Ve 280

Programming and Elementary Data Structures

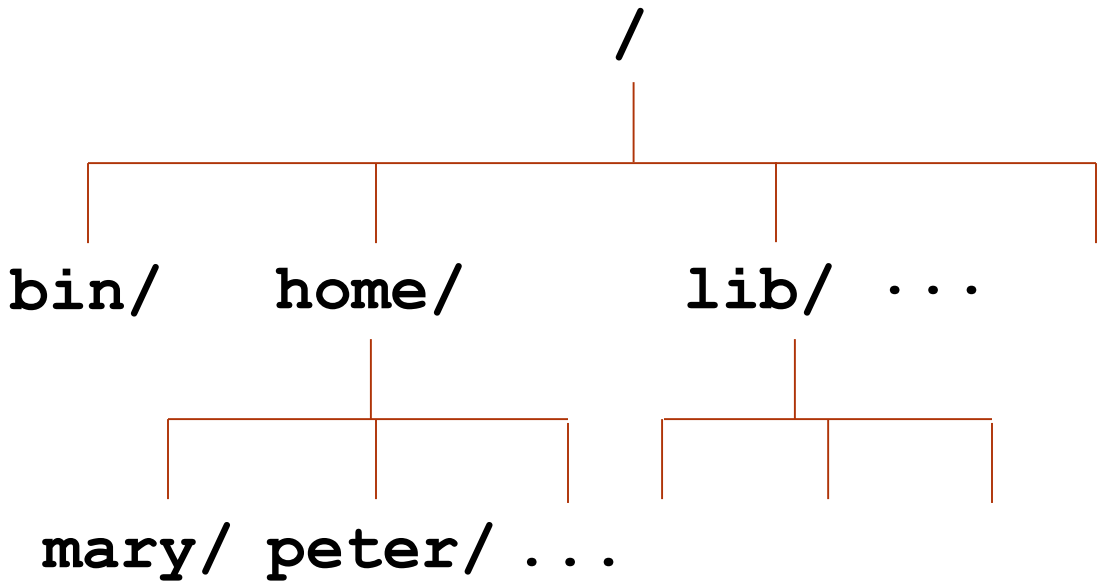
Linux

Change Directory

- Basic command: cd pathname
  - E.g., cd /usr/bin
    typical path name format
- Special characters for directories
  - root directory: /
  - home directory: ~
    - Linux is a multi-user operating system. It is the "home directory" of you.
  - current directory: .
  - parent directory: ..

Aside: Root Directory

- Directory in Linux is organized as a tree
- The topmost directory is root directory "/"



List Contents of a Directory

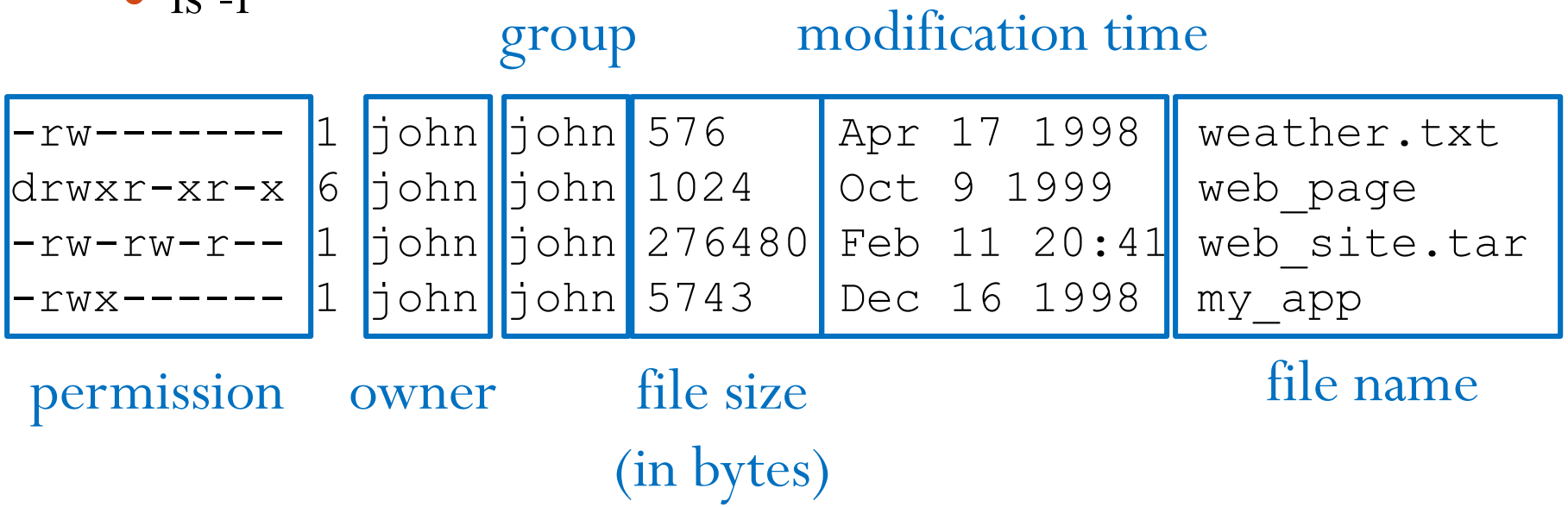
- Basic command: ls directory
  - E.g., ls /home

