



Rich's lesson module checklist

Last updated 2/8/2017

- ☐ Slides and lab posted
- ☐ WB converted from PowerPoint
- ☐ Print out agenda slide and annotate page numbers

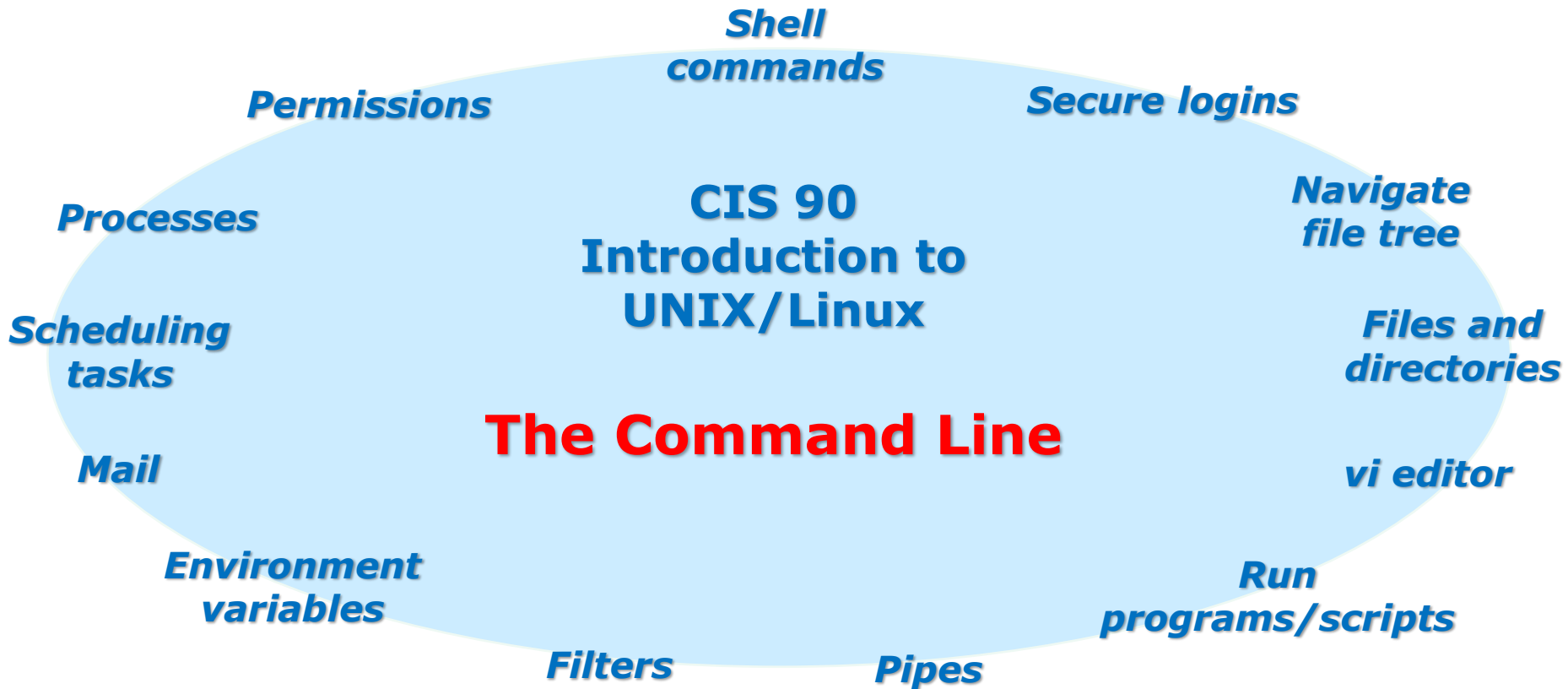
- ☐ Flash cards
- ☐ Properties
- ☐ Page numbers
- ☐ 1st minute quiz
- ☐ Web Calendar summary
- ☐ Web book pages
- ☐ Commands

- ☐ Lab 3 tested
- ☐ Opus – set submit deadline
 - at 12:00 am thursday
 - chmod 700 /home/cis90/bin/submit
 - chmod 700 /home/turnin/cis90
 - at 9:00 am thursday
 - chmod 750 /home/cis90/bin/submit
 - chmod 755 /home/turnin/cis90

- ☐ Census done - Microsoft and VMware web store accounts made
- ☐ CIS Lab schedule published
- ☐ cis90-students alias in /etc/aliases + newaliases command
- ☐ Welcome ready for mailing
- ☐ Lab 3 Unix events ready for mailing
- ☐ sun-hwa-iii ice cream and accounts made
- ☐ rhea setup

- ☐ 9V backup battery for microphone
- ☐ Backup slides, CCC info, handouts on flash drive
- ☐ Key card to open door

- ☐ Update CCC Confer and 3C Media portals



Student Learner Outcomes

1. Navigate and manage the UNIX/Linux file system by viewing, copying, moving, renaming, creating, and removing files and directories.
2. Use the UNIX features of file redirection and pipelines to control the flow of data to and from various commands.
3. With the aid of online manual pages, execute UNIX system commands from either a keyboard or a shell script using correct command syntax.

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/>)



Student checklist for attending class

The screenshot shows a web browser at simms-teach.com/cis90calendar.php. The page title is "Rich's Cabrillo College CIS Classes CIS 90 Calendar". On the left sidebar, the "CIS 90" link is highlighted. The main content area shows a calendar for "CIS 90 (Fall 2014) Calendar" with tabs for "Course Dates", "Grades", and "Calendar". The "Calendar" tab is selected, showing a table with columns for "Lesson", "Date", "Topics", and "Link". The first row is for Lesson 1 on 9/2, titled "Class and Linux Overview". Below the table, there are links for "Presentation slides (download)", "Supplemental" (with a link to "PowerPoint: Logging into Opus (download)"), "Assignments" (with links to "Student Survey" and "Lab 1"), "CIS Confer" (with a link to "Enter virtual classroom"), "Quiz 1", and "Comments".

1. Browse to:
<http://simms-teach.com>
2. Click the **CIS 90** link.
3. Click the **Calendar** link.
4. Locate today's lesson.
5. Find the **Presentation slides** for the lesson and **download** for easier viewing.
6. Click the **Enter virtual classroom** link to join CCC Confer.
7. Log into Opus with Putty or ssh command.

Note: Blackboard Collaborate Launcher only needs to be installed once. It has already been downloaded and installed on the classroom PC's.

