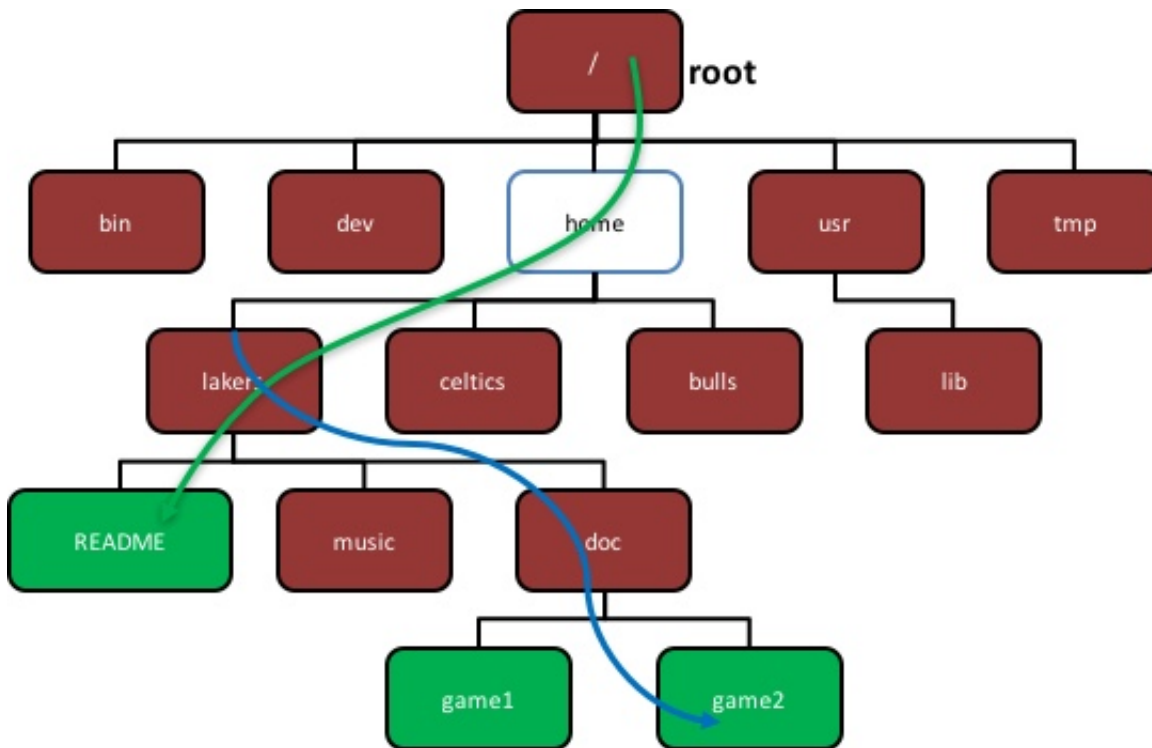CLI,linux

---

Shell Basics

- **<up arrow>**: previous command
- **<tab>**: autocomplete
- **!!**: replace with previous command
- **![str]**: refer to previous command with str
- **^[str]**: replace with command referred to as str

Linux File System Layout

Absolute Path

- **always** starts at the root
  - thus, will start with a forward-slash, /
- /home/lakers/README

Relative Path (relative to lakers)

- relative to a certain directory
- does not need to start with a forward-slash
- lakers/doc/game2

Files and Processes

- everything is either a **process** or a **file**
- even folders are directories, which are just files

Process

- an executing program identified by PID

File

- collection of data
    - document
    - text of program written in high-level language
    - executable
    - directory
    - devices

