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# Motivation and Command 1

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# Outlines

- Why to Learn Unix?
- Unix Shell
- Get Started

# Why bother to learn Unix?

- Powerful Command Line tools (Shell)
  - GUI are helpful for many tasks, but not for all.
    - Many time are wasted when you pointing and clicking.
  - An example: look through all the user's directory and add up space they were using and make a list of the results.
    - Write a program in Java or C?
    - du -s * | sort -nr > $HOME/user_space_report.txt

# Why bother to learn Unix?

- Another Example
  - All my images are named wrong!
    - 2007-09-24-picturename.jpg should be
    - 24-09-2007-picturename.jpg
  - Solution:

```
for  fn  in ./*.jpg
   do mv $fn `echo $fn |\
   sed -rn 's/([0-9]+)-([0-9]+)-([0-9]+)/\3-\2-\1/p'`
done
```

# Why bother to learn Unix?

- *The power of a system comes more from the relationships among programs than from the programs themselves* as quoted.
  - Idea of I/O redirection and pipe, hierarchical file system.
  - Treat devices as files.

# Why bother to learn Unix?

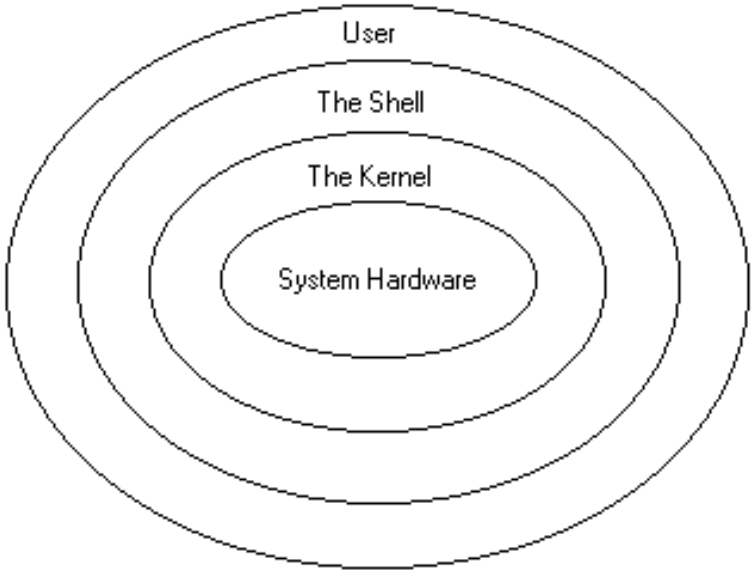
- Widely used in servers, workstations, and mobile devices.
  - The Unix environment and the client–server program model were essential elements in the development of the Internet.
  - And essential in reshaping of computing as centered in networks rather than in individual computers.
    - Cloud computing, grid computing and distributed computing.

# Unix Shell

- A shell is a program that allows the user to interact with the UNIX system:
  - read user's input and parses it.
  - evaluates special characters.
  - setup pipes, redirections, and background processing.
  - find and setup programs for execution.

# Unix Shell

- The Shell is sandwiched between Users and Kernel.
- Shell accepts command and parse it, sometimes invokes the services Kernel provides.




Picture in courtesy of http://www.livefirelabs.com/unix_tip_trick_shell_script/unix_shell_scripting/20-unix-shell-scripting-interview-questions-and-answers-part-1.htm

# Unix Shell

- There are primarily two families of Unix shells:
  - Bourne shell (AT&T) sh → ksh → bash
  - C shell (Berkley) csh → tcsh
- We focus on bash: easy syntax and default in many systems, such as Debian.
- You check the type of shell you are using:

```
ps –p $$
```