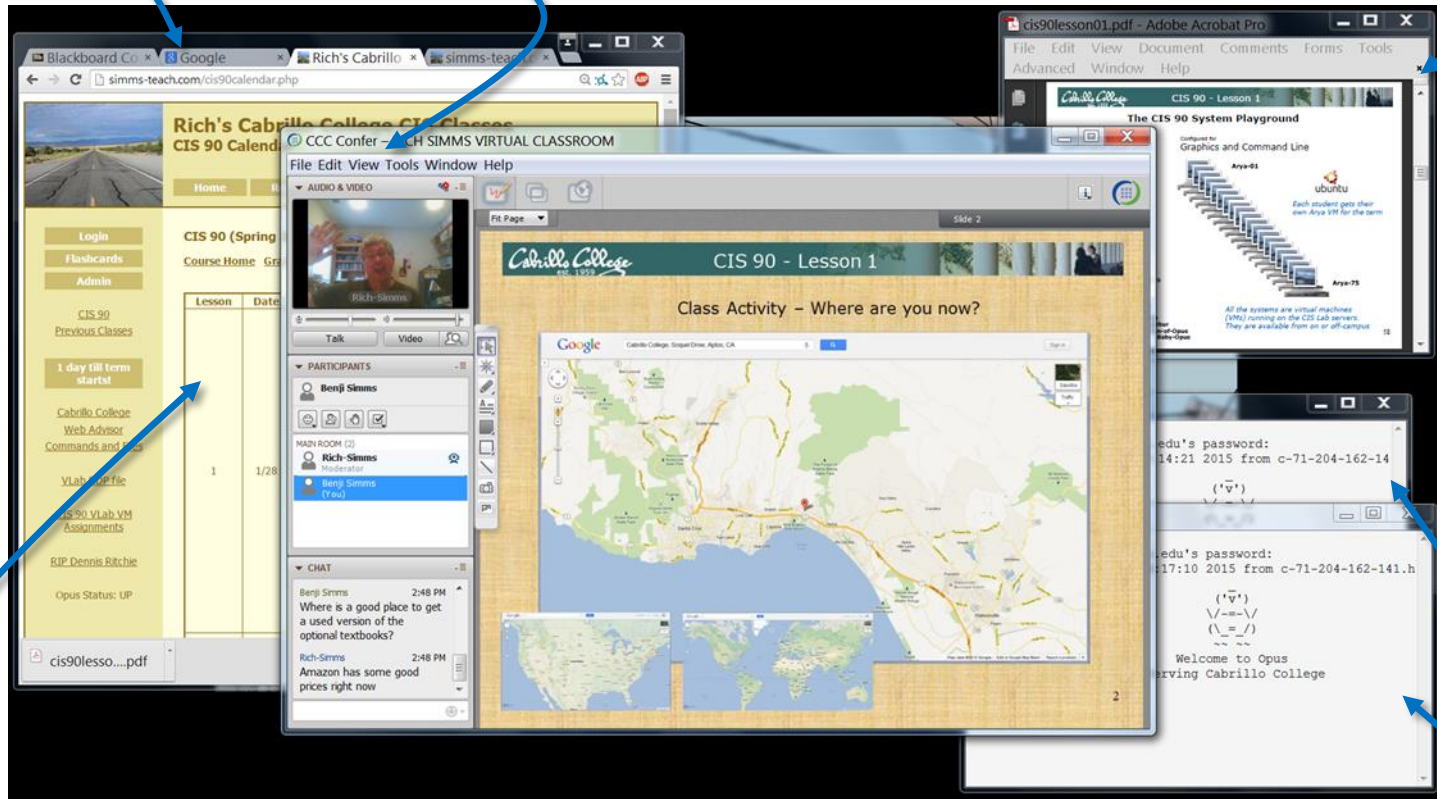


Student checklist for suggested screen layout

☐ Google

☐ CCC Confer

☐ Downloaded PDF of Lesson Slides



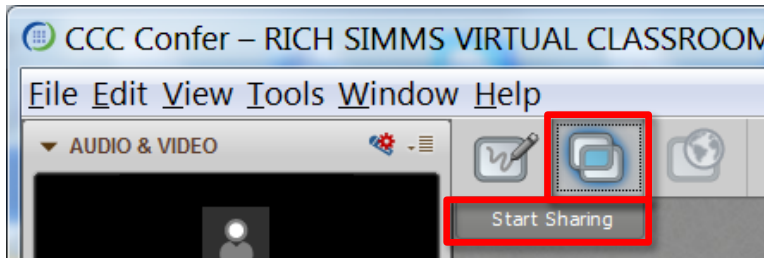
☐ CIS 90 website Calendar page

☐ One or more login sessions to Opus

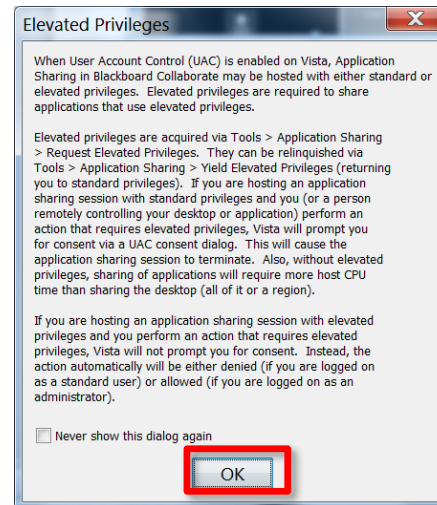


Student checklist for sharing desktop with classmates

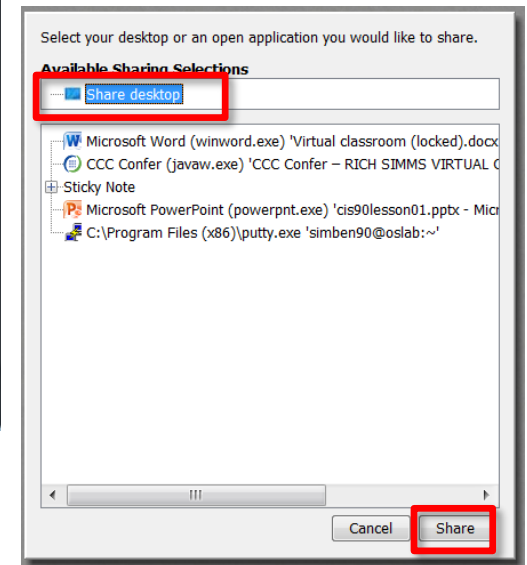
1) Instructor gives you sharing privileges



2) Click overlapping rectangles icon. If white "Start Sharing" text is present then click it as well.



3) Click OK button.



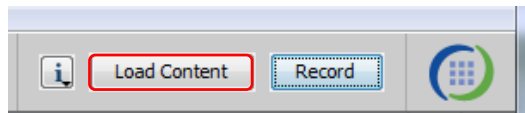
4) Select "Share desktop" and click Share button.



Rich's CCC Confer checklist - setup

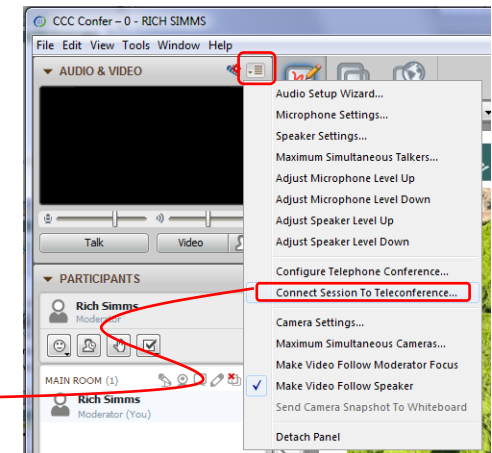
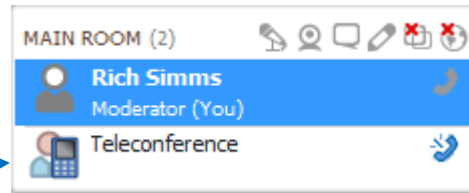


[] Preload White Board



[] Connect session to Teleconference

Session now connected to teleconference



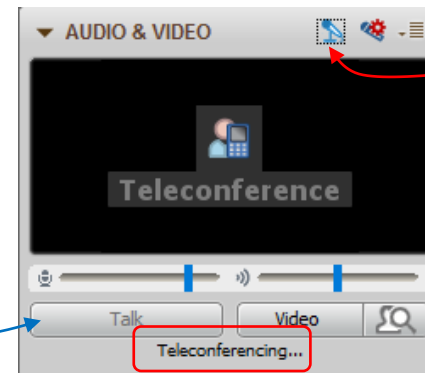
[] Is recording on?



Red dot means recording

[] Use teleconferencing, not mic

Should be grayed out



Should change from phone handset icon to little Microphone icon and the Teleconferencing ... message displayed



Rich's CCC Confer checklist - screen layout



The screenshot displays a Windows desktop environment during a CCC Confer session. The desktop includes the following elements:

- CCC Confer - 0 - RIC...:** A window showing the conferencing interface with a video feed of Rich Simms, a list of participants (Rich Simms, Moderator), and a chat window.
- simms-teach.com/docs/cis90/cis-90-TEST-1-Fall-12.pdf:** A web browser window displaying a quiz titled "Part 1 - Flashc (1 point each)". The quiz questions are:
 - [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]
- Terminal Window:** A terminal window showing a login session for simben90@oslab. The output includes:


```
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 2011 from 10.10.10.10
```
- vSphere Client:** A window showing the vSphere Client interface, displaying a list of virtual machines (CIS 192, Pod 01, p01-arw, p01-cpl, p01-elo, p01-fro, p01-legolas) and a table of recent tasks.

Red boxes and arrows highlight specific components:

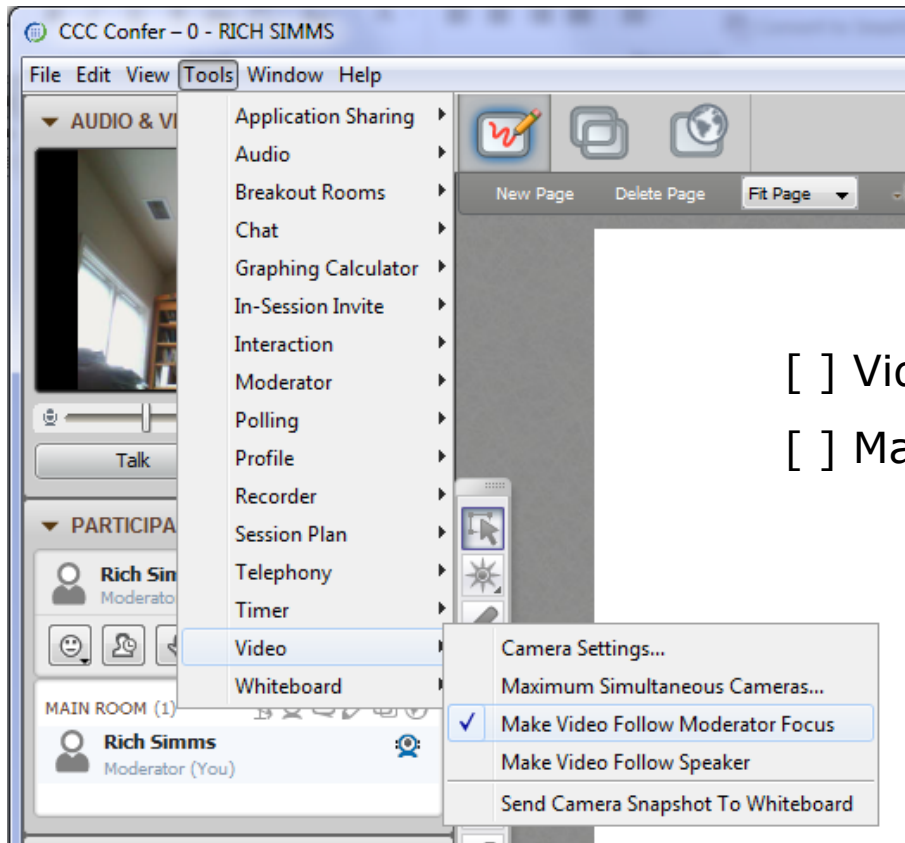
- foxit for slides:** Points to the Foxit Reader window displaying a PDF document.
- chrome:** Points to the web browser window displaying the quiz.
- putty:** Points to the terminal window.
- vSphere Client:** Points to the vSphere Client window.

