Lesson Module Checklist

- Slides
- Flash cards
- First minute quiz
- Web calendar summary
- Web book pages
- Commands
- Howtos

- Lab tested
- Opus - submit and turnin directory tested

- Bring Add Codes
- Bring printed roster

- Backup slides, Confer links, handouts on flash drive
- 9V backup battery for microphone

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CIS 90 - Lesson 2

Instructor: **Rich Simms**
Dial-in: **888-450-4821**
Passcode: **761867**

Aaron Andrew B. Andrew C.

Arthur Brian Cory

Daniel David G. Dave L. David P. Debbie Edtson Fidel Humberto Hunter Imara

Ismael Jessica Joseph Juliana Lucie Marc Marty Matt Michael Rochelle

Shawn Tabitha Taylor Tyler Will Zachary Zsolt

Email me (risimms@cabrillo.edu) a relatively current photo of your face for 3 points extra credit

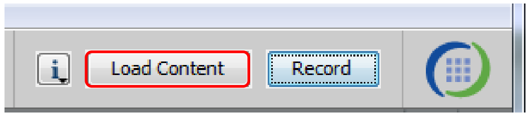
Introductions and Credits

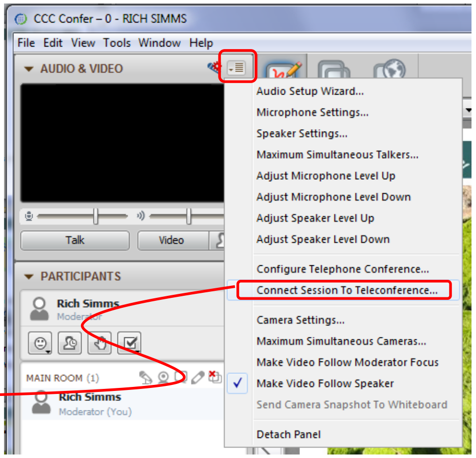
Jim Griffin
- Created this Linux course
- Created Opus and the CIS VLab
- Jim's site: http://cabrillo.edu/~jgriffin/

Rich Simms
- HP Alumnus
- Started teaching this course in 2008 when Jim went on sabbatical
- Rich's site: http://simms-teach.com

And thanks to:
- John Govsky for many teaching best practices: e.g. the First Minute quizzes, the online forum, and the point grading system (http://teacherjohn.com/)

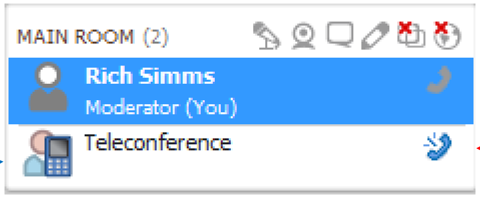
[ ] **Preload White Board with *cis*lesson??*-WB***



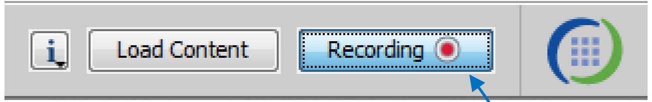

CCC Confer – 0 - RICH SIMMS
File Edit View Tools Window Help
AUDIO & VIDEO
Audio Setup Wizard...
Microphone Settings...
Speaker Settings...
Maximum Simultaneous Talkers...
Adjust Microphone Level Up
Adjust Microphone Level Down
Adjust Speaker Level Up
Adjust Speaker Level Down
Configure Telephone Conference...
Connect Session To Teleconference...
Camera Settings...
Maximum Simultaneous Cameras...
Make Video Follow Moderator Focus
Make Video Follow Speaker
Send Camera Snapshot To Whiteboard
Detach Panel
Talk
Video
PARTICIPANTS
Rich Simms
MAIN ROOM (1)
Rich Simms
Moderator (You)

[ ] **Connect session to Teleconference**

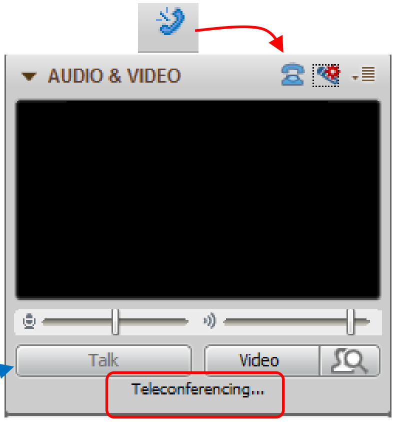
Session now connected to teleconference



[ ] **Is recording on?**



Red dot means recording



[ ] **Use teleconferencing, not mic**

Should be greyed out

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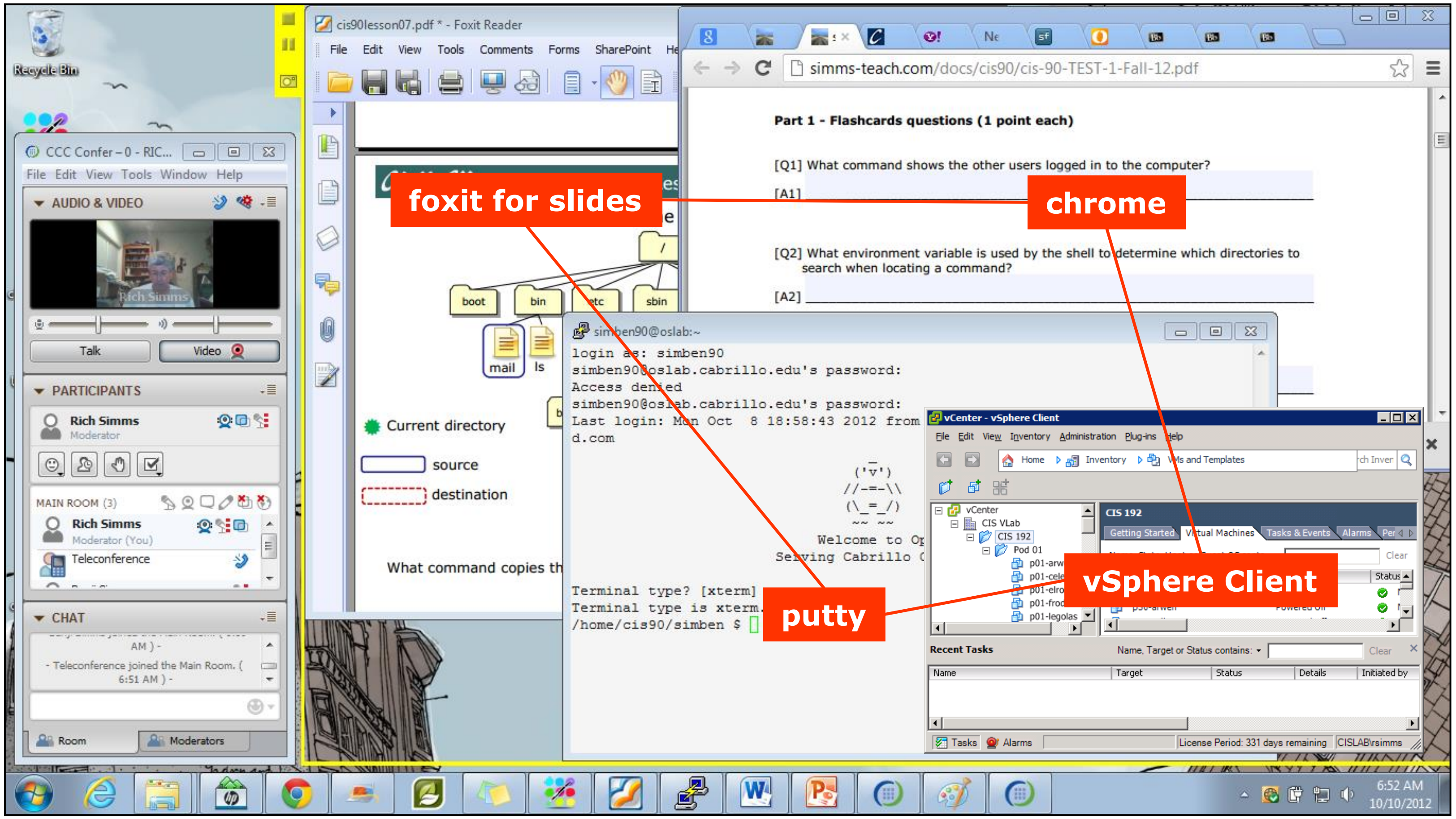
CIS 90 - Lesson 2

CCC Confer

[ ] Video (webcam) optional

[ ] layout and share apps



- Teleconference joined the Main Room. (6:51 AM) -

Part 1 - Flashcards questions (1 point each)

[Q1] What command shows the other users logged in to the computer?

[A1] ______________________________

[Q2] What environment variable is used by the shell to determine which directories to search when locating a command?

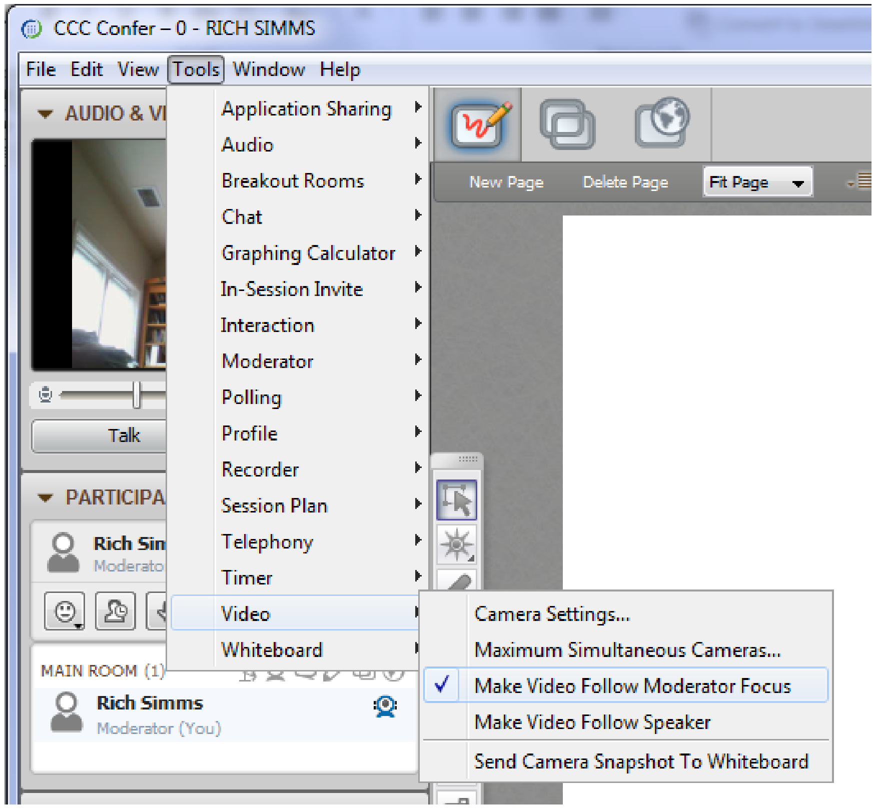
[A2] ______________________________

```
simben90@oslab:~
login as: simben90
simben90@oslab.cabrillo.edu's password:
Access denied
simben90@oslab.cabrillo.edu's password:
Last login: Mon Oct  8 18:58:43 2012 from
d.com

                                    ('v')
                                   //-=-\\
                                   (\_=_/)
                                    ~~ ~~
                                Welcome to Op
                             Serving Cabrillo C

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
```

[ ] Video (webcam) optional

[ ] Follow moderator

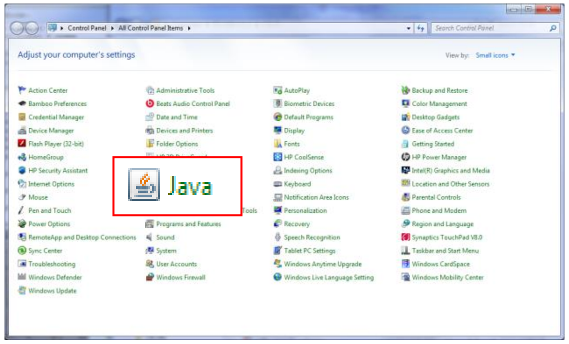
[ ] Double-click on postages stamps



Universal Fix for CCC Confer:

1) Shrink (500 MB) and delete Java cache
2) Uninstall and reinstall latest Java runtime

Control Panel (small icons)



Control Panel ▸ All Control Panel Items ▸

Adjust your computer's settings — View by: Small icons

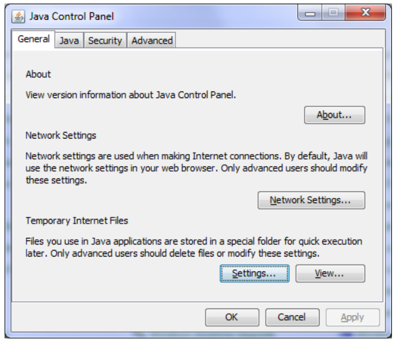
Action Center, Bamboo Preferences, Credential Manager, Device Manager, Flash Player (32-bit), HomeGroup, HP Security Assistant, Internet Options, Mouse, Pen and Touch, Power Options, RemoteApp and Desktop Connections, Sync Center, Troubleshooting, Windows Defender, Windows Update

Administrative Tools, Beats Audio Control Panel, Date and Time, Devices and Printers, Folder Options, Java, Programs and Features, Sound, System, User Accounts, Windows Firewall

AutoPlay, Biometric Devices, Default Programs, Display, Fonts, HP CoolSense, Indexing Options, Keyboard, Notification Area Icons, Personalization, Recovery, Speech Recognition, Tablet PC Settings, Windows Anytime Upgrade, Windows Live Language Setting

Backup and Restore, Color Management, Desktop Gadgets, Ease of Access Center, Getting Started, HP Power Manager, Intel(R) Graphics and Media, Location and Other Sensors, Parental Controls, Phone and Modem, Region and Language, Synaptics TouchPad V8.0, Taskbar and Start Menu, Windows CardSpace, Windows Mobility Center

General Tab > Settings…



Java Control Panel

General | Java | Security | Advanced

About

View version information about Java Control Panel.

About…

Network Settings

Network settings are used when making Internet connections. By default, Java will use the network settings in your web browser. Only advanced users should modify these settings.

Network Settings…

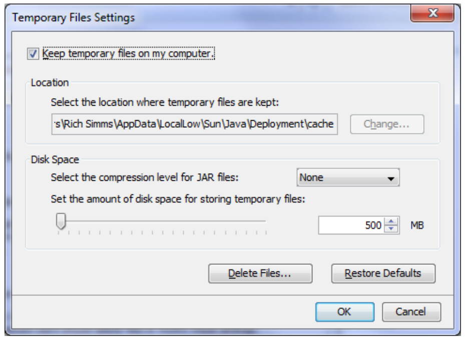
Temporary Internet Files

Files you use in Java applications are stored in a special folder for quick execution later. Only advanced users should delete files or modify these settings.

Settings… | View…

OK | Cancel | Apply

500MB cache size



Temporary Files Settings

☑ Keep temporary files on my computer.

Location

Select the location where temporary files are kept:

s\Rich Simms\AppData\LocalLow\Sun\Java\Deployment\cache | Change…

Disk Space

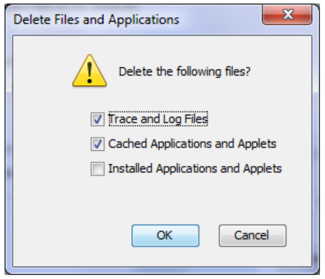
Select the compression level for JAR files: None

Set the amount of disk space for storing temporary files: 500 MB

Delete Files… | Restore Defaults

OK | Cancel

Delete these



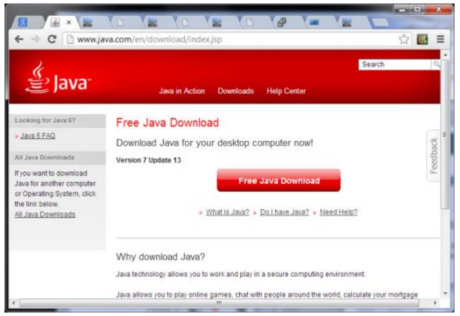
Delete Files and Applications

Delete the following files?

☑ Trace and Log Files
☑ Cached Applications and Applets
☐ Installed Applications and Applets

OK | Cancel

Google Java download



www.java.com/en/download/index.jsp

Java — Java in Action | Downloads | Help Center — Search

Looking for Java 6?
» Java 6 FAQ

All Java Downloads
If you want to download Java for another computer or Operating System, click the link below.
All Java Downloads

Free Java Download

Download Java for your desktop computer now!

Version 7 Update 13

Free Java Download

» What is Java? » Do I have Java? » Need Help?

Why download Java?

Java technology allows you to work and play in a secure computing environment.

Java allows you to play online games, chat with people around the world, calculate your mortgage

First Minute Quiz

Please answer these questions **in the order** shown:

Use CCC Confer White Board

email answers to: risimms@cabrillo.edu

(answers must be emailed within the first few minutes of class for credit)

Commands

Objectives	Agenda
• Understand how the UNIX login operation works. • Meet John the Ripper and learn how vulnerable a poor password is. • Understand basic command syntax and operation. • Understand program files and what happens when they are run. • Understand how the shell works and environment variables. • Understand how to get documentation when online.	• Quiz • Questions and Review • Putty tips • Deep dive on logging in • Passwords • Housekeeping • New commands • Programs/processes • Command line syntax • Environment variables • Metacharacters • Life of the shell • Docs • Wrap up

Questions

Questions

How this course works?

Previous lessons

Previous labs?

Chinese Proverb	他問一個問題，五分鐘是個傻子，他不問一個問題仍然是一個傻瓜永遠。 *He who asks a question is a fool for five minutes; he who does not ask a question remains a fool forever.*

Review and clarifications

Forum Top Issues

1) How to get into VLab

2) Shell vs Kernel

3) Blank PDF submittals (surveys and lab submittals)

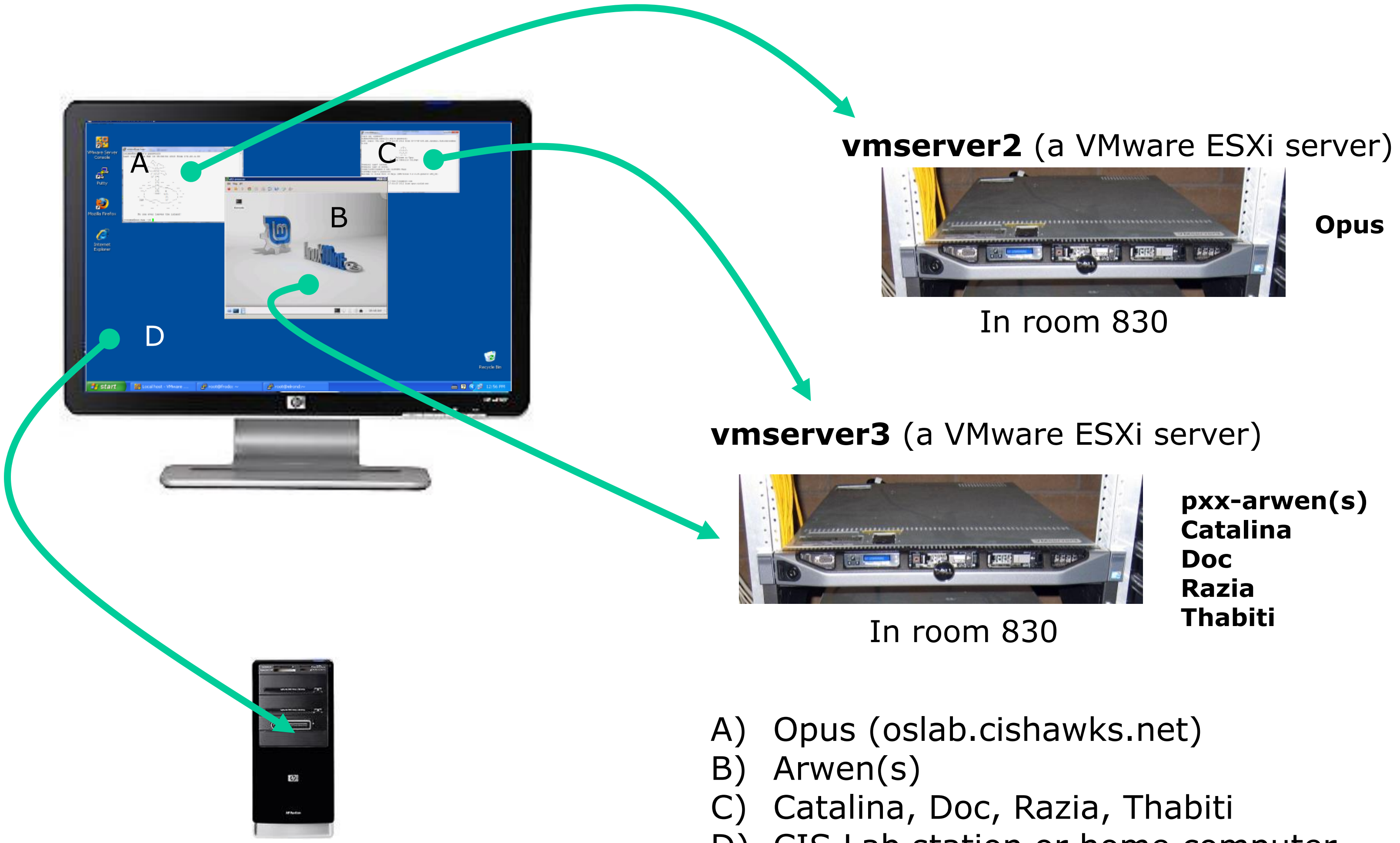
Thanks to everyone who posted these issues on the forum!

And thanks to everyone who posted solutions to these issues on the forum!

The new Lesson 1 tools in your toolbox

cal	*Prints calendars*
clear	*Clears the screen*
date	*Shows the time and date*
exit	*Exits login session*
history	*Shows previous commands*
hostname	*Shows name of computer being interacted with*
id	*Shows UID's, GID's and SELinux information*
ps	*Shows process information*
ssh	*Initiates connection and login to remote computer*
uname	*Shows name of operating system kernel*
tty	*Shows name of terminal device*
who	*Shows all users who are logged in and from where*
who am i	*Like **who**, but only shows your login session*

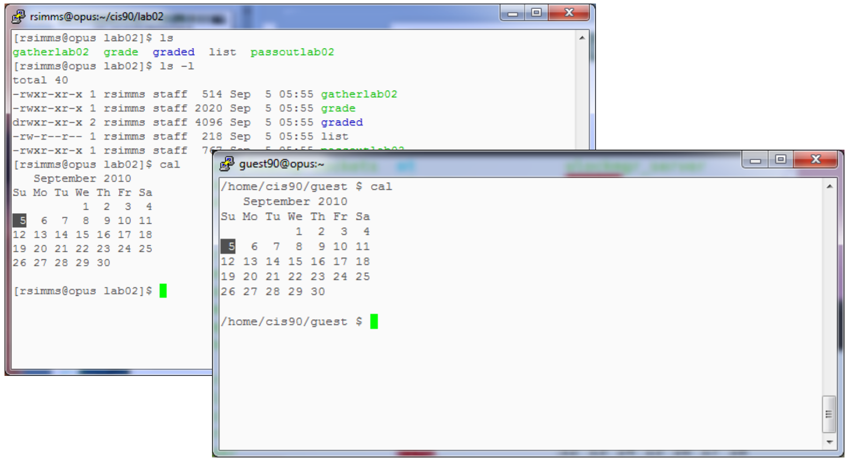
We used multiple physical and virtual computers for Lab 1 !!



CIS-Lab-XX
(or your home computer/tablet)

A) Opus (oslab.cishawks.net)
B) Arwen(s)
C) Catalina, Doc, Razia, Thabiti
D) CIS Lab station or home computer

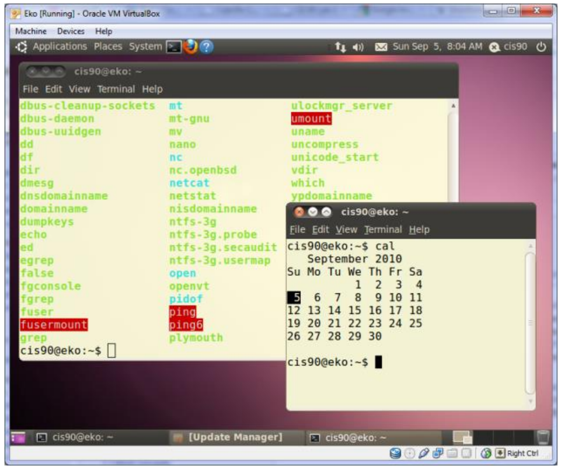
Terminals



```
[rsimms@opus lab02]$ ls
gatherlab02  grade  graded  list  passoutlab02
[rsimms@opus lab02]$ ls -l
total 40
-rwxr-xr-x 1 rsimms staff  514 Sep  5 05:55 gatherlab02
-rwxr-xr-x 1 rsimms staff 2020 Sep  5 05:55 grade
drwxr-xr-x 2 rsimms staff 4096 Sep  5 05:55 graded
-rw-r--r-- 1 rsimms staff  218 Sep  5 05:55 list
-rwxr-xr-x 1 rsimms staff  76
[rsimms@opus lab02]$ cal
   September 2010
Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30

[rsimms@opus lab02]$
```

```
/home/cis90/guest $ cal
   September 2010
Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30

/home/cis90/guest $
```

Terminal emulators like PuTTY or Mac terminal (with scroll bars, colors, customizable backgrounds, fonts and sizes) and runs on another computer



```
dbus-cleanup-sockets  mt                  ulockmgr_server
dbus-daemon           mt-gnu              umount
dbus-uuidgen          mv                  uname
dd                    nano                uncompress
df                    nc                  unicode_start
dir                   nc.openbsd          vdir
dmesg                 netcat              which
dnsdomainname         netstat             ypdomainname
domainname            nisdomainname
dumpkeys              ntfs-3g
echo                  ntfs-3g.probe
ed                    ntfs-3g.secaudit
egrep                 ntfs-3g.usermap
false                 open
fgconsole             openvt
fgrep                 pidof
fuser                 ping
fusermount            ping6
grep                  plymouth
cis90@eko:~$
```

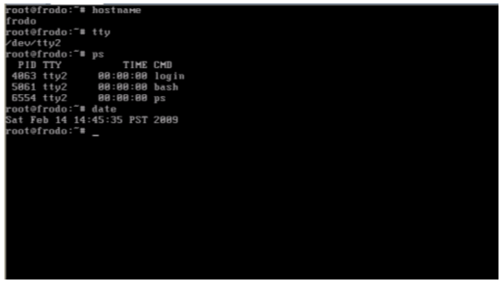
```
cis90@eko:~$ cal
   September 2010
Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30

cis90@eko:~$
```

Graphical terminals (with scroll bars, colors, customizable backgrounds, fonts and sizes) available on the graphical desktop

tty = teletype

Terminals were used in the old days to interact with computers.

Today we use **terminal emulators** that are software programs.



```
root@frodo:~# hostname
frodo
root@frodo:~# tty
/dev/tty2
root@frodo:~# ps
  PID TTY          TIME CMD
 4063 tty2     00:00:00 login
 5061 tty2     00:00:00 bash
 6554 tty2     00:00:00 ps
root@frodo:~# date
Sat Feb 14 14:45:35 PST 2009
root@frodo:~# _
```

Virtual terminals (use ctrl-alt-fn)
(no scroll bars, also called a console)

Which car should you drive today?

Access the UNIX/Linux systems using:

ssh when:

- You just need a command line
- Have a low or high speed network connection
- Note: Windows users can use Putty

VLab when:

- You want a graphical desktop
- You want to use virtual terminals
- High speed network connection needed
- Note: Mac users can use CoRD
- Note: you may need a fix applied to your VM if you experience the dreaded "unintended repeating key" issue

VLab = using the VMware vSphere Client via an Remote Desktop (RDP) connection

Class Activity
Command Review

Login to Opus if you haven’t already

Now follow along as we review the commands learned last week and new commands for this week

Terminals types and devices

```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Sat Sep  1 09:26:51 2012 from 50-0-68-
235.dsl.dynamic.fusionbroadband.com

                                  _
                                ('v')
                               //-=-\\
                               (\_=_/)
                                ^^ ^^
                           Welcome to Opus
                      Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $ tty
/dev/pts/3
```

Hit Enter to accept

*The terminal type is **xterm***

*The terminal device for this session is **/dev/pts/3***

The **terminal type** is not the same as the **terminal device**

How can I print a calendar?

```
/home/cis90/simben $ cal
   September 2012
Su Mo Tu We Th Fr Sa
                   1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30

/home/cis90/simben $ cal 9 2001
   September 2001
Su Mo Tu We Th Fr Sa
                   1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30
/home/cis90/simben $
```

*The **cal** command*

*Month and year **arguments***

A command can have arguments

What is the current time and date?

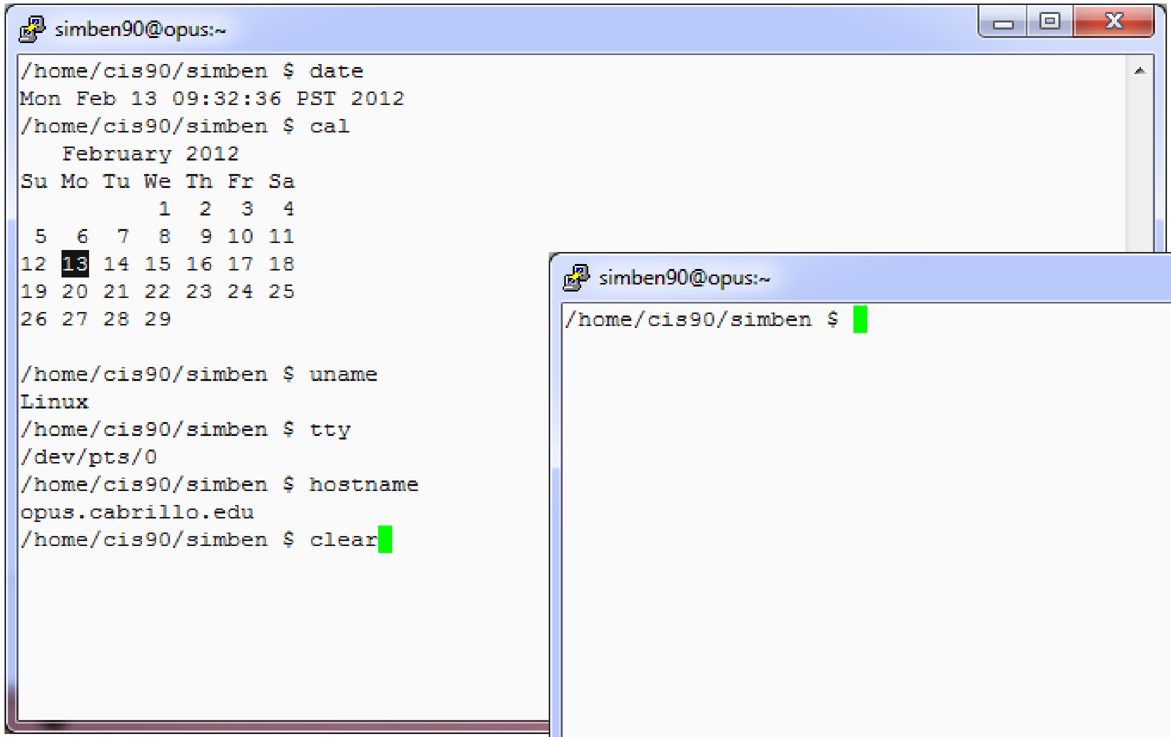
The shell "prompt"

The "command"

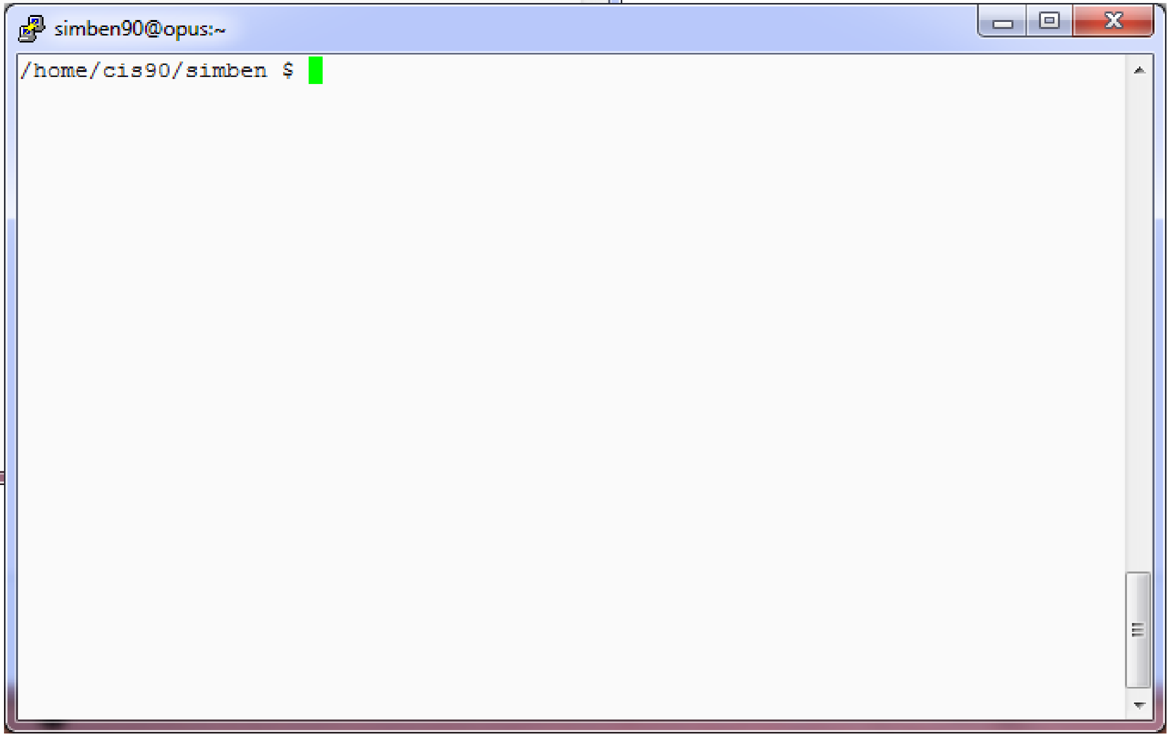
```
/home/cis90/simben $ date
Sat Sep  1 14:03:33 PDT 2012
/home/cis90/simben $
```

The prompt is output by the shell, you type the command

How do I clear the screen?



```
/home/cis90/simben $ date
Mon Feb 13 09:32:36 PST 2012
/home/cis90/simben $ cal
   February 2012
Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29

/home/cis90/simben $ uname
Linux
/home/cis90/simben $ tty
/dev/pts/0
/home/cis90/simben $ hostname
opus.cabrillo.edu
/home/cis90/simben $ clear
```

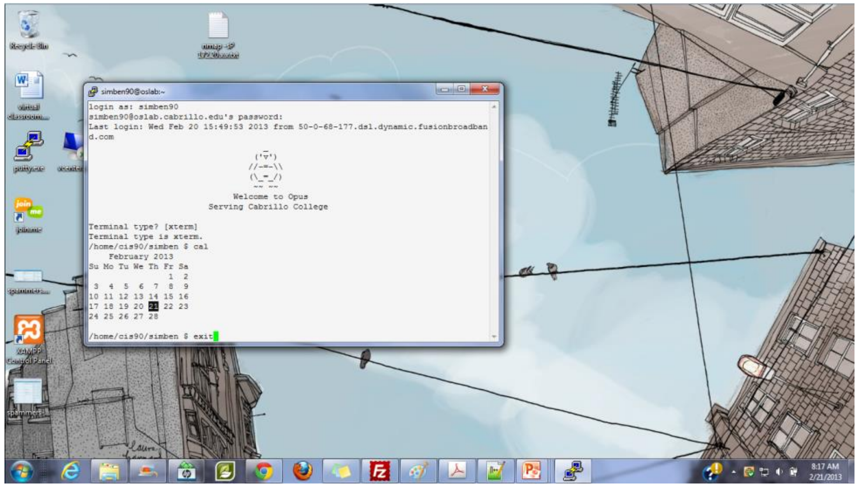


```
/home/cis90/simben $
```

The **clear** command scrolls previous commands out of sight

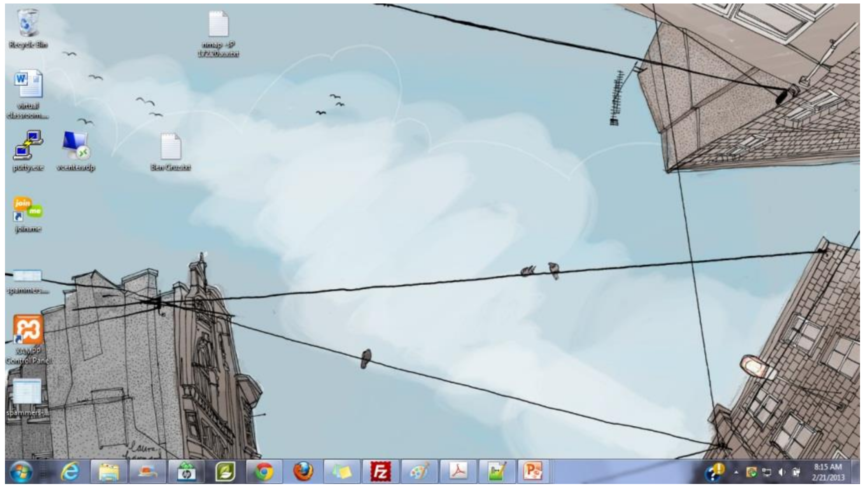
How do I end this login session?

before **exit**



```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Wed Feb 20 15:49:53 2013 from 50-0-68-177.dsl.dynamic.fusionbroadban
d.com

                              _
                            ('v')
                           //-=-\\
                           (\_=_/)
                            ~~ ~~
                        Welcome to Opus
                    Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $ cal
    February 2013
Su Mo Tu We Th Fr Sa
                1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28

/home/cis90/simben $ exit
```

after **exit**



The **exit** command ends the session and the terminal window disappears ... POOF!