- ls (i.e., "ls" alone): list the current working directory

- ls -l [directory]: list in long format
- ls -a [directory]: list all files including the hidden files
  - Hidden files: file name begin with a dot. E.g., ".bash_history"
- In Linux, options can be combined together.
  - "ls -la" or "ls -l -a"

Aside: Long Format of File Information

- ls -l



- File permission
  - First character: '-' regular file; 'd' directory
  - Next three: read, write, execution permission of the owner
  - Next three: read, write, execution permission of the group
  - Final three: read, write, execution permission of everyone else

Manipulating Files/Directories

- Create directories: mkdir dir
- Delete directories: rmdir dir
  - Can only remove **empty** directory
- Create an empty file: touch file

Copy Files/Directories

- Basic command: cp source dest

- Variations
  - cp file1 file2: copy the content of file1 into file2
  - cp file1 dir: copy file into a directory
    - cp file1 file2 dir
    - cp file* dir
      - *: wildcard, matches any character
  - cp -r dir1 dir2: If dir2 does not exist, copy dir1 as dir2. If dir2 exists, copy dir1 **inside** dir2

Question: How do you list all the ".cpp" file in the current directory?

Rename/Move a File

- Basic command: mv source dest

- Variations
  - mv file1 file2: rename file1 as file2
  - mv file1 dir: move file into a directory
  - mv dir1 dir2: If dir2 does not exist, then rename dir1 as dir2. If dir2 exists, then move dir1 **inside** dir2

Delete Files/Directories

- Basic command: rm file

- Variations
  - rm file: delete file
  - rm file1 file2: delete file1 and file2
  - rm -r dir: delete dir along with its contents

- Useful options -i: prompt before every removal
  - To use: alias rm='rm -i';
  - Put it into ~/.bashrc

Edit/Show a File

- Edit file: nano file gedit file
  - advanced editor: vim, emacs
- Show file content
  - cat file
  - less file
    - quit 'less': press 'q'
    - go to the end: press 'G' (shift + g)
    - go to the beginning: press 'g'
    - search: press '/', then enter the thing to be searched
    - press 'n' for the next match; press 'N' for the previous match.

I/O Redirection

- Most command line programs display their results on the **standard output**.
  - By default, standard output is our display.

- We can redirect from standard output to a file by using '>'.
  - E.g., ls -l > ls_rst.txt: the "ls" result is now in ls_rst.txt

I/O Redirection

- Many commands can accept input from a facility called **standard input**.
  - By default, standard input is our keyboard.
- We can redirect standard input from a file instead of keyboard by using '<'.
  - One application: testing
  - E.g., my_add < input.txt
    # my_add is a program taking two inputs from keyboard and output their sum on screen
- Question: what does the following command mean?
  - my_add < input.txt > output.txt

Other Commands

- Auto completion: type a few characters; then press 'Tab'
  - If there is a single match, Linux completes the remaining.
  - If there are multiple matches, hit the second time, Linux show the candidates.
- Compare two files: diff file1 file2
  - If files are the same, no output
  - If there are differences: lines after "<" are from the first file; lines after ">" are from the second file
  - In a summary line: 'c': change; 'a': add; 'd': delete
  - Useful option "-w": ignore white spaces (space, tab)

Other Commands

- Install a program: sudo apt-get install program
  - E.g., sudo apt-get install emacs
  - sudo command: execute command as a superuser
    - Need you to type your password
- Remove a program: sudo apt-get autoremove program
- Looking for help? man command E.g., man ls
  - Browse the manual using the same command as for 'less'

Reference

- http://linuxcommand.org/