[] layout and share apps





Rich's CCC Confer checklist - webcam setup

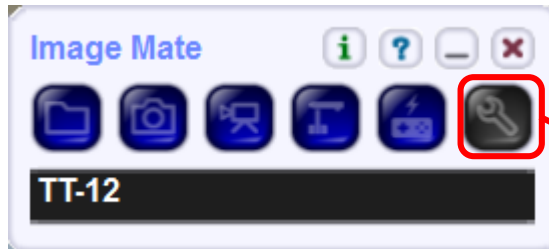


[] Video (webcam)

[] Make Video Follow Moderator Focus



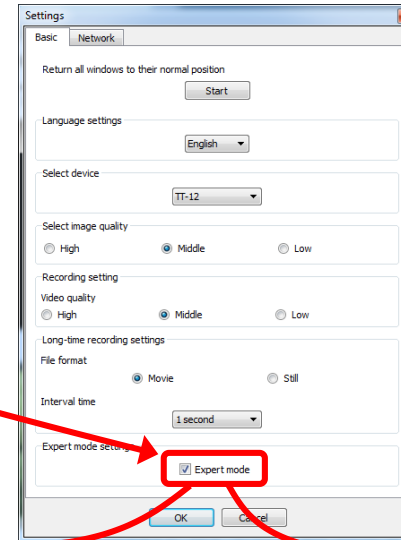
Rich's CCC Confer checklist - Elmo



Elmo rotated down to view side table



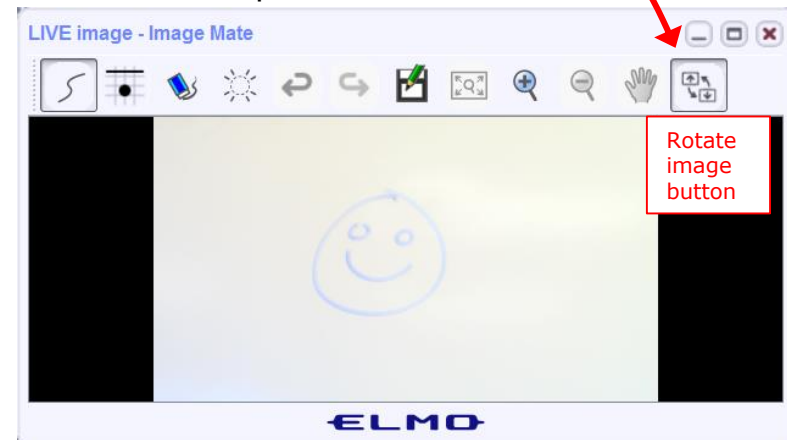
Run and share the Image Mate program just as you would any other app with CCC Confer



The "rotate image" button is necessary if you use both the side table and the white board.

Quite interesting that they consider you to be an "expert" in order to use this button!

Elmo rotated up to view white board



Rich's CCC Confer checklist - universal fixes

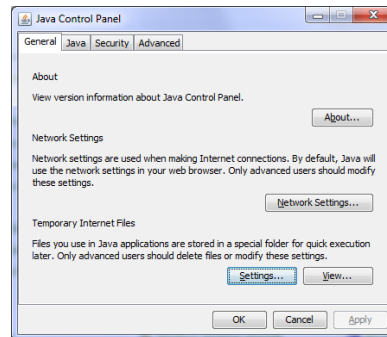
Universal Fix for CCC Confer:

- 1) Shrink (500 MB) and delete Java cache
- 2) Uninstall and reinstall latest Java runtime
- 3) <http://www.cccconfer.org/support/technicalSupport.aspx>

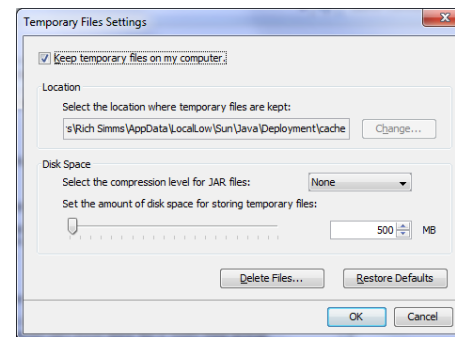
Control Panel (small icons)



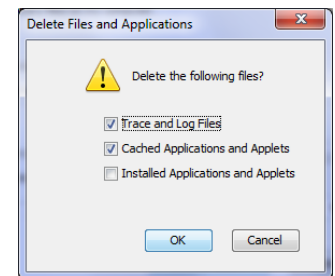
General Tab > Settings...



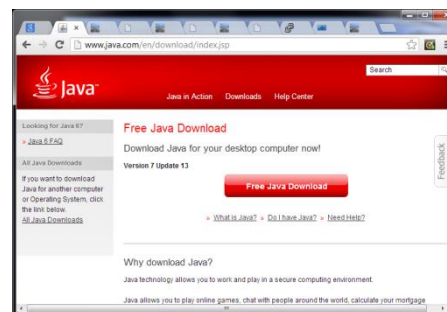
500MB cache size



Delete these

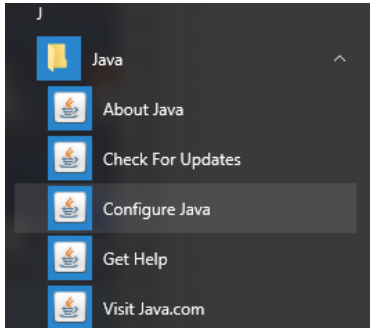


Google Java download

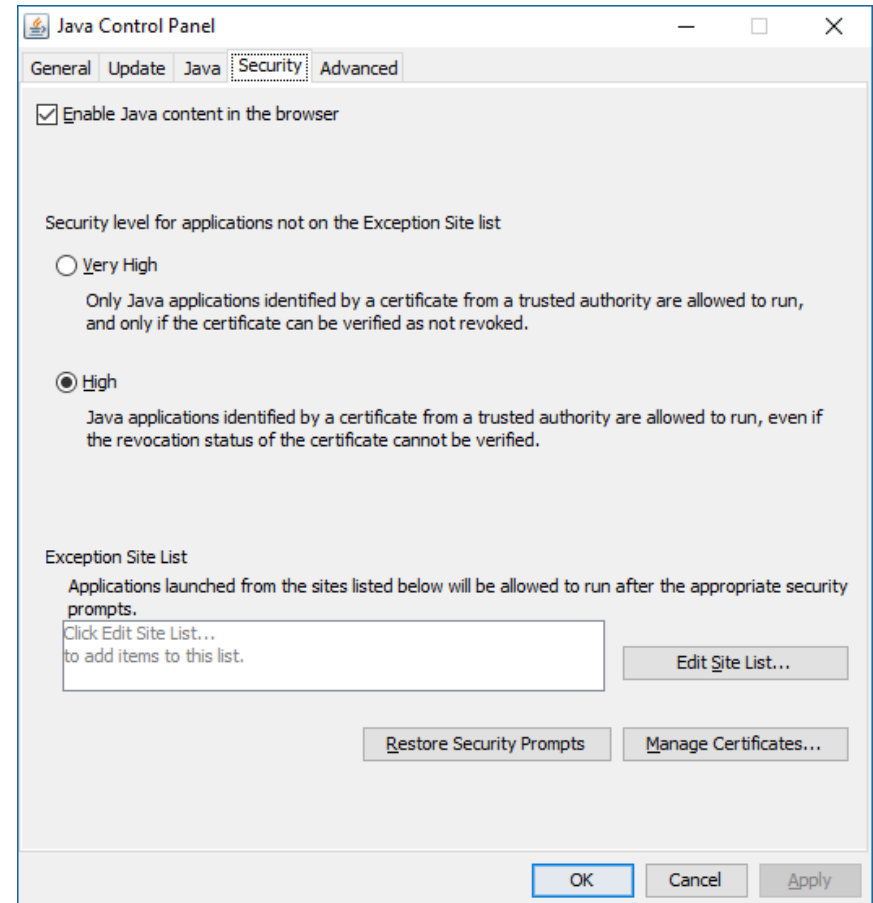




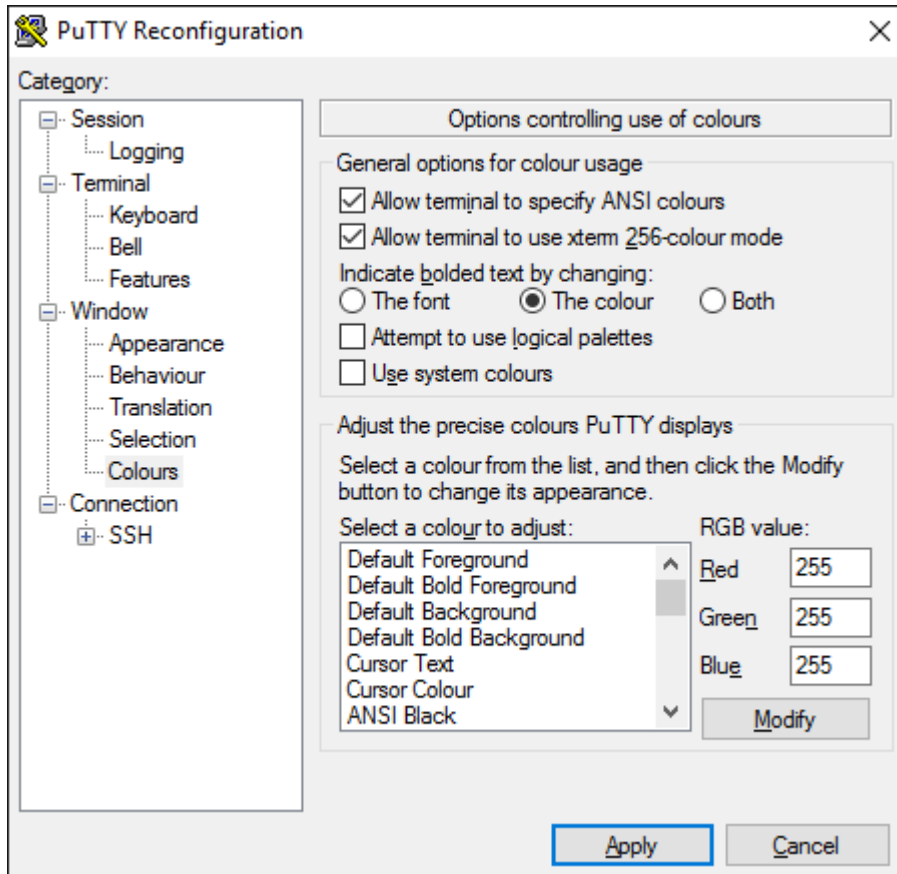
Rich's CCC Confer checklist - digital certificate work around