Viewing your command history

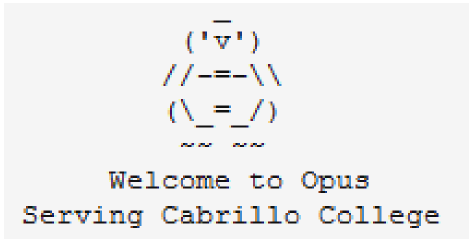
```
/home/cis90/simben $ history
    1  hostname
    2  exit
    3  who
    4  who -q
    5  ps -e
< snipped >
  177  cal 9 2001
  178  exit
  179  who
  180  cal
  181  tty
  182  uname
  183  ps
  184  id
  185  exit
  186  history
/home/cis90/simben $
```

*The **history** command outputs the commands used previously … even from previous login sessions*

Tip: Use the "Up Arrow" key to quickly re-issue a previous command!

What is the name of the computer I'm interacting with?

```
/home/cis90/simben $ hostname
oslab.cishawks.net
/home/cis90/simben $
```



```
      _
    ('v')
   //-=-\\
   (\_=_/)
    ~~ ~~
 Welcome to Opus
Serving Cabrillo College
```

We still refer to Opus as "Opus" in this class however it's official hostname on the Internet is "oslab". This may change in the future after some network changes are made.

Last week's temporary DNS glitch has partially been resolved!

You may now use either of the following FQDN's (Fully Qualified Domain Names) to reach Opus on the Internet:

oslab.cis.cabrillo.edu or **oslab.cishawks.net**

What is the UID (User ID) for my account or other accounts?

```
/home/cis90/simben $ id
uid=1001(simben90) gid=190(cis90) groups=190(cis90),100(users)
context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023

/home/cis90/simben $ id milhom90
uid=1002(milhom90) gid=190(cis90) groups=190(cis90),100(users)

/home/cis90/simben $ id simben90
uid=1001(simben90) gid=190(cis90) groups=190(cis90),100(users)
```

Usernames

UID's (user ID numbers)

We are all just numbers to the Linux kernel

What shell am I using?

```
/home/cis90/simben $ ps
  PID TTY          TIME CMD
28994 pts/0    00:00:00 bash
29093 pts/0    00:00:00 ps
```

Process ID numbers

Terminal device being used

*the shell is sleeping and waiting for **ps** command to finish*

***ps** command is running as it outputs this*

The **ps** command outputs the current processes you own including the shell program you are using

How do I log into another computer system?

*Method 1: The **ssh** command using a hostname*

username on remote computer

Hostname of remote computer

Notice how the prompt changes on the remote computer

```
/home/cis90/simben $ ssh cis90@p06-arwen
cis90@p06-arwen's password:
Welcome to Linux Mint 15 Olivia (GNU/Linux 3.8.0-26-generic x86_64)

Welcome to Linux Mint
 * Documentation:  http://www.linuxmint.com
Last login: Sun Sep  8 09:52:00 2013
cis90@p06-arwen:~ >
```

*Note: You can also **ssh** into the same computer you are currently using for an additional session.*

How do I log into another computer system?

*Method 1: The **ssh** command using am IP address*

username on remote computer

IP address of remote computer

Notice how the prompt changes on the remote computer

```
/home/cis90/simben $ ssh cis90@172.20.4.34
cis90@172.20.4.34's password:
Welcome to Ubuntu 12.04.1 LTS (GNU/Linux 3.2.0-29-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

361 packages can be updated.
109 updates are security updates.

Last login: Wed Feb 20 17:26:25 2013 from oslab.cabrillo.edu
cis90@frodo-108:~$
```

What kernel am I running on?

```
/home/cis90/simben $ uname
Linux
```

The **uname** command (with no arguments) outputs the name of the operating system kernel

What terminal device am I using?

```
/home/cis90/simben $ tty
/dev/pts/5
```

The **terminal type** is not the same as the **terminal device**

Who else is logged in and from where?

when they logged in

```
/home/cis90/simben $ who
simben90 pts/0        2013-02-21 08:17 (50-0-68-28.dsl.dynamic.fusion.com)
simben90 pts/1        2013-02-21 08:45 (50-0-68-28.dsl.dynamic.fusion.com)
milhom90 pts/2        2013-02-21 08:46 (50-0-68-28.dsl.dynamic.fusion.com)
rsimms   pts/4        2013-02-21 08:46 (50-0-68-28.dsl.dynamic.fusion.com)
rodduk90 pts/7        2013-02-21 08:46 (50-0-68-28.dsl.dynamic.fusion.com)
simben90 pts/8        2013-02-21 08:49 (172.20.4.34)
milhom90 pts/9        2013-02-21 08:50 (sun-hwa.cislab.net)
```

username

terminal device (pts/5 = /dev/pts/5)

where they logged in from (hostname or IP address)

The who command shows who is logged in, their terminal device, when they logged in and from where they logged in

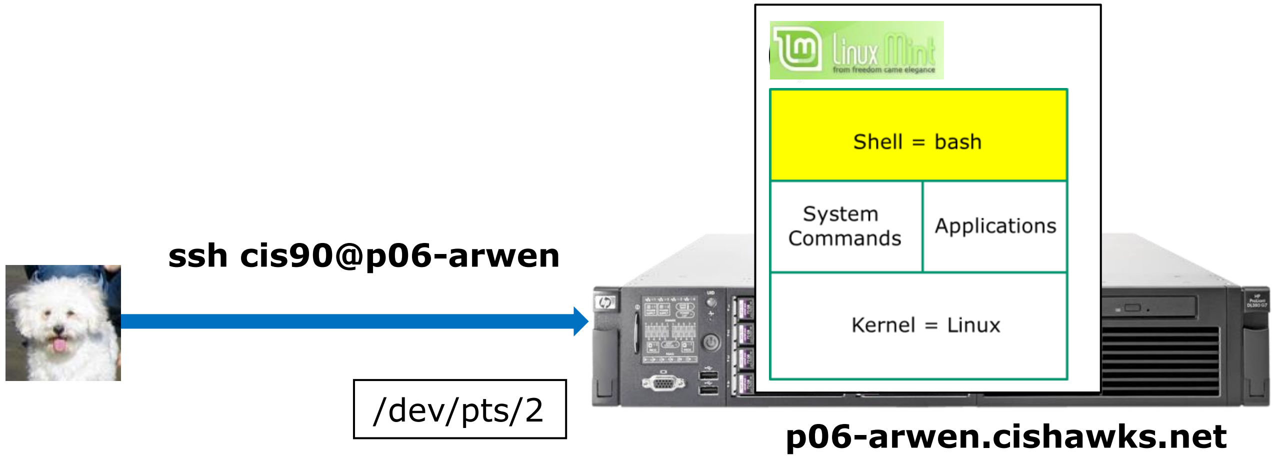
Which is my login session?

```
/home/cis90/simben $ who
simben90 pts/0        2013-02-21 08:17 (50-0-68-28.dsl.dynamic.fusion.com)
simben90 pts/1        2013-02-21 08:45 (50-0-68-28.dsl.dynamic.fusion.com)
milhom90 pts/2        2013-02-21 08:46 (50-0-68-28.dsl.dynamic.fusion.com)
rsimms   pts/4        2013-02-21 08:46 (50-0-68-28.dsl.dynamic.fusion.com)
rodduk90 pts/7        2013-02-21 08:46 (50-0-68-28.dsl.dynamic.fusion.com)
simben90 pts/8        2013-02-21 08:49 (172.20.4.34)
milhom90 pts/9        2013-02-21 08:50 (sun-hwa.cislab.net)

/home/cis90/simben $ who am i
simben90 pts/0        2013-02-21 08:17 (50-0-68-177.dsl.dynamic.fusion.com)

/home/cis90/simben $ tty
/dev/pts/0
```

When logged in multiple times use the terminal device to distinguish the sessions

"Name" Lingo

Benji logs in as cis90 on his p06-arwen system



user's first and last **name**: Benji Simms

user**name** = cis90

name of terminal device used by cis90 = /dev/pts/2

(terminal type = xterm)

host**name** = p06-arwen.cishawks.net

Name of distro = LinuxMint

Name of shell = bash

Name of kernel = Linux

Test your knowledge

What’s the name of the terminal device I’m using right now?

```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Sat Sep  1 09:26:51 2012 from 172.30.90.83
                                  _
                                ('v')
                               //-=-\\
                               (\_=_/)
                                ~~ ~~
                            Welcome to Opus
                        Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
```

What's the name of the terminal device I'm using right now?

```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Sat Sep  1 09:26:51 2012 from 172.30.90.83

                                  _
                                ('v')
                               //-=-\\
                               (\_=_/)
                                ^^ ^^
                            Welcome to Opus
                        Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
/home/cis90/simben $ tty
/dev/pts/0
/home/cis90/simben $
```

Answer: /dev/pts/0

*Use the **tty** command to find out*

What type of terminal am I using right now?

```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Sat Sep  1 09:26:51 2012 from 172.30.90.83
                                 _
                               ('v')
                              //-=-\\
                              (\_=_/)
                               ~~ ~~
                          Welcome to Opus
                      Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
```

What type of terminal am I using right now?

```
login as: simben90
simben90@oslab.cabrillo.edu's password:
Last login: Sat Sep  1 09:26:51 2012 from 172.30.90.83

                                   _
                                 ('v')
                                //-=-\\
                                (\_=_/)
                                 ~~ ~~
                            Welcome to Opus
                        Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
```

Answer: xterm

We have the answer already!

What is the hostname of the computer I'm using?

```
/home/cis90/simben $
```

What is the hostname of the computer I’m using?

```
/home/cis90/simben $
/home/cis90/simben $ hostname
oslab.cabrillo.edu
/home/cis90/simben $
```

Answer: oslab.cabrillo.edu

Use the ***hostname***
command to find out

What is the name of the OS (operating System) kernel?

```
/home/cis90/simben $
```

What is the name of the OS (operating System) kernel?

```
/home/cis90/simben $
/home/cis90/simben $ uname
Linux
/home/cis90/simben $
```

*Use the **uname** command to find out*

Answer: Linux

What is the name of the Linux Distribution being run?

```
/home/cis90/simben $
```

What is the name of the Linux Distribution being run?

```
/home/cis90/simben $
/home/cis90/simben $ cat /etc/release
cat: /etc/release: No such file or directory
/home/cis90/simben $ cat /etc/issue
CentOS release 6.2 (Final)
Kernel \r on \l

/home/cis90/simben $ cat /etc/*-release
CentOS release 6.2 (Final)
CentOS release 6.2 (Final)
CentOS release 6.2 (Final)
/home/cis90/simben $
```

*Use the **cat /etc/issue** or **cat /etc/*-release** commands to find out*

Answer: CentOS

What is my username and uid (user ID number)?

```
/home/cis90/simben $
```

What is my username and uid (user ID number)?

```
/home/cis90/simben $
/home/cis90/simben $ id
uid=1001(simben90) gid=190(cis90)
groups=190(cis90),100(users)
context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
/home/cis90/simben $
```

Answer: username=simben90 and the uid=1001

*Use the **id** command
to find out*

What is the name of the shell I'm using?

```
/home/cis90/simben $
```

What is the name of the shell I’m using?

```
/home/cis90/simben $
/home/cis90/simben $ ps
  PID TTY          TIME CMD
28237 pts/0    00:00:00 bash
28752 pts/0    00:00:00 ps
/home/cis90/simben $
```

Answer: bash

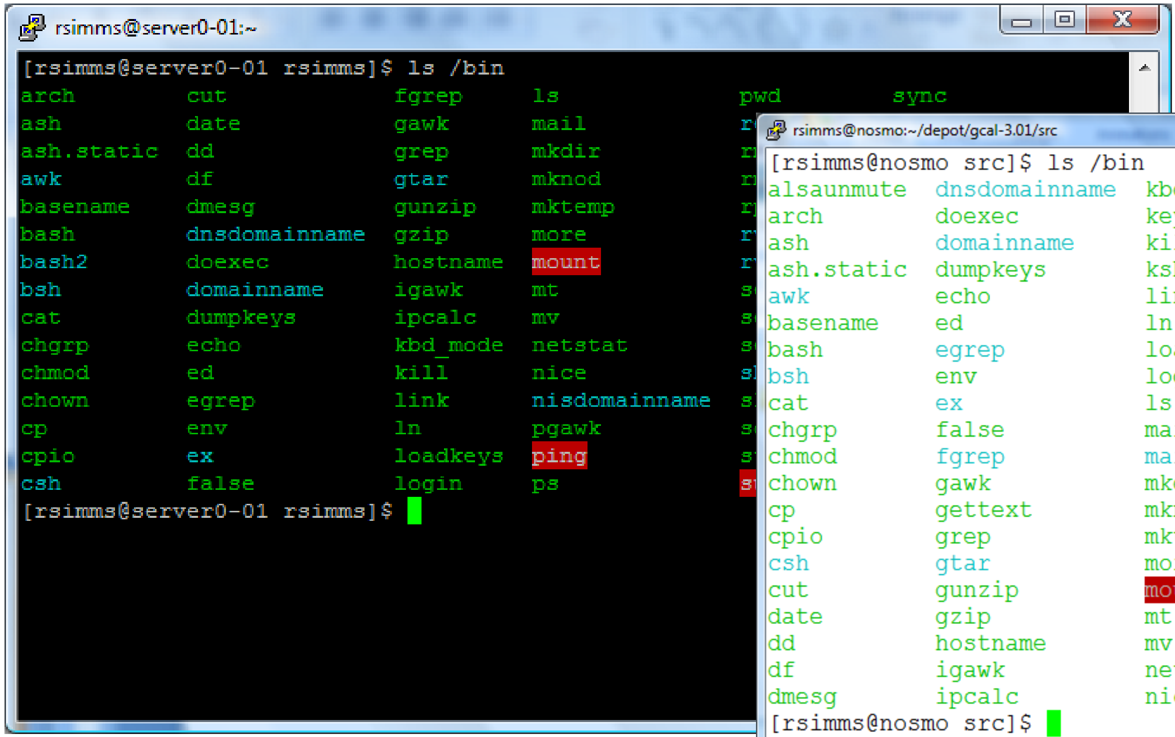
*Use the **ps** command to find out.*

We will soon learn another command for doing this.

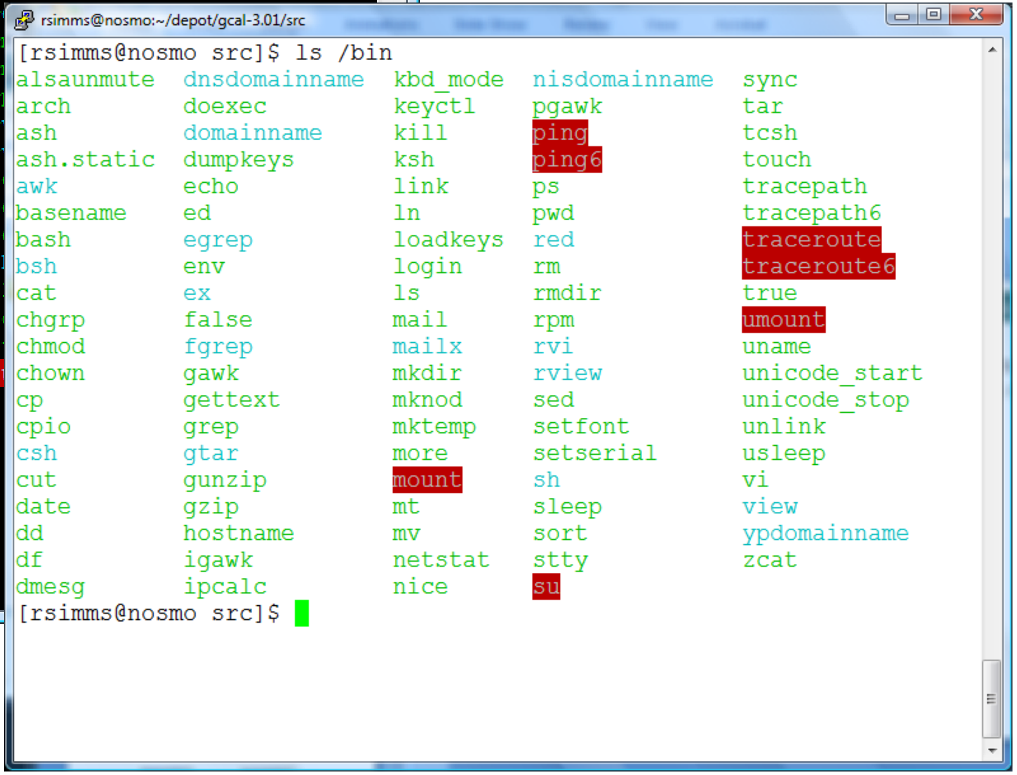
Putty
Tips

(Note: tty = teletype)

The Putty program



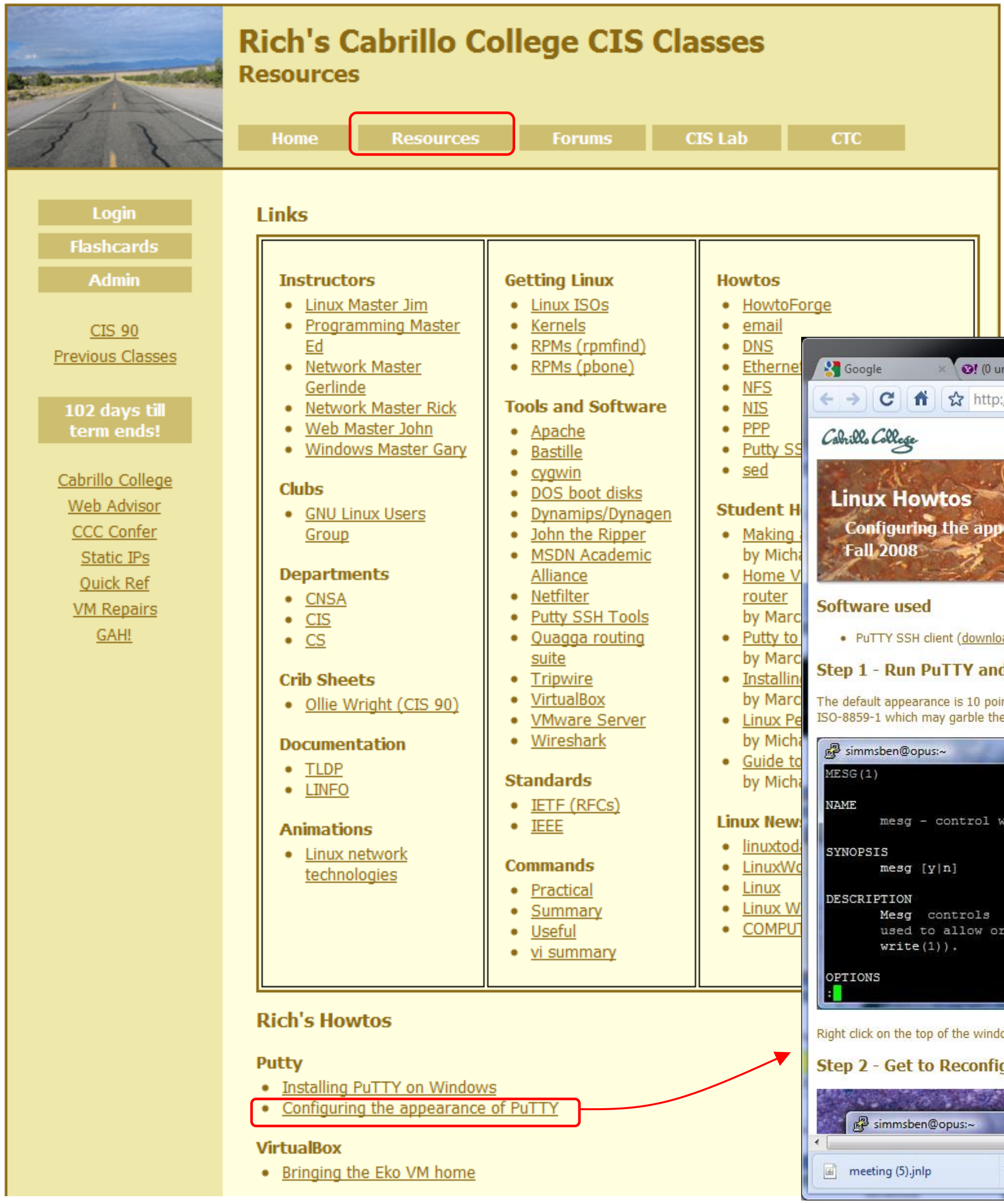
```
[rsimms@server0-01 rsimms]$ ls /bin
arch          cut             fgrep       ls              pwd         sync
ash           date            gawk        mail            r
ash.static    dd              grep        mkdir           r
awk           df              gtar        mknod           r
basename      dmesg           gunzip      mktemp          r
bash          dnsdomainname   gzip        more            r
bash2         doexec          hostname    mount           r
bsh           domainname      igawk       mt              s
cat           dumpkeys        ipcalc      mv              s
chgrp         echo            kbd_mode    netstat         s
chmod         ed              kill        nice            sl
chown         egrep           link        nisdomainname   s
cp            env             ln          pgawk           s
cpio          ex              loadkeys    ping            s
csh           false           login       ps              s
[rsimms@server0-01 rsimms]$
```



```
[rsimms@nosmo src]$ ls /bin
alsaunmute    dnsdomainname  kbd_mode   nisdomainname  sync
arch          doexec         keyctl     pgawk          tar
ash           domainname     kill       ping           tcsh
ash.static    dumpkeys       ksh        ping6          touch
awk           echo           link       ps             tracepath
basename      ed             ln         pwd            tracepath6
bash          egrep          loadkeys   red            traceroute
bsh           env            login      rm             traceroute6
cat           ex             ls         rmdir          true
chgrp         false          mail       rpm            umount
chmod         fgrep          mailx      rvi            uname
chown         gawk           mkdir      rview          unicode_start
cp            gettext        mknod      sed            unicode_stop
cpio          grep           mktemp     setfont        unlink
csh           gtar           more       setserial      usleep
cut           gunzip         mount      sh             vi
date          gzip           mt         sleep          view
dd            hostname       mv         sort           ypdomainname
df            igawk          netstat    stty           zcat
dmesg         ipcalc         nice       su
[rsimms@nosmo src]$
```

Why does Putty sometimes have a ***black background*** *and sometimes a* ***white background****?*

There is a Howto on the Resource page to walk you through customizing Putty



Rich's Cabrillo College CIS Classes
Resources

Home | Resources | Forums | CIS Lab | CTC

Login
Flashcards
Admin

CIS 90
Previous Classes

102 days till term ends!

Cabrillo College
Web Advisor
CCC Confer
Static IPs
Quick Ref
VM Repairs
GAH!

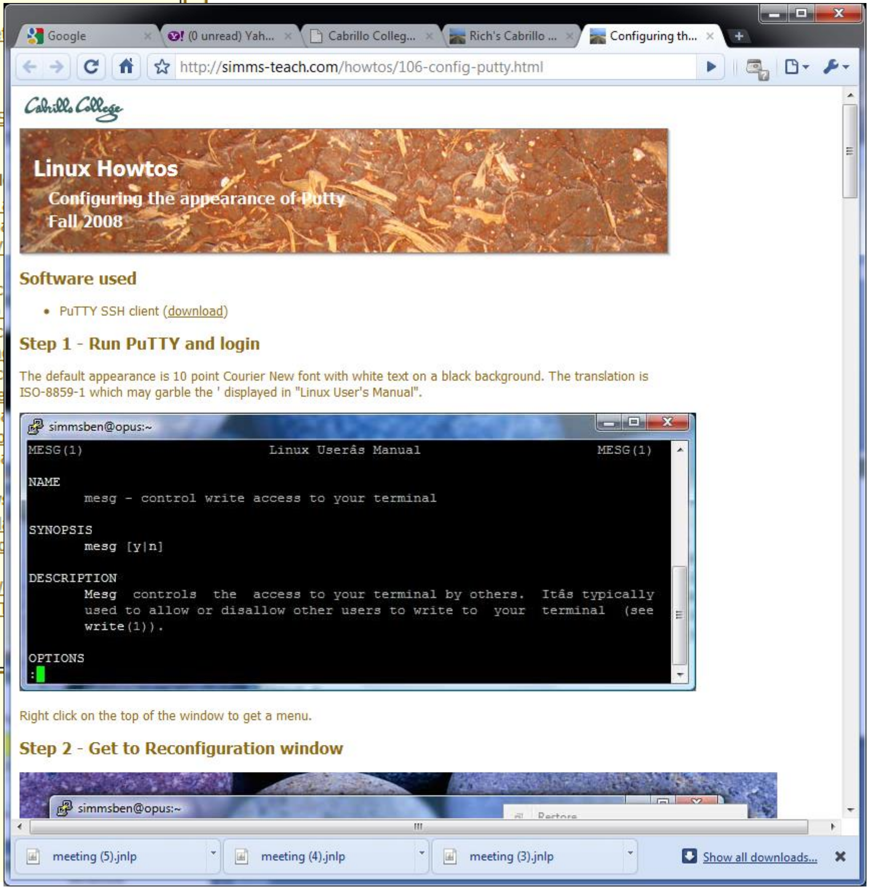
Links

Instructors	Getting Linux	Howtos
• Linux Master Jim • Programming Master Ed • Network Master Gerlinde • Network Master Rick • Web Master John • Windows Master Gary	• Linux ISOs • Kernels • RPMs (rpmfind) • RPMs (pbone)	• HowtoForge • email • DNS • Etherne • NFS • NIS • PPP • Putty SS • sed
Clubs • GNU Linux Users Group	**Tools and Software** • Apache • Bastille • cygwin • DOS boot disks • Dynamips/Dynagen • John the Ripper • MSDN Academic Alliance • Netfilter • Putty SSH Tools • Quagga routing suite • Tripwire • VirtualBox • VMware Server • Wireshark	**Student H** • Making by Micha • Home V router by Marc • Putty to by Marc • Installin by Marc • Linux Pe by Micha • Guide to by Micha
Departments • CNSA • CIS • CS		
Crib Sheets • Ollie Wright (CIS 90)	**Standards** • IETF (RFCs) • IEEE	**Linux New** • linuxtod • LinuxWo • Linux • Linux W • COMPU
Documentation • TLDP • LINFO	**Commands** • Practical • Summary • Useful • vi summary	
Animations • Linux network technologies		

Rich's Howtos

Putty
- Installing PuTTY on Windows
- Configuring the appearance of PuTTY

VirtualBox
- Bringing the Eko VM home



Cabrillo College

Linux Howtos
Configuring the appearance of Putty
Fall 2008

Software used
- PuTTY SSH client (download)

Step 1 - Run PuTTY and login

The default appearance is 10 point Courier New font with white text on a black background. The translation is ISO-8859-1 which may garble the ' displayed in "Linux User's Manual".

```
MESG(1)                    Linux Userâs Manual                    MESG(1)

NAME
       mesg - control write access to your terminal

SYNOPSIS
       mesg [y|n]

DESCRIPTION
       Mesg  controls  the  access to your terminal by others.  Itâs typically
       used to allow or disallow other users to write to  your  terminal  (see
       write(1)).

OPTIONS
:
```

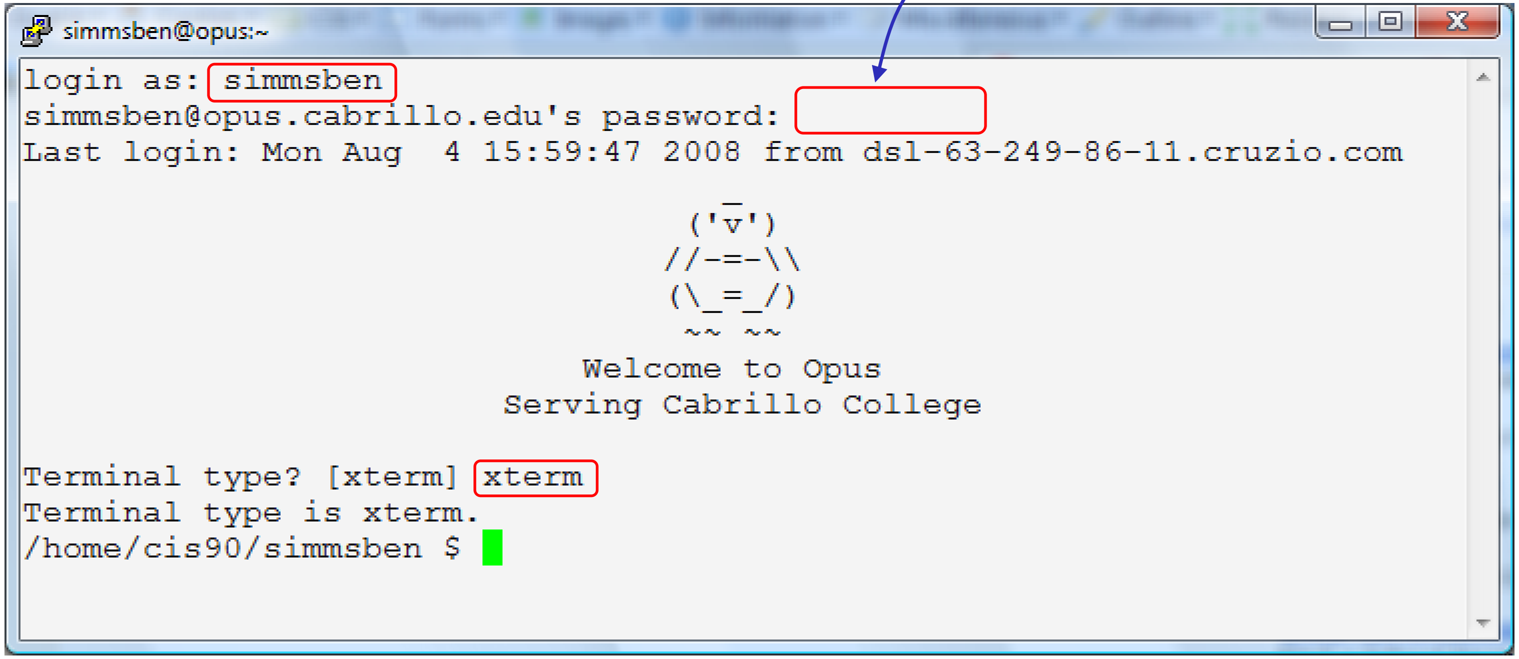
Right click on the top of the window to get a menu.

