CS114: Unix Tools

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http://www.cs.cornell.edu/courses/cs114/2007fa

Please take one of each handout (3 sheets)

Why UNIX Tools?

- Build complex commands out of simple pieces
  - What are the 5 most common commands I use?
  - `history | awk '{print $2}' | sort | uniq -c | sort -rn | head -5`
    - 1440 ls
    - 1348 less
    - 909 vim
    - 849 cd
    - 673 make
- String together separate programs (five here)

Another example

- Help! My files are named wrong
- 2007-09-24-picture.jpg should be 24-09-2007-picture.jpg
- ```
  for fn in *.jpg
    do mv $fn `echo $fn | sed -E
  's/([0-9]+)-([0-9]+)-([0-9]+)/\3-
  \2-\1/'`
  done
  ```
  ```

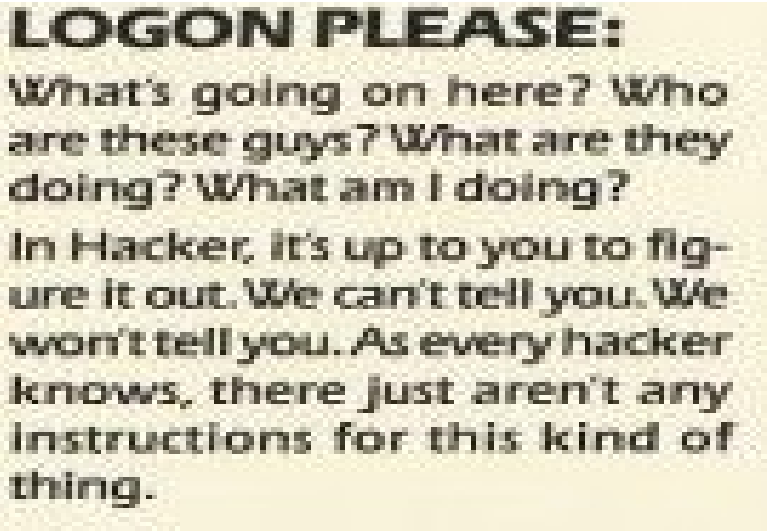
What is UNIX?

- A family of *operating systems*
  - Like Microsoft Windows, Mac OS, ...
- UNIX != Linux
  - Linux is one of many members of the UNIX family
  - Also Mac OS X, FreeBSD, Solaris, IRIX, ...

This course

- Files and Directories
- Security and permissions
- Editors: vi and emacs
- Shells, environment variables
- Jobs, pipes, IO redirection
- Regular expressions
- Awk and sed
- Basic shell scripting

Step 1: logging in



LOGON PLEASE:

What's going on here? Who are these guys? What are they doing? What am I doing?