1. Open the [Java Control Panel](#)
2. Select the **Security** tab
3. Select **Edit Site List...**
4. Select **Add**
5. Click into the white box next to the red exclamation mark and type **<https://na-downloads.illuminate.com>**
6. Press OK
7. Press **Continue** on the pop-up message
8. Press OK
9. Access your session or recording once more



Rich's CCC Confer checklist - Putty Colors



Putty Colors

Default Foreground 255 255 255
 Default Bold Foreground 255 255 255
 Default Background 51 51 51
 Default Bold Background 255 2 85
 Cursor Text 0 0 0
 Cursor Color 0 255 0
 ANSI Black 77 77 77
 ANSI Black Bold 85 85 85
 ANSI Red 187 0 0
 ANSI Red Bold 255 85 85
 ANSI Green 152 251 152
 ANSI Green Bold 85 255 85
 ANSI Yellow 240 230 140
 ANSI Yellow Bold 255 255 85
 ANSI Blue 205 133 63
 ANSI Blue Bold 135 206 235
 ANSI Magenta 255 222 173
 ANSI Magenta Bold 255 85 255
 ANSI Cyan 255 160 160
 ANSI Cyan Bold 255 215 0
 ANSI White 245 222 179
 ANSI White Bold 255 255 255

<http://looselytyped.blogspot.com/2013/02/zenburn-pleasant-color-scheme-for-putty.html>

Start

Sound Check

*Students that dial-in should mute their line using *6 to prevent unintended noises distracting the web conference.*

*Instructor can use *96 to mute all student lines.*

Volume

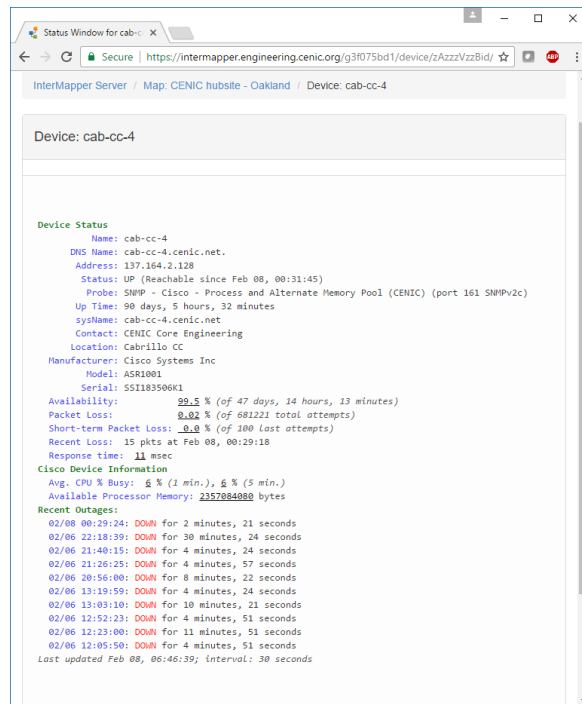
**4 - increase conference volume.*

**7 - decrease conference volume.*

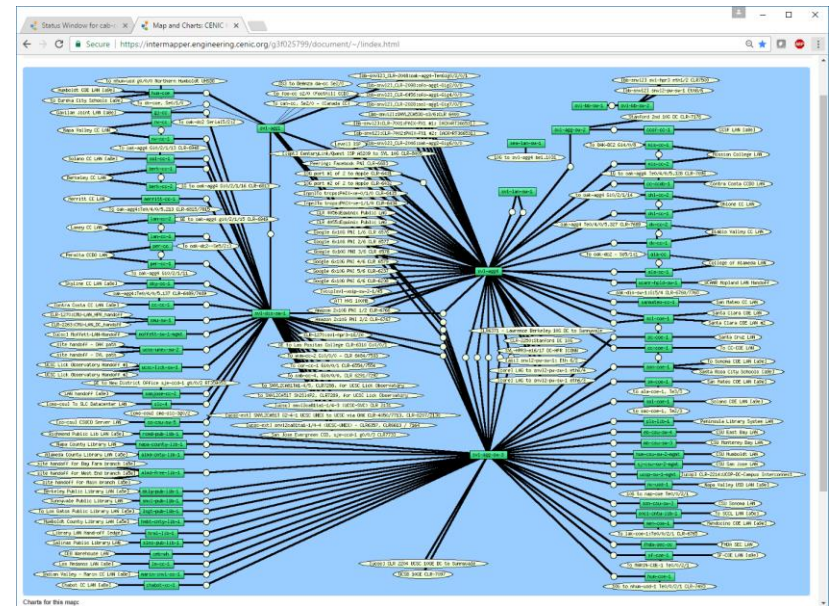
**5 - increase your voice volume.*

**8 - decrease your voice volume.*

Network Check



<https://intermapper.engineering.cenic.org/g3f075bd1/device/zAzzzVzzBid/!device.html>



<https://intermapper.engineering.cenic.org/g3f025799/document/~!/index.html>



Instructor: **Rich Simms**

Dial-in: **888-886-3951**

Passcode: **136690**



Melissa



Tess



Alex



Daniel



Ian J.



Harold



Victor



Jasen



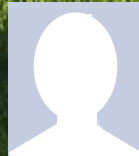
Sam



Steven P.



Ryan



Roberto



Hans



Cristian



Nicholas



Fritz



Luis



Nigel



Philip



Josh M.



Ian K.



Gracie



James



Julian



Ken



Joshua V.



Samantha



Justin



Ian C.



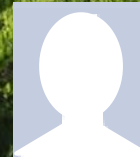
Venus



Stephen L.



Alison



Dillon

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)

Electronic Mail

Objectives	Agenda
<ul style="list-style-type: none">• Learn how to use the UNIX communication tools write and mail.• Overview on end-to-end email.	<ul style="list-style-type: none">• Quiz• Questions• Subtle stuff• Mini review• Practice questions• Terminals• Housekeeping• Course expectations check• Write command• IRC• Mail basics (send, read, reply, save)• More on mail (forward, docs, headers, delete, folders)• End-to-end email• Other MUAs, MTAs, DA and AAs• Wrap up

Class Activity

```
( 'v' )  
//--\\  
( \_ = \_ / )  
~~  ~~
```

```
Welcome to Opus  
Serving Cabrillo College
```

If you haven't already,
log into Opus

Questions

Questions?

Lesson material?

Labs? Tests?

How this course works?

- Graded work in home directories
- Answers in /home/cis90/answers

Who questions much, shall learn much, and retain much.

- Francis Bacon

If you don't ask, you don't get.

- Mahatma Gandhi

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.



The slippery slope



- 1) If you didn't submit Lab 1 then contact me ASAP if you would like some extra help getting started in the course.
- 2) If you didn't submit Quiz 1 contact me if you are not sure how quizzes work.
- 3) If you didn't send me the student survey assigned in Lesson 1 then please send it to me or contact me if your are running into issues using the PDF form.

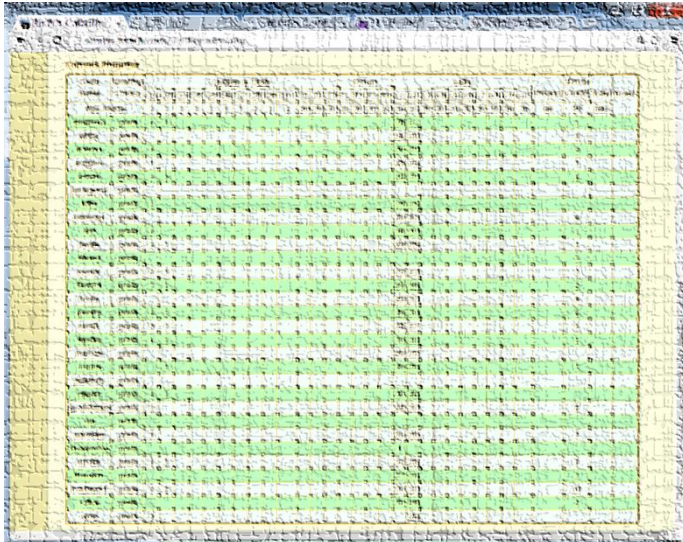
Please don't fall behind in the course

Email: risimms@cabrillo.edu

Monitoring your grades

Send me your survey to get your LOR code name.

The CIS 90 website



A screenshot of a web browser displaying a table of student grades. The table has multiple columns, including student names, IDs, and various grade categories. The rows are color-coded in alternating light green and light blue.