Step 2 - Get to Reconfiguration window

Logging In (A deep dive)

Logging in

Note: the password is never echoed for security reasons



```
login as: simmsben
simmsben@opus.cabrillo.edu's password:
Last login: Mon Aug  4 15:59:47 2008 from dsl-63-249-86-11.cruzio.com

                               _
                             ('v')
                            //-=-\\
                            (\_=_/)
                             ~~ ~~
                         Welcome to Opus
                     Serving Cabrillo College

Terminal type? [xterm] xterm
Terminal type is xterm.
/home/cis90/simmsben $
```

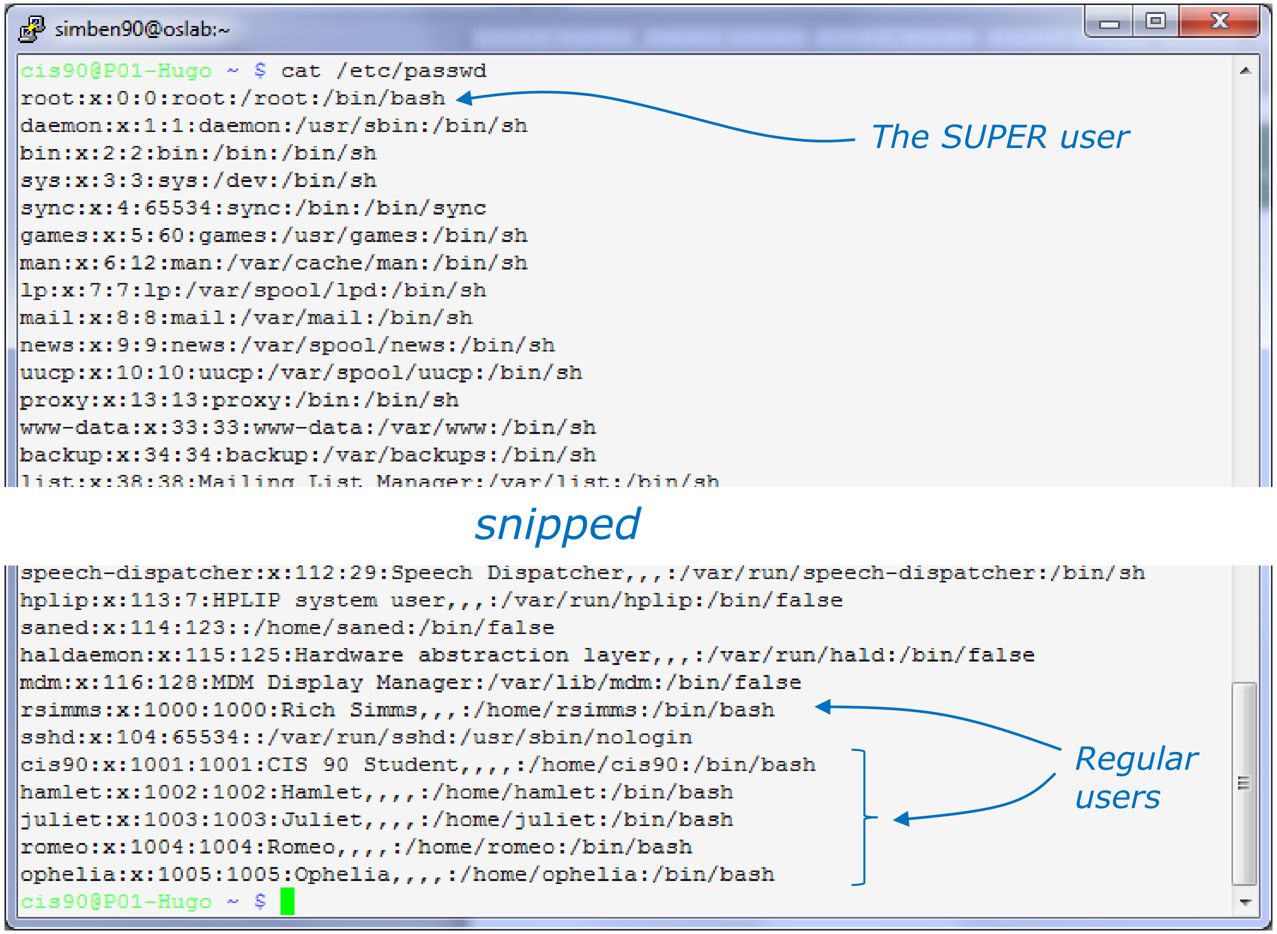
always requires:

username + password + terminal type

Note: Terminal Type ≠ Terminal Device

/etc/passwd

cat /etc/passwd



```
cis90@P01-Hugo ~ $ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/bin/sh
bin:x:2:2:bin:/bin:/bin/sh
sys:x:3:3:sys:/dev:/bin/sh
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/bin/sh
man:x:6:12:man:/var/cache/man:/bin/sh
lp:x:7:7:lp:/var/spool/lpd:/bin/sh
mail:x:8:8:mail:/var/mail:/bin/sh
news:x:9:9:news:/var/spool/news:/bin/sh
uucp:x:10:10:uucp:/var/spool/uucp:/bin/sh
proxy:x:13:13:proxy:/bin:/bin/sh
www-data:x:33:33:www-data:/var/www:/bin/sh
backup:x:34:34:backup:/var/backups:/bin/sh
list:x:38:38:Mailing List Manager:/var/list:/bin/sh
```

snipped

```
speech-dispatcher:x:112:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/sh
hplip:x:113:7:HPLIP system user,,,:/var/run/hplip:/bin/false
saned:x:114:123::/home/saned:/bin/false
haldaemon:x:115:125:Hardware abstraction layer,,,:/var/run/hald:/bin/false
mdm:x:116:128:MDM Display Manager:/var/lib/mdm:/bin/false
rsimms:x:1000:1000:Rich Simms,,,:/home/rsimms:/bin/bash
sshd:x:104:65534::/var/run/sshd:/usr/sbin/nologin
cis90:x:1001:1001:CIS 90 Student,,,,:/home/cis90:/bin/bash
hamlet:x:1002:1002:Hamlet,,,,:/home/hamlet:/bin/bash
juliet:x:1003:1003:Juliet,,,,:/home/juliet:/bin/bash
romeo:x:1004:1004:Romeo,,,,:/home/romeo:/bin/bash
ophelia:x:1005:1005:Ophelia,,,,:/home/ophelia:/bin/bash
cis90@P01-Hugo ~ $
```

The SUPER user

Regular users

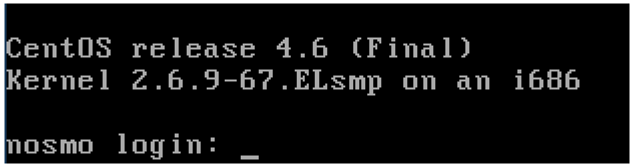
All user accounts are kept in the /etc/passwd file

Passwords are no longer kept here though!

Passwords are now kept (encrypted) in the /etc/shadow file

Login and Passwords

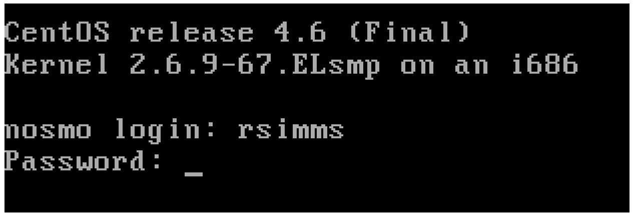
1) ***init*** *starts up the* ***mingetty*** *program for each terminal which then prompts for the username, gets it, then starts login.*



```
CentOS release 4.6 (Final)
Kernel 2.6.9-67.ELsmp on an i686

nosmo login: _
```

```
[root@nosmo ~]# ps t tty1
  PID TTY      STAT   TIME COMMAND
 3545 tty1     Ss+    0:00 /sbin/mingetty tty1
```

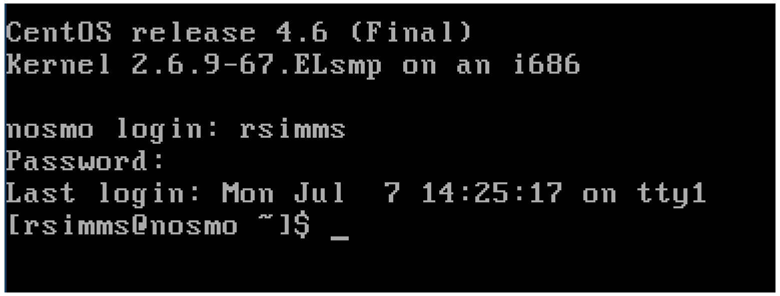
2) ***login*** *collects the password and checks it with /etc/passwd and /etc/shadow*



```
CentOS release 4.6 (Final)
Kernel 2.6.9-67.ELsmp on an i686

nosmo login: rsimms
Password: _
```

```
[root@nosmo ~]# ps t tty1
  PID TTY      STAT   TIME COMMAND
 3545 tty1     Ss+    0:00 /bin/login -
```

3) If a match then the shell specified in the /etc/passwd file is started



```
CentOS release 4.6 (Final)
Kernel 2.6.9-67.ELsmp on an i686

nosmo login: rsimms
Password:
Last login: Mon Jul  7 14:25:17 on tty1
[rsimms@nosmo ~]$ _
```

```
[root@nosmo ~]# ps t tty1
  PID TTY      STAT   TIME COMMAND
 4917 tty1     Ss+    0:00 -bash
```

/etc/passwd

This command, which we will learn how to do later, outputs ***just one line*** *of the /etc/passwd file on Opus*

```
/home/cis90/simben $ cat /etc/passwd | grep simben
simben90:x:1001:190:Benji Simms:/home/cis90/simben:/bin/bash
```

username

password (just a placeholder now)

User ID (UID)

Group ID (GID)

Comment

Home directory

Shell

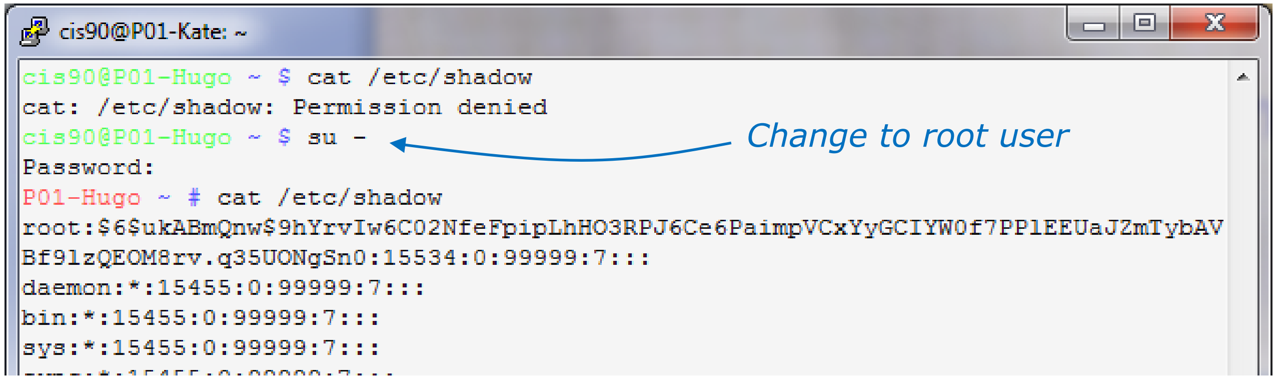
Note the field separator used in /etc/passwd is a ":"

```
/home/cis90/simben $ id
uid=1001(simben90) gid=190(cis90) groups=190(cis90),100(users)
context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
```

Now you know the source of some of the information displayed by the id command

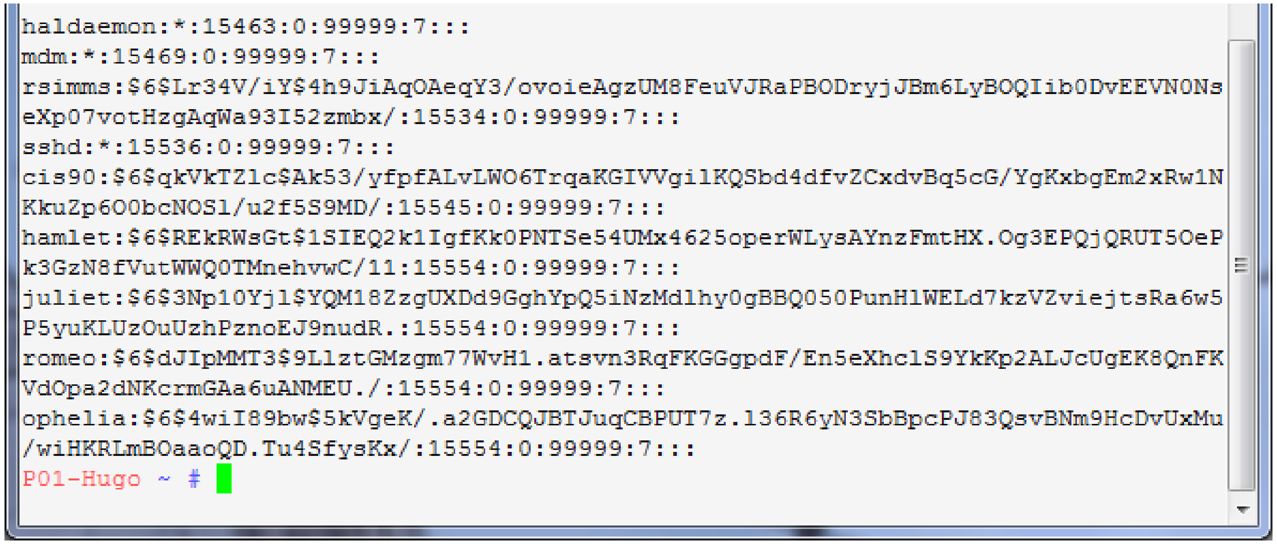
/etc/shadow

cat /etc/shadow



```
cis90@P01-Hugo ~ $ cat /etc/shadow
cat: /etc/shadow: Permission denied
cis90@P01-Hugo ~ $ su -
Password:
P01-Hugo ~ # cat /etc/shadow
root:$6$ukABmQnw$9hYrvIw6C02NfeFpipLhHO3RPJ6Ce6PaimpVCxYyGCIYW0f7PPlEEUaJZmTybAV
Bf9lzQEOM8rv.q35UONgSn0:15534:0:99999:7:::
daemon:*:15455:0:99999:7:::
bin:*:15455:0:99999:7:::
sys:*:15455:0:99999:7:::
```

snipped

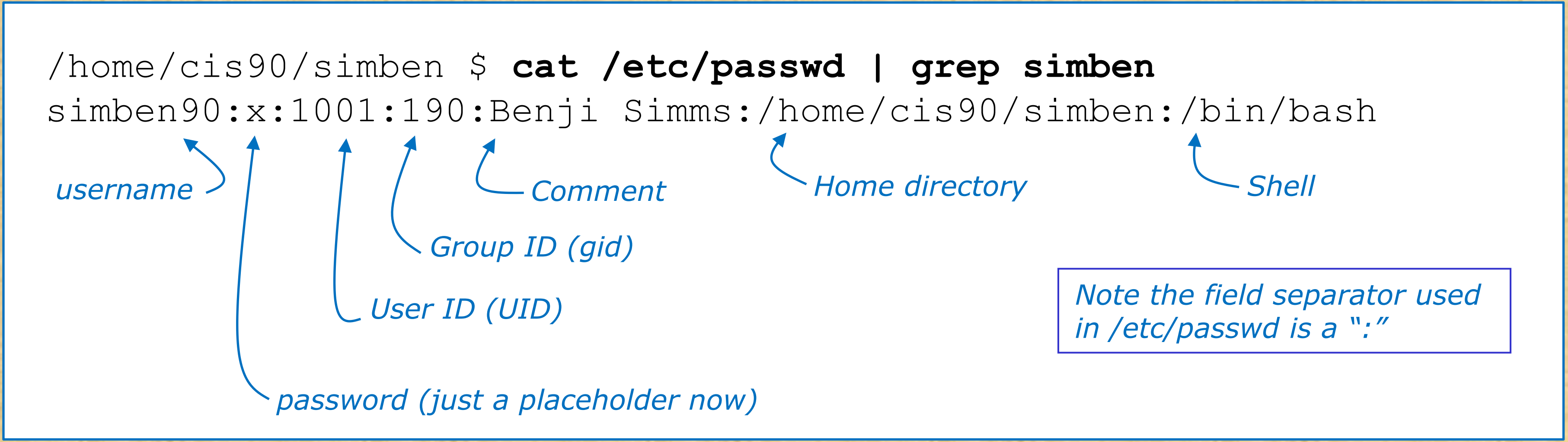


```
haldaemon:*:15463:0:99999:7:::
mdm:*:15469:0:99999:7:::
rsimms:$6$Lr34V/iY$4h9JiAqOAeqY3/ovoieAgzUM8FeuVJRaPBODryjJBm6LyBOQIib0DvEEVNONs
eXp07votHzgAqWa93I52zmbx/:15534:0:99999:7:::
sshd:*:15536:0:99999:7:::
cis90:$6$qkVkTZlc$Ak53/yfpfALvLWO6TrqaKGIVVgilKQSbd4dfvZCxdvBq5cG/YgKxbgEm2xRw1N
KkuZp6O0bcNOSl/u2f5S9MD/:15545:0:99999:7:::
hamlet:$6$REkRWsGt$1SIEQ2k1IgfKk0PNTSe54UMx4625operWLysAYnzFmtHX.Og3EPQjQRUT5OeP
k3GzN8fVutWWQ0TMnehvwC/11:15554:0:99999:7:::
juliet:$6$3Np10Yjl$YQM18ZzgUXDd9GghYpQ5iNzMdlhy0gBBQ050PunHlWELd7kzVZviejtsRa6w5
P5yuKLUzOuUzhPznoEJ9nudR.:15554:0:99999:7:::
romeo:$6$dJIpMMT3$9LlztGMzgm77WvH1.atsvn3RqFKGGgpdF/En5eXhclS9YkKp2ALJcUgEK8QnFK
VdOpa2dNKcrmGAa6uANMEU./:15554:0:99999:7:::
ophelia:$6$4wiI89bw$5kVgeK/.a2GDCQJBTJuqCBPUT7z.136R6yN3SbBpcPJ83QsvBNm9HcDvUxMu
/wiHKRLmBOaaoQD.Tu4SfysKx/:15554:0:99999:7:::
P01-Hugo ~ #
```

All passwords are encrypted and kept in the /etc/shadow file now.

Only the root user can view this file!

Class Activity



```
/home/cis90/simben $ cat /etc/passwd | grep simben
simben90:x:1001:190:Benji Simms:/home/cis90/simben:/bin/bash
```

Note the field separator used in /etc/passwd is a ":"

1. **cat /etc/passwd**
   - Find your own username
   - Compare your /etc/passwd home directory with your prompt
   - Compare your /etc/passwd shell with output from the ps command
   - Compare your /etc/passwd uid and gid with output from the **id** command
2. **cat /etc/shadow**

What happens when you try to look at /etc/shadow?

Your Opus Password

Your Opus password

- Strong passwords are critical!
- **Botnets** and **ne-er-do-wells** are constantly attempting to break into computers attached to the Internet!
  (Even my little Frodo VM at home)

They never stop trying

The ne'er-do-wells trying to break in …
this is why you need strong passwords

```
 --------------------- SSHD Begin ------------------------

SSHD Killed: 1 Time(s)

SSHD Started: 1 Time(s)

Disconnecting after too many authentication failures for user:
   guest90 : 1 Time(s)

 Failed logins from:
    76.254.22.196 (adsl-76-254-22-196.dsl.pltn13.sbcglobal.net): 2 times
    201.7.115.194 (201-7-115-194.spopa302.ipd.brasiltelecom.net.br): 2135 times
    210.240.12.14: 20 times

 Illegal users from:
    201.7.115.194 (201-7-115-194.spopa302.ipd.brasiltelecom.net.br): 564 times
    210.240.12.14: 42 times

Users logging in through sshd:
   guest:
      76.254.22.196 (adsl-76-254-22-196.dsl.pltn13.sbcglobal.net): 2 times
   jimg:
      70.132.20.25 (adsl-70-132-20-25.dsl.snfc21.sbcglobal.net): 7 times
   ordazedw:
      76.254.22.196 (adsl-76-254-22-196.dsl.pltn13.sbcglobal.net): 1 time
   root:
      63.249.86.11 (dsl-63-249-86-11.cruzio.com): 3 times
      70.132.20.25 (adsl-70-132-20-25.dsl.snfc21.sbcglobal.net): 1 time
   rsimms:
      63.249.86.11 (dsl-63-249-86-11.cruzio.com): 2 times
```

From a logwatch report showing malicious attempts to break into Opus

They never stop trying

The firewall on Opus slows down but does not end the attacks

```
Failed logins from:
    122.249.183.95 (x183095.ppp.asahi-net.or.jp): 3 times
    218.64.5.131 (131.5.64.218.broad.nc.jx.dynamic.163data.com.cn): 3
times

 Illegal users from:
    78.46.83.76 (static.76.83.46.78.clients.your-server.de): 3 times
    218.4.157.178: 3 times

 pam_succeed_if(sshd:auth): error retrieving information about user
teamspeak : 1 time(s)
 reverse mapping checking getaddrinfo for
131.5.64.218.broad.nc.jx.dynamic.163data.com.cn failed - POSSIBLE
BREAK-IN ATTEMPT! : 3 time(s)
 pam_succeed_if(sshd:auth): error retrieving information about user ts
: 2 time(s)
 pam_succeed_if(sshd:auth): error retrieving information about user
plcmspip : 2 time(s)
 pam_succeed_if(sshd:auth): error retrieving information about user
PlcmSpIp : 1 time(s)
```

We used to get up thousands of attempts every day until we made some changes to the firewall on Opus. Attacks always would come from different computers around the world.

/var/log/wtmp and var/log/btmp

```
[root@opus log]# lastb | sort | cut -f1 -d' ' | grep -v ^$ | uniq -c > bad
[root@opus log]# sort -g bad > bad.sort
[root@opus log]# cat  bad.sort | tail -50
    471 ftp
    472 public
    490 test
    490 tomcat
    498 user
    506 service
    508 mike
    508 username
    524 cyrus
    530 pgsql
    532 test1
    544 master
    554 linux
    554 toor
    576 paul
    584 support
    590 testuser
    604 irc
    610 test
    656 noc
    686 www
    690 postfix
    723 john
    734 testing
    738 adam
    746 alex
    754 info
    798 tester
    832 library
    935 guest
    990 admin
   1002 office
   1022 temp
   1070 ftpuser
   1138 webadmin
   1298 nagios
   1332 web
   1374 a
   1384 student
   1416 postgres
   1690 user
   1858 oracle
   1944 mysql
   2086 webmaste
   5324 test
  10803 root
  10824 admin
  18679 root
  24064 root
[root@opus log]#
```

Top 50 usernames used by the ne'er-do-wells

How to make a strong password

- The longer the better (8 or more characters)
- Not in any dictionary
- Use upper case, lowercase, punctuation, digits
- Something you can remember
- Keep it secret
- Change when compromised

`Wh0le#!!`	(Whole sh'bang)
`KuKu4(co)2`	(Cuckoo for Cocoa Puffs)
`#0p&s@ve`	(shop and save)
`Idl02$da`	(I do laundry on Tuesday)

How to change your password on Opus

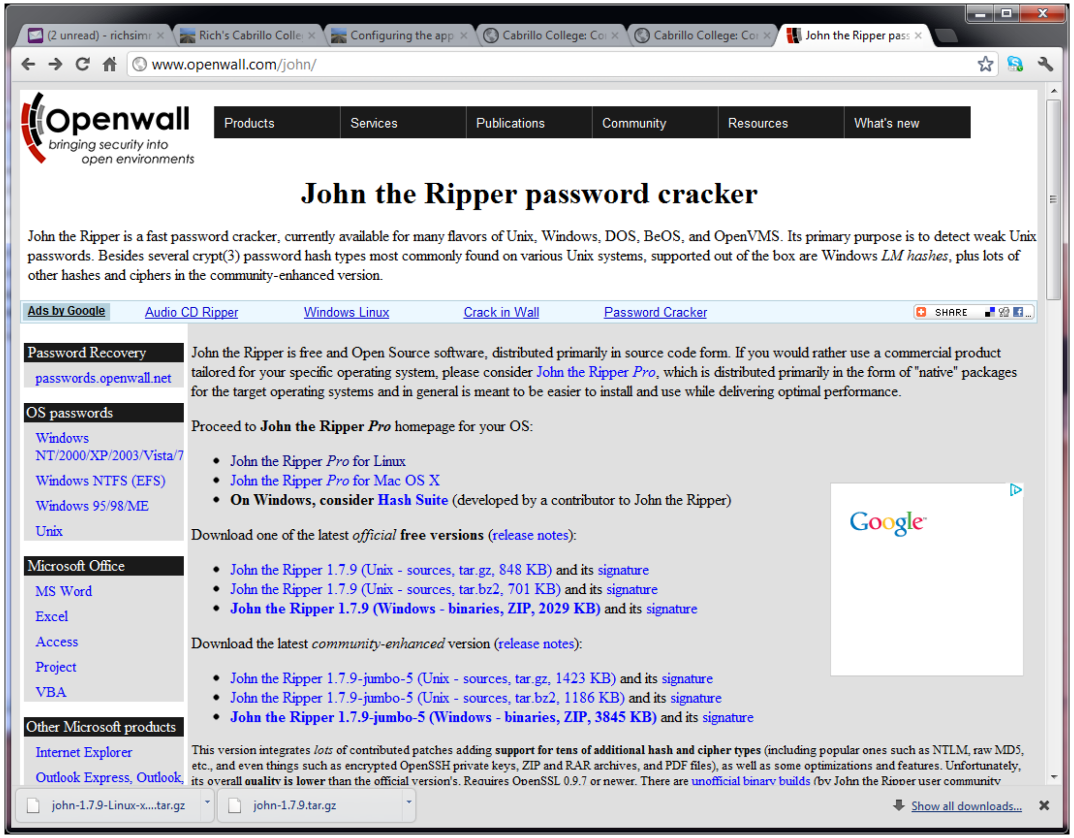
```
/home/cis90/simmsben $ passwd
Changing password for user simben90.
Changing password for simben90
(current) UNIX password:
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully.
/home/cis90/simmsben $
```

Note, the passwords are not echoed as you type them.

This changes your password on Opus only (not on VLab or the forum)

John the Ripper

An open source cracker that tries common passwords first followed by a brute force dictionary attack



John the Ripper password cracker

John the Ripper is a fast password cracker, currently available for many flavors of Unix, Windows, DOS, BeOS, and OpenVMS. Its primary purpose is to detect weak Unix passwords. Besides several crypt(3) password hash types most commonly found on various Unix systems, supported out of the box are Windows *LM hashes*, plus lots of other hashes and ciphers in the community-enhanced version.

John the Ripper is free and Open Source software, distributed primarily in source code form. If you would rather use a commercial product tailored for your specific operating system, please consider John the Ripper *Pro*, which is distributed primarily in the form of "native" packages for the target operating systems and in general is meant to be easier to install and use while delivering optimal performance.

Proceed to **John the Ripper *Pro*** homepage for your OS:

- John the Ripper *Pro* for Linux
- John the Ripper *Pro* for Mac OS X
- **On Windows, consider Hash Suite** (developed by a contributor to John the Ripper)

Download one of the latest *official* **free versions** (release notes):

- John the Ripper 1.7.9 (Unix - sources, tar.gz, 848 KB) and its signature
- John the Ripper 1.7.9 (Unix - sources, tar.bz2, 701 KB) and its signature
- **John the Ripper 1.7.9 (Windows - binaries, ZIP, 2029 KB)** and its signature

Download the latest *community-enhanced* version (release notes):

- John the Ripper 1.7.9-jumbo-5 (Unix - sources, tar.gz, 1423 KB) and its signature
- John the Ripper 1.7.9-jumbo-5 (Unix - sources, tar.bz2, 1186 KB) and its signature
- **John the Ripper 1.7.9-jumbo-5 (Windows - binaries, ZIP, 3845 KB)** and its signature

This version integrates *lots* of contributed patches adding **support for tens of additional hash and cipher types** (including popular ones such as NTLM, raw MD5, etc., and even things such as encrypted OpenSSH private keys, ZIP and RAR archives, and PDF files), as well as some optimizations and features. Unfortunately, its overall **quality is lower** than the official version's. Requires OpenSSL 0.9.7 or newer. There are unofficial binary builds (by John the Ripper user community

john-1.7.9/run/password.lst has most popular passwords to try first

Housekeeping

Housekeeping

1. Send me your student survey

2. Lab 1 submittal due by 11:59PM tonight

   Grading Rubric (30 points)
   3 points - for using the lab01.txt template.
   3 points - for emailing the completed lab01.txt as an attached text file.
   2 points - for each correct answer to questions Q1 through Q12
   3 points - optional extra credit questions (1 point each).

3. Last day to drop/add is Saturday 9/14

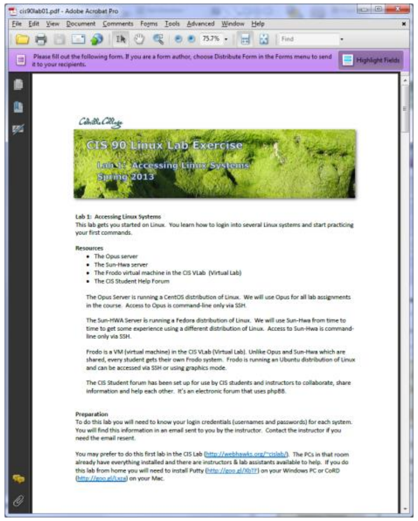
Credentials = usernames and passwords

1. If you didn't receive the email sent out last week on credentials then you need to contact the instructor for another copy!

2. Please keep usernames and passwords off the forum

Important

Lab Assignments


cis90lab01.pdf - Adobe Acrobat Pro
File Edit View Document Comments Forms Tools Advanced Window Help
75.7%
Find
Highlight Fields

Please fill out the following form. If you are a form author, choose Distribute Form in the Forms menu to send it to your recipients.

Cabrillo College

CIS 90 Linux Lab Exercise

Lab 1: Accessing Linux Systems
Spring 2013

Lab 1: Accessing Linux Systems
This lab gets you started on Linux. You learn how to login into several Linux systems and start practicing your first commands.

Resources
- The Opus server
- The Sun-Hwa server
- The Frodo virtual machine in the CIS VLab (Virtual Lab)
- The CIS Student Help Forum

The Opus Server is running a CentOS distribution of Linux. We will use Opus for all lab assignments in the course. Access to Opus is command-line only via SSH.

The Sun-HWA Server is running a Fedora distribution of Linux. We will use Sun-Hwa from time to time to get some experience using a different distribution of Linux. Access to Sun-Hwa is command-line only via SSH.

Frodo is a VM (virtual machine) in the CIS VLab (Virtual Lab). Unlike Opus and Sun-Hwa which are shared, every student gets their own Frodo system. Frodo is running an Ubuntu distribution of Linux and can be accessed via SSH or using graphics mode.

The CIS Student forum has been set up for use by CIS students and instructors to collaborate, share information and help each other. It's an electronic forum that uses phpBB.

Preparation
To do this lab you will need to know your login credentials (usernames and passwords) for each system. You will find this information in an email sent to you by the instructor. Contact the instructor if you need the email resent.

You may prefer to do this first lab in the CIS Lab (http://webhawks.org/~cislab/). The PCs in that room already have everything installed and there are instructors & lab assistants available to help. If you do this lab from home you will need to install Putty (http://goo.gl/XbTF) on your Windows PC or CoRD (http://goo.gl/Lxza) on your Mac.