In Hacker, it's up to you to figure it out. We can't tell you. We won't tell you. As every hacker knows, there just aren't any instructions for this kind of thing.

- `ssh`
  - From CSUGlab, use SSH Secure Shell
  - Other programs: putty, non-GUI ssh
  - [demo]

Now what?

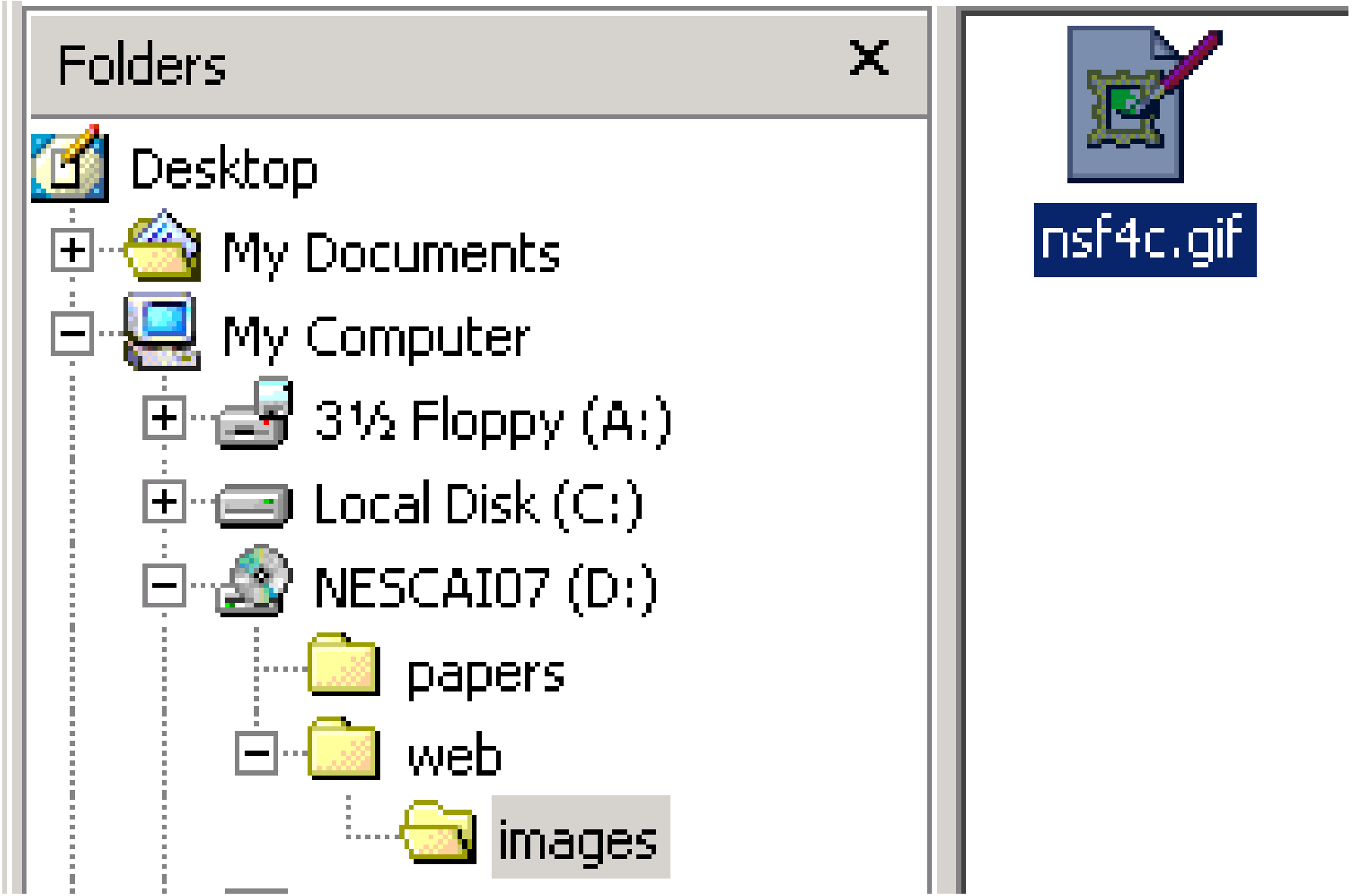
- `[ejb34@empire ~]%`
- This is the “shell prompt”
  - Just like “DOS prompt” or Command Window (or Mac Terminal)
- Does nothing till you type a command & hit <ENTER>

- No GUI!
  - There are UNIX GUIs, but we won't cover them here

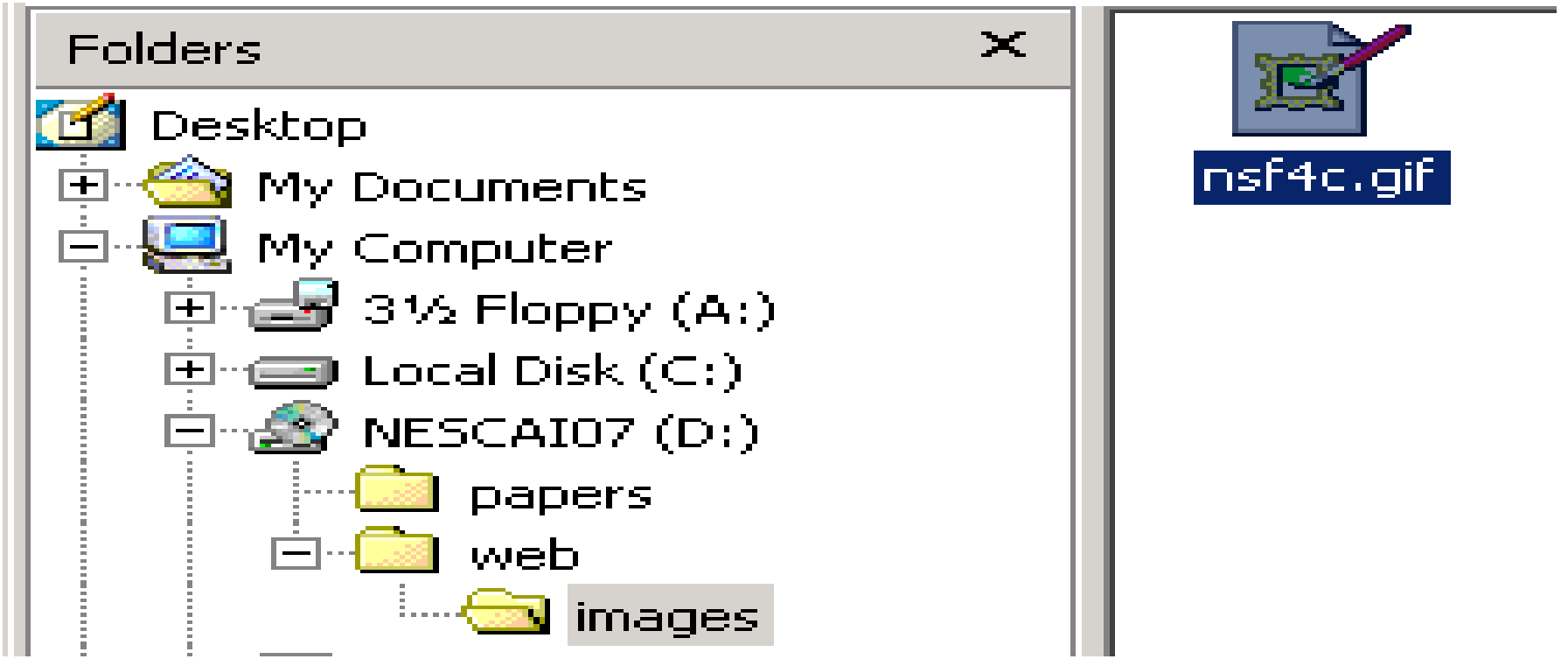
Files and directories

- Directory = Folder 
- CaSe SeNsiTiVE
  - hello.txt != HELLO.TXT
- Single global “root” directory
  - Unlike Windows: root = C:\, D:\
  - / / / instead of \ \ \

Nested directories: Windows



Windows paths



~~\Desktop\My Computer\NESCAI07\web\images\nsf4c.gif~~

D:\web\images\nsf4c.gif

Nested directories: UNIX

`/home/ejb34/cs114/hw1.txt`

Directories and paths

- The current directory
- Your home directory
- .. (the parent directory)

- Absolute
  - `/home/ejb34/cs114/hw1.txt`
- Relative (when current = /home/ejb34)
  - `cs114/hw1.txt`

The most important commands

- `ls` – **li**s**t** contents of current directory
- `cd` – **c**hange current **d**irectory
- `pwd` – **p**rint **w**orking (current) **d**irectory