<http://simms-teach.com/cis90grades.php>

On Opus

checkgrades *codename*
(where *codename* is your LOR codename)



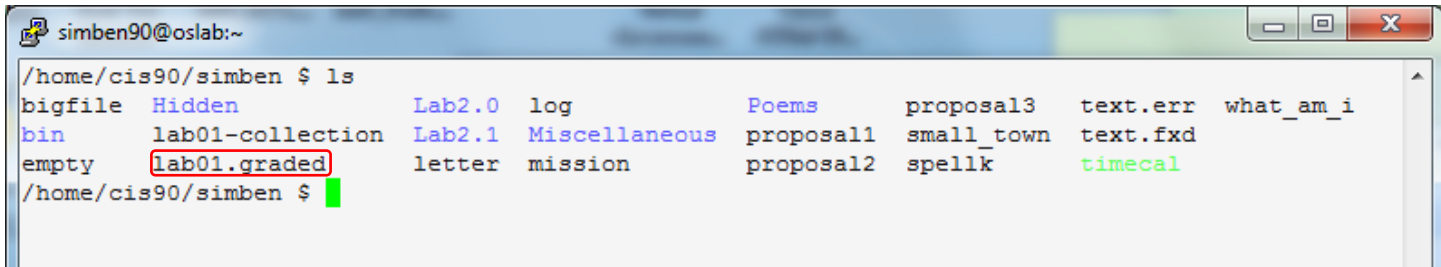
Written by Jesse Warren a past CIS 90 Alumnus

Percentage	Total Points	Letter Grade	Pass/No Pass
90% or higher	504 or higher	A	Pass
80% to 89.9%	448 to 503	B	Pass
70% to 79.9%	392 to 447	C	Pass
60% to 69.9%	336 to 391	D	No pass
0% to 59.9%	0 to 335	F	No pass

At the end of the term I'll add up all your points and assign you a grade using this table

Graded work is copied to your home directories

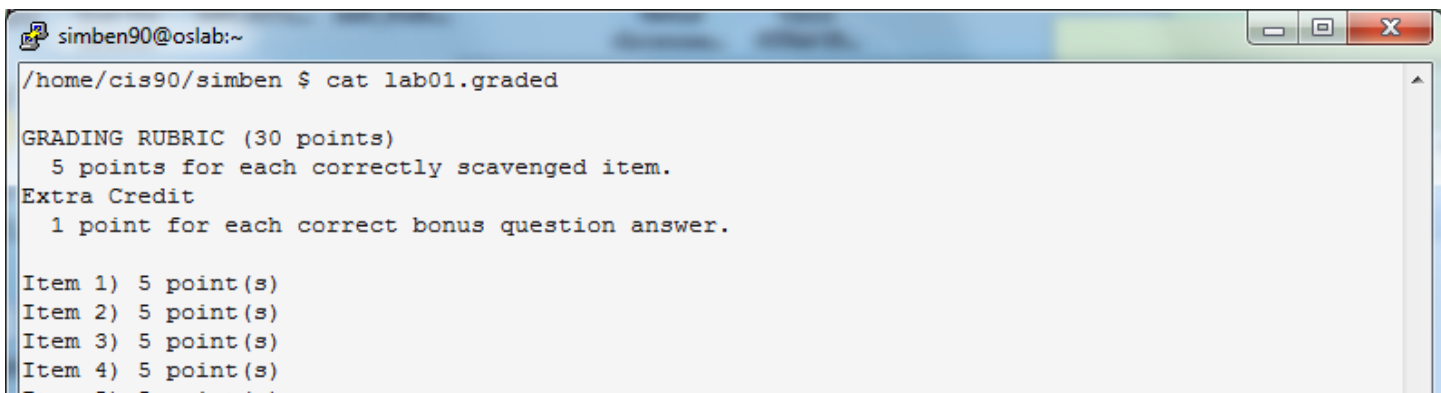
ls



```
simben90@oslab:~  
/home/cis90/simben $ ls  
bigfile  Hidden          Lab2.0  log          Poems      proposal3  text.err  what_am_i  
bin      lab01-collection  Lab2.1  Miscellaneous proposal1  small_town text.fxd  
empty    lab01.graded      letter  mission      proposal2  spellk     timecal  
/home/cis90/simben $
```

*Log in to Opus and use the **ls** and **cat** commands to see your graded work*

cat lab01.graded

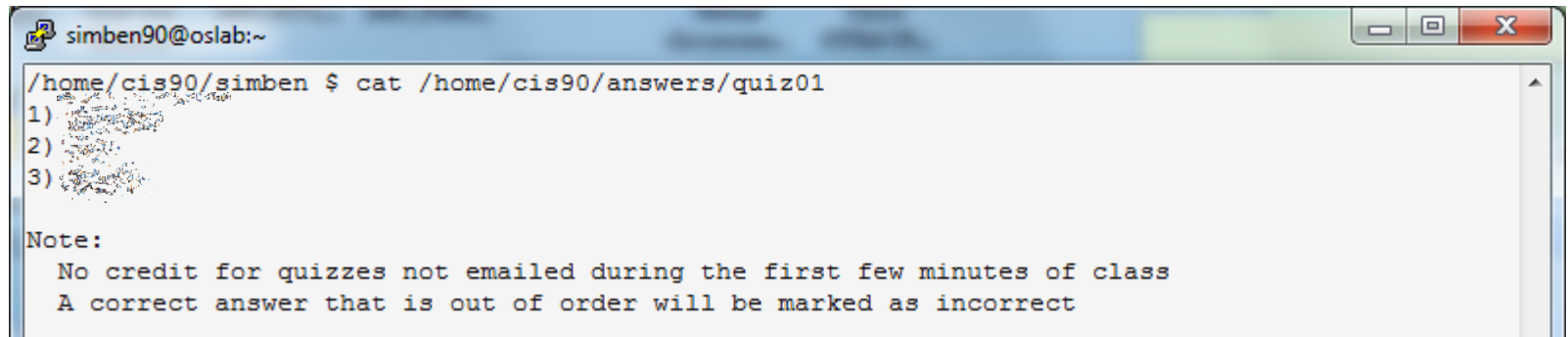


```
simben90@oslab:~  
/home/cis90/simben $ cat lab01.graded  
  
GRADING RUBRIC (30 points)  
5 points for each correctly scavenged item.  
Extra Credit  
1 point for each correct bonus question answer.  
  
Item 1) 5 point(s)  
Item 2) 5 point(s)  
Item 3) 5 point(s)  
Item 4) 5 point(s)  
Item 5) 5 point(s)
```

*Be sure to scroll back to the beginning of the **cat** output*

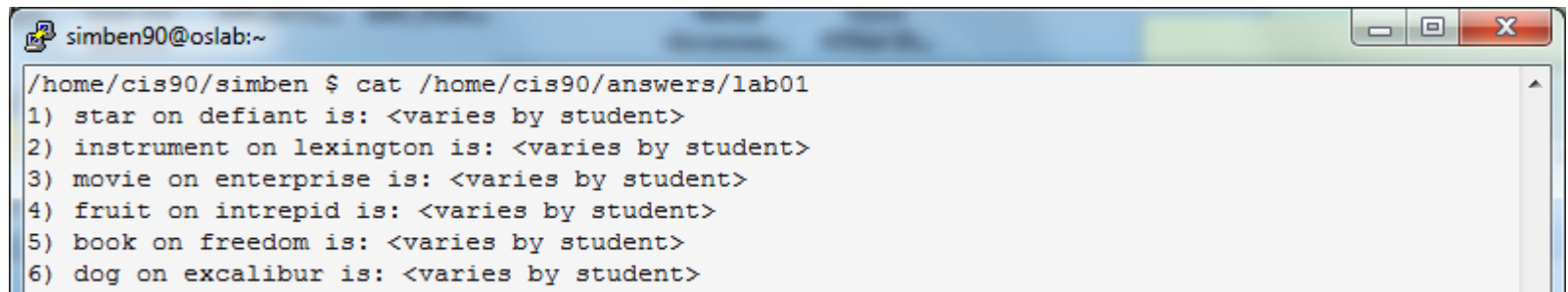
The answers/ directory on Opus

```
cat /home/cis90/answers/quiz01
```



```
simben90@oslab:~  
/home/cis90/simben $ cat /home/cis90/answers/quiz01  
1)  
2)  
3)  
  
Note:  
  No credit for quizzes not emailed during the first few minutes of class  
  A correct answer that is out of order will be marked as incorrect
```

```
cat /home/cis90/answers/lab01
```



```
simben90@oslab:~  
/home/cis90/simben $ cat /home/cis90/answers/lab01  
1) star on defiant is: <varies by student>  
2) instrument on lexington is: <varies by student>  
3) movie on enterprise is: <varies by student>  
4) fruit on intrepid is: <varies by student>  
5) book on freedom is: <varies by student>  
6) dog on excalibur is: <varies by student>
```

The answers to quizzes, tests and labs will be posted to the /home/cis90/answers/ directory after the due date has passed.

Subtle Stuff

Who else is logged in?

```
[rsimms@excalibur ~]$ who
simben90 :0                2015-09-16 08:36 (:0)
jadzia   pts/0             2015-09-16 08:41 (freedom.cis.cabrillo.edu)
rsimms   pts/1             2015-09-16 08:36 (opus.cis.cabrillo.edu)
worf     pts/3             2015-09-16 08:42 (2601:647:cb02:9eed:78d1:ef8f:7225:43e5)
simben90 pts/2             2015-09-16 08:38 (:0)
[rsimms@excalibur ~]$
```

```
[rsimms@excalibur ~]$ who -Hu
NAME      LINE      TIME      IDLE      PID COMMENT
simben90  :0        2015-09-16 08:36 ?         13924 (:0)
jadzia    pts/0     2015-09-16 08:41 00:01     15092 (freedom.cis.cabrillo.edu)
rsimms    pts/1     2015-09-16 08:36 .         14270 (opus.cis.cabrillo.edu)
worf      pts/3     2015-09-16 08:42 .         15181 (2601:647:cb02:9eed:78d1:ef8f:7225:43e5)
simben90  pts/2     2015-09-16 08:38 00:02     14876 (:0)
[rsimms@excalibur ~]$
```

```
[rsimms@excalibur ~]$ w
08:43:17 up 11 days, 10:10, 5 users, load average: 0.02, 0.14, 0.13
USER      TTY      LOGIN@  IDLE   JCPU   PCPU   WHAT
simben90  :0        08:36   ?xdm?  13:51  0.33s  gdm-session-worker [pam/gdm-password]
jadzia    pts/0     08:41   1:44   0.03s  0.03s  -bash
rsimms    pts/1     08:36   5.00s  0.04s  0.00s  w
worf      pts/3     08:42   5.00s  0.02s  0.00s  ping netlab.cis.cabrillo.edu
simben90  pts/2     08:38   2:53   0.35s  0.32s  top
[rsimms@excalibur ~]$
```



Putty to:
rsimms@oslab.cis.cabrillo.edu
vs **oslab.cis.cabrillo.edu**

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address) Port

rsimms@oslab.cis.cabrillo.edu 2220

Connection type:

☐ Raw ☐ Telnet ☐ Rlogin ☒ SSH ☐ Serial

172.30.1.1 - PuTTY

```
Using username "rsimms".  
rsimms@oslab.cabrillo.edu's password: 
```

If you specify the username in Putty you won't be prompted for it, just the password.