Pearls of Wisdom:

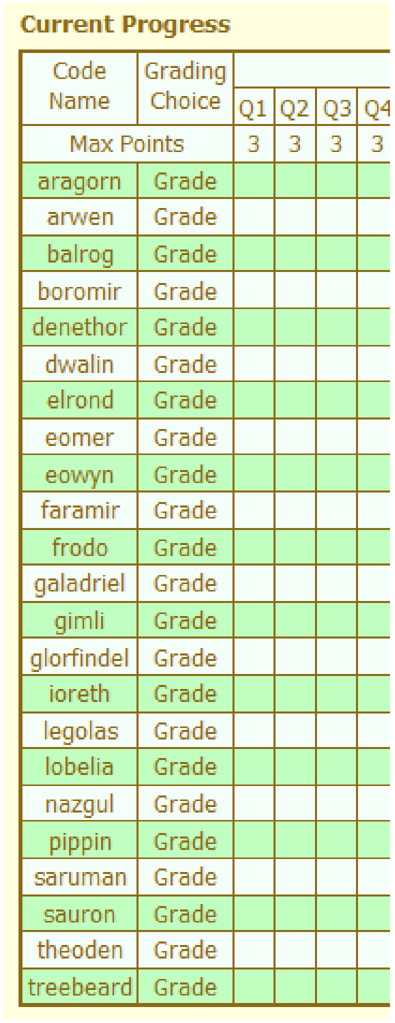
- Don't wait till the last minute to start.
- The *slower* you go the *sooner* you will be finished.
- A few minutes reading the forum can save you hour(s).
- Scan and read through the lesson slides and any supplemental materials on the website.
- It's best if you fully understand each step as you do it. Use Google or refer back to lesson slides to understand the commands you are using.
- Use Google when trouble-shooting
- Keep a growing cheat sheet of commands and examples.
- Partner with another student – "two heads are better than one" (at least most of the time!)
- Use the forum to collaborate and share specific tips you learned while doing a lab.
- Late work is not accepted so submit what you have for partial credit.

Turn OFF the recording

Roll Call

Turn recording back ON

Grading Code Names
Lord of the Rings Characters



Current Progress

Code Name	Grading Choice	Q1	Q2	Q3	Q4
Max Points		3	3	3	3
aragorn	Grade				
arwen	Grade				
balrog	Grade				
boromir	Grade				
denethor	Grade				
dwalin	Grade				
elrond	Grade				
eomer	Grade				
eowyn	Grade				
faramir	Grade				
frodo	Grade				
galadriel	Grade				
gimli	Grade				
glorfindel	Grade				
ioreth	Grade				
legolas	Grade				
lobelia	Grade				
nazgul	Grade				
pippin	Grade				
saruman	Grade				
sauron	Grade				
theoden	Grade				
treebeard	Grade				

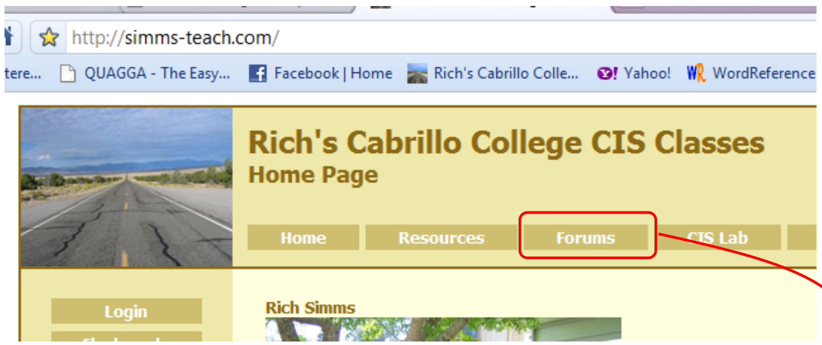
Everyone who is enrolled for this course will be assigned a LOR code name.

I will use your grading choice on the survey you send me (you can change your mind later)

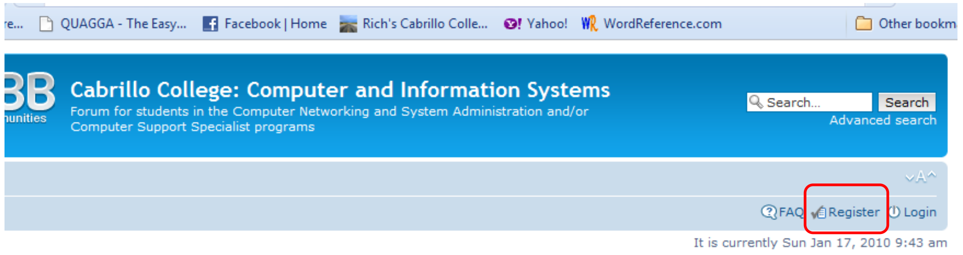
I'll start sending out code names this week for ***everyone who sends or has sent me their survey****.*

Forum spambot counter-measures

simms-teach.com



oslab.cishawks.net/forum


QUAGGA - The Easy...
Facebook | Home
Rich's Cabrillo Colle...
Yahoo!
WordReference.com
Other bookm
Cabrillo College: Computer and Information Systems
Forum for students in the Computer Networking and System Administration and/or Computer Support Specialist programs
Search...
Search
Advanced search
FAQ
Register
Login
It is currently Sun Jan 17, 2010 9:43 am

To Register:

1. Browse to the forum
2. Click on

3. Review and agree to terms
4. Your **username** must be your **first and last name separated by a space**

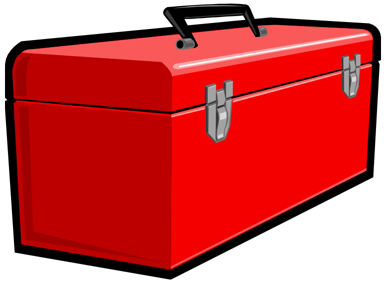
   - e.g. Rich Simms
     Not rsimms71 or richsimms

- *New security question in place*
- *Each registration must be manually approved by your instructor*

Friday September 13th
3-6:00PM

CIS Systems will be down for maintenance

Opus
Forum
All VLab VMs



More commands for your toolbox

New commands for this lesson

cat *filename*	*print file(s) ("cat" comes from con**cat**enate)*
cd *[pathname]*	*Change to a new directory*
ls *[pathname]*	*List files in a directory*
echo *string*	*Print string (on screen)*
file *pathname*	*Show additional file information*
type *command*	*Shows where command resides on the path*
man *command*	*Show manual page for a command*
bc	*Binary calculator*
banner *text*	*Make a banner*
passwd	*Change password*
apropos *command*	*Looks up references in the whatis database*

cat command

Concatenate files and print on the standard output

```
/home/cis90/simben $ cat letter
Hello Mother!  Hello Father!

Here I am at Camp Granada.  Things are very entertaining,
and they say we'll have some fun when it stops raining.

< snipped >

Wait a minute!  It's stopped hailing!  Guys are swimming!
Guys are sailing!  Playing baseball, gee that's better!
Mother, Father, kindly disregard this letter.

                                                Alan Sherman
/home/cis90/simben $
```

cd and ls commands

Change directory and list directory contents

```
/home/cis90/simben $ cd
```

*Using **cd** by itself with no argument will return you to your home directory*

```
/home/cis90/simben $ ls
bigfile  lab01-submitted      letter         Poems      small_town  timecal
bin      lab01-submitted.bak  log            proposal1  spellk      what_am_i
empty    Lab2.0               Miscellaneous  proposal2  text.err
Hidden   Lab2.1               mission        proposal3  text.fxd
```

List files in current directory

```
/home/cis90/simben $ cd Poems/
/home/cis90/simben/Poems $ ls
ant  Blake  nursery  Shakespeare  twister  Yeats
/home/cis90/simben/Poems $
```

Change to the Poems directory

Notice how your prompt changes when changing into the Poems directory

ls command

List directory contents

```
/home/cis90/simben $ ls
bigfile  Lab2.0         mission    proposal3  text.fxd
bin      Lab2.1         Poems      small_town timecal
empty    letter         proposal1  spellk     what_am_i
Hidden   Miscellaneous  proposal2  text.err
```

If no argument is specified, the current directory is listed

```
/home/cis90/simben $ ls Poems/
ant  Blake  nursery  Shakespeare  twister  Yeats
```

If one or more directories are specified as arguments then they will be listed

```
/home/cis90/simben $ ls /bin/uname
/bin/uname
```

If one or more filenames are specified as arguments then those filenames will be listed

Regular files show as black, directories show as blue and executable programs/scripts show as green

echo command

Echo (output) the arguments on the command line

```
/home/cis90/simben $ echo hello rich
hello rich

/home/cis90/simben $ echo 123
123

/home/cis90/simben $ echo 1 2 3
1 2 3
```

file command

Show extended file information

```
/home/cis90/simben $ file letter
letter: ASCII English text

/home/cis90/simben $ file Miscellaneous/
Miscellaneous/: directory

/home/cis90/simben $ file timecal
timecal: shell archive or script for antique kernel text
```

type command

Locate where a command resides on your path

```
[rsimms@opus run]$ type cal
cal is /usr/bin/cal
```

*The **cal** command is on the user's path and is located in the /usr/bin directory*

```
/home/cis90/simben $ type bogus
-bash: type: bogus: not found
```

*The **bogus** command is not on the user's path*

```
[rsimms@opus run]$ type uname cal
uname is /bin/uname
cal is /usr/bin/cal
```

*Both **uname** and **cal** commands are on the user's path. **uname** is in the /bin directory and **cal** is in the /usr/bin directory*

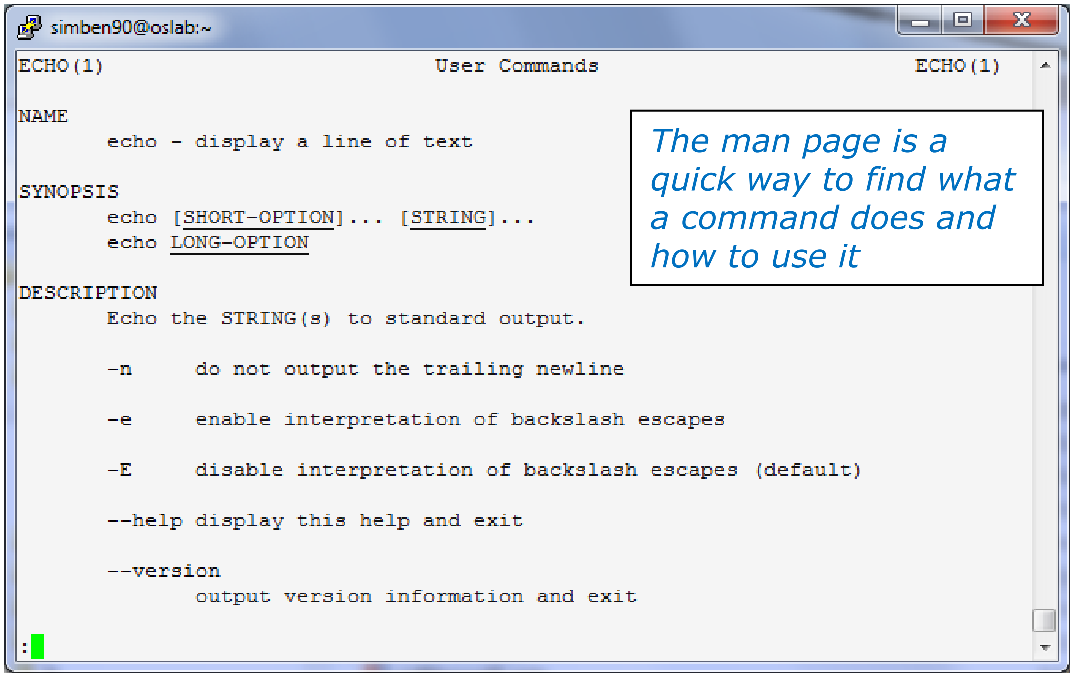
name of the file (command/program)

name of the directory where file is found

man command

Show the manual page (documentation) for a command

```
/home/cis90/simben $ man echo
```



simben90@oslab:~

```
ECHO(1)                          User Commands                         ECHO(1)

NAME
       echo - display a line of text

SYNOPSIS
       echo [SHORT-OPTION]... [STRING]...
       echo LONG-OPTION

DESCRIPTION
       Echo the STRING(s) to standard output.

       -n     do not output the trailing newline

       -e     enable interpretation of backslash escapes

       -E     disable interpretation of backslash escapes (default)

       --help display this help and exit

       --version
              output version information and exit

:
```

The man page is a quick way to find what a command does and how to use it

Use these keys to scroll

Use q key to quit

bc command

A binary calculator

```
/home/cis90/simben $ bc
bc 1.06.95
Copyright 1991-1994, 1997, 1998, 2000, 2004, 2006
Free Software Foundation, Inc.
This is free software with ABSOLUTELY NO WARRANTY.
For details type `warranty'.
2+2
4
3*30
90
(3*31)+251*1.5
469.5
quit
/home/cis90/simben $
```

Enter mathematical equations for bc to solve

Use quit to end program

banner command

Make a banner

```
/home/cis90/simben $ banner I Love Linux
 #####
   #
   #
   #
   #
   #
 #####

#       ####### #     # #######
#       #     # #     # #
#       #     # #     # #
#       #     # #     # #####
#       #     #  #   #  #
#       #     #   # #   #
####### #######    #    #######

#        #####  #     # #     # #     #
#          #    ##    # #     #  #   #
#          #    # #   # #     #   # #
#          #    #  #  # #     #    #
#          #    #   # # #     #   # #
#          #    #    ## #     #  #   #
#######  #####  #     #  #####  #     #
```

Similar to echo command but outputs banner sized letters instead

apropos command

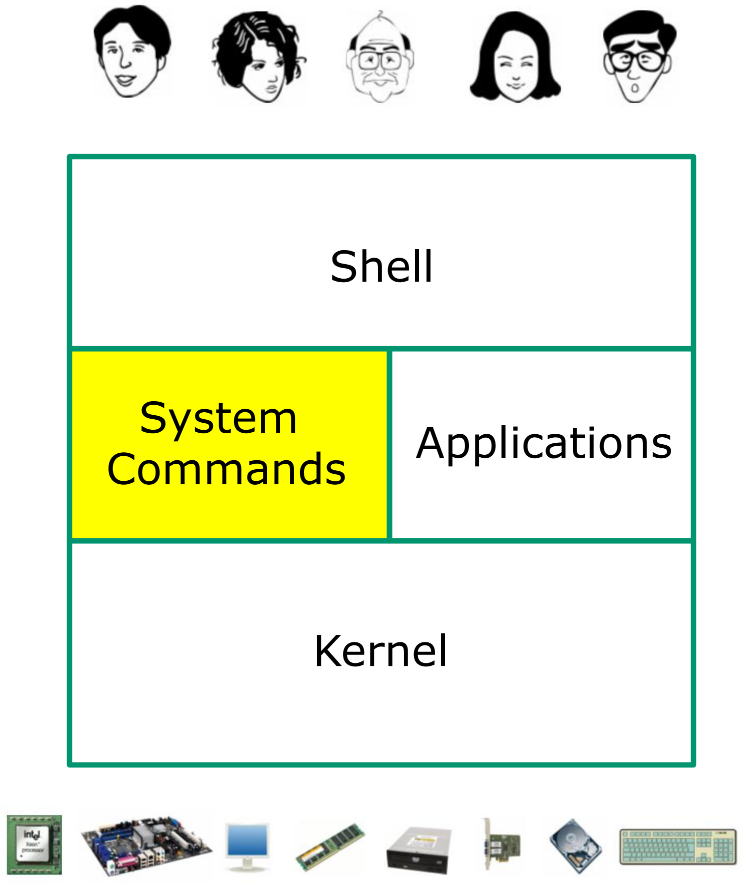
apropos - search the whatis database for strings

```
/home/cis90/simben $ apropos echo
echo                     (1)   - display a line of text
echo                     (1p)   - write arguments to standard output
echo [builtins]          (1)   - bash built-in commands, see bash(1)
lessecho                 (1)   - expand metacharacters
pam_echo                 (8)   - PAM module for printing text messages
ping                     (8)   - send ICMP ECHO_REQUEST to network hosts
ping6 [ping]             (8)   - send ICMP ECHO_REQUEST to network hosts
/home/cis90/simben $
```

Where are the commands?

UNIX/Linux Architecture

System Commands

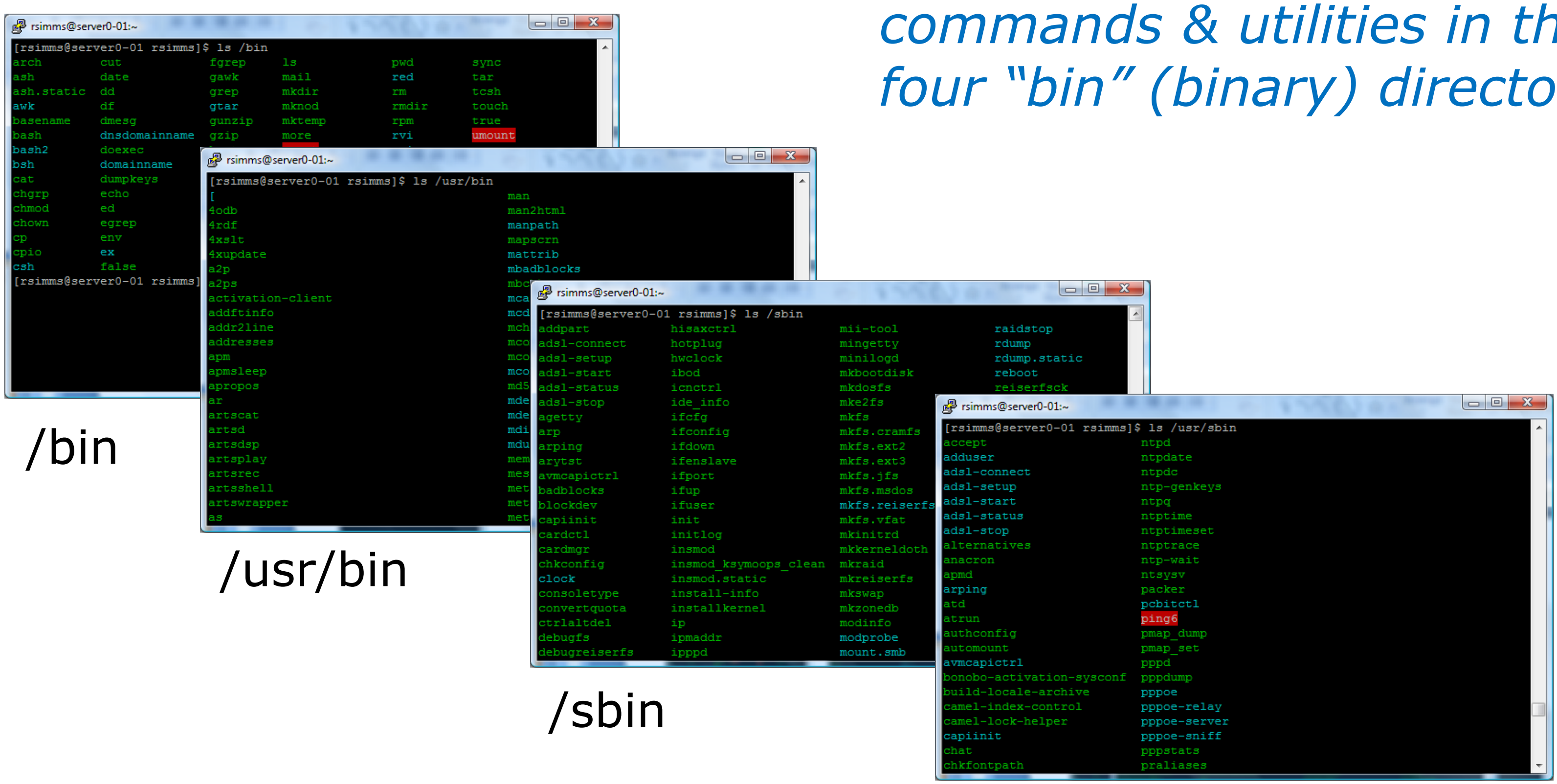


- 100's of system commands and utilities .
- Commands like **ls** (list directories), **cat** (print a file), **rm** (remove a file), … etc.
- Utilities like **vi** (text editor), **sort** (sorts file contents), **find** (searches), … etc.
- Larger utilities like **sendmail** (email), **tar** (backup), **tcpdump** (sniffer), … etc.
- Administrative utilities like **useradd**, **groupadd**, **passwd** (change password), … etc.

Commands and Utilities

Executable binary code (programs) or scripts

There are lots and LOTS of commands & utilities in the four "bin" (binary) directories



```
[rsimms@server0-01 rsimms]$ ls /bin
arch        cut            fgrep    ls         pwd     sync
ash         date           gawk     mail       red     tar
ash.static  dd             grep     mkdir      rm      tcsh
awk         df             gtar     mknod      rmdir   touch
basename    dmesg          gunzip   mktemp     rpm     true
bash        dnsdomainname  gzip     more       rvi     umount
bash2       doexec
bsh         domainname
cat         dumpkeys
chgrp       echo
chmod       ed
chown       egrep
cp          env
cpio        ex
csh         false
[rsimms@server0-01 rsimms]
```

/bin

```
[rsimms@server0-01 rsimms]$ ls /usr/bin
[                                           man
4odb                                        man2html
4rdf                                        manpath
4xslt                                       mapscrn
4xupdate                                    mattrib
a2p                                         mbadblocks
a2ps                                        mbc
activation-client                           mca
addftinfo                                   mcd
addr2line                                   mch
addresses                                   mco
apm                                         mco
apmsleep                                    mco
apropos                                     md5
ar                                          mde
artscat                                     mde
artsd                                       mdi
artsdsp                                     mdu
artsplay                                    mem
artsrec                                     mes
artsshell                                   met
artswrapper                                 met
as                                          met
```

/usr/bin

```
[rsimms@server0-01 rsimms]$ ls /sbin
addpart            hisaxctrl               mii-tool         raidstop
adsl-connect       hotplug                 mingetty         rdump
adsl-setup         hwclock                 minilogd         rdump.static
adsl-start         ibod                    mkbootdisk       reboot
adsl-status        icnctrl                 mkdosfs          reiserfsck
adsl-stop          ide_info                mke2fs
agetty             ifcfg                   mkfs
arp                ifconfig                mkfs.cramfs
arping             ifdown                  mkfs.ext2
arytst             ifenslave               mkfs.ext3
avmcapictrl        ifport                  mkfs.jfs
badblocks          ifup                    mkfs.msdos
blockdev           ifuser                  mkfs.reiserfs
capiinit           init                    mkfs.vfat
cardctl            initlog                 mkinitrd
cardmgr            insmod                  mkkerneldoth
chkconfig          insmod_ksymoops_clean   mkraid
clock              insmod.static           mkreiserfs
consoletype        install-info            mkswap
convertquota       installkernel           mkzonedb
ctrlaltdel         ip                      modinfo
debugfs            ipmaddr                 modprobe
debugreiserfs      ipppd                   mount.smb
```

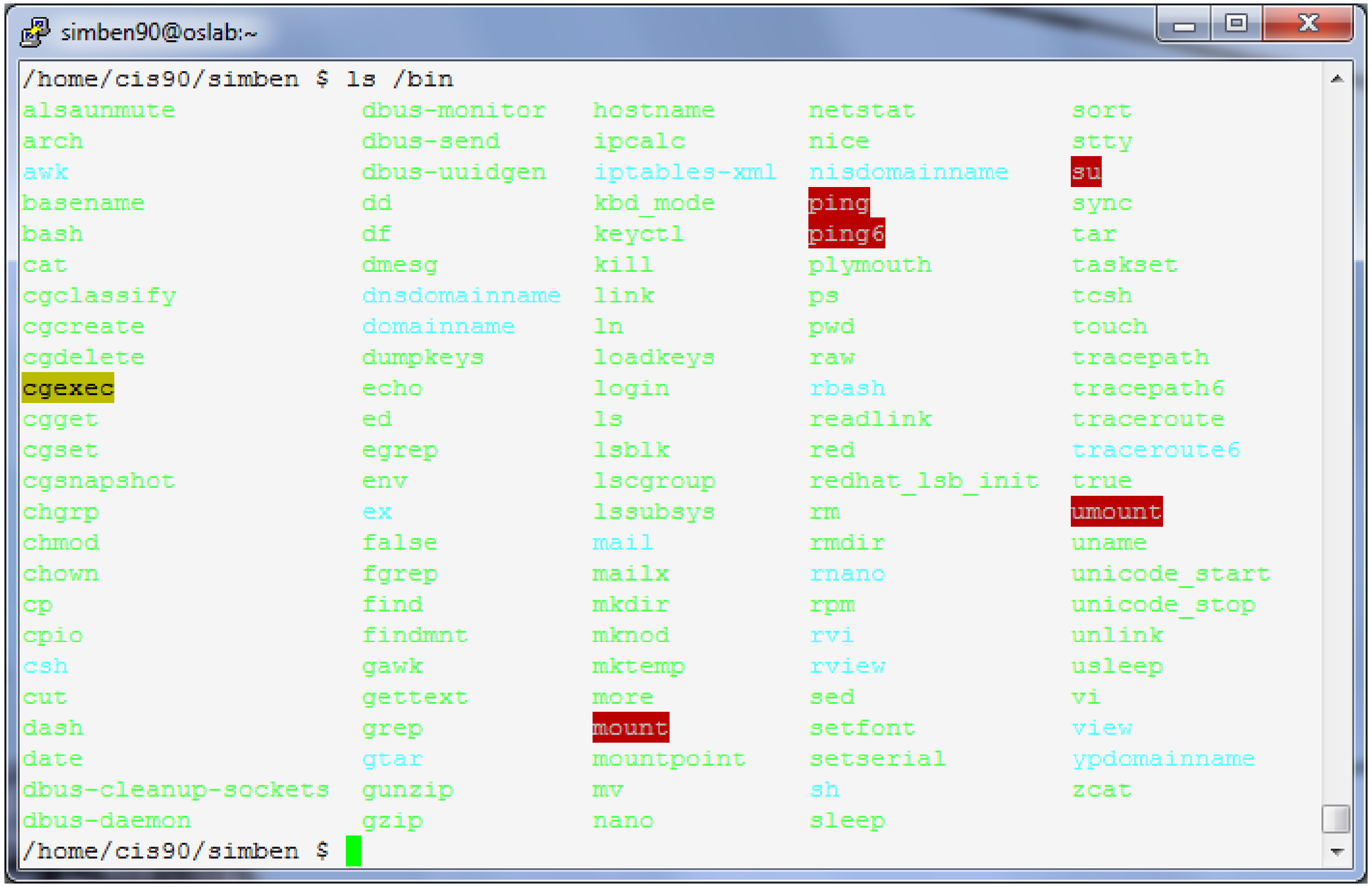
/sbin

```
[rsimms@server0-01 rsimms]$ ls /usr/sbin
accept                       ntpd
adduser                      ntpdate
adsl-connect                 ntpdc
adsl-setup                   ntp-genkeys
adsl-start                   ntpq
adsl-status                  ntptime
adsl-stop                    ntptimeset
alternatives                 ntptrace
anacron                      ntp-wait
apmd                         ntsysv
arping                       packer
atd                          pcbitctl
atrun                        ping6
authconfig                   pmap_dump
automount                    pmap_set
avmcapictrl                  pppd
bonobo-activation-sysconf    pppdump
build-locale-archive         pppoe
camel-index-control          pppoe-relay
camel-lock-helper            pppoe-server
capiinit                     pppoe-sniff
chat                         pppstats
chkfontpath                  praliases
```

/usr/sbin

The /bin directory

Use **ls /bin** to view



```
/home/cis90/simben $ ls /bin
alsaunmute              dbus-monitor   hostname       netstat           sort
arch                    dbus-send      ipcalc         nice              stty
awk                     dbus-uuidgen   iptables-xml   nisdomainname     su
basename                dd             kbd_mode       ping              sync
bash                    df             keyctl         ping6             tar
cat                     dmesg          kill           plymouth          taskset
cgclassify              dnsdomainname  link           ps                tcsh
cgcreate                domainname     ln             pwd               touch
cgdelete                dumpkeys       loadkeys       raw               tracepath
cgexec                  echo           login          rbash             tracepath6
cgget                   ed             ls             readlink          traceroute
cgset                   egrep          lsblk          red               traceroute6
cgsnapshot              env            lscgroup       redhat_lsb_init   true
chgrp                   ex             lssubsys       rm                umount
chmod                   false          mail           rmdir             uname
chown                   fgrep          mailx          rnano             unicode_start
cp                      find           mkdir          rpm               unicode_stop
cpio                    findmnt        mknod          rvi               unlink
csh                     gawk           mktemp         rview             usleep
cut                     gettext        more           sed               vi
dash                    grep           mount          setfont           view
date                    gtar           mountpoint     setserial         ypdomainname
dbus-cleanup-sockets    gunzip         mv             sh                zcat
dbus-daemon             gzip           nano           sleep
/home/cis90/simben $
```

/bin has essential commands used by everyone.

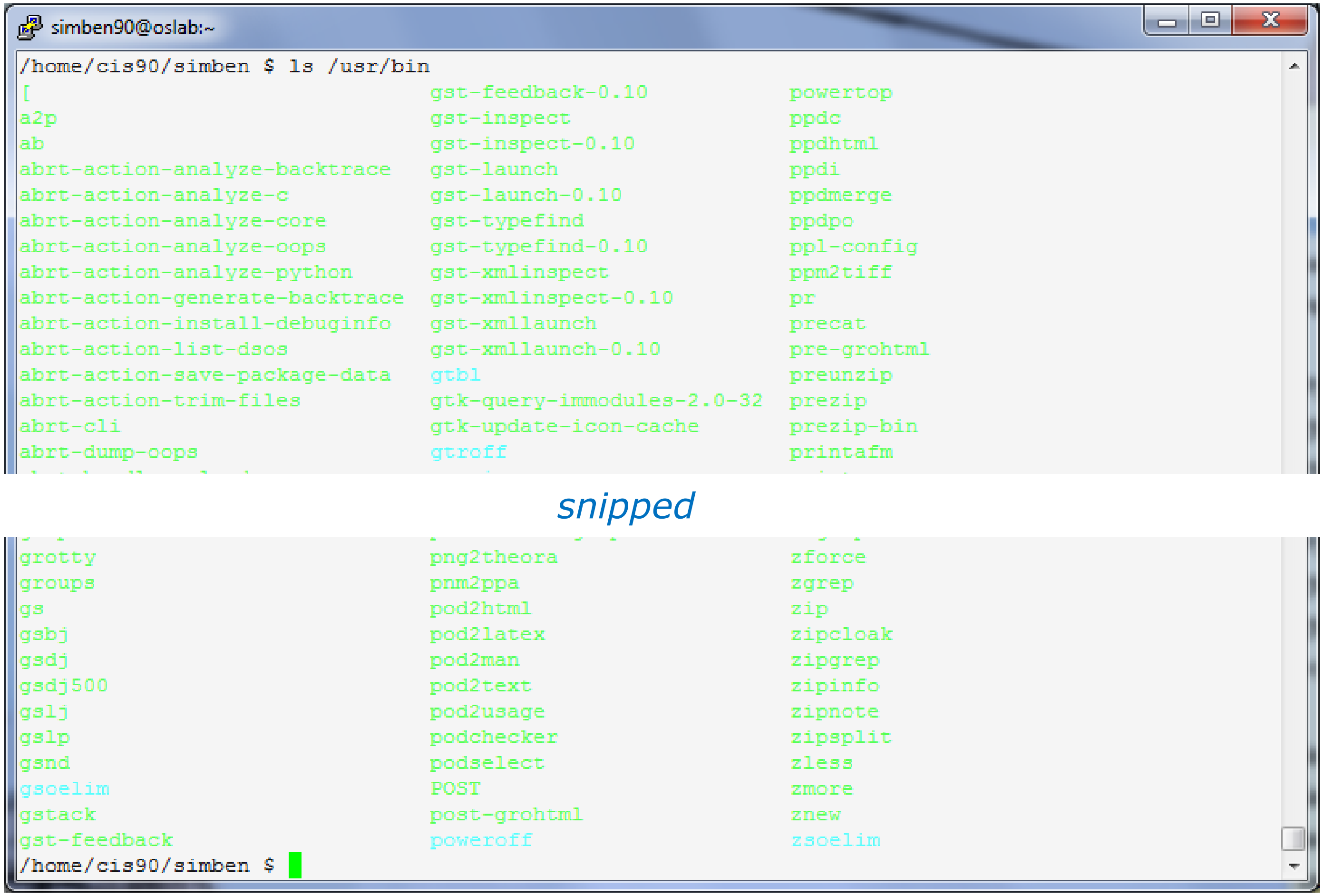
*Can you find the Lesson 1 **date**, **hostname**, **ps** and **uname** commands?*

*Can you find the **bash** shell?*

Commands are either program or script files that can be executed

The /usr/bin directory

Use **ls /usr/bin** to view



simben90@oslab:~

```
/home/cis90/simben $ ls /usr/bin
[                                 gst-feedback-0.10            powertop
a2p                               gst-inspect                  ppdc
ab                                gst-inspect-0.10             ppdhtml
abrt-action-analyze-backtrace     gst-launch                   ppdi
abrt-action-analyze-c             gst-launch-0.10              ppdmerge
abrt-action-analyze-core          gst-typefind                 ppdpo
abrt-action-analyze-oops          gst-typefind-0.10            ppl-config
abrt-action-analyze-python        gst-xmlinspect               ppm2tiff
abrt-action-generate-backtrace    gst-xmlinspect-0.10          pr
abrt-action-install-debuginfo     gst-xmllaunch                precat
abrt-action-list-dsos             gst-xmllaunch-0.10           pre-grohtml
abrt-action-save-package-data     gtbl                         preunzip
abrt-action-trim-files            gtk-query-immodules-2.0-32   prezip
abrt-cli                          gtk-update-icon-cache        prezip-bin
abrt-dump-oops                    gtroff                       printafm
```

snipped

```
grotty                            png2theora                   zforce
groups                            pnm2ppa                      zgrep
gs                                pod2html                     zip
gsbj                              pod2latex                    zipcloak
gsdj                              pod2man                      zipgrep
gsdj500                           pod2text                     zipinfo
gslj                              pod2usage                    zipnote
gslp                              podchecker                   zipsplit
gsnd                              podselect                    zless
gsoelim                           POST                         zmore
gstack                            post-grohtml                 znew
gst-feedback                      poweroff                     zsoelim
/home/cis90/simben $
```

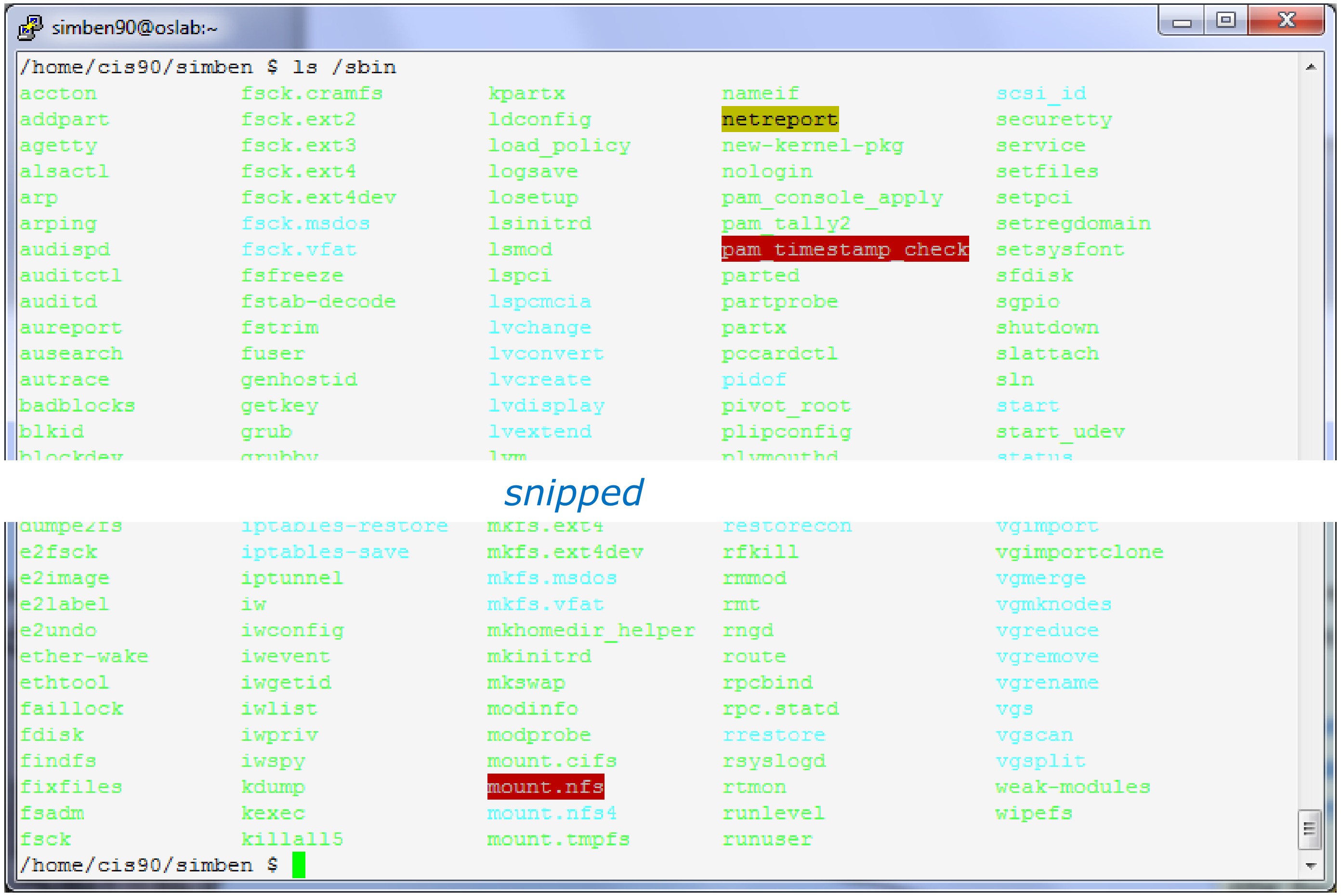
There are a "ton" of additional commands (programs) in this directory.

