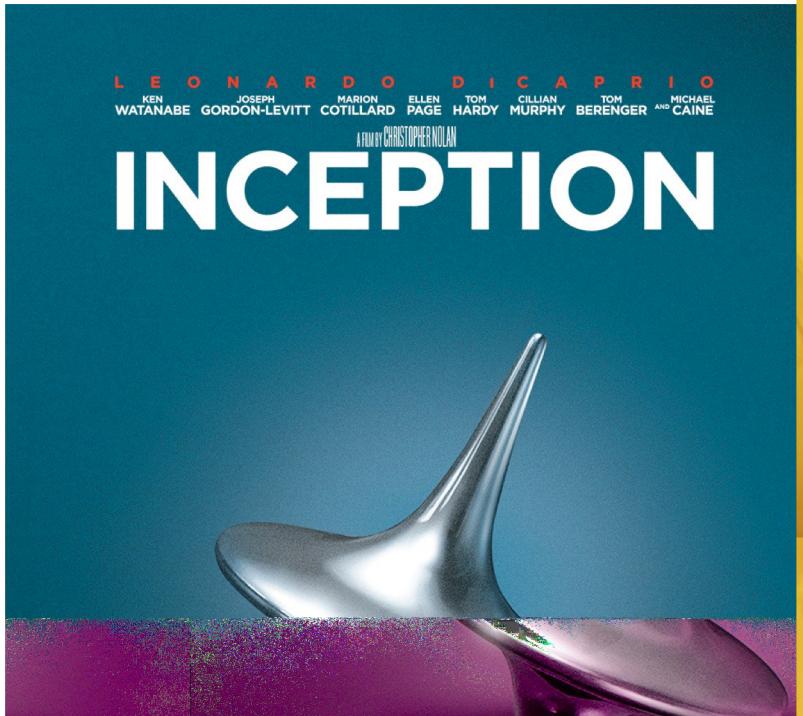


Quick and dirty memory basics

- Random Access Memory
- Hard Drive

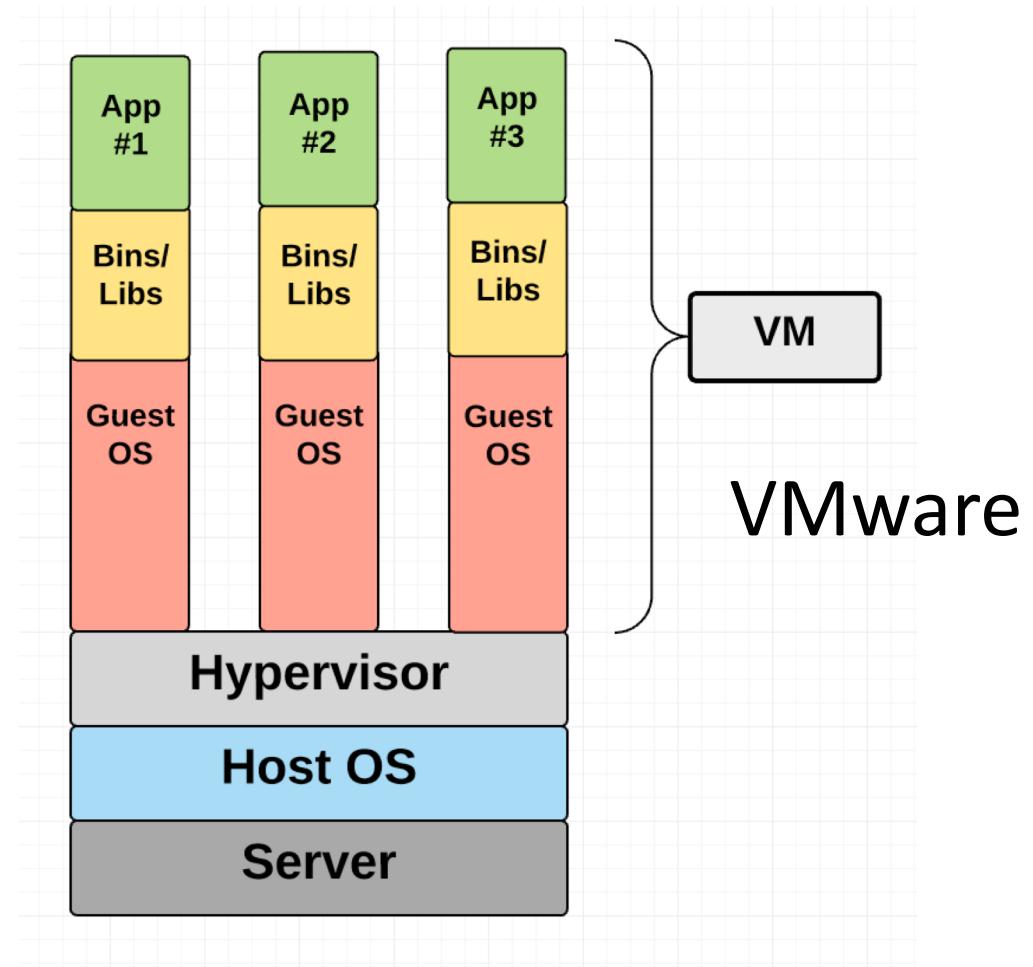


Virtual Machine



Virtual Machine

Ubuntu, Linux OS
Windows computer



Questions

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Computer Time!

Open Linux computer using Vmware

Share physical file folders

Everyone makes their own folders

Create files on the computer that match the manila folders

Pause and upload to onedrive

TERMS

- Command Line – interface to interact with program via text only, text input/output environment
- Terminal – Application to access command line
- Shell – command line interpreter, the language used to translate what you type into commands for the system
 - Bash- a type of shell. Comes with Terminal application

THE COMMAND LINE

- Why not just use a Graphical User Interface?
 - Not good for long sequences of operations that need to be repeated on multiple datasets
 - No log of what you did and what commands you executed
 - Not conducive to executing jobs remotely on a cluster
 - Labor intensive to develop and generally restricted to a single OS
- Use the command line!
 - Extremely, extremely powerful
 - Up-front investment with ENORMOUS long-term payoff
 - Absolute necessity for big datasets, which characterize modern biology
 - Automate tasks
 - Do and re-do and re-do and re-do analyses with minimal added effort
 - Easy to record what you did, minimizing mistakes while enhancing repeatability and troubleshooting

What's a Shell?

- Interact within a SHELL
 - Intermediary between user and inner workings of the OS
 - A command interpreter, providing an interface with programs & utilities
 - A programming language, combining utilities in different ways to carry out some function(s)
 - May be used interactively or non-interactively
 - accepts input from the keyboard
 - accepts commands from a file
 - Execute *builtin* commands, implemented internally by the shell
 - `cd`, `pwd`, `exit`
 - Execute programs installed elsewhere on the file system
 - GNU Core Utilities (`coreutils`)
 - `ls`, `mv`, `rm`, `mkdir`, `chmod`, `pwd`

Bash

- Lots of different shells
- We'll use Bash, which is the default Shell in Linux and Mac OS X
 - Bash = Bourne again shell, replaced its predecessor (Bourne shell)
 - Run from a text window, e.g., Terminal in Mac OS X

Really important warnings

- Unix commands are permanent.
- There is no Recycle bin.
- There are usually no warnings*.
- If you **overwrite** a file, it's gone forever.
- If you **delete** a file, it's gone forever.
- If you don't back up your data, it's your own fault.
- Mac users: Use Time Machine.
- Make copies of your files before doing something drastic.
- Make dummy files and folders and test your command on those first. (Use **/tmp**)
- You can do real and permanent damage with the commands you learn in this course.