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address) Port

oslab.cis.cabrillo.edu 2220

Connection type:

☐ Raw ☐ Telnet ☐ Rlogin ☒ SSH ☐ Serial

172.30.1.1 - PuTTY

```
login as: 
```

If you specify only the hostname in Putty you get prompted for both username and password.

Tip: Use the Putty "Saved Sessions" for your Opus connection. Then you don't have to type in the username, hostname and port number each time you connect to Opus.



ssh arya-xx vs ssh cis90@arya-xx

(your Opus accounts are NOT on the Arya systems)

```

simben90@oslab:~
/home/cis90/simben $ ssh arya-35
simben90@arya-35's password:
Permission denied, please try again.
simben90@arya-35's password:
Permission denied, please try again.
simben90@arya-35's password:
Permission denied (publickey)
/home/cis90/simben $

cis90@Arya-35: ~
/home/cis90/simben $ ssh cis90@arya-35
cis90@arya-35's password:
Welcome to Ubuntu 14.04.1 LTS (GNU/Linux 3.13.0-35-generic x86_64)

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

Benji is logged in as simben90 on Opus tries and fails to ssh into Arya-35 as simben90


Benji is logged in as simben90 on Opus tries and succeeds to uses ssh into Arya-35 as cis90

If you don't specify the username the **ssh** command will use the username you are currently logged in as. This account may not exist on the remote system!

type and man caveats

Usually, to find the location of a command on your path, use the **type** command:

```
/home/cis90/simben $ type hostname  
hostname is /bin/hostname
```

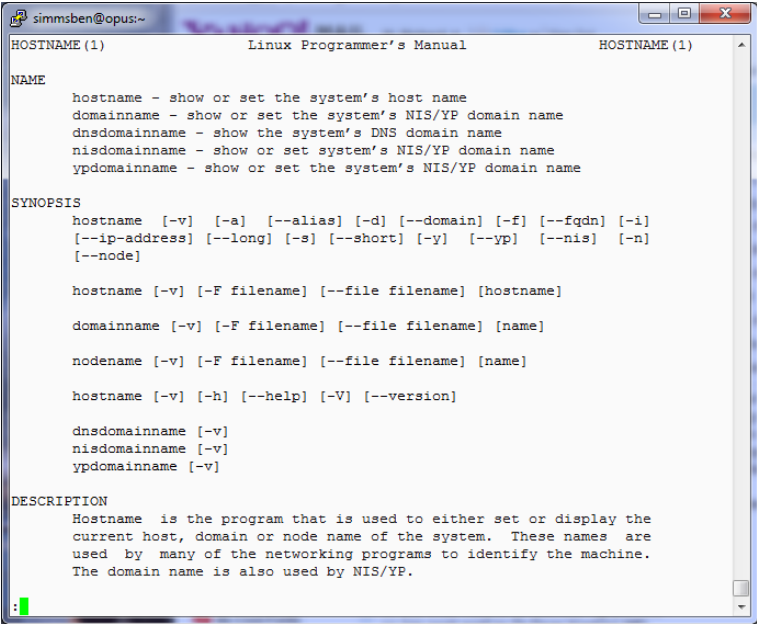


*The hostname program
file is in the /bin directory*

type and man caveats

Usually, to find the manual page for a command, use the **man** command:

```
/home/cis90/simben $ man hostname
```



```
simmsben@opus:~
HOSTNAME(1)                                Linux Programmer's Manual                HOSTNAME(1)

NAME
hostname - show or set the system's host name
domainname - show or set the system's NIS/YP domain name
dnsdomainname - show the system's DNS domain name
nisdomainname - show or set system's NIS/YP domain name
ypdomainname - show or set the system's NIS/YP domain name

SYNOPSIS
hostname [-v] [-a] [--alias] [-d] [--domain] [-f] [--fqdn] [-i]
[--ip-address] [--long] [-s] [--short] [-y] [--yp] [--nis] [-n]
[--node]

hostname [-v] [-F filename] [--file filename] [hostname]
domainname [-v] [-F filename] [--file filename] [name]
nodename [-v] [-F filename] [--file filename] [name]
hostname [-v] [-h] [--help] [-V] [--version]

dnsdomainname [-v]
nisdomainname [-v]
ypdomainname [-v]

DESCRIPTION
Hostname is the program that is used to either set or display the
current host, domain or node name of the system. These names are
used by many of the networking programs to identify the machine.
The domain name is also used by NIS/YP.
```

Command Review

However,

Sometimes you may get something different than expected with the **type** and **man** commands

type and man caveats

```
/home/cis90/simmsben $ type ls  
ls is aliased to `ls --color=tty`
```

If the command is an alias (which we will learn about later) the type command by default doesn't show where the command resides on the path

```
/home/cis90/simmsben $ type -a ls  
ls is aliased to `ls --color=tty`  
ls is /bin/ls
```

*To get around that use the **-a** option*

The ls program file resides in the /bin directory

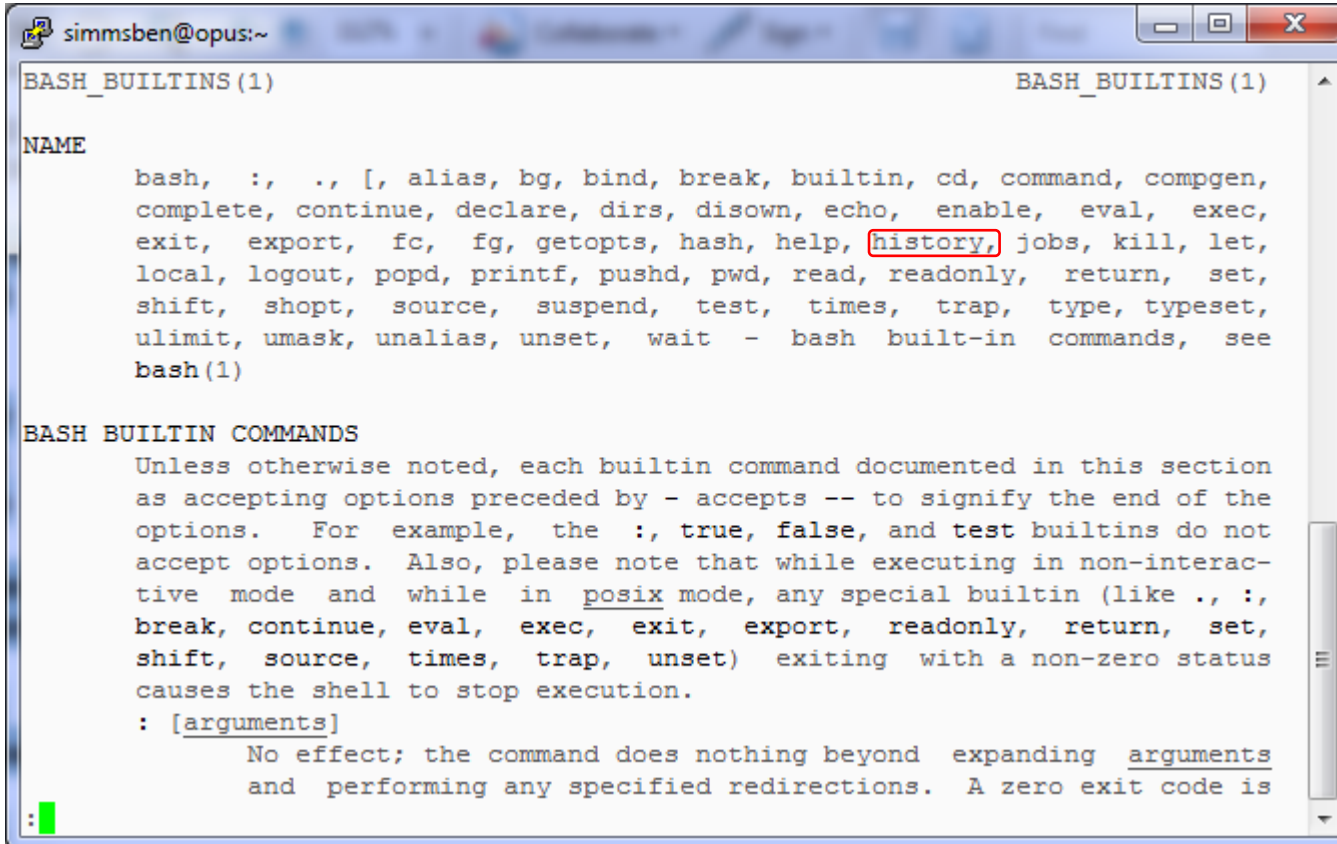
*The **ls** command is aliased, use the **-a** option on the **type** command to find where the command resides on the path*

type and man caveats

```
/home/cis90/simben $ type history
history is a shell builtin
```

*The **history** command is built into the shell and does not have its own program file*