You will need to scroll through a lot of pages to see them all!

Can you find the Lesson 1 ***cal, clear****,* ***id, ssh, tty****, and* ***who*** *commands we used in Lab 1?*

The /sbin directory

Use **ls /sbin** to view this directory



```
/home/cis90/simben $ ls /sbin
accton           fsck.cramfs        kpartx            nameif               scsi_id
addpart          fsck.ext2          ldconfig          netreport            securetty
agetty           fsck.ext3          load_policy       new-kernel-pkg       service
alsactl          fsck.ext4          logsave           nologin              setfiles
arp              fsck.ext4dev       losetup           pam_console_apply    setpci
arping           fsck.msdos         lsinitrd          pam_tally2           setregdomain
audispd          fsck.vfat          lsmod             pam_timestamp_check  setsysfont
auditctl         fsfreeze           lspci             parted               sfdisk
auditd           fstab-decode       lspcmcia          partprobe            sgpio
aureport         fstrim             lvchange          partx                shutdown
ausearch         fuser              lvconvert         pccardctl            slattach
autrace          genhostid          lvcreate          pidof                sln
badblocks        getkey             lvdisplay         pivot_root           start
blkid            grub               lvextend          plipconfig           start_udev
blockdev         grubby             lvm               plymouthd            status
```

snipped

```
dumpe2fs         iptables-restore   mkfs.ext4         restorecon           vgimport
e2fsck           iptables-save      mkfs.ext4dev      rfkill               vgimportclone
e2image          iptunnel           mkfs.msdos        rmmod                vgmerge
e2label          iw                 mkfs.vfat         rmt                  vgmknodes
e2undo           iwconfig           mkhomedir_helper  rngd                 vgreduce
ether-wake       iwevent            mkinitrd          route                vgremove
ethtool          iwgetid            mkswap            rpcbind              vgrename
faillock         iwlist             modinfo           rpc.statd            vgs
fdisk            iwpriv             modprobe          rrestore             vgscan
findfs           iwspy              mount.cifs        rsyslogd             vgsplit
fixfiles         kdump              mount.nfs         rtmon                weak-modules
fsadm            kexec              mount.nfs4        runlevel             wipefs
fsck             killall5           mount.tmpfs       runuser
/home/cis90/simben $
```

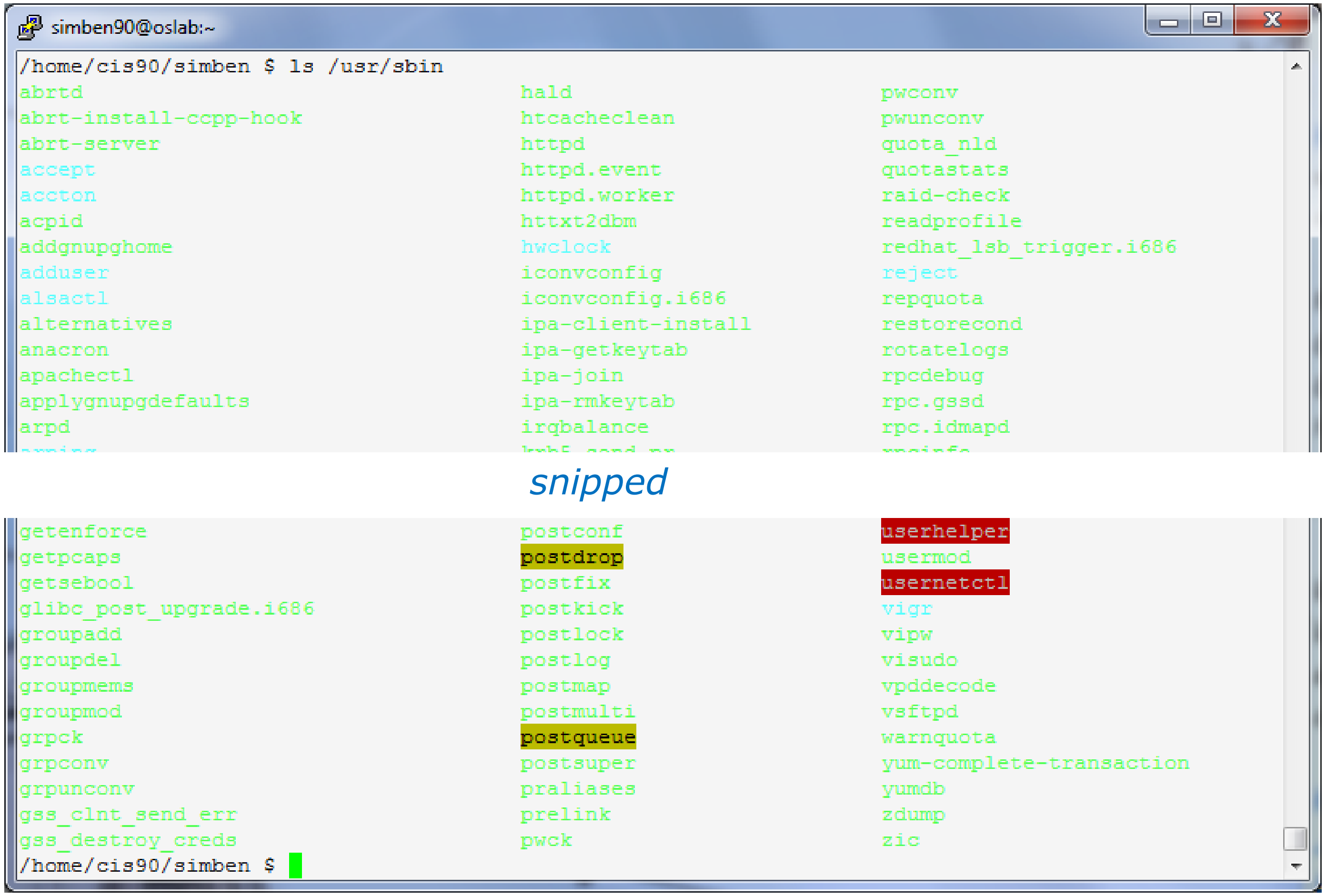
These are essential commands and utilities used by system administrators.

This is where the ***chkconfig****,* ***ifconfig*** *and* ***iptables*** *commands are found.*

You will learn how to use these commands in CIS 191 and CIS 192.

The /usr/sbin directory

Use **ls /usr/sbin** to view this directory



```
simben90@oslab:~
/home/cis90/simben $ ls /usr/sbin
abrtd                                      hald                          pwconv
abrt-install-ccpp-hook                     htcacheclean                  pwunconv
abrt-server                                httpd                         quota_nld
accept                                     httpd.event                   quotastats
accton                                     httpd.worker                  raid-check
acpid                                      httxt2dbm                     readprofile
addgnupghome                               hwclock                       redhat_lsb_trigger.i686
adduser                                    iconvconfig                   reject
alsactl                                    iconvconfig.i686              repquota
alternatives                               ipa-client-install            restorecond
anacron                                    ipa-getkeytab                 rotatelogs
apachectl                                  ipa-join                      rpcdebug
applygnupgdefaults                         ipa-rmkeytab                  rpc.gssd
arpd                                       irqbalance                    rpc.idmapd
```

snipped

```
getenforce                                 postconf                      userhelper
getpcaps                                   postdrop                      usermod
getsebool                                  postfix                       usernetctl
glibc_post_upgrade.i686                    postkick                      vigr
groupadd                                   postlock                      vipw
groupdel                                   postlog                       visudo
groupmems                                  postmap                       vpddecode
groupmod                                   postmulti                     vsftpd
grpck                                      postqueue                     warnquota
grpconv                                    postsuper                     yum-complete-transaction
grpunconv                                  praliases                     yumdb
gss_clnt_send_err                          prelink                       zdump
gss_destroy_creds                          pwck                          zic
/home/cis90/simben $
```

These are additional commands and utilities are typically used by system administrators.

This is where commands like ***useradd, userdel, tcpdump*** *are located.*

You will learn how to use these commands in CIS 191 and CIS 192.

Programs

Binary code vs text scripts

UNIX commands & utilities are executable programs

A program can be binary code:

- Binary machine code is unprintable. A programmer must use hex dumps to examine binary code.
- Binary machine code executes very quickly and is targeted for a specific CPU instruction set.
- The binaries are produced by compiling source code written in a higher level language such as C, or C++.

A program can be a text-based script:

- A script can be directly viewed and printed.
- A script does not need to be compiled. It is interpreted on the fly and because of that doesn't run as fast as binary code.
- Common scripting languages include bash, perl and python.

Two example programs: apropos and cal

Lets take a deep dive on two random commands:

apropos - searches the whatis database for a string of text

cal - prints a calendar

I'll be using this graphic to indicate a program that has been loaded into memory to be executed

What do they do?

apropos

cal

*The **apropos** command looks up the argument it gets in the whatis database.*

```
/home/cis90/simben $ apropos uname
oldolduname [obsolete] (2)   - obsolete system calls
olduname [obsolete]   (2)   - obsolete system calls
uname                 (1)   - print system information
uname                 (1p)   - return system name
uname                 (2)   - get name and information about current kernel
uname                 (3p)   - get the name of the current system
```

*The **cal** prints a calendar*

```
/home/cis90/simben $ cal
   February 2012
Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29
```

Where are the programs located?

apropos

cal

The **type** command shows where commands are located on the path:

```
/home/cis90/simben $ type apropos cal
apropos is hashed (/usr/bin/apropos)
cal is /usr/bin/cal
```

*The **apropos** and **cal** commands are used as arguments on the **type** command*

They are both in the /usr/bin directory.

Note: Sometimes you will see "Hashed" which means the command has been run previously and its location on the path has been temporarily "remembered" to speed up subsequent path searches for the same command.

Listing the program files

1) Change into the /usr/bin directory:

```
/home/cis90/simben $ cd /usr/bin
```

*The /usr/bin pathname is used as and argument on the **cd** command*

2) List the two files in that directory:

```
/usr/bin $ ls apropos cal
apropos  cal
```

*The **apropos** and **cal** commands are used as arguments on the **ls** command*

3) Use the **-l** option on the **ls** command to show additional information:

```
/usr/bin $ ls -l apropos cal
-rwxr-xr-x 1 root root  1786 Jul 12  2006 apropos
-rwxr-xr-x 1 root root 18764 Jul  3  2009 cal
```

Note the execute permissions set (more on this later)

Getting more information on the program files

apropos

cal

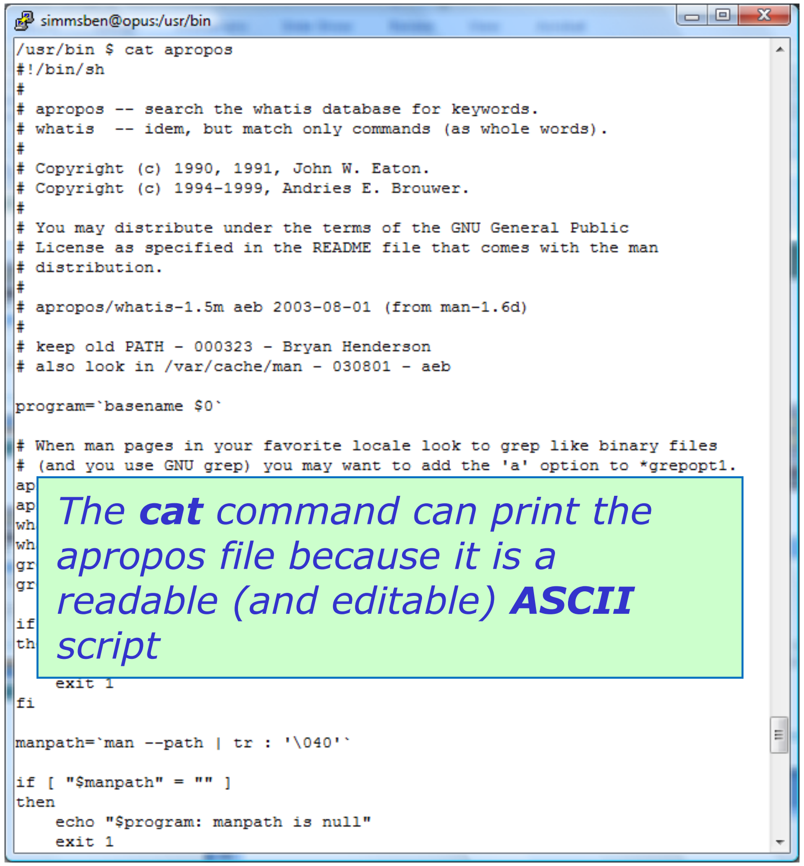
```
/usr/bin $ file apropos
apropos: Bourne shell script text executable
/usr/bin $

/usr/bin $ file cal
cal: ELF 32-bit LSB executable, Intel 80386, version 1 (SYSV),
for GNU/Linux 2.6.9, dynamically linked (uses shared libs),
for GNU/Linux 2.6.9, stripped
/usr/bin $
```

*The **file** command shows that **apropos** is a shell script and **cal** is binary code (has been compiled from higher level source code)*

Looking at the contents of the program files

apropos
(script)

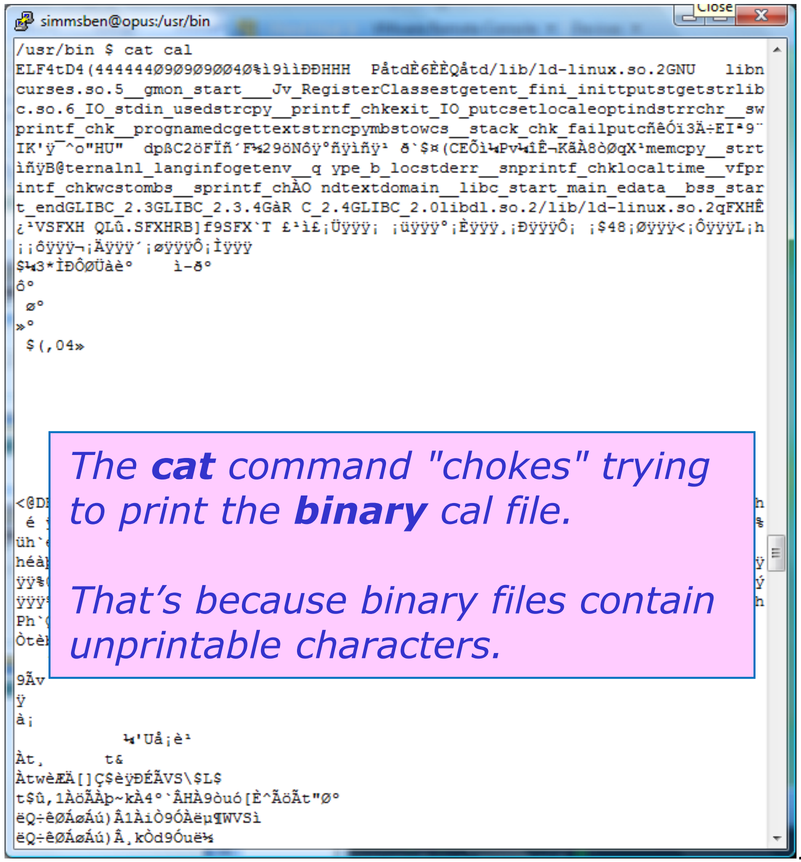
cal
(binary code)



simmsben@opus:/usr/bin

```
/usr/bin $ cat apropos
#!/bin/sh
#
# apropos -- search the whatis database for keywords.
# whatis  -- idem, but match only commands (as whole words).
#
# Copyright (c) 1990, 1991, John W. Eaton.
# Copyright (c) 1994-1999, Andries E. Brouwer.
#
# You may distribute under the terms of the GNU General Public
# License as specified in the README file that comes with the man
# distribution.
#
# apropos/whatis-1.5m aeb 2003-08-01 (from man-1.6d)
#
# keep old PATH - 000323 - Bryan Henderson
# also look in /var/cache/man - 030801 - aeb

program=`basename $0`

# When man pages in your favorite locale look to grep like binary files
# (and you use GNU grep) you may want to add the 'a' option to *grepopt1.
ap
ap
wh
wh
gr
gr

if
th

    exit 1
fi

manpath=`man --path | tr : '\040'`

if [ "$manpath" = "" ]
then
    echo "$program: manpath is null"
    exit 1
```

*The **cat** command can print the apropos file because it is a readable (and editable) **ASCII** script*



simmsben@opus:/usr/bin

```
/usr/bin $ cat cal
ELF4tD4(44444Ø9Ø9Ø9ØØ4Ø%ì9ììÐÐHHH  PåtdÈ6ÈÈQåtd/lib/ld-linux.so.2GNU   libn
curses.so.5__gmon_start___Jv_RegisterClassestgetent_fini_inittputstgetstrlib
c.so.6_IO_stdin_usedstrcpy__printf_chkexit_IO_putcsetlocaleoptindstrrchr__sw
printf_chk__prognamedcgettextstrncpymbstowcs__stack_chk_failputcñêÓï3Ä÷EIª9¨
IK'ÿ¯^o"HU"  dpßC2öFÏñ´F¾29öNôÿ°ñÿìñÿ¹ ð`$¤(CEÕì¼Pv¼îÊ¬KãÀ8òØqX¹memcpy__strt
ìñÿB@ternalnl_langinfogetenv__q ype_b_locstderr__snprintf_chklocaltime__vfpr
intf_chkwcstombs__sprintf_chÀO ndtextdomain__libc_start_main_edata__bss_star
t_endGLIBC_2.3GLIBC_2.3.4GàR C_2.4GLIBC_2.0libdl.so.2/lib/ld-linux.so.2qFXHÊ
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ëQ÷êØÁøÁú)Â,kÒd9Óuë½
```
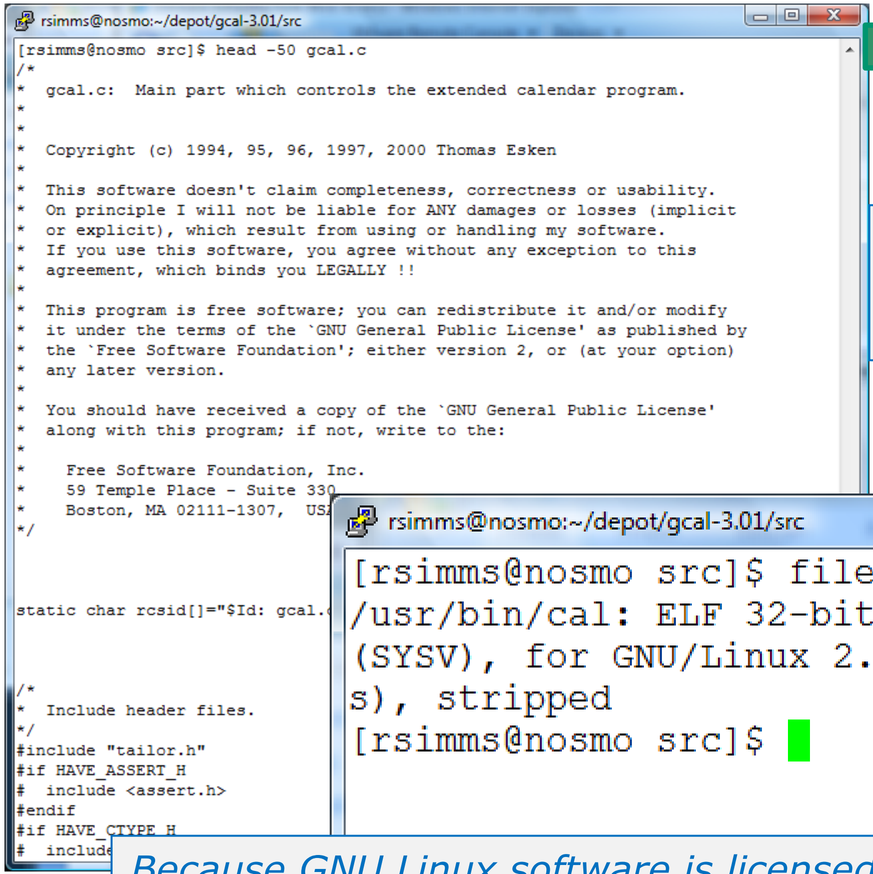

*The **cat** command "chokes" trying to print the **binary** cal file.*

That's because binary files contain unprintable characters.

How binary programs are created

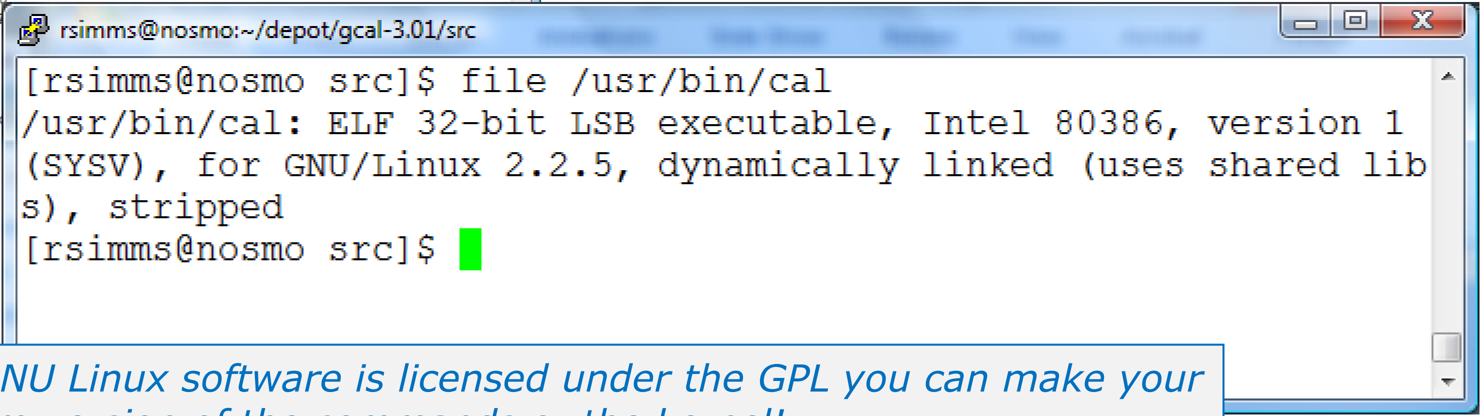
cal

From: gcal-3.01.tar.gz



```
[rsimms@nosmo src]$ head -50 gcal.c
/*
*  gcal.c:  Main part which controls the extended calendar program.
*
*
*  Copyright (c) 1994, 95, 96, 1997, 2000 Thomas Esken
*
*  This software doesn't claim completeness, correctness or usability.
*  On principle I will not be liable for ANY damages or losses (implicit
*  or explicit), which result from using or handling my software.
*  If you use this software, you agree without any exception to this
*  agreement, which binds you LEGALLY !!
*
*  This program is free software; you can redistribute it and/or modify
*  it under the terms of the `GNU General Public License' as published by
*  the `Free Software Foundation'; either version 2, or (at your option)
*  any later version.
*
*  You should have received a copy of the `GNU General Public License'
*  along with this program; if not, write to the:
*
*    Free Software Foundation, Inc.
*    59 Temple Place - Suite 330
*    Boston, MA 02111-1307,  USA
*/



static char rcsid[]="$Id: gcal.c



/*
*  Include header files.
*/
#include "tailor.h"
#if HAVE_ASSERT_H
#  include <assert.h>
#endif
#if HAVE_CTYPE_H
#  include
```

*Note: The **cal** binary code resulted from compiling the original gcal.c source code.*



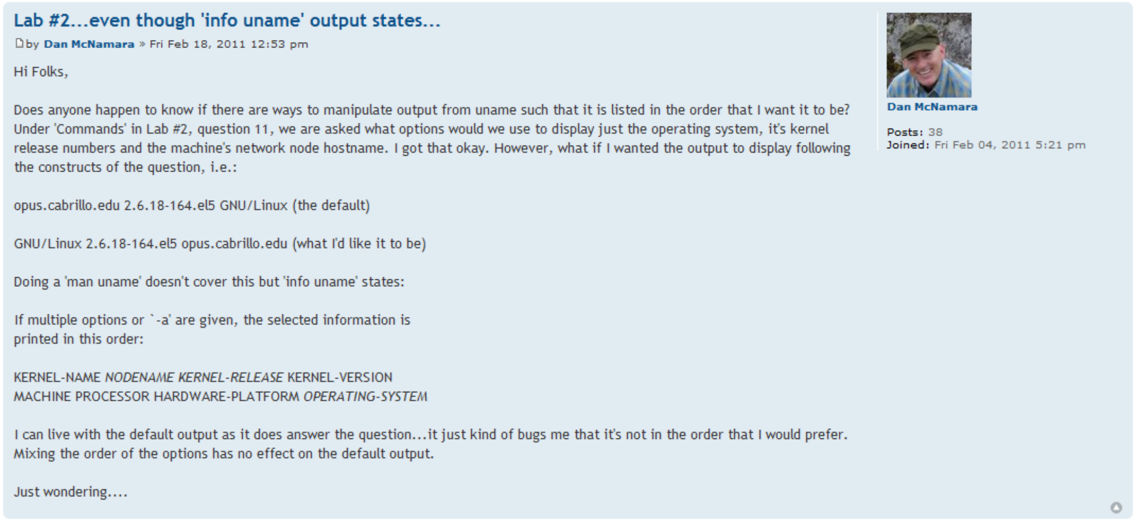
```
[rsimms@nosmo src]$ file /usr/bin/cal
/usr/bin/cal: ELF 32-bit LSB executable, Intel 80386, version 1
(SYSV), for GNU/Linux 2.2.5, dynamically linked (uses shared lib
s), stripped
[rsimms@nosmo src]$ 
```

Because GNU Linux software is licensed under the GPL you can make your own custom version of the commands or the kernel!

FYI

See this forum post from a previous class for an example of obtaining the source code for a Linux command and modifying it:

http://oslab.cabrillo.edu/forum/viewtopic.php?f=31&t=683&p=2774



Lab #2...even though 'info uname' output states...

by **Dan McNamara** » Fri Feb 18, 2011 12:53 pm

Hi Folks,

Does anyone happen to know if there are ways to manipulate output from uname such that it is listed in the order that I want it to be? Under 'Commands' in Lab #2, question 11, we are asked what options would we use to display just the operating system, it's kernel release numbers and the machine's network node hostname. I got that okay. However, what if I wanted the output to display following the constructs of the question, i.e.:

opus.cabrillo.edu 2.6.18-164.el5 GNU/Linux (the default)

GNU/Linux 2.6.18-164.el5 opus.cabrillo.edu (what I'd like it to be)

Doing a 'man uname' doesn't cover this but 'info uname' states:

If multiple options or `-a' are given, the selected information is
printed in this order:

KERNEL-NAME *NODENAME KERNEL-RELEASE* KERNEL-VERSION
MACHINE PROCESSOR HARDWARE-PLATFORM *OPERATING-SYSTEM*

I can live with the default output as it does answer the question...it just kind of bugs me that it's not in the order that I would prefer. Mixing the order of the options has no effect on the default output.

Just wondering....

Dan McNamara

Posts: 38
Joined: Fri Feb 04, 2011 5:21 pm

It all started when Dan did Lab 2 and wanted to change the way ***uname*** *ordered its output!*

Inputs to programs (commands and scripts)

You will get these questions when you submit Lab 2

Name a UNIX command that gets its input only from the command line?

Name an interactive command that reads its input from the keyboard?

Name a UNIX command that gets its input from the Operating System?