- `mv oldfilename newfilename`
  - **m**o**v**e old file to new file (= rename)
- `cp oldfilename newfilename`
  - **c**o**p**y old file to new file
- `rm file`
  - **r**e**m**ove file – dangerous, be careful!

The most important command

- `man` – online manual
  - [demo]

Administrivia

- No required textbook (see website)
- Drop deadline = October 1
- Auditors welcome (but you need your own UNIX access)
- Submitting assignments: Cornell CS Course Management System (CMS) (see website)

Policies

- Working together
  - Okay, but write up your own work, do not copy code.
  - Academic integrity will be enforced (see handout, website)
- Late assignments
  - Will not be accepted.

By Wednesday

- Make sure you have a CSUG account
- Log in to the csug linux machines

- Before you go today
  - Hand in your student information sheet!

Permissions and security

- I don't want you to read my e-mail
- Every file and directory has an *owner* and a *group*.
- The owner can set permissions for
  - Owner
  - Group
  - Everybody
- Read
- Write (modify)
- Execute (running programs)

Changing permissions

- `chmod`
- Make `hw1` readable by everyone
  - `chmod a+r hw1`
- Remove all permissions for everyone but owner of `hw1`
  - `chmod og-rwx hw1`
- Make `hw1` writeable by owner
  - `chmod u+w hw1`