```
/home/cis90/simben $ man history
```



```
simmsben@opus:~
BASH_BUILTINS(1)
NAME
    bash, :, ., [, alias, bg, bind, break, builtin, cd, command, compgen,
    complete, continue, declare, dirs, disown, echo, enable, eval, exec,
    exit, export, fc, fg, getopts, hash, help, history, jobs, kill, let,
    local, logout, popd, printf, pushd, pwd, read, readonly, return, set,
    shift, shopt, source, suspend, test, times, trap, type, typeset,
    ulimit, umask, unalias, unset, wait - bash built-in commands, see
    bash(1)
BASH BUILTIN COMMANDS
    Unless otherwise noted, each builtin command documented in this section
    as accepting options preceded by - accepts -- to signify the end of the
    options. For example, the :, true, false, and test builtins do not
    accept options. Also, please note that while executing in non-interactive
    mode and while in posix mode, any special builtin (like ., :,
    break, continue, eval, exec, exit, export, readonly, return, set,
    shift, source, times, trap, unset) exiting with a non-zero status
    causes the shell to stop execution.
    : [arguments]
        No effect; the command does nothing beyond expanding arguments
        and performing any specified redirections. A zero exit code is
```

*The **history** command does not have its own man page either!*

... but it is included in the man page for bash builtins

Either scroll down or use /history

Path (from Lesson 2)

Life without a path

<https://simms-teach.com/docs/cis90/cis90-life-with-no-path.pdf>

Mini Review

Expectation Check

Commands you should understand and be comfortable using

Lesson/Lab 1		Lesson/Lab 2	
Commands	Files & Directories	Commands	Files & Directories
cal clear date exit history hostname id ps ssh uname tty who who am i	/etc/issue /etc/*-release	apropos banner bash bc cat cd echo env file finger info file ls passwd set type man whatis	/bin /usr/bin /sbin /usr/sbin /etc/passwd /etc/shadow

If you have any questions on these commands, post a question on the forum!

Class Activity

In what file are all the encrypted passwords kept?

Put your answer in the chat window

ssh command

Syntax:

ssh -p *port username@hostname*

Examples:

```
ssh -p 2220 simben90@son-of-opus.simms-teach.com
```

```
ssh -p 22 cis90@rhea.cishawks.net
```

Syntax shortcuts:

- If the port is 22, then it does not need to be specified.
- If the username is the same on the remote system it can be left off.
- If domain suffixes are automatically added they can be left off.

For example Benji could use any of the commands below to log into daughter-of-opus from Opus:

```
ssh -p 22 simben90@daughter-of-opus.cis.cabrillo.edu
```

```
ssh simben90@daughter-of-opus.cis.cabrillo.edu
```

```
ssh daughter-of-opus.cis.cabrillo.edu
```

```
ssh daughter
```

The ssh command is used to log into a remote system

Class Activity

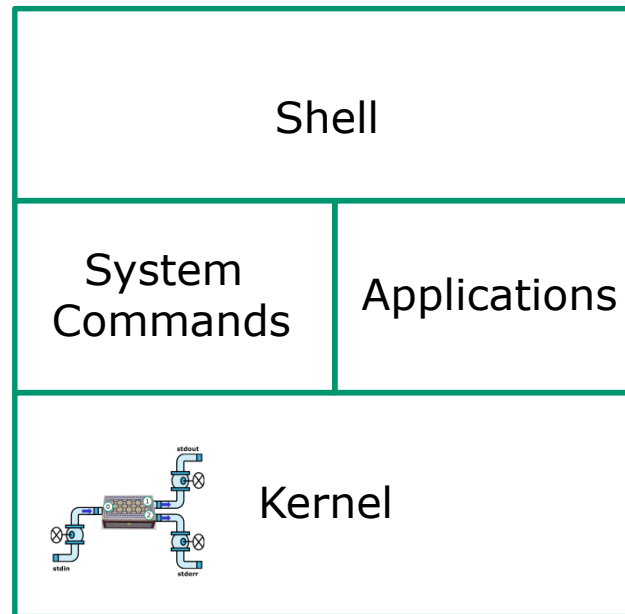
ssh to the Rhea system (port 22) and login as the cis90 user.

What terminal device are you using on Rhea?

Put your answer in the chat window

Key components of the Linux/UNIX architecture

Users interact with the shell to run commands



Commands such as ls, cal, date, tty, id, who, etc.

Web servers, databases, word processors, etc.



The kernel manages processes, memory, file system, and the network stack and interacts with all the hardware components

Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

What kernel is running on Rhea?

Put your answer in the chat window

Class Activity

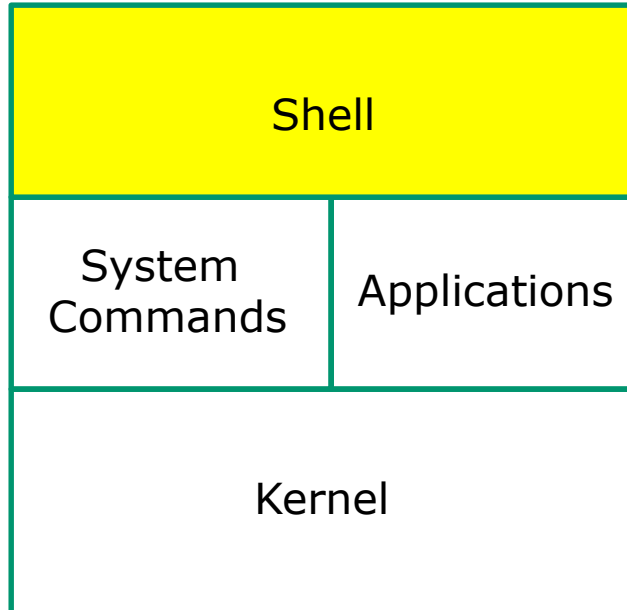
If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

What shell is running on Rhea?

Put your answer in the chat window



Life of the Shell



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



Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

As the cis90 user on Rhea enter this command:

```
ls -lt /usr/games
```

How many directories on the path did the shell have to search to locate the command used above?

Put your answer in the chat window?

Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

As the cis90 user on Rhea enter this command:

```
ls -z /bin
```

Which program, ls or the shell, output the error message?

Put your answer in the chat window?

Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

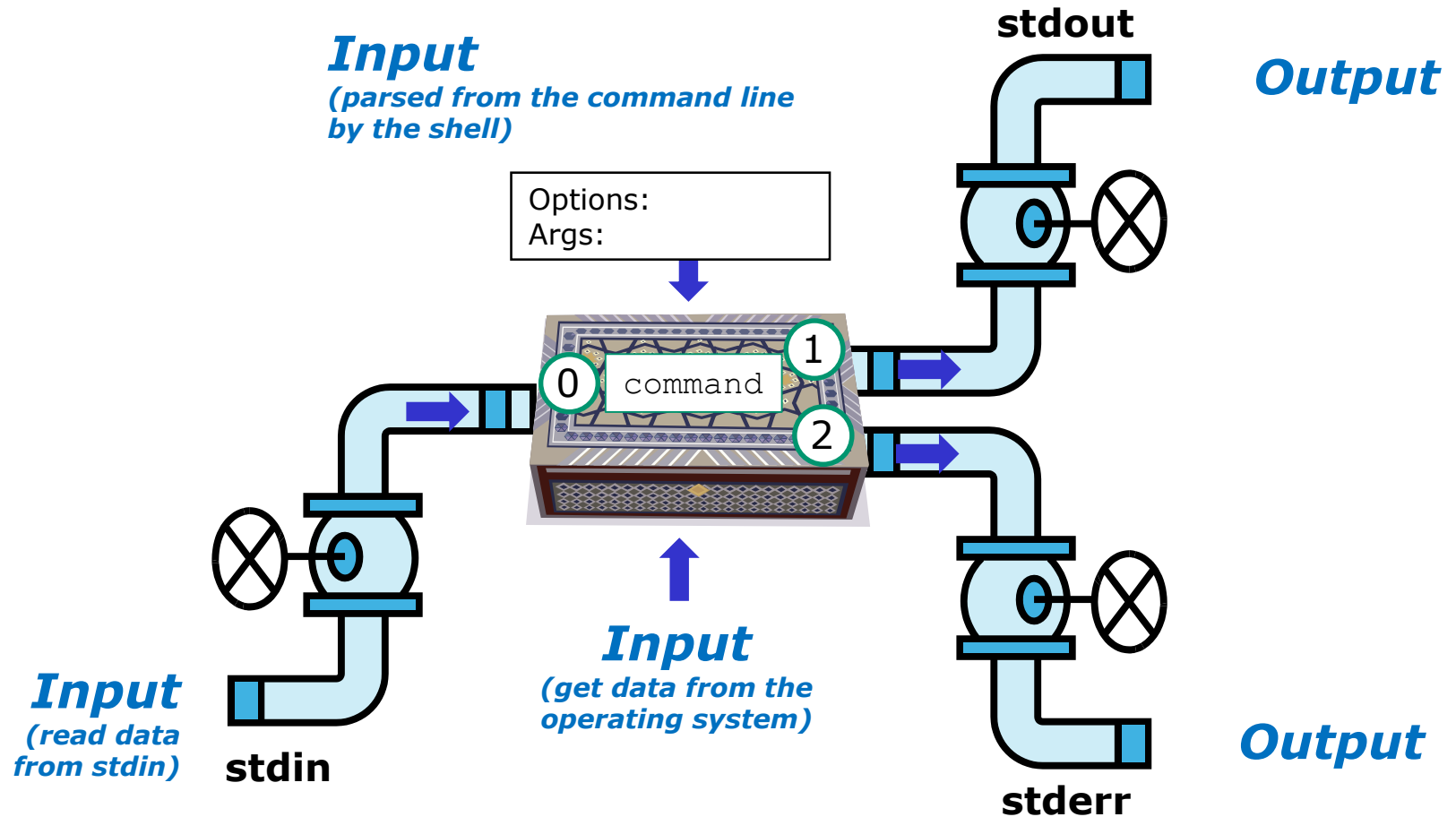
As the cis90 user on Rhea enter this command:

```
lls -z /bin
```

Which program, ls or the shell, output the error message?

Put your answer in the chat window?

Inputs and Outputs



The three file descriptors provided to every process are named **stdin**, **stdout** and **stderr**

Class Activity

As the cis90 user on Rhea enter this command:

```
banner Hola
```

Where does the **banner** command on Rhea get it's input from?

- a) The command line (passed in by the shell)
- b) The keyboard (read from stdin)
- c) The operating system

Put your answer in the chat window

Answer

In what file are all the encrypted passwords kept?

/etc/shadow

Answer

ssh to the Rhea system (port 22) and login as the cis90 user.

What terminal device are you using on Rhea?