Name a UNIX command that gets its input only from the command line?

```
/home/cis90/simmen $ echo hello world
hello world
```

```
/home/cis90/simben $ banner hello world
#     # ####### #       #       #######
#     # #       #       #       #     #
#     # #       #       #       #     #
####### #####   #       #       #     #
#     # #       #       #       #     #
#     # #       #       #       #     #
#     # ####### ####### ####### #######

#     # ####### ######  #       ######
#  #  # #     # #     # #       #     #
#  #  # #     # #     # #       #     #
#  #  # #     # ######  #       #     #
#  #  # #     # #   #   #       #     #
#  #  # #     # #    #  #       #     #
 ## ##  ####### #     # ####### ######
```

*The **echo** and **banner** commands are examples of commands that get their input from the command line*

Name an interactive command that reads its input from the keyboard?

```
/home/cis90/simmsben $ bc
bc 1.06
Copyright 1991-1994, 1997, 1998, 2000 Free
Software Foundation, Inc.
This is free software with ABSOLUTELY NO
WARRANTY.
For details type `warranty'.
2+2
4
500-200+3
303
sqrt(64)
8
quit
```

```
/home/cis90/simmsben $ passwd
Changing password for user simmsben.
Changing password for simmsben
(current) UNIX password:
New UNIX password:
BAD PASSWORD: is too similar to the old
one
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated
successfully.
```

*The **bc** (binary calculator) and **passwd** commands are examples of interactive commands that read their input from the keyboard*

Name a UNIX command that gets its input from the Operating System?

```
/home/cis90/simmen $ who
dycktim  pts/1        2010-09-07 17:07 (nosmo-nat.cabrillo.edu)
root     :0           2009-12-18 17:30
velasoli pts/2        2010-09-07 17:08 (adsl-35-201-114-102.dsl.net)
guest90  pts/3        2010-09-07 16:56 (nosmo-nat.cabrillo.edu)
rsimms   pts/4        2010-09-07 15:54 (dsl-45-78-13-81.dhcp.com)
guest90  pts/5        2010-09-07 16:59 (nosmo-nat.cabrillo.edu)
watsohar pts/6        2010-09-07 17:03 (nosmo-nat.cabrillo.edu)
swansgre pts/7        2010-09-07 17:10 (nosmo-nat.cabrillo.edu)
guest90  pts/8        2010-09-07 17:10 (nosmo-nat.cabrillo.edu)
abbenste pts/9        2010-09-07 17:11 (nosmo-nat.cabrillo.edu)
```

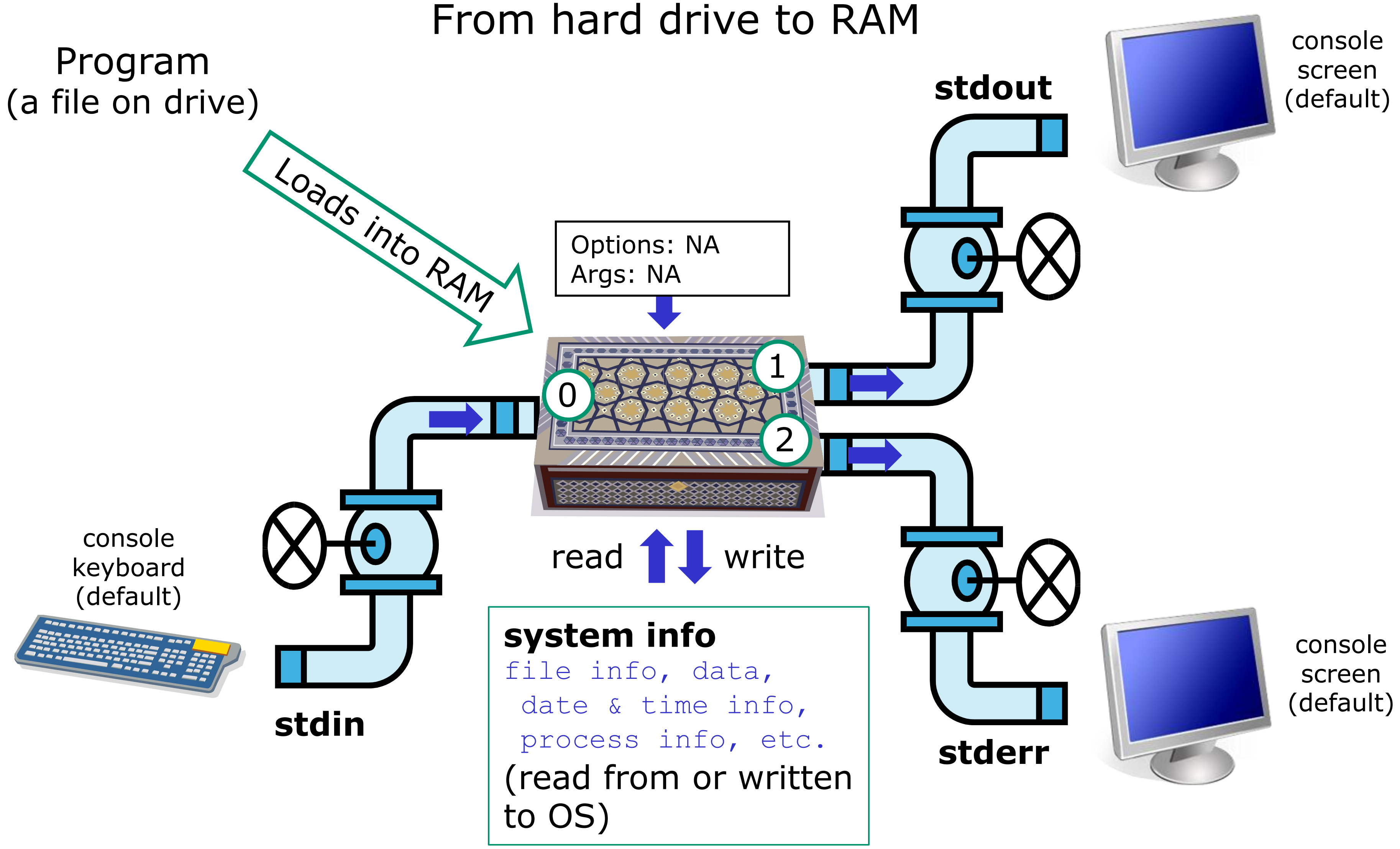
```
/home/cis90/simben $ uname
Linux
```

*The **who** and **uname** commands are examples of commands that get their input from the Operating System*

Drill Down on running programs

The next slides are a preview of future lessons on processes … for now just you don't need to understand all the ins and outs of how this works.

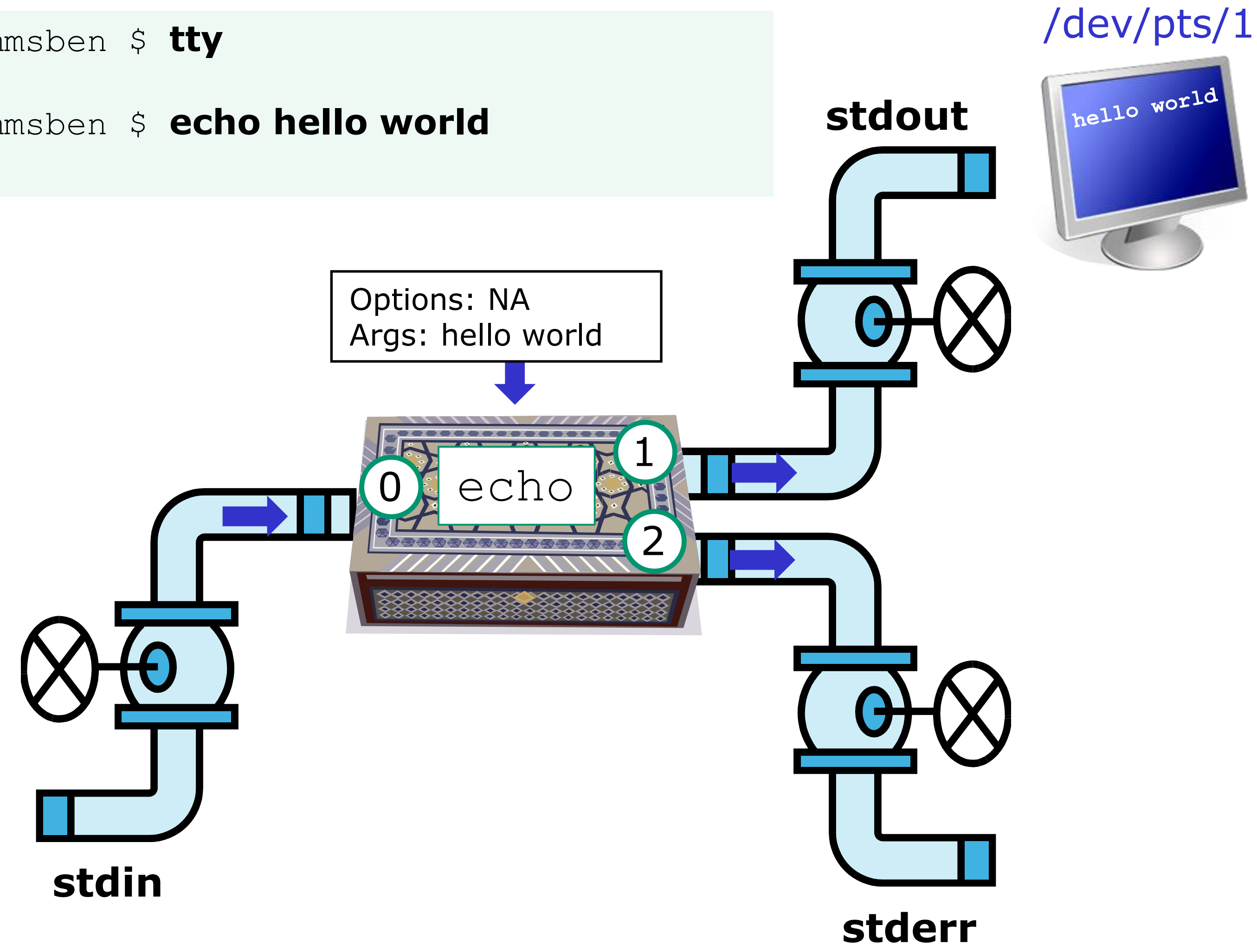
Program to Process
From hard drive to RAM



system info
file info, data,
date & time info,
process info, etc.
(read from or written to OS)

echo command

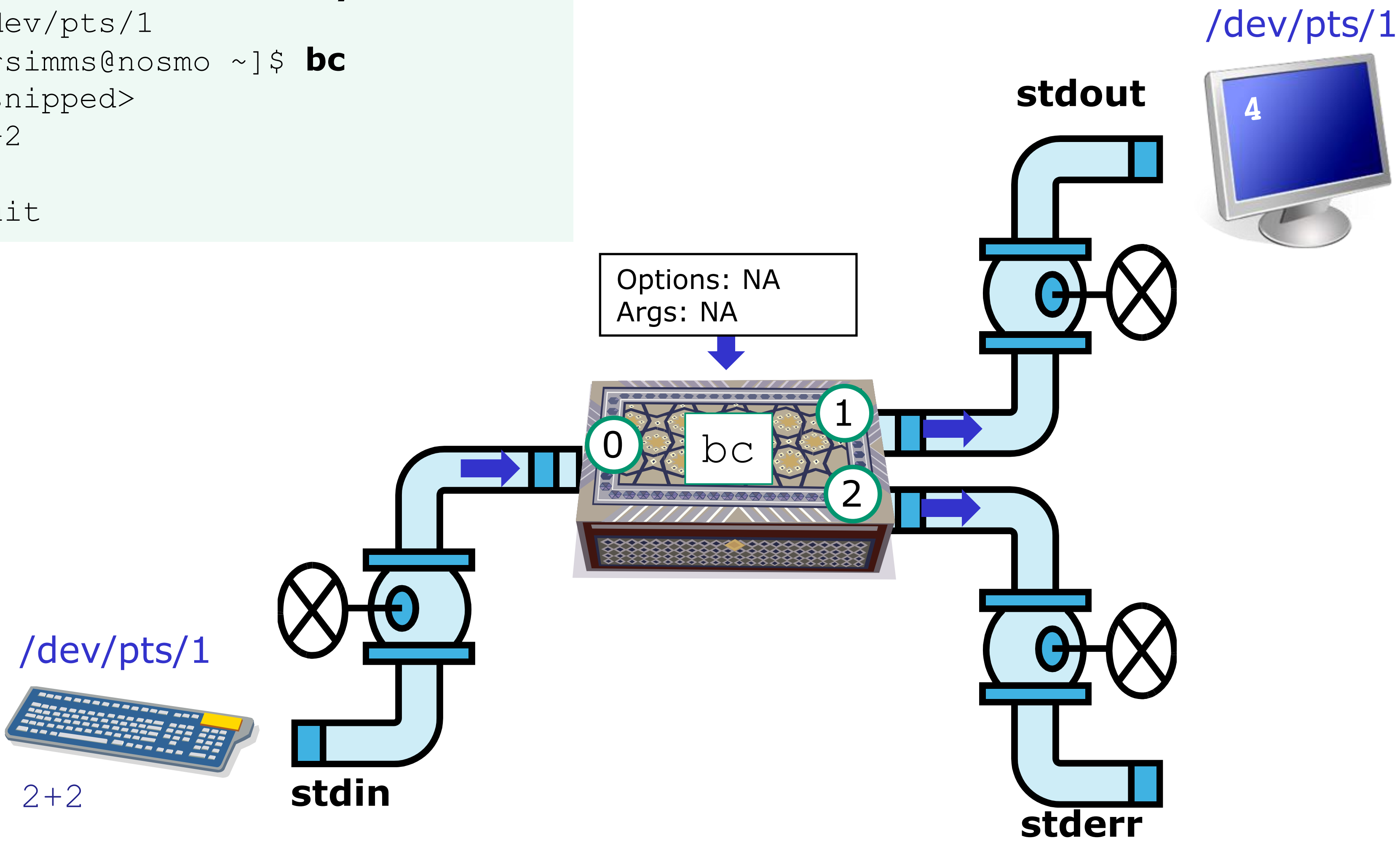
```
/home/cis90/simmsben $ tty
/dev/pts/1
/home/cis90/simmsben $ echo hello world
hello world
```



*The **echo** command is an example of a command that gets its input from the command line*

bc command

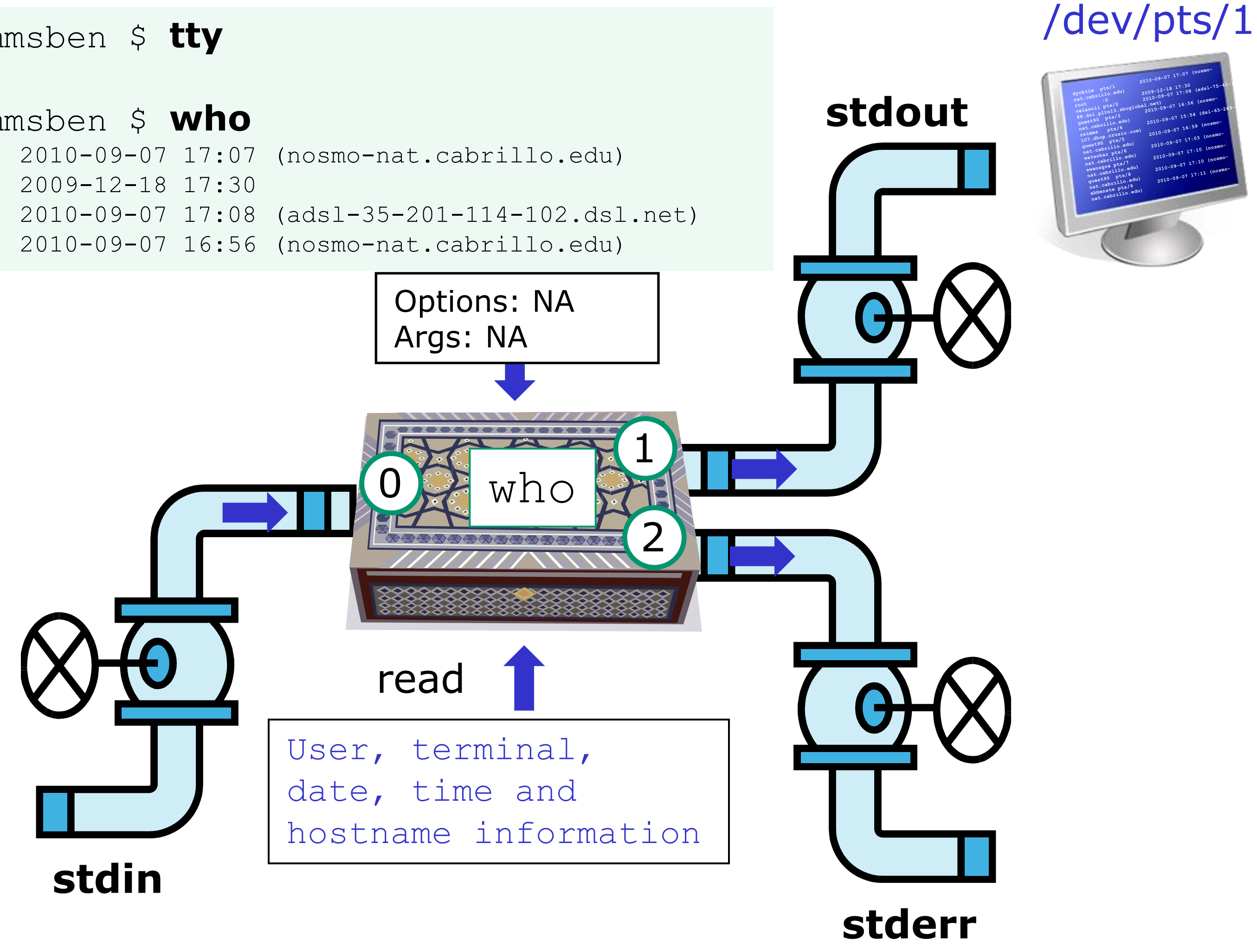
```
[rsimms@nosmo ~]$ tty
/dev/pts/1
[rsimms@nosmo ~]$ bc
<snipped>
2+2
4
quit
```



*The **bc** (binary calculator) command is an example of an interactive command that reads its input from the keyboard*

who command

```
/home/cis90/simmsben $ tty
/dev/pts/1
/home/cis90/simmsben $ who
dycktim  pts/1        2010-09-07 17:07 (nosmo-nat.cabrillo.edu)
root     :0           2009-12-18 17:30
velasoli pts/2        2010-09-07 17:08 (adsl-35-201-114-102.dsl.net)
guest90  pts/3        2010-09-07 16:56 (nosmo-nat.cabrillo.edu)
```



*The **who** command is an example of a command that gets its input from the Operating System*

Class Exercise
Running Programs

1. Use **echo Hello World** and **banner Hello World** commands
   (these commands get their input from the command line)

2. Use **bc** to add 2+2, use **quit** to end
   (this command reads its input from the keyboard)

3. Run the **who, tty, and uname** commands
   (these commands get their input from the operating system)

Command Syntax

(grammar lesson)

Command Syntax

Command	Options	Arguments	Redirection

Command – is the name of an executable program file.

Options – a special type of argument that is used to control how the program operate operates.

Arguments – the objects the command is directed to work upon. Multiple arguments are separated by spaces.

Redirection – The default input stream (stdin) is from the console keyboard, the default output (stdout) and error (stderr) streams go to the console screen. Redirection can modify these streams to other files or devices.

Command Syntax

Command	Options	Arguments	Redirection

Command – usually at the beginning of the line

Options – follow the command, usually starts with a dash, may be combined after a single "-" or separated by spaces (`-iad = -i -a -d`)

Arguments – follow the options. Multiple arguments must be separated by spaces.

Redirection – Will be a <, >, >>, 2> or | followed by where the redirection is going or coming from.

Spaces are required between commands, options, arguments and any redirection

Multiple spaces are treated as a single space (unless inside quotes)

One of the things the shell does is to parse commands issued by the user

from Dictionary.com

parse [pahrs, pahrz] ***verb, parsed, pars·ing***.
verb (used with object)

1. to analyze (a sentence) in terms of grammatical constituents, identifying the parts of speech, syntactic relations, etc.

2. to describe (a word in a sentence) grammatically, identifying the part of speech, inflectional form, syntactic function, etc.

3. Computers . to analyze (a string of characters) in order to associate groups of characters with the syntactic units of the underlying grammar.

Command Syntax

Command | Options | Arguments | Redirection

The command syntax is the underlying grammar used to parse the command line

```
/home/cis90/simben $ hostname
opus.cabrillo.edu

/home/cis90/simben $ uname -o
GNU/Linux

/home/cis90/simben $ ls -ld Poems/
drwxr-xr-x 5 simben90 cis90 4096 Jan 18  2004 Poems/

/home/cis90/simben $ ls -li letter > /dev/null
```

More on redirection in later lessons

Command Syntax

Command	Options	Arguments	Redirection
`clear`			
`who`			
`who`	`-Hu`		
`is`			
`id`		`root`	
`ls`			
`ls`	`-l`		
`ls`	`-l -i`	`Poems/`	
`ls`	`-li`	`letter log`	
`ls`	`-ld`	`Miscellaneous`	`> myfile`
`echo`		`red          blue`	
`echo`		`"red blue"`	
`echo`		`Hello`	`>> myfile`

More on redirection in later lessons

Parsing Practice

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ echo I love Linux
I love Linux
```

Please parse the command line above

Command:

Options:
- How many:
- What are they:

Arguments:
- How many:
- What are they:

Redirection:
- How many:
- What is redirected:

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ echo I love Linux
I love Linux
```

Please parse the command line above

Command: echo

Options:

How many:	NA
What are they:	NA

Arguments:

How many:	3
What are they:	I, Love, Linux

Redirection:

How many:	NA
What is redirected:	NA

Command Syntax

Command | Options | Arguments | Redirection

```
/home/cis90/simben $ ls -ld /bin /usr/bin
drwxr-xr-x 2 root root  4096 Nov 23 13:49 /bin
drwxr-xr-x 2 root root 61440 Nov 23 13:49 /usr/bin
```

Please parse the command line above

Command:

Options:
How many:
What are they:

Arguments:
How many:
What are they:

Redirection:
How many:
What is redirected:

Command Syntax

Command | Options | Arguments | Redirection

```
/home/cis90/simben $ ls -ld /bin /usr/bin
drwxr-xr-x 2 root root  4096 Nov 23 13:49 /bin
drwxr-xr-x 2 root root 61440 Nov 23 13:49 /usr/bin
```

Please parse the command line above

Command: ls

Options:
- How many: 2
- What are they: l, d

Arguments:
- How many: 2
- What are they: /bin, /usr/bin

Redirection:
- How many: NA
- What is redirected: NA

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ ls-ld/bin/usr/bin
-bash: ls-ld/bin/usr/bin: No such file or directory
```

Please parse the command line above

Command:

Options:
How many:
What are they:

Arguments:
How many:
What are they:

Redirection:
How many:
What is redirected:

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ ls-ld/bin/usr/bin
-bash: ls-ld/bin/usr/bin: No such file or directory
```

Please parse the command line above

Command: ls-ld/bin/usr/bin

Options:

How many:	NA
What are they:	NA

Arguments:

How many:	NA
What are they:	NA

Redirection:

How many:	NA
What is redirected:	NA

Spaces are required between commands, options, arguments and any redirection

Command Syntax

Command | Options | Arguments | Redirection

```
/home/cis90/simben $ file proposal1 timecal
proposal1: ASCII English text
timecal:   shell archive or script for antique kernel text
```

Please parse the command line above

Command:

Options:
    How many:
    What are they:

Arguments:
    How many:
    What are they:

Redirection:
    How many:
    What is redirected:

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ file proposal1 timecal
proposal1: ASCII English text
timecal:   shell archive or script for antique kernel text
```

Please parse the command line above

Command: file

Options:

How many:	NA
What are they:	NA

Arguments:

How many:	2
What are they:	proposal1, timecal

Redirection:

How many:	NA
What is redirected:	NA

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ ls -l -i -a /bin Poems/ letter small_town > /dev/null
/home/cis90/simben $
```

Please parse the command line above

Command:

Options:
How many:
What are they:

Arguments:
How many:
What are they:

Redirection:
How many:
What is redirected:

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ ls -l -i -a /bin Poems/ letter small_town > /dev/null
/home/cis90/simben $
```

Please parse the command line above

Command:	ls	
Options:		
	How many:	3
	What are they:	l, i, a
Arguments:		
	How many:	4
	What are they:	/bin, Poems/, letter, small_town
Redirection:		
	How many:	1
	What is redirected:	stdout redirected to /dev/null

Command Syntax

Command | Options | Arguments | Redirection

```
/home/cis90/simben $ echo "1   2   3   4   5"
1   2   3   4   5
```

Please parse the command line above

Command:

Options:
How many:
What are they:

Arguments:
How many:
What are they:

Redirection:
How many:
What is redirected:

Command Syntax

Command	Options	Arguments	Redirection

```
/home/cis90/simben $ echo "1   2   3   4   5"
1   2   3   4   5
```

Please parse the command line above

Command: echo

Options:

How many:	NA
What are they:	NA

Arguments:

How many:	1
What are they:	"1 2 3 4 5"

Redirection:

How many:	NA
What is redirected:	NA

Variables

Variables

Just like any programming language, the shell has variables:

- A shell variable gives a name to a location in memory where data can be kept during the session.
- Shell variables are lost when a session ends.
- The shell variables used to customize the users environment are called *Environment* variables.
- To look at the value of a variable use the **echo** command and precede the variable name with a $

echo $PS1 *shows the current value of the PS1 variable*

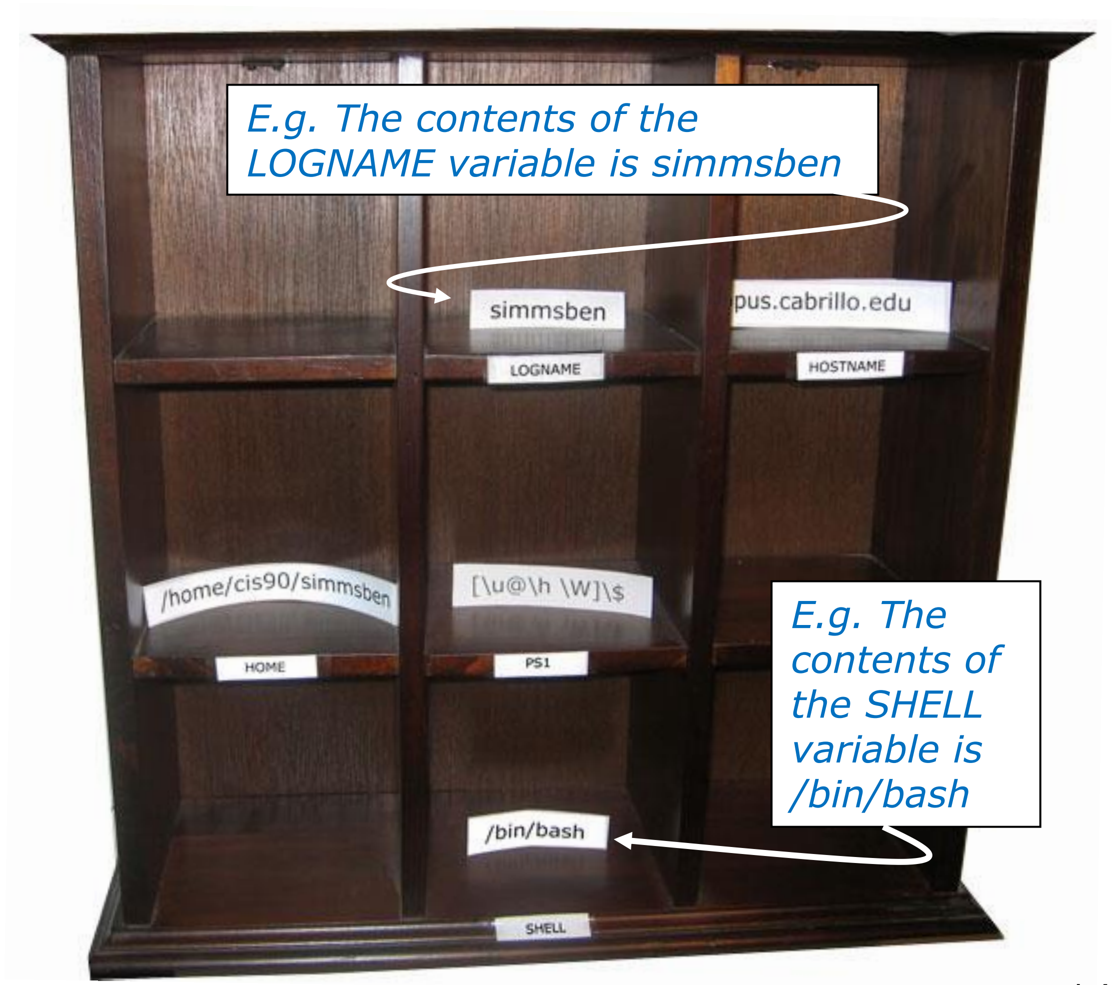
- To change the value of a variable, use an = sign with no surrounding blanks and no $

PS1="Enter next command: " *sets the PS1 prompt variable*

Variables

Think of variables as named boxes containing data

```
$ echo $LOGNAME
simmsben

$ echo $HOSTNAME
opus.cabrillo.edu

$ echo $HOME
/home/cis90/simmsben

$ echo $SHELL
/bin/bash
```



E.g. The contents of the LOGNAME variable is simmsben

E.g. The contents of the SHELL variable is /bin/bash

Showing Variable Values

To show the value of a variable use the echo command and precede the variable name with a $

```
/home/cis90/simben $ echo $SHELL
/bin/bash
```

Shows the name of your shell

```
/home/cis90/simben $ echo $LOGNAME
simben90
```

Shows your username

```
/home/cis90/simben $ echo I am $LOGNAME and I use the $SHELL shell
I am simben90 and I use the /bin/bash shell
```

If the $ is not used, echo prints the name of the variable instead

```
/home/cis90/simben $ echo PS1
PS1
/home/cis90/simben $ echo LOGNAME
LOGNAME
/home/cis90/simben $ echo I am LOGNAME and I use the SHELL shell
I am LOGNAME and I use the SHELL shell
```

Showing Variable Values

```
/home/cis90/simben $ echo $TERM     Shows your terminal type
xterm

/home/cis90/simben $ echo $PWD      Shows your current working directory
/home/cis90/simben

/home/cis90/simben $ echo $PS1      Shows your level 1 prompt string
$PWD $

/home/cis90/simben $ echo $HOME     Shows your home directory
/home/cis90/simben

/home/cis90/simben $ echo $PATH     Shows the directories making up your path
/usr/lib/qt-
3.3/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/s
bin:/home/cis90/simben/../bin:/home/cis90/simben/bin:.
```

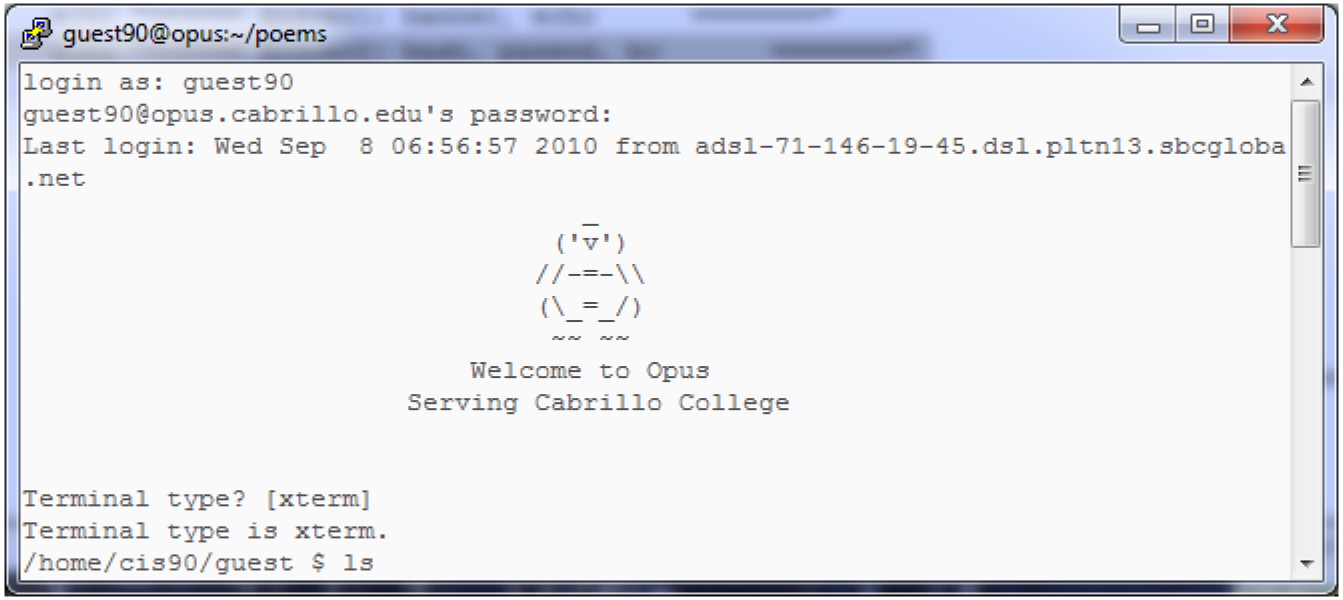
Shell (Environment) Variables

common environment variables

Shell Variable	Description
HOME	Users home directory (starts here after logging in and returns with a cd command (with no arguments)
LOGNAME	User's username for logging in with.
PATH	List of directories, separated by :'s, for the Shell to search for commands (which are program files) .
PS1	The prompt string.
PWD	Current working directory
SHELL	Name of the Shell program being used.
TERM	Type of terminal device , e.g. dumb, vt100, xterm, ansi, linux, etc.

Shell (Environment) Variables
common environment variables

Shell Variable	Description
TERM	Type of terminal, e.g. dumb, vt100, xterm, ansi, linux, color, etc.


guest90@opus:~/poems

```
login as: guest90
guest90@opus.cabrillo.edu's password:
Last login: Wed Sep  8 06:56:57 2010 from adsl-71-146-19-45.dsl.pltn13.sbcgloba
.net

                                 _
                                ('v')
                               //-=-\\
                               (\_=_/)
                                ~~ ~~
                            Welcome to Opus
                        Serving Cabrillo College


Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/guest $ ls
```

Note the TERM variable gets set every time we log into Opus

Setting Variable Values

To change the value of a variable, use an = sign with no surrounding blanks and no $

```
/home/cis90/simben $ echo $TERM
xterm
```

Show the current terminal type

```
/home/cis90/simben $ TERM=dumb
/home/cis90/simben $ echo $TERM
dumb
```

Change the terminal type and display the new value

```
/home/cis90/simben $ TERM=xterm
/home/cis90/simben $ echo $TERM
xterm
```

Change the terminal type back to the original value

In Lab 2 you will see what happens when the terminal type is changed

Changing the prompt (PS1 variable)

Changing the prompt

```
/home/cis90/simben $ echo $PS1
$PWD $
/home/cis90/simben $ cd Poems/
/home/cis90/simben/Poems $ cd /bin
/bin $ cd
/home/cis90/simben $
```

View the current prompt variable which contains another variable $PWD followed by a $.

The PWD variable always contains the name of the current directory. Notice how the prompt changes when you change directories.

