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Unix Bash Efficiency and Env

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Recall Last Class

- Now you know how to change permission for a file.
  - chmod 755 myfile1
  - chmod ug+rw myfile2
- We learned nano and vi used to edit a file
- less and more
- head and tail
- echo and cat

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Outline for Today

- Shell shortcut keys
- History
- Special characters or metacharactgers

Shell Shortcuts

- Tab completion
  - Very useful when you input path to a file
- Up-down arrow: browse through command history
  - so you do not have to retype everything
- Ctrl + e: jump cursor to end of line
- Ctrl + a: jump cursor to beginning of line

Reusing History

- Use the bang operator (!) to repeat a command from your history that begins with the characters following it.

  ytian@debian:$ **pdflatex lecture3.tex**

  ytian@debian:$ **!pdf**

  (repeat most recent command that starts 'pdf')

  !! will run your last command.

- **History**
  - This command shows the history command you typed in previously.

Shell Expansion/Metacharacters

- * ^ ? { } [ ] are all “wildcard" characters that the shell uses to match:
  - Any string
  - A single character
  - A phrase
  - A restricted set of characters
- The shell's ability to interpret and expand commands is one of the powers of shell scripting.

Shell Expansion/Metacharacters

- *
  - Matches any string, including the null string (i.e. 0 or more characters).
- Examples:

Input	Matched	Not Matched
Lec*	Lecture1.pdf Lec.avi	ALecBaldwin/
L*ure*	Lecture2.pdf Lectures/	sure.txt
*.tex	Lecture1.tex Presentation.tex	tex/

Shell Expansion

- ?
  - matches a single character
- Examples:

Input	Matched	Not Matched
Lecture?.pdf	Lecture1.pdf Lecture2.pdf	Lecture11.pdf
ca?	cat can cap	ca cake

Shell Expansion/Metacharacters

- [ ]
  - matches any ***one*** character inside the brackets
  - Use a dash to indicate a range of characters
  - Can put commas between characters/ranges.

Input	Matched	Not Matched
[SL]ec*	Lecture Section	Vector.tex
Day[1-4].pdf	Day1.pdf Day2.pdf	Day5.pdf
[A-Z,a-z][0-9].mp3	A9.mp3 z4.mp3	Bz2.mp3 9a.mp3

Shell Expansion/Metacharacters

- [^ ….]
  - matches any character NOT inside the square brackets.
  - Characters inside brackets provide options for only one place.

Input	Matched	Not Matched
[^A-P]ec*	Section.pdf	Lecture.pdf
[^A-Za-z]*	9Days.avi .bash_profile	vacation.jpg

Shell Expansion/Metacharacters

- Example usage with command
- Assume we have four files in the current directory, file1, file2, test3, file22 and file33
- Using wildcard, how to delete file1, file2 and test3 in one command but keep file22 and file33?
- **rm file*** Is that right? NO
- Any thought?

Shell Expansion/Metacharacters

- Example usage with command
- **rm *[1-3]** Is that right? NO
- Any thought?

```
rm *[a-z][0-9]
```

Step back a little…

- Shell commands can be one of three things:
  - 1, Executable program (compiled and linked)
    - Such as exe file in windows.
  - 2, Shell script - a text file of shell commands and shell programming statements.
    - file must have execute permission

Step back a little…

- Shell commands can be one of three things:
  - 3, Shell builtin command - hard to tell which commands are builtin to the shell.
    - e.g. cd and pwd are actually builtins. Some built-ins have no man pages - use "help“.

Environment Variables

- When you log in on UNIX, your current shell (login shell) sets a unique working environment for you
  - which is maintained until you log out.
- Some common environment variables
  - PATH, HOME, JAVA_HOME, SHELL, LD_LIBRARY_PATH
  - **env** command shows all environment variables.

Environment Variables

- PATH
  - Specify a list of directories the shell searches for the commands, using colon to separate them.
  - **echo $PATH**
    - Show all directories where shell searches for commands
- Change PATH in bash
  - export PATH="$PATH":/path/to/your/program
  - This command only works for your current session.

Environment Variables

- The **.bashrc** file in your home directory
  - executed whenever a new shell is started.
  - To add a PATH entry **permanently** for all your sessions.
    - Add a command in your .bashrc file
    - **export PATH=/files/local/jdk1.6.O_23/bin:"${PATH}"**
    - /files/local/jdk1.6.O_23/bin is added to PATH permanently**.**
  - Or make an alias permanent by add to your .bashrc file
    - **alias dir="ls -alh"**

Alias Again

- **alias name='command'**
- The alias allows you to rename or type something simple instead of typing a long command.
- You can set an alias for your current session at the command prompt.
- To set an alias more permanently add it to your .bashrc or .bash_profile file in your home directory.

Summary

- Now you know using metacharacters in your command, such as *, ?, [], [^….].
- Using !! to run last command you did.
- Using !cd to run your history command that starts with ‘cd’
  - !echo run your history command that starts with ‘echo’.
- PATH and .bashrc file in your home.

Next Class

- Process and Pipe
- Output redirection