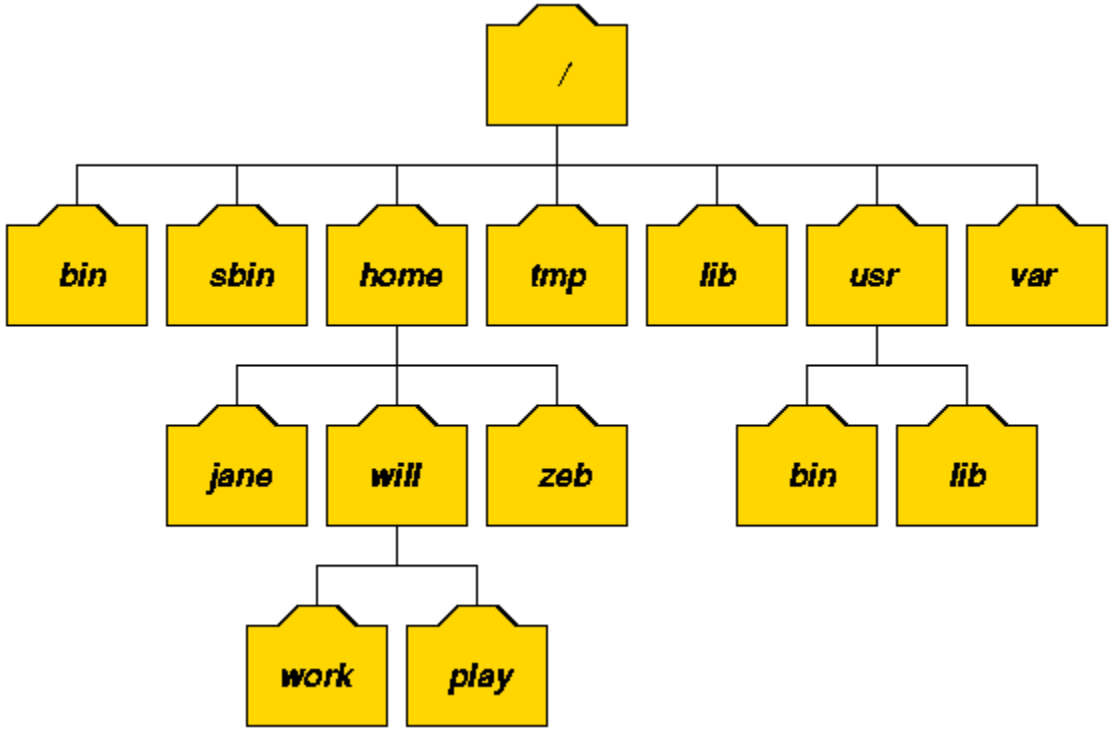
# Run A Command

- Commands will be shown on slides using font
  - **Command [opt1] [opt2]**
  - A summary synopsis of calling the command will be shown listing the command name and potential optional arguments.
- To execute a command, just type its name into the shell and press return/enter.

# The Unix File System

- Unlike windows, UNIX has a single global “root” directory / (instead of a root directory for each disk or volume)
- All files and directories are case sensitive.
  - hello.txt != hEllO.tXt
- Directories are separated by / instead of \ in windows
  - UNIX: /home/ytian/Documents/cscd240/2013/Lecture2/
  - Windows: D:\Documents\cscd240\2013\Lecture2\
- “Hidden” files begin with “.” (dot) e.g. .gimp
- Lets look at directories in my root directory.

# The Unix File System




Unix File System Tree
Picture from http://www.doc.ic.ac.uk/~wjk/UnixIntro/Lecture2.html

# The Unix File System

- /dev: Hardware devices can be accessed here - usually you don't mess with this stuff.
- /lib: Stores libraries, along with /usr/lib, /usr/local/lib, etc.
- /usr: Mostly user-installed programs and their related files.
- /etc: System-wide settings

# The Unix File System

- /mnt: Frequently used to mount disk drives.
  - File Systems from different devices and partitions are hung on the tree at commonly accepted points – referred as **mounting**.
  - **df –h** command to display all mounted file systems.

# The Unix File System

- Programs are usually installed in one of the “binaries" directories:
  - /bin: System programs.
  - /usr/bin: Most user programs.
  - /usr/local/bin: A few other user programs.

# The Unix File System

- Where are my stuff?
  - Your files can be found in your home directory, usually located at:
    - /home/username
  - Your home directory can also be access using the special character ~

# The Unix File System

- Where am I now in the file tree?
  - Many shells default to using the current path in their prompt.
- If current path is not shown in the prompt,
  - Print Working Directory Command
  - **pwd**
    - Print the full path of the current directory.
    - Handy when get lost.