```
/home/cis90/simben $ PS1="By your command > "
By your command > date
Mon Sep  3 17:25:32 PDT 2012
By your command >
```

Set the prompt to a new value

```
By your command > PS1='What can I do for you $LOGNAME? '
What can I do for you simben90? date
Mon Sep  3 17:26:10 PDT 2012
What can I do for you simben90?
```

Set the prompt to a new value

```
What can I do for you simben90? PS1='$PWD $ '
/home/cis90/simben $
/home/cis90/simben $
```

Restore the original CIS 90 prompt. This prompt is automatically set every time you login

Changing the prompt

Special Codes	Meaning
\!	history command number
\#	session command number
\d	date
\h	hostname
\n	new line
\s	shell name
\t	time
\u	user name
\w	entire path of working directory
\W	only working directory
\$	$ or # (for root user)

The PS1 variable (defines the prompt) can be set to any combination of text, variables and these special codes.

Changing the prompt

There are some special \codes you can use when setting the prompt

\h gets replaced by the hostname

\W gets replaced by the base working directory

\u gets replaced by the username

```
/home/cis90/simben $ PS1="[\u@\h \W]\$ "
[simben90@oslab ~]$ date
Mon Sep  3 17:38:54 PDT 2012
[simben90@oslab ~]$
```

\$ gets replaced by a $ for regular users or # if the root user

user name

hostname

indicates regular user

working directory (~ is shorthand for the home directory)

Environment variables
Changing the shell prompt

Prompt string	Result
`PS1='$PWD $ '`	`/home/cis90/simmsben/Poems $`
`PS1="\w $ "`	`~/Poems $`
`PS1="\W $ "`	`Poems $`
`PS1="\u@\h $ "`	`simmsben@opus $`
`PS1='\u@\h $PWD $ '`	`simmsben@opus /home/cis90/simmsben/Poems $`
`PS1='\u@\$HOSTNAME $PWD $ '`	`simmsben@opus.cabrillo.edu /home/cis90/simmsben/Poems $`
`PS1='\u \! $PWD $ '`	`simmsben 825 /home/cis90/simmsben/Poems $`
`PS1="[\u@\h \W] $ "`	`[simmsben@opus Poems] $`

Important: Use single quotes around variables that change. For example if you use $PWD with double quotes, the prompt will not changes as you change directories! More on this later …

Need a fresh start -- just log out and back in again and your prompt will be back to normal!

Listing all the variables

Shell Variables
set command

```
/home/cis90/simben $ set
BASH=/bin/bash
BASHOPTS=checkwinsize:cmdhist:expand_aliases:extquote:force_fignore:hostco
mplete:interactive_comments:login_shell:progcomp:promptvars:sourcepath
BASH_ALIASES=()
BASH_ARGC=()
BASH_ARGV=()
BASH_CMDS=()
BASH_ENV=/home/cis90/simben/.bashrc
BASH_LINENO=()
BASH_SOURCE=()
BASH_VERSINFO=([0]="4" [1]="1" [2]="2" [3]="1" [4]="release" [5]="i386-
redhat-linux-gnu")
BASH_VERSION='4.1.2(1)-release'
COLORS=/etc/DIR_COLORS
COLUMNS=123
CVS_RSH=ssh
DIRSTACK=()
EUID=1001
GROUPS=()
G_BROKEN_FILENAMES=1
HISTCONTROL=ignoredups
HISTFILE=/home/cis90/simben/.bash_history
HISTFILESIZE=1000
HISTSIZE=1000
HOME=/home/cis90/simben
HOSTNAME=oslab.cabrillo.edu
HOSTTYPE=i386
ID=1001
IFS=$' \t\n'
IGNOREEOF=10
LANG=en_US.UTF-8
LESSOPEN='|/usr/bin/lesspipe.sh %s'
LINES=38
LOGNAME=simben90
LS_COLORS='rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;3
3;01:cd=40;33;01:or=40;31;01:mi=01;05;37;41:su=37;41:sg=30;43:ca=30;41:tw=
30;42:ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:*.arj=01;31:*.taz
=01;31:*.lzh=01;31:*.lzma=01;31:*.tlz=01;31:*.txz=01;31:*.zip=01;31:*.z=01
;31:*.Z=01;31:*.dz=01;31:*.gz=01;31:*.lz=01;31:*.xz=01;31:*.bz2=01;31:*.tb
z=01;31:*.tbz2=01;31:*.bz=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar=0
1;31:*.rar=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.rz=01;3
1:*.jpg=01;35:*.jpeg=01;35:*.gif=01;35:*.bmp=01;35:*.pbm=01;35:*.pgm=01;35
:*.ppm=01;35:*.tga=01;35:*.xbm=01;35:*.xpm=01;35:*.tif=01;35:*.tiff=01;35:
*.png=01;35:*.svg=01;35:*.svgz=01;35:*.mng=01;35:*.pcx=01;35:*.mov=01;35:*
.mpg=01;35:*.mpeg=01;35:*.m2v=01;35:*.mkv=01;35:*.ogm=01;35:*.mp4=01;35:*.
m4v=01;35:*.mp4v=01;35:*.vob=01;35:*.qt=01;35:*.nuv=01;35:*.wmv=01;35:*.as
f=01;35:*.rm=01;35:*.rmvb=01;35:*.flc=01;35:*.avi=01;35:*.fli=01;35:*.flv=
01;35:*.gl=01;35:*.dl=01;35:*.xcf=01;35:*.xwd=01;35:*.yuv=01;35:*.cgm=01;3
5:*.emf=01;35:*.axv=01;35:*.anx=01;35:*.ogv=01;35:*.ogx=01;35:*.aac=01;36:
*.au=01;36:*.flac=01;36:*.mid=01;36:*.midi=01;36:*.mka=01;36:*.mp3=01;36:*
.mpc=01;36:*.ogg=01;36:*.ra=01;36:*.wav=01;36:*.axa=01;36:*.oga=01;36:*.sp
x=01;36:*.xspf=01;36:'
MACHTYPE=i386-redhat-linux-gnu
MAIL=/var/spool/mail/simben90
MAILCHECK=60
OLDPWD=/bin
OPTERR=1
OPTIND=1
OSTYPE=linux-gnu
PATH=/usr/lib/qt-
3.3/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/sbin:/home
/cis90/simben/../bin:/home/cis90/simben/bin:.
PIPESTATUS=([0]="127")
PPID=17309
PROMPT_COMMAND='printf "\033]0;%s@%s:%s\007" "${USER}" "${HOSTNAME%%.*}"
"${PWD/#$HOME/~}"'
PS1='$PWD $ '
PS2='> '
PS4='+ '
PWD=/home/cis90/simben
QTDIR=/usr/lib/qt-3.3
QTINC=/usr/lib/qt-3.3/include
QTLIB=/usr/lib/qt-3.3/lib
SELINUX_LEVEL_REQUESTED=
SELINUX_ROLE_REQUESTED=
SELINUX_USE_CURRENT_RANGE=
SHELL=/bin/bash
SHELLOPTS=braceexpand:emacs:hashall:histexpand:history:ignoreeof:interacti
ve-comments:monitor
SHLVL=1
SSH_CLIENT='50.0.68.235 51849 2220'
SSH_CONNECTION='50.0.68.235 51849 172.30.5.20 2220'
SSH_TTY=/dev/pts/2
TERM=xterm
UID=1001
USER=simben90
USERNAME=
_=ser
colors=/etc/DIR_COLORS
/home/cis90/simben $
```

*The **set** command shows all shell variables including the special environment variables.*

Shell (Environment) Variables

env command

*The **env** command shows just the environment variables*

```
/home/cis90/simben $ env
HOSTNAME=oslab.cabrillo.edu
SELINUX_ROLE_REQUESTED=
TERM=xterm
SHELL=/bin/bash
HISTSIZE=1000
SSH_CLIENT=50.0.68.235 51849 2220
SELINUX_USE_CURRENT_RANGE=
QTDIR=/usr/lib/qt-3.3
QTINC=/usr/lib/qt-3.3/include
SSH_TTY=/dev/pts/2
USER=simben90
LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=40;31;01:mi=01;05;37;41:su=37;41:sg=30;43:ca=
30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:*.arj=01;31:*.taz=01;31:*.lzh=01;31:*.lzma=01;31:*.tlz=01;31:*.txz=01;31
:*.zip=01;31:*.z=01;31:*.Z=01;31:*.dz=01;31:*.gz=01;31:*.lz=01;31:*.xz=01;31:*.bz2=01;31:*.tbz=01;31:*.tbz2=01;31:*.bz=01;31:*.tz=01;31:*.
deb=01;31:*.rpm=01;31:*.jar=01;31:*.rar=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.rz=01;31:*.jpg=01;35:*.jpeg=01;35:*.gif=01
;35:*.bmp=01;35:*.pbm=01;35:*.pgm=01;35:*.ppm=01;35:*.tga=01;35:*.xbm=01;35:*.xpm=01;35:*.tif=01;35:*.tiff=01;35:*.png=01;35:*.svg=01;35:*
.svgz=01;35:*.mng=01;35:*.pcx=01;35:*.mov=01;35:*.mpg=01;35:*.mpeg=01;35:*.m2v=01;35:*.mkv=01;35:*.ogm=01;35:*.mp4=01;35:*.m4v=01;35:*.mp4
v=01;35:*.vob=01;35:*.qt=01;35:*.nuv=01;35:*.wmv=01;35:*.asf=01;35:*.rm=01;35:*.rmvb=01;35:*.flc=01;35:*.avi=01;35:*.fli=01;35:*.flv=01;35
:*.gl=01;35:*.dl=01;35:*.xcf=01;35:*.xwd=01;35:*.yuv=01;35:*.cgm=01;35:*.emf=01;35:*.axv=01;35:*.anx=01;35:*.ogv=01;35:*.ogx=01;35:*.aac=0
1;36:*.au=01;36:*.flac=01;36:*.mid=01;36:*.midi=01;36:*.mka=01;36:*.mp3=01;36:*.mpc=01;36:*.ogg=01;36:*.ra=01;36:*.wav=01;36:*.axa=01;36:*
.oga=01;36:*.spx=01;36:*.xspf=01;36:
USERNAME=
MAIL=/var/spool/mail/simben90
PATH=/usr/lib/qt-3.3/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/sbin:/home/cis90/simben/../bin:/home/cis90/simben/bin:.
PWD=/home/cis90/simben
LANG=en_US.UTF-8
SELINUX_LEVEL_REQUESTED=
HISTCONTROL=ignoredups
SHLVL=1
HOME=/home/cis90/simben
BASH_ENV=/home/cis90/simben/.bashrc
LOGNAME=simben90
QTLIB=/usr/lib/qt-3.3/lib
CVS_RSH=ssh
SSH_CONNECTION=50.0.68.235 51849 172.30.5.20 2220
LESSOPEN=|/usr/bin/lesspipe.sh %s
G_BROKEN_FILENAMES=1
_=/bin/env
OLDPWD=/bin
/home/cis90/simben $
```

Class Exercise
Environment Variables

1. Change your prompt to "What is your command master? "
2. Use **echo** to show your logname ($LOGNAME)

Meta-characters

Metacharacters

The shell gives special meaning to metacharacters

" - use double quotes to preserve blanks and allow variable expansion

' - use single quotes to preserve blanks and block variable expansion

$ - use to show the value rather than the name of a variable

; - allows multiple commands on one line

<enter key> - The invisible newline control character marking the end of a command

= - use to set variables to new values

\ - removes (escapes) the special powers of a metacharacter

Other metacharacters we will learn about later include:
*?, *, <, >, >>, !, |, [], {}, &, && and ||*

Metacharacters - quotes

" - use double quotes preserve blanks and allows variable expansion
' - use single quotes preserve blanks and block variable expansion

```
/home/cis90/simben $ echo I am                      $LOGNAME    (3 arguments)
I am simben90 Extra blanks ignored, variable expanded
```

```
/home/cis90/simben $ echo "I am                      $LOGNAME"    (1 argument)
I am                  simben90  Extra blanks preserved, variable expanded to show value
```

```
/home/cis90/simben $ echo 'I am                      $LOGNAME'    (1 argument)
I am                  $LOGNAME  Extra blanks preserved, variable expansion blocked
```

Sometimes you will hear single quotes called strong quotes as they block variable expansion. Likewise you may hear double quotes called weak quotes because they allow variable expansion.

Metacharacters - quotes

" - use double quotes preserve blanks and allows variable expansion
' - use single quotes preserve blanks and block variable expansion

```
/home/cis90/simben $ echo '"double quotes"'
"double quotes"
```

```
/home/cis90/simben $ echo "'single quotes'"
'single quotes'
```

Tip: single quotes can be used to output double quotes and vice-versa

Metacharacters

<enter key> newline control character

<enter key> - The invisible *newline* control character marking the end of a command

```
[rsimms@opus ~]$ ps
  PID TTY          TIME CMD
19015 pts/0    00:00:00 bash
19378 pts/0    00:00:00 ps

[rsimms@opus ~]$ hostname
opus.cabrillo.edu

[rsimms@opus ~]$ echo "Use <enter key> to end the command"
Use <enter key> to end the command
```

Pressing the Enter key here generates an invisible `<newline>` *character*

Metacharacters - \ (backslash)

\ - removes (escapes) the special powers of a metacharacter

```
[rsimms@oslab ~]$ echo a b c d e f
a b c d e f

[rsimms@opus ~]$ echo a b c \
> d e f
a b c d e f
```

Escape the invisible newline <enter key> which marks the end of a command

```
[rsimms@opus ~]$ echo $PS1
[\u@\h \W]\$

[rsimms@opus ~]$ echo \$PS1
$PS1
```

Escape the $ (which shows the value of the variable)

```
[rsimms@opus ~]$ echo "Hello World"
Hello World

[rsimms@opus ~]$ echo \"Hello World\"
"Hello World”
```

Escape the double quote marks

Metacharacters - ; (command separator)

; - allows multiple commands on one line

```
[simmsben@opus Poems]$ hostname; uname; echo $LOGNAME; ls
opus.cabrillo.edu
Linux
simmsben
ant  Blake  nursery  Shakespeare  twister  Yeats
```

Four commands on one line

Shortcuts

More on the Command Line

Handy Shortcuts

- Use up and down arrows to “retype” previous commands
- Left and right arrow for editing current command
- Use <tab> to complete filenames automatically

```
[simmsben@opus Poems]$ hostname; name; echo $LOGNAME; ls Blake/
opus.cabrillo.edu
bash: name: command not found
simmsben
jerusalem  tiger

[simmsben@opus Poems]$ hostname; uname; echo $LOGNAME; ls Blake/
opus.cabrillo.edu
Linux
simmsben
jerusalem  tiger
```

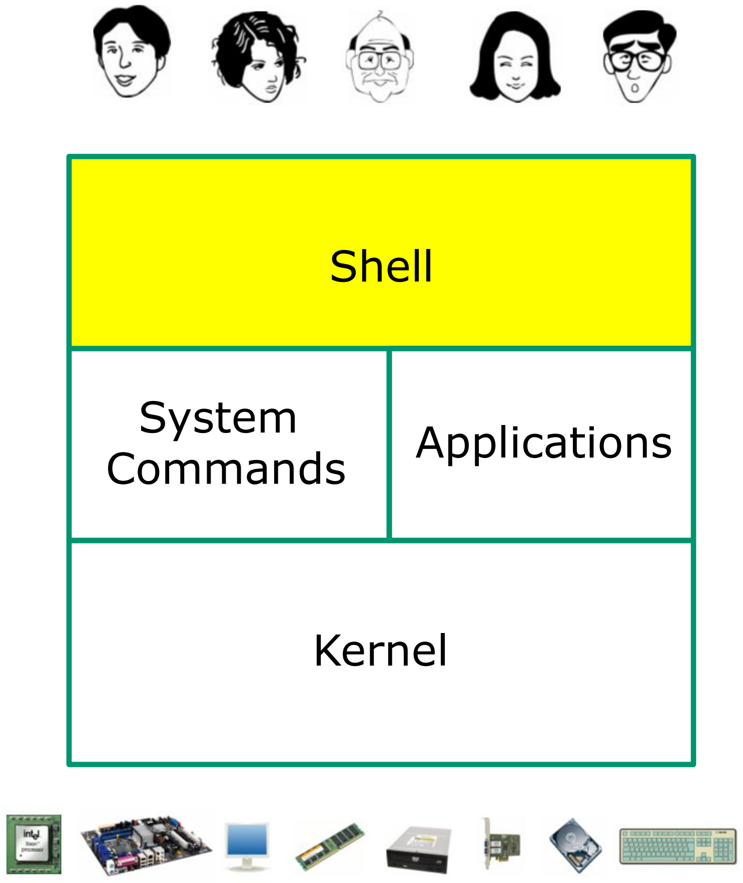
Press <tab> after the B and the shell fills in the remaining “lake/”

Press up arrow and the shell retypes the previous command

Use the left arrow to backup and fix the typo (uname instead of name)

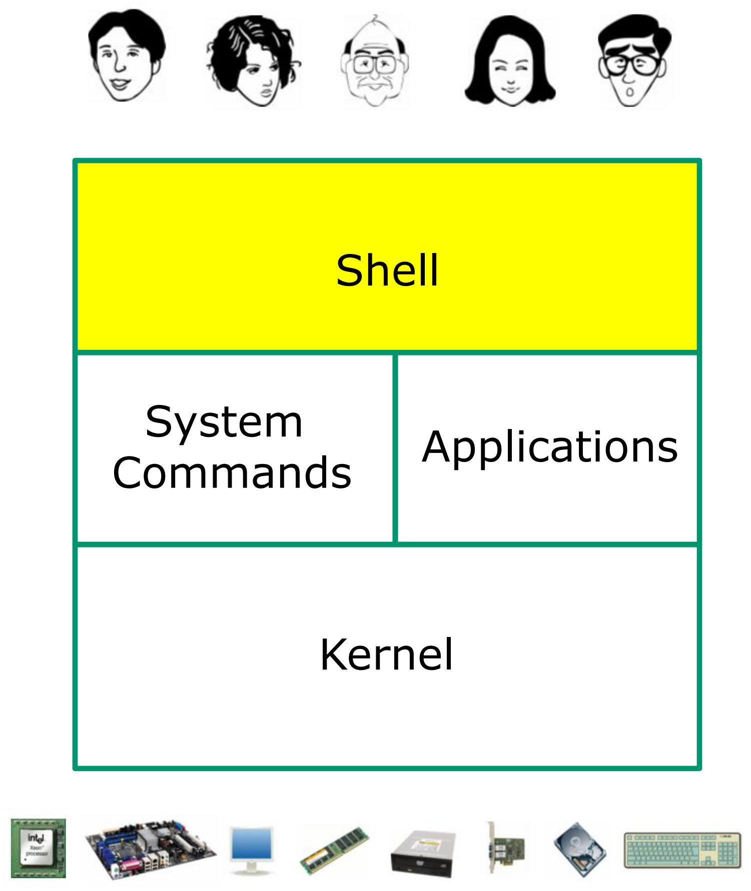
Shell

The Shell



- Allows users to interact with the computer via a "**command line**".
- **Prompts** for a command, parses the command, finds the right program and gets that program executed.
- Is called a "**shell**" because it hides the underlying operating system.
- Multiple shell programs are available: **sh** (Bourne shell), **bash** (born again shell), **csh** (C shell), **ksh** (Korn shell).
- The shell is a **user interface** and a **programming language** (scripts).
- GNOME and KDE desktops could be called **graphical shells**

Life of the Shell



1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

Life of the Shell

Example:

```
/home/cis90/simben $ ls -lt proposal1 proposal2
-rw-r--r--. 1 simben90 cis90 1074 Aug 26  2003 proposal1
-rw-r--r--. 1 simben90 cis90 2175 Jul 20  2001 proposal2
/home/cis90/simben $
```

Shell Steps
1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

Lets take a deep dive into how a command gets executed.

Note it is always a team effort by both the shell and the command.

Life of the Shell

Shell Steps
1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

1) Prompt user for a command

Example:

The shell begins by outputting the prompt (which is based on the PS1 variable)

```
/home/cis90/simben $ ls -lt proposal1 proposal2
```

Then you type the command

FYI, you can mimic outputting the prompt yourself with these commands:

```
/home/cis90/simben $ echo $PS1
$PWD $
/home/cis90/simben $ echo $PWD $
/home/cis90/simben $
/home/cis90/simben $
```

to show value of PS1 variable

echo the output of the previous command

was output by the echo command above

was output by the shell (the same output)

Life of the Shell

Shell Steps
1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

2) Parse command user typed

Example:

```
ls -lt proposal1 proposal2
```

- Command = ls
- 2 Options = l, t
- 2 Arguments = proposal1, proposal2
- 1 Redirection = NA

During the parse step the shell identifies all options & arguments, handles any metacharacters and redirection

Life of the Shell

Shell Steps
1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

3) Search path for the program to run

```
ls -lt proposal1 proposal2
```

Use this command to see the path directories (separated by :'s) on your path

```
/home/cis90/simben $ echo $PATH
/usr/lib/qt-3.3/bin:/usr/local/bin:/bin:/usr/bin:
/usr/local/sbin:/usr/sbin:/sbin:
/home/cis90/simben/../bin:/home/cis90/simben/bin:.
```

*The shell will search each directory in order for an **ls** command*

```
/usr/lib/qt-3.3/bin  no
/usr/local/bin       no
/bin                 YES! – it was found in the /bin directory
/usr/bin
/usr/local/sbin
/usr/sbin
/sbin
/home/cis90/simben/../bin
/home/cis90/simben/bin
     .
```

Try mimicking what the shell does to search for ls:

```
/home/cis90/simben $ ls /usr/lib/qt-3.3/bin/ls
ls: cannot access /usr/lib/qt-3.3/bin/ls: No
such file or directory

/home/cis90/simben $ ls /usr/local/bin/ls
ls: cannot access /usr/local/bin/ls: No such
file or directory

/home/cis90/simben $ ls /bin/ls
/bin/ls
```

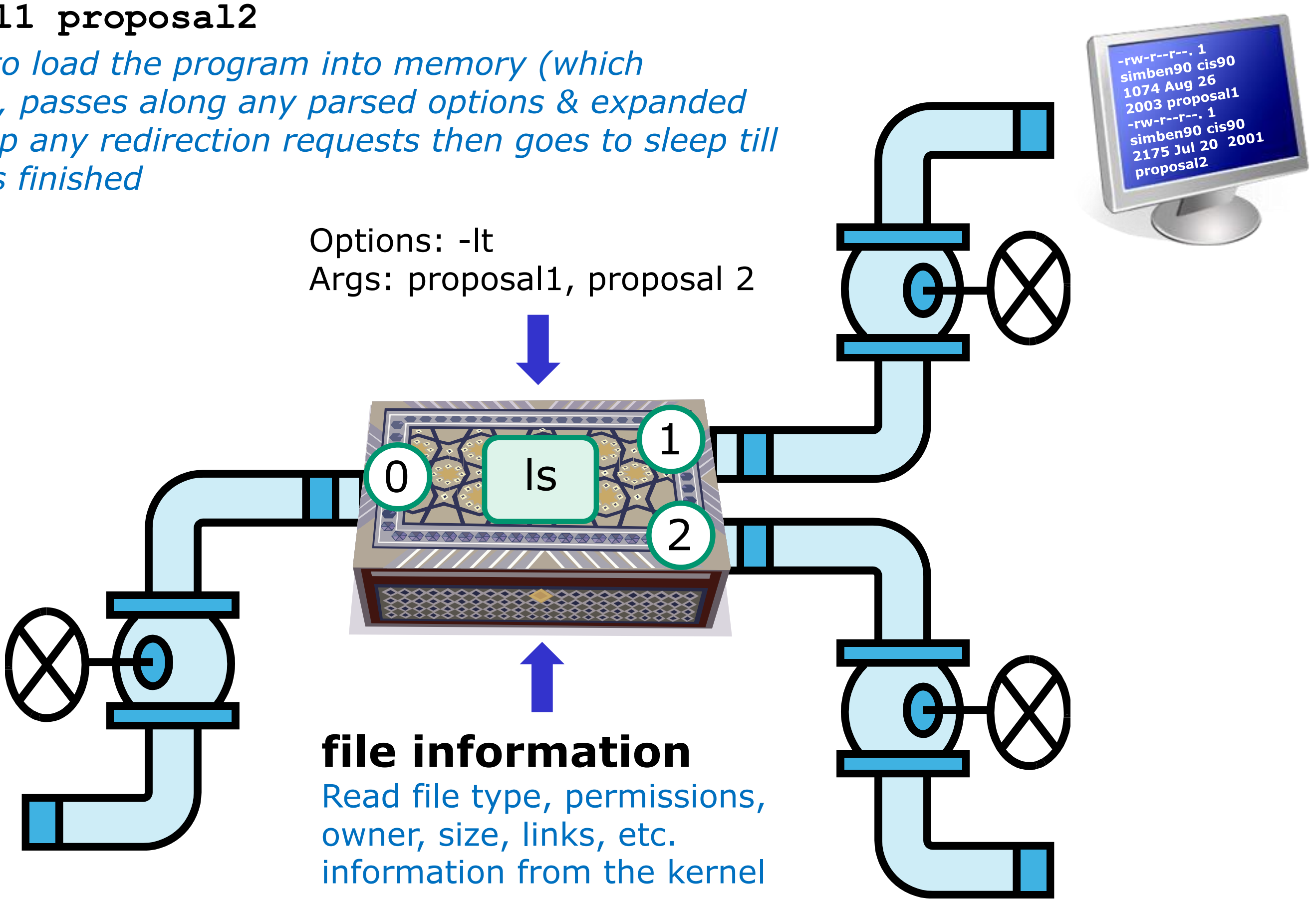
Life of the Shell

Shell Steps
1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

4) Execute the command

```
ls -lt proposal1 proposal2
```

Invokes the kernel to load the program into memory (which becomes a process), passes along any parsed options & expanded arguments, hooks up any redirection requests then goes to sleep till the new process has finished


Options: -lt
Args: proposal1, proposal 2
0
ls
1
2
file information
Read file type, permissions, owner, size, links, etc. information from the kernel

```
-rw-r--r--. 1
simben90 cis90
1074 Aug 26
2003 proposal1
-rw-r--r--. 1
simben90 cis90
2175 Jul 20  2001
proposal2
```

Life of the Shell

Shell Steps
1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

5) Nap while the command (process) runs to completion

(The shell, itself a loaded process, goes into the sleep state and waits till the command process is finished)

```
/home/cis90/simben $ ls -lt proposal1 proposal2
-rw-r--r--. 1 simben90 cis90 1074 Aug 26  2003 proposal1
-rw-r--r--. 1 simben90 cis90 2175 Jul 20  2001 proposal2
```

Life of the Shell

6) And do it all over again
   … go to step 1

Shell Steps
1) Prompt
2) Parse
3) Search
4) Execute
5) Nap
6) Repeat

Life of the Shell

A
```
/home/cis90/simben $ Ls -lt proposal1 proposal2
-bash: Ls: command not found
```
What's wrong?
Who output the error?

B
```
/home/cis90/simben $ ls -lt proposal1 proposal5
ls: cannot access proposal5: No such file or directory
-rw-r--r--. 1 simben90 cis90 1074 Aug 26  2003 proposal1
```
What's wrong?
Who output the error?

C
```
/home/cis90/simben $ ls -lw proposal1 proposal2
ls: invalid line width: proposal1
```
What's wrong?
Who output the error?

D
```
/home/cis90/simben $ ls -lt proposal1proposal2
ls: cannot access proposal1proposal2: No such file or directory
```
What's wrong?
Who output the error?

E
```
/home/cis90/simben $ ls-lt proposal1 proposal2
-bash: ls-lt: command not found
```
What's wrong?
Who output the error?

Life without a path

-bash: *xxxx*: command not found

Don't get mad, just fix your path!

The Path

The shell uses your path to locate commands to execute

- A path is a ordered set of directories along which the shell will search to locate commands to execute
- The path is defined by the PATH variable
- Show your path with **echo $PATH**
- If you specify a command *xxxx* that the shell cannot find on the path it will print the following error message:

  -bash: *xxxx*: command not found

- To run a command that is not on your path the complete absolute pathname must be specified. e.g. /usr/bin/uname

The Path

Use this command to see the directories (separated by :'s) on your path

```
/home/cis90/simben $ echo $PATH
/usr/lib/qt-
3.3/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/sbin:/home/c
is90/simben/../bin:/home/cis90/simben/bin:.
```

The shell will search for the ls command along the path in this order:

```
/usr/lib/qt-3.3/bin
/usr/local/bin
/bin
/usr/bin
/usr/local/sbin
/usr/sbin
/sbin
/home/cis90/simben/../bin
/home/cis90/simben/bin
.
```

yes, . is a directory too and it is whatever directory you have currently changed into

Experiment – Breaking the Path

*The **echo** command is built into bash*

```
/home/cis90/simben $ type echo ps tty
echo is a shell builtin
ps is /bin/ps
tty is /usr/bin/tty
```

*the **ps** command is in the /bin directory*

*The **tty** command is in the /usr/bin directory*

/usr/bin

/bin

Experiment – Breaking the Path

Default path

```
/home/cis90/simben $ echo I love Linux
I love Linux
/home/cis90/simben $ date
Mon Sep  3 15:17:52 PDT 2012
/home/cis90/simben $ tty
/dev/pts/2
/home/cis90/simben $
```

TROUBLE!

```
/home/cis90/simben $ PATH=""
/home/cis90/simben $ echo $PATH

/home/cis90/simben $
```

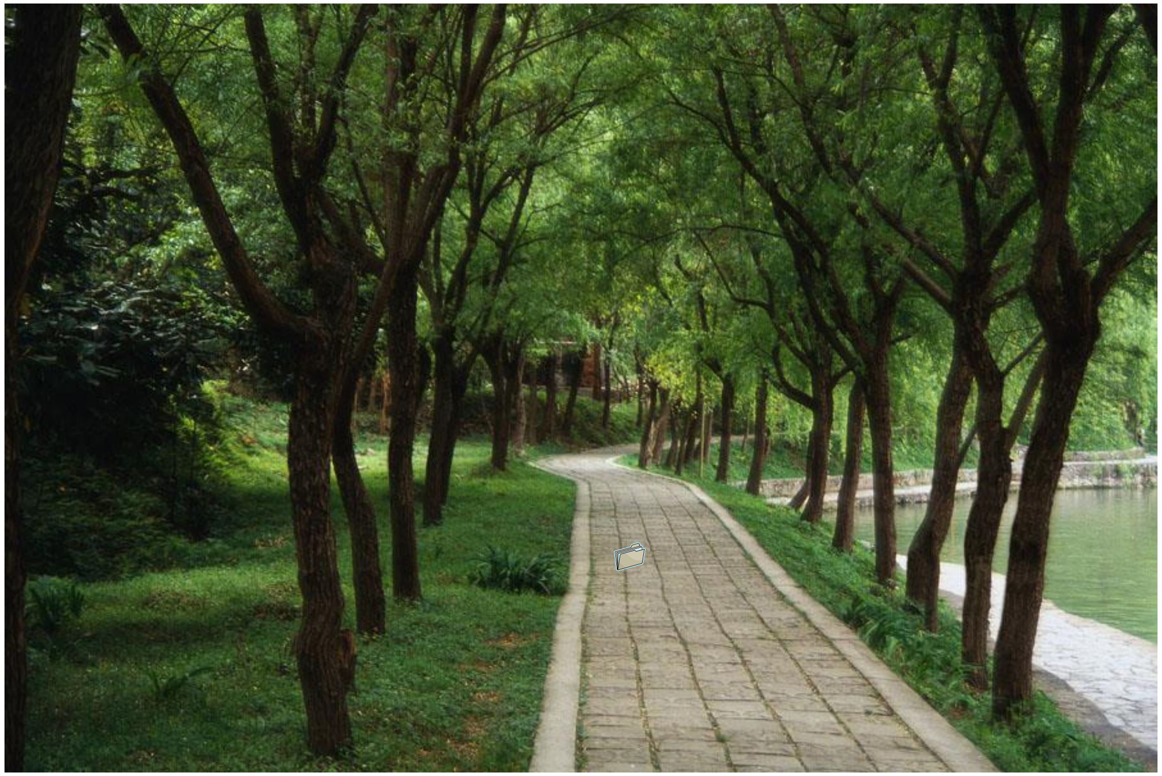
Break the path by setting it to null

No path

```
/home/cis90/simben $ echo I love Linux
I love Linux
/home/cis90/simben $ date
-bash: date: No such file or directory
/home/cis90/simben $ tty
-bash: tty: No such file or directory
```

*Only **echo** works because it is built into the shell!*

```
/home/cis90/simben $ echo $PATH

/home/cis90/simben $
```



There is nothing on the path!

Experiment – Restoring the Path

```
/home/cis90/simben $ PATH=/bin
/home/cis90/simben $ echo $PATH
/bin
/home/cis90/simben $

/home/cis90/simben $ echo I love Linux
I love Linux
/home/cis90/simben $ date
Mon Sep  3 15:24:19 PDT 2012
/home/cis90/simben $ tty
-bash: tty: No such file or directory
```

Add the /bin directory to the path

***echo** works because it is built into the shell*

***date** works because it resides in the /bin directory which is now on the path*

***tty** does not work because it is in the /usr/bin directory which is not on the path*

```
/home/cis90/simben $ echo $PATH
/bin
/home/cis90/simben $
```

Experiment – Restoring the Path

```
/home/cis90/simben $ PATH=$PATH:/usr/bin
/home/cis90/simben $ echo $PATH
/bin:/usr/bin
/home/cis90/simben $

/home/cis90/simben $ echo I love Linux
I love Linux
/home/cis90/simben $ date
Mon Sep  3 15:24:19 PDT 2012
/home/cis90/simben $ tty
/dev/pts/2
```

Append the /usr/bin directory to the path

All three commands work because /bin and /usr/bin are on the path.

The shell will only run commands found in the directories that make up the path

```
/home/cis90/simben $ echo $PATH
/bin:/usr/bin
/home/cis90/simben $
```

tty,
who, id
/usr/bin
ps, date,
uname
/bin

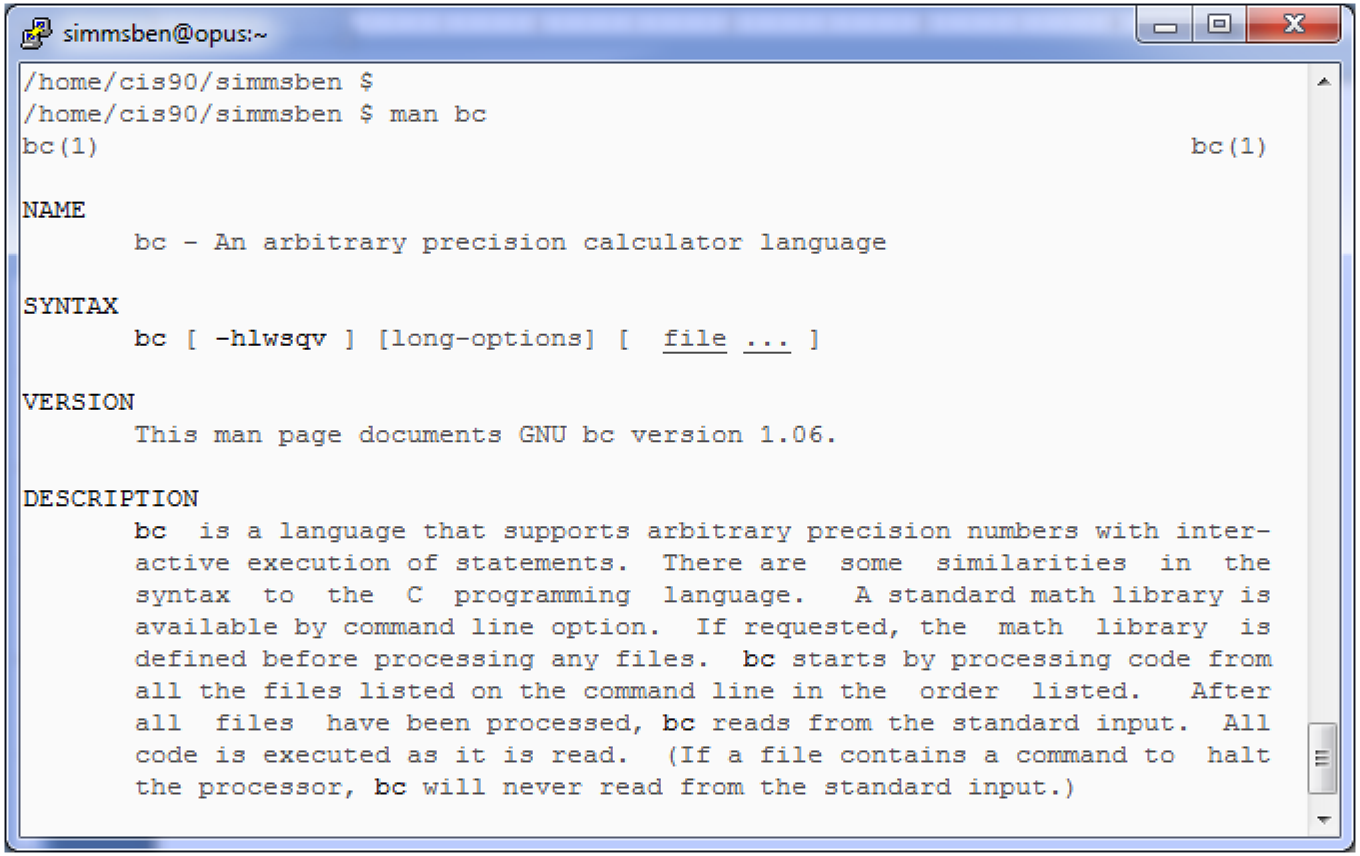
Need a fresh start -- just log out and back in again and your path will be back to normal!

Docs

Using man (manual) pages

*Type the **man** command followed by the name of the command you want documentation on.*

Example: **man bc**



simmsben@opus:~

```
/home/cis90/simmsben $
/home/cis90/simmsben $ man bc
bc(1)                                                            bc(1)

NAME
       bc - An arbitrary precision calculator language

SYNTAX
       bc [ -hlwsqv ] [long-options] [  file ... ]

VERSION
       This man page documents GNU bc version 1.06.