Moving Around

- **pwd**: print working directory
- **cd:** change directory
    - home directory: **~**
    - current directory: **.**
    - root directory, or directory separator: **/**
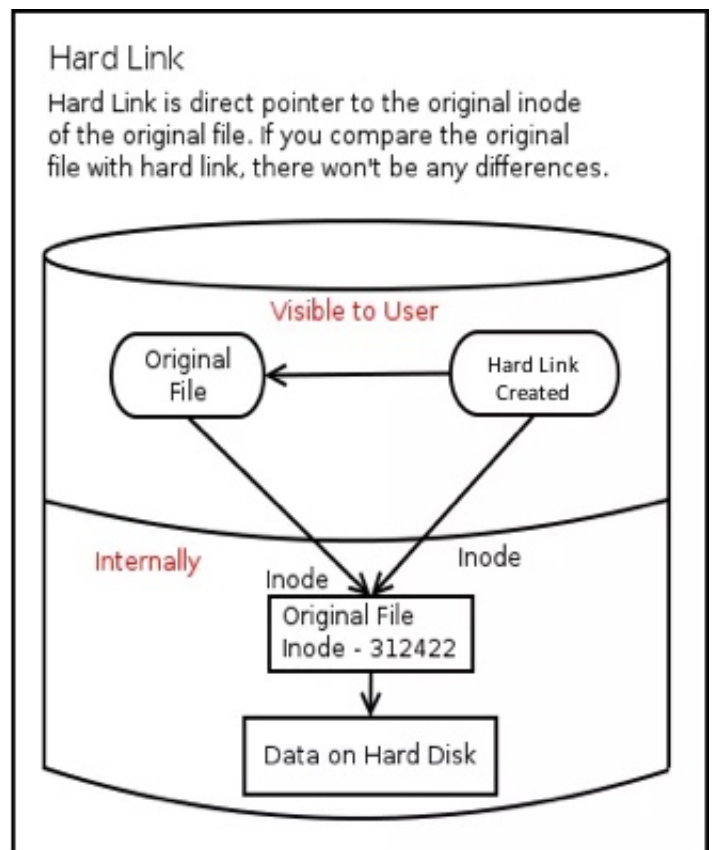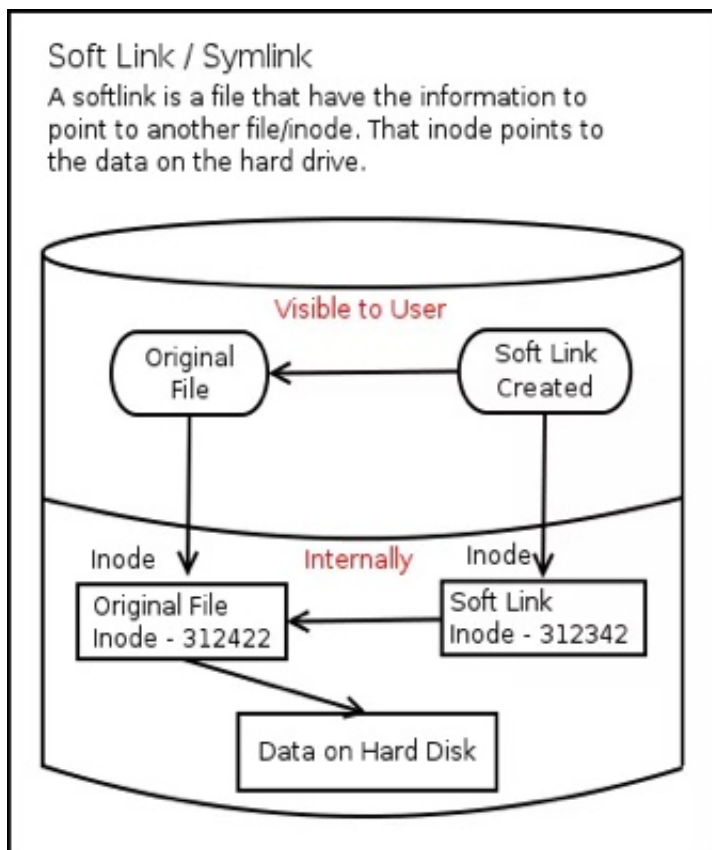   - parent directory: **..**

Dealing with Files

- **mv**: move/rename a file
- **cp**: copy a file
- **rm**: remove a file
    - **r**: remove directories and their contents recursively
- **mkdir**: remove an empty directory
- **ls**: list contents of a directory
    - **d**: list only directories
    - **a**: list all files including hidden ones
    - **l**: show long listing including permission info
    - **s**: show size of each file, in blocks
    - can apply multiple of these modifiers to ls at the same time
        - e.g. `ls -dals`

Changing File Attributes

- **ln**: create a link
  - hard links: point to physical data
  - soft links (aka symbolic links (-s)): point to a file
- **touch**: update access & modification time to current time
  - `touch filename`
  - `touch -t 201101311759.30 filename`
    - change filename's access & modification time to: 2011 January 31, 17:59:30

Soft Link v. Hard Link

Soft Link / Symlink
A softlink is a file that have the information to point to another file/inode. That inode points to the data on the hard drive.

Visible to User

Original File

Soft Link Created

Inode | Internally | Inode

Original File Inode - 312422

Soft Link Inode - 312342

Data on Hard Disk

Hard Link
Hard Link is direct pointer to the original inode of the original file. If you compare the original file with hard link, there won't be any differences.

Visible to User

Original File

Hard Link Created

Internally

Inode | Inode

Original File Inode - 312422

Data on Hard Disk

find

- **-type**: type of a file (e.g: directory, symbolic link)
- **-perm**: permission of a file
- **-name**: name of a file
- **-user**: owner of a file
- **-maxdepth**: how many levels to search

Usage

- `find . –name my*`
  - Finds any file in current directory with name starting "my"
- `find /–name filename –user Josh`
  - Finds any file in root directory with name "filename" and user "Josh"
- `find / –type f –name myfile –print`

File Name Matching

- **?**: matches any **single** character in a filename
- *****: matches **one or more** characters in a filename
- **[]**: matches any one of the characters between brackets
  - use '-' to separate a range of consecutive characters

wh… Commands

`whatis <command>`

- returns name section of `man` page

`whereis <command>`

- locates the binary, source, and manual page files for a command

Process: ps and kill

Process

- an instance of a computer program in execution

ps

- list processes that are currently running

kill

- terminates a certain process
- usage
  - `kill PID`

Daemon

- a process that runs in the background (long-term process life)
- **Ex**: cron

- enables users to schedule jobs to run periodically at certain times (cron jobs)
  - usage: full backup every month

diff

- a file comparison utility that outputs the differences between the two files
- shows the changes between one version of a file and a former version of the same file

Usage

- `diff original_file new_file`
- `diff -u original_file new_file`

wget

- a computer program that retrieves content from web servers
- similar to **curl**

Usage

- `wget <URL>`