# The Unix File System

- Before we move around, let us see what is in the current direcory,

  **ls [options] [file]**

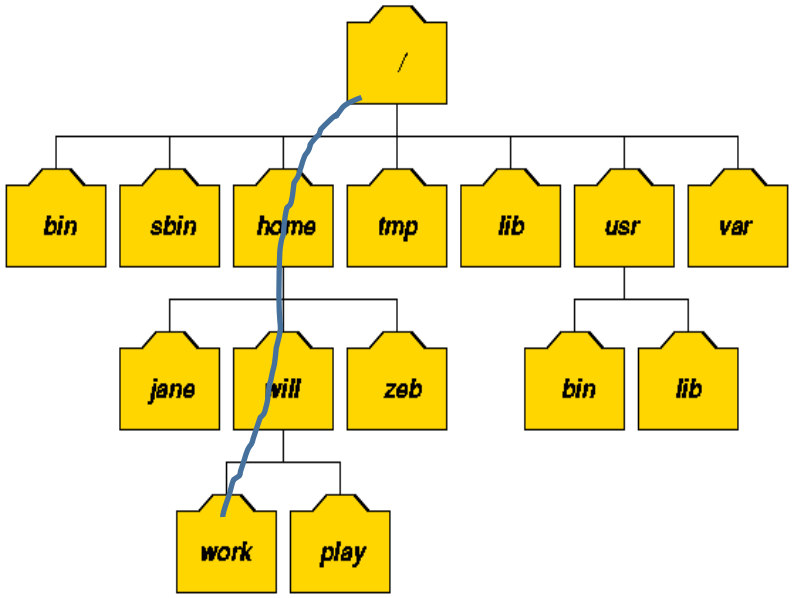
- List directory contents ( including subdirectories)
- Works like the dir command from DOS
- The *-l* option lists detailed file/directory information.

# The Unix File System

- How can we move around in file tree?
- **cd [directory_name]**
  - changes directory to [directory_name]
- If not given a destination, defaults to the user's home directory,
  - Equivalent to **cd ~**

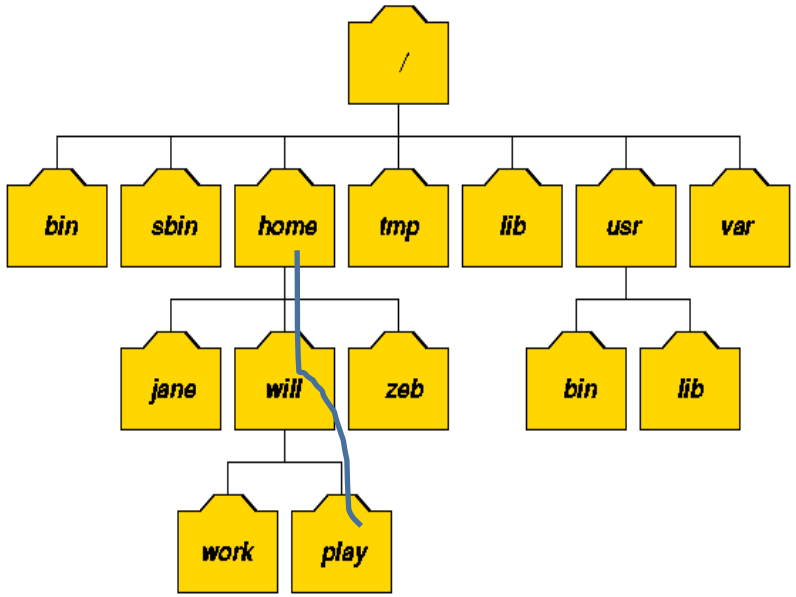
# The Unix File System

- **cd** command could take an absolute path
  - cd /home/will/work
  - Absolute path starts from the root of the tree, down to the folder that you like to access.



# The Unix File System

- **cd** command could also take an relative path
  - Assume you currently in folder /home.
  - You can go into /home/will/play by using command:
  - **cd will/play** ( will/play is a relative path that starts from the current directory.)



# Take Home Summary

- What is Unix Shell?
- The Unix File System Commands
  - Home directory and **~**
  - List files in a directory using **ls -l**
  - Change directory using **cd folder_name**
  - Print current directory **pwd**

# Next Class

- More information for commands
  - ls and cd
- More commands
  - mkdir rmdir, rm, touch, cp, mv etc.