DESCRIPTION
       bc  is a language that supports arbitrary precision numbers with inter-
       active execution of statements.  There are  some  similarities  in  the
       syntax  to  the  C  programming  language.   A standard math library is
       available by command line option.  If requested, the  math  library  is
       defined before processing any files.  bc starts by processing code from
       all the files listed on the command line in the  order  listed.   After
       all  files  have been processed, bc reads from the standard input.  All
       code is executed as it is read.  (If a file contains a command to  halt
       the processor, bc will never read from the standard input.)
```

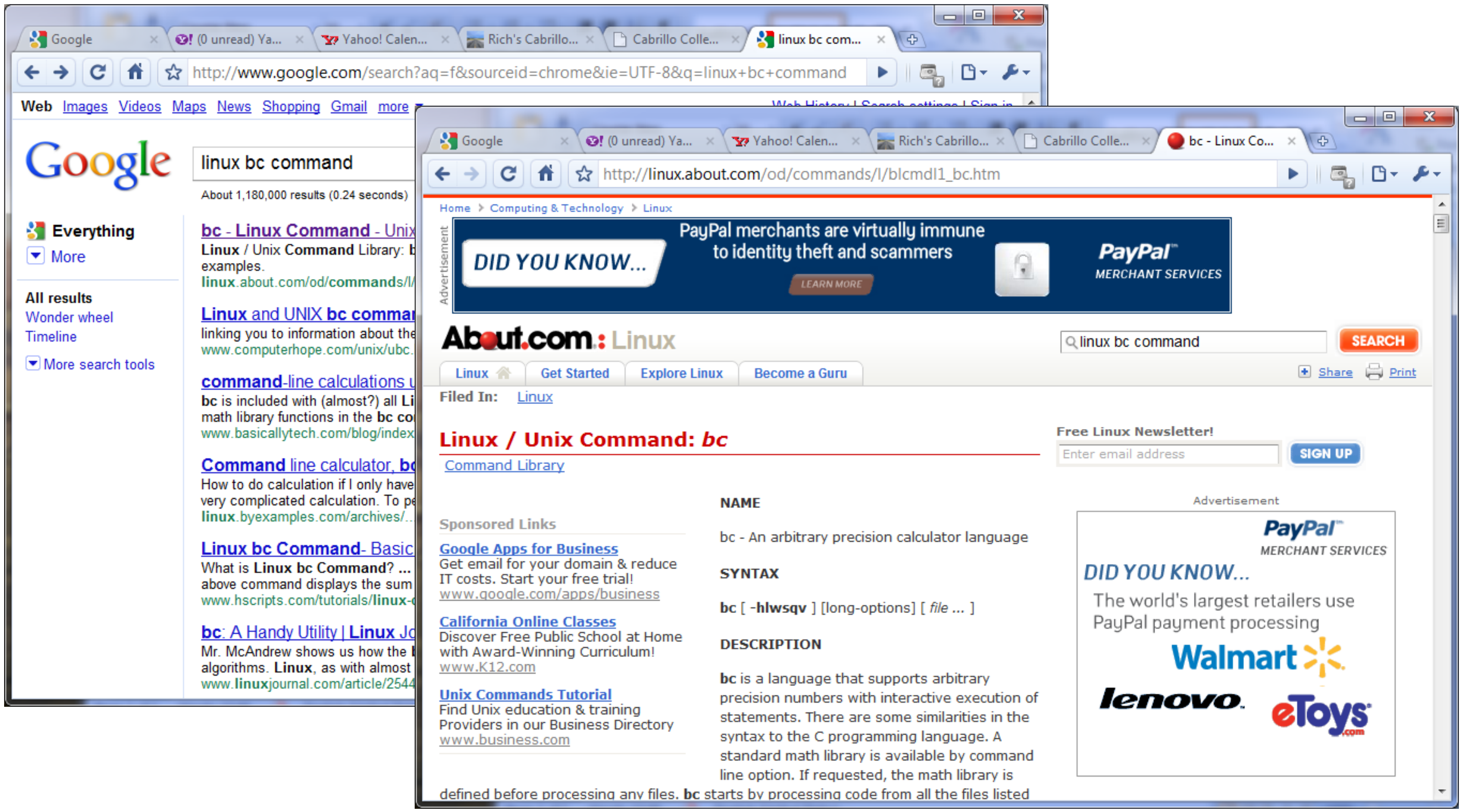
Use these keys to scroll

Use q key to quit

Using Google

Do a Google search on "linux xxx command" where xxx is the command you want documentation for.

Example: google linux bc command



linux bc command

About 1,180,000 results (0.24 seconds)

bc - Linux Command - Unix
Linux / Unix Command Library: b
examples.
linux.about.com/od/commands/l/

Linux and UNIX bc comma
linking you to information about the
www.computerhope.com/unix/ubc.

command-line calculations u
bc is included with (almost?) all Li
math library functions in the bc co
www.basicallytech.com/blog/index

Command line calculator, bc
How to do calculation if I only have
very complicated calculation. To pe
linux.byexamples.com/archives/...

Linux bc Command- Basic
What is Linux bc Command? ...
above command displays the sum
www.hscripts.com/tutorials/linux-

bc: A Handy Utility | Linux Jo
Mr. McAndrew shows us how the
algorithms. Linux, as with almost
www.linuxjournal.com/article/2544

Filed In: Linux

Linux / Unix Command: *bc*

Command Library

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Google Apps for Business
Get email for your domain & reduce IT costs. Start your free trial!
www.google.com/apps/business

California Online Classes
Discover Free Public School at Home with Award-Winning Curriculum!
www.K12.com

Unix Commands Tutorial
Find Unix education & training Providers in our Business Directory
www.business.com

NAME

bc - An arbitrary precision calculator language

SYNTAX

bc [**-hlwsqv**] [long-options] [*file ...*]

DESCRIPTION

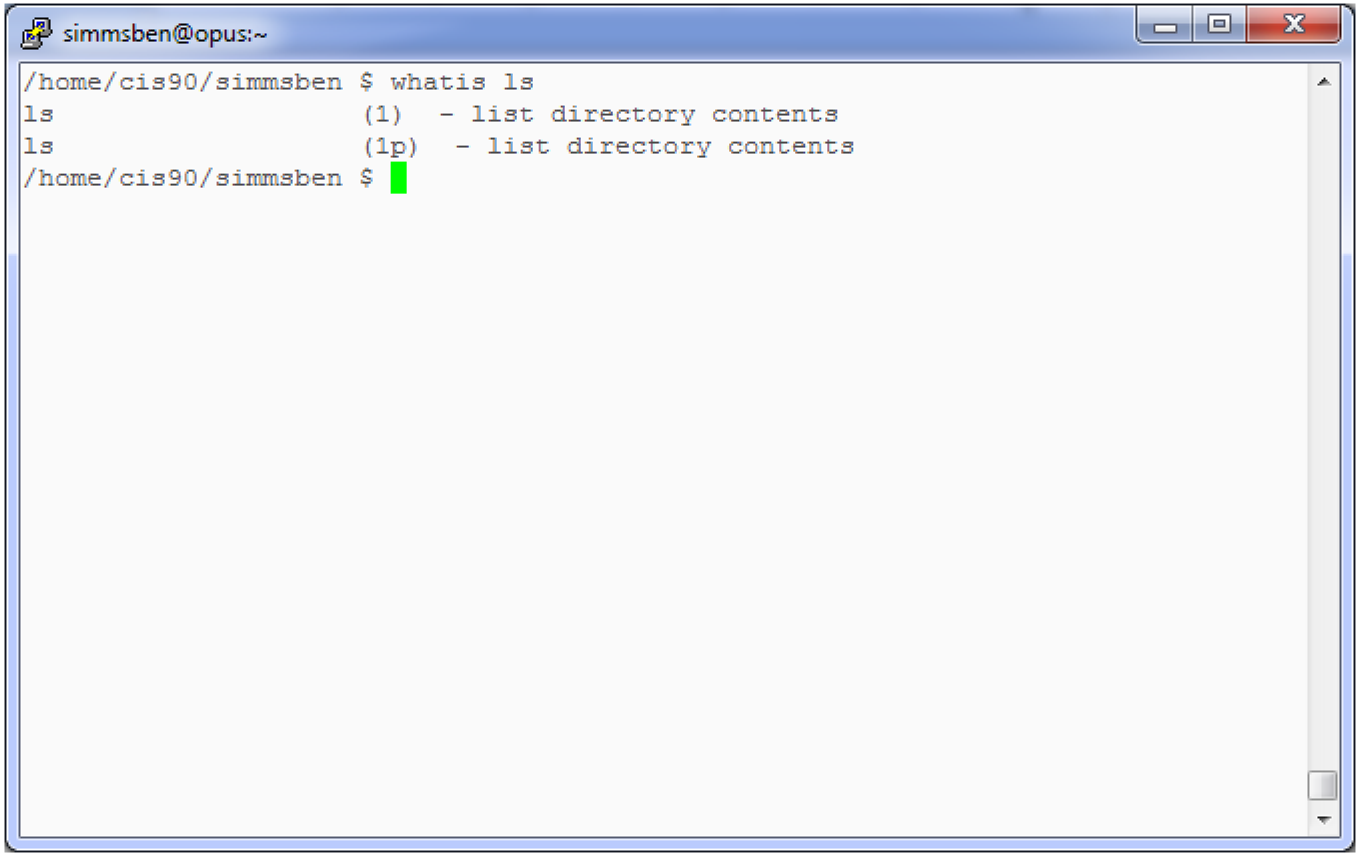
bc is a language that supports arbitrary precision numbers with interactive execution of statements. There are some similarities in the syntax to the C programming language. A standard math library is available by command line option. If requested, the math library is defined before processing any files. **bc** starts by processing code from all the files listed

Other Documentation

- **whatis** *command* *same as the **man –f** command*
- **apropos** *command* *same as the **man –k** command*
- **info** *command*

Documentation examples

Example: **whatis ls**

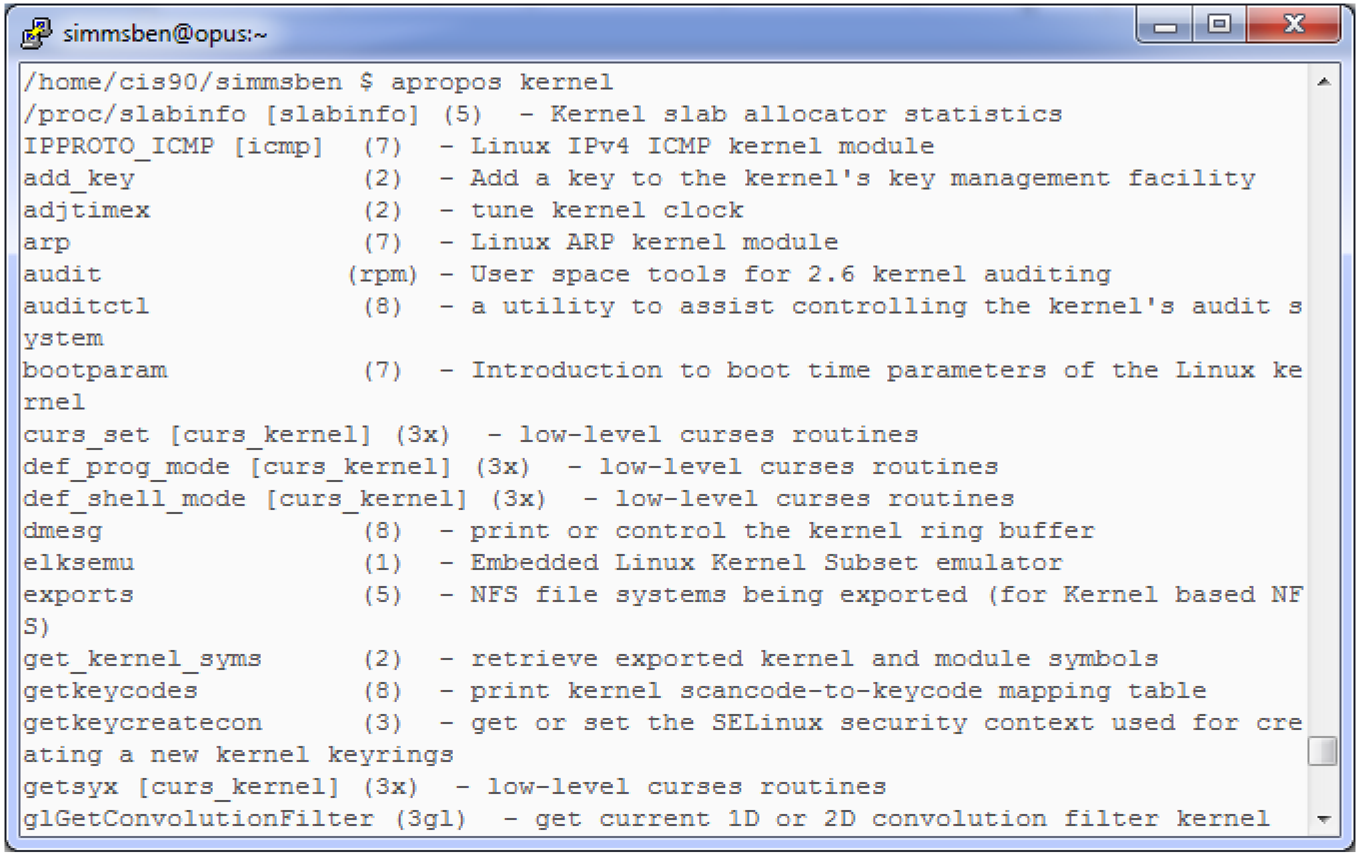

simmsben@opus:~

```
/home/cis90/simmsben $ whatis ls
ls                    (1)  - list directory contents
ls                    (1p)  - list directory contents
/home/cis90/simmsben $
```

whatis *searches the whatis database for a complete word. Same as the* ***man -f*** *command .*

Documentation examples

Example: **apropos kernel**



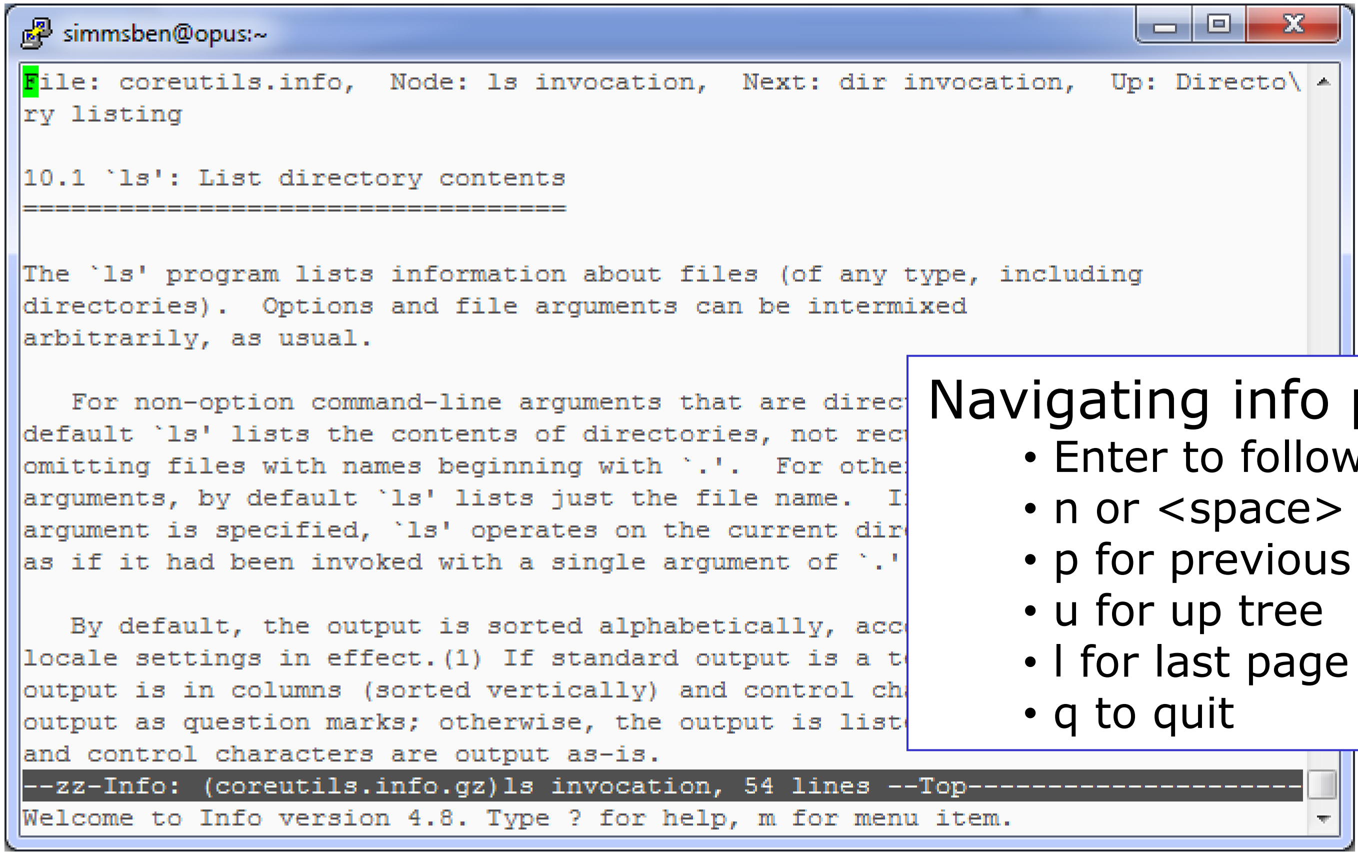
simmsben@opus:~

```
/home/cis90/simmsben $ apropos kernel
/proc/slabinfo [slabinfo] (5)  - Kernel slab allocator statistics
IPPROTO_ICMP [icmp]   (7)  - Linux IPv4 ICMP kernel module
add_key               (2)  - Add a key to the kernel's key management facility
adjtimex              (2)  - tune kernel clock
arp                   (7)  - Linux ARP kernel module
audit               (rpm)  - User space tools for 2.6 kernel auditing
auditctl              (8)  - a utility to assist controlling the kernel's audit s
ystem
bootparam             (7)  - Introduction to boot time parameters of the Linux ke
rnel
curs_set [curs_kernel] (3x)  - low-level curses routines
def_prog_mode [curs_kernel] (3x)  - low-level curses routines
def_shell_mode [curs_kernel] (3x)  - low-level curses routines
dmesg                 (8)  - print or control the kernel ring buffer
elksemu               (1)  - Embedded Linux Kernel Subset emulator
exports               (5)  - NFS file systems being exported (for Kernel based NF
S)
get_kernel_syms       (2)  - retrieve exported kernel and module symbols
getkeycodes           (8)  - print kernel scancode-to-keycode mapping table
getkeycreatecon       (3)  - get or set the SELinux security context used for cre
ating a new kernel keyrings
getsyx [curs_kernel] (3x)  - low-level curses routines
glGetConvolutionFilter (3gl)  - get current 1D or 2D convolution filter kernel
```

***apropos** searches the whatis database for a string of text. Same as the **man -k** command .*

Documentation examples

Example: **info ls**



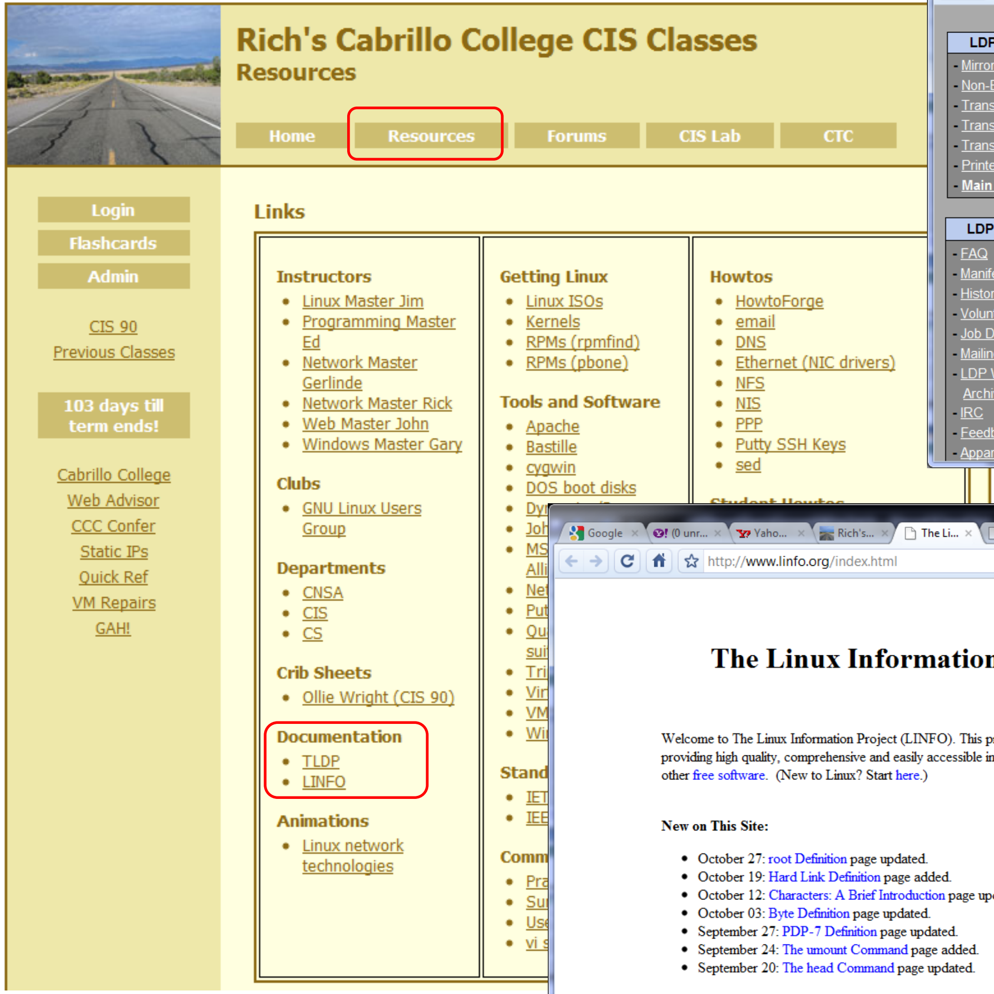
```
File: coreutils.info,  Node: ls invocation,  Next: dir invocation,  Up: Directo\
ry listing

10.1 `ls': List directory contents
==================================

The `ls' program lists information about files (of any type, including
directories).  Options and file arguments can be intermixed
arbitrarily, as usual.

   For non-option command-line arguments that are direc
default `ls' lists the contents of directories, not rec
omitting files with names beginning with `.'.  For othe
arguments, by default `ls' lists just the file name.  I
argument is specified, `ls' operates on the current dir
as if it had been invoked with a single argument of `.'

   By default, the output is sorted alphabetically, acc
locale settings in effect.(1) If standard output is a t
output is in columns (sorted vertically) and control ch
output as question marks; otherwise, the output is list
and control characters are output as-is.
--zz-Info: (coreutils.info.gz)ls invocation, 54 lines --Top---------------------
Welcome to Info version 4.8. Type ? for help, m for menu item.
```

Navigating info pages:

- Enter to follow links (*'s)
- n or <space> for next page
- p for previous page
- u for up tree
- l for last page
- q to quit

Documentation

Two of my favorite documentation links



Rich's Cabrillo College CIS Classes
Resources

Home | Resources | Forums | CIS Lab | CTC

Login
Flashcards
Admin

CIS 90
Previous Classes

103 days till term ends!

Cabrillo College
Web Advisor
CCC Confer
Static IPs
Quick Ref
VM Repairs
GAH!

Links

Instructors
- Linux Master Jim
- Programming Master Ed
- Network Master Gerlinde
- Network Master Rick
- Web Master John
- Windows Master Gary

Clubs
- GNU Linux Users Group

Departments
- CNSA
- CIS
- CS

Crib Sheets
- Ollie Wright (CIS 90)

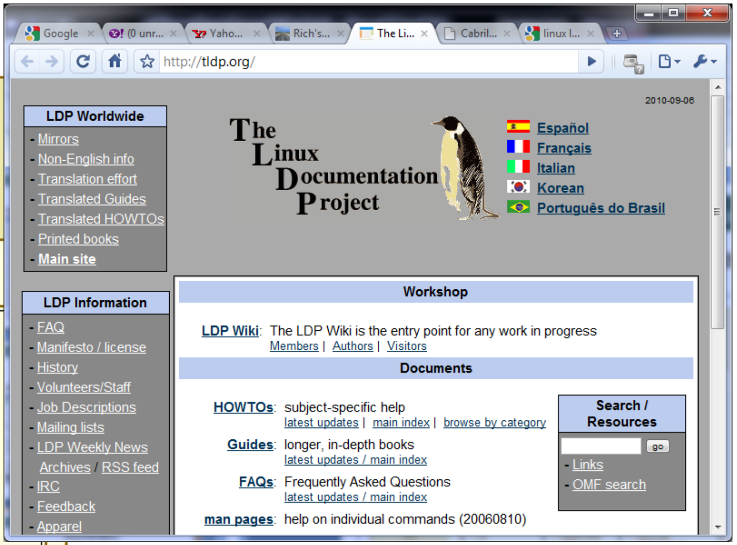
Documentation
- TLDP
- LINFO

Animations
- Linux network technologies

Getting Linux
- Linux ISOs
- Kernels
- RPMs (rpmfind)
- RPMs (pbone)

Tools and Software
- Apache
- Bastille
- cygwin
- DOS boot disks

Howtos
- HowtoForge
- email
- DNS
- Ethernet (NIC drivers)
- NFS
- NIS
- PPP
- Putty SSH Keys
- sed



http://tldp.org/

2010-09-06

The Linux Documentation Project

Español
Français
Italian
Korean
Português do Brasil

LDP Worldwide
- Mirrors
- Non-English info
- Translation effort
- Translated Guides
- Translated HOWTOs
- Printed books
- Main site

LDP Information
- FAQ
- Manifesto / license
- History
- Volunteers/Staff
- Job Descriptions
- Mailing lists
- LDP Weekly News
  Archives / RSS feed
- IRC
- Feedback
- Apparel

Workshop

LDP Wiki: The LDP Wiki is the entry point for any work in progress
Members | Authors | Visitors

Documents

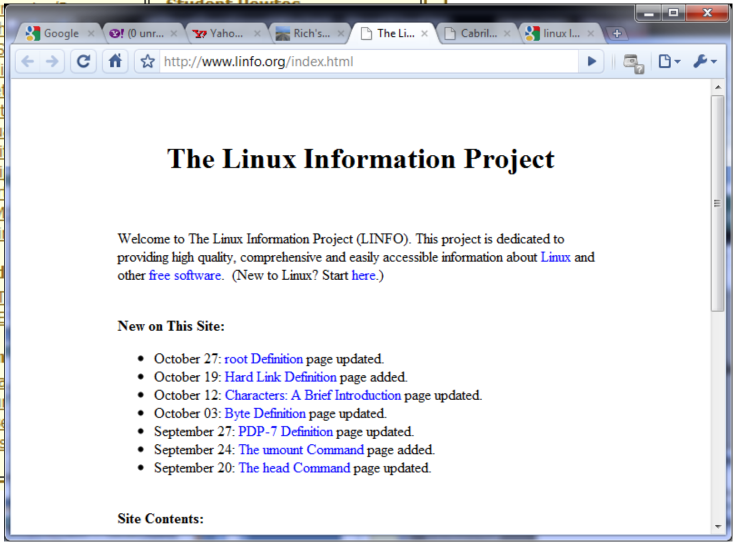
HOWTOs: subject-specific help
latest updates | main index | browse by category

Guides: longer, in-depth books
latest updates / main index

FAQs: Frequently Asked Questions
latest updates / main index

man pages: help on individual commands (20060810)

Search / Resources
- Links
- OMF search



http://www.linfo.org/index.html

The Linux Information Project

Welcome to The Linux Information Project (LINFO). This project is dedicated to providing high quality, comprehensive and easily accessible information about Linux and other free software. (New to Linux? Start here.)

New on This Site:

- October 27: root Definition page updated.
- October 19: Hard Link Definition page added.
- October 12: Characters: A Brief Introduction page updated.
- October 03: Byte Definition page updated.
- September 27: PDP-7 Definition page updated.
- September 24: The umount Command page added.
- September 20: The head Command page updated.

Site Contents:

The Linux Documentation and Information Projects

Class Exercise
Documentation

Use the man command on itself:
- **man man**

Research the **ls** command using:
- The **whatis** command
- The **man** command
- The **info** command
- Google

Wrap up

New commands:

apropos	- search for string in whatis database
bc	- binary calculator
cat	- print file(s)
cd	- change directory
echo	- print text
env	- show shell environment variables
info	- online documentation with hot links
file	- show file information
ls	- show directory contents
passwd	- change password
set	- show (or set) shell variables
type	- show command location in path
man	- manual page for a command
whatis	- command summary

New Files and Directories:

/etc/passwd	- user accounts
/etc/shadow	- encrypted passwords
/bin	- directory of commands
/sbin	- directory of superuser commands
/usr/bin	- directory of commands, tools and utilities
/usr/sbin	- directory of superuser commands, tools and utilities

Next Class

Assignment: Check Calendar Page on web site to see what is due next week.

Lab #2

Quiz questions for next class:

- Name four directories where one can find commands?
- How do you show your path?
- What is the command to print the manual page for a command?

Backup