```
/home/cis90/simben $ ssh cis90@rhea
Password for cis90@rhea:
Last login: Tue Feb  9 15:32:36 2016 from opus.cis.cabrillo.edu
FreeBSD 10.0-RELEASE-p18 (GENERIC) #0: Wed Feb 25 01:08:00 UTC 2015
```

```

      .-
     /  \
    /    \
   /      \
  /        \
 /          \
/            \
 \          /
  \        /
   \      /
    \    /
     \  /
      -
```

< *snipped* >

```
$ tty
/dev/pts/0
```

 *Terminal device will vary by user*

< *snipped* >

FreeBSD

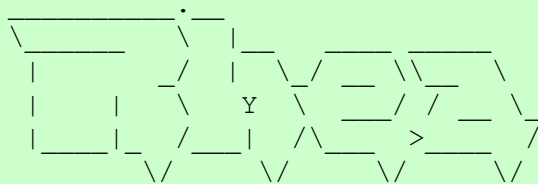
Free BSD kernel

Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

What shell is running on Rhea?

```
/home/cis90/simben $ ssh cis90@rhea
Password for cis90@rhea:
Last login: Wed Feb  8 06:54:35 2017 from opus.cis.cabrillo.edu
FreeBSD 10.0-RELEASE-p18 (GENERIC) #0: Wed Feb 25 01:08:00 UTC 2015
```



```
< snipped >
$ echo $SHELL
/bin/sh
$ ps
  PID TT  STAT      TIME COMMAND
 4999  0   Ss    0:00.00 -sh (sh)
 5001  0   R+    0:00.00 ps
$
```

The sh (Bourne shell) is running on Rhea

Answer

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

As the cis90 user on Rhea enter this command:

```
ls -lt /usr/games
```

How many directories on the path did the shell have to search to locate the command used above?

```
$ type ls  
ls is /bin/ls  
$ echo $PATH  
/sbin:/bin:/usr/sbin:/usr/bin:/usr/games:/usr/local/sbin:/usr/local/bin:/home/cis90/bin
```

The shell had to search two directories. The first was /sbin and the second was /bin.

Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

As the cis90 user on Rhea enter this command:

```
ls -z /bin
```

Which program, ls or the shell, output the error message?

```
$ ls -z /bin
ls: illegal option -- z
usage: ls [-ABCFGHILPRSTUWZabcdefghiklmnopqrstuwxy1,] [-D format] [file ...]
$
```

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

The ls command, during the execute step, output the error message.

Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

As the cis90 user on Rhea enter this command:

```
lls -z /bin
```

Which program, ls or the shell, output the error message?

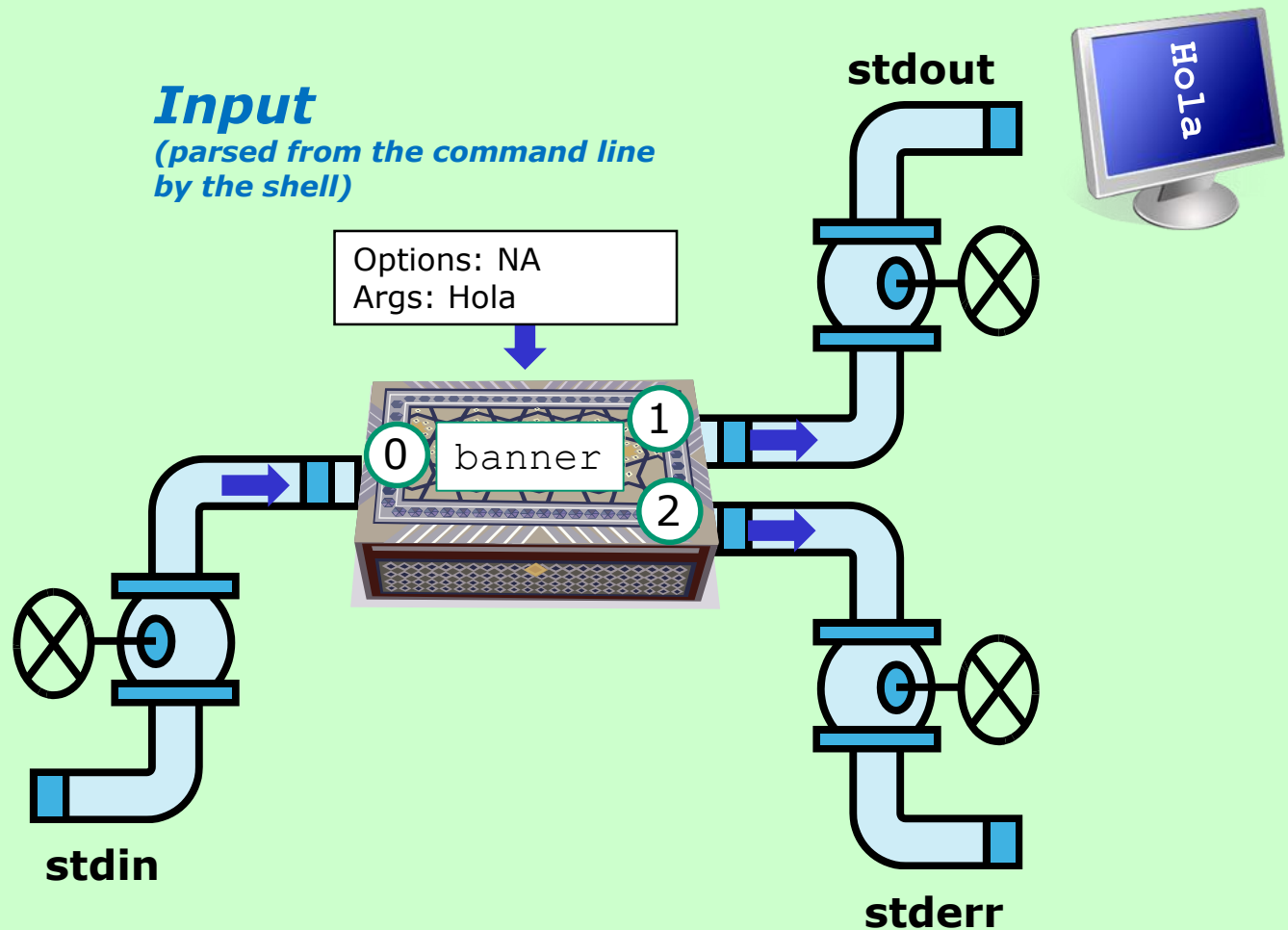
```
$ lls -z /bin
lls: not found
$
```

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

The shell, during the search step, output the error message.

Answer

\$ **banner Hola**



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

Practice Questions sun-hwa-iii

My favorite ice cream shop



Source: http://attractions.uptake.com/blog/files/2008/10/dsc_0002.jpg

Practice Test Questions

Return back to Opus.

What command could be used on Opus to log into this remote system:

hostname: sun-hwa-iii.cis.cabrillo.edu

username: *same as your Opus username*

port: 22

Write your command in the chat window

Practice Test Questions

Log into sun-hwa-iii and run the **icecream** command.

Copy your ice cream flavor into the chat window.

Practice Test Questions

On Sun-Hwa-III, is the **icecream** command on your path?

Write your answer in the chat window

Practice Test Questions

On Sun-Hwa-III, what kind of a file is the **icecream** command?

Write your answer in the chat window

Practice Test Questions

On Sun-Hwa-III, how many directories does the shell have to search to locate the **icecream** command on your path?

Write your answer in the chat window

Practice Test Questions

Is **icecream** a standard UNIX command?

Write your answer in the chat window

Practice Test Questions

Is Sun-Hwa-iii a Linux or UNIX system?

Write your answer in the chat window

Practice Test Questions

What distro has been installed on Sun-Hwa-iii?

Write your answer in the chat window

Answer

1) What command could be used on Opus to log into this remote system:

hostname: sun-hwa-iii.cis.cabrillo.edu

username: *same as your Opus username*

port: 22

Answer: ssh sun-hwa-iii

Answer

On Sun-Hwa-III, is the **icecream** command on your path? If so what directory is it in?

If the shell can find it when you run it then it is on your path!

```
[simben90@sun-hwa-iii ~]$ icecream
```

```
Welcome to Sun-Hwa-III Benji!  
You get 10-20 icecream today.  
Hope you like it. Have a great day!
```

*Use the **type** command to find the first directory on your path containing the command*

```
[simben90@sun-hwa-iii ~]$ type icecream  
icecream is /usr/local/bin/icecream  
[simben90@sun-hwa-iii ~]$
```

Answer: YES, the **icecream** command is in the `/usr/local/bin` directory

Answer

On Sun-Hwa-III, what kind of file is the **icecream** command?

*Use the **file** command to probe and get extended file type information*

```
[simben90@sun-hwa-iii ~]$ file /usr/local/bin/icecream  
/usr/local/sbin/icecream: Bourne-Again shell script, ASCII text  
executable  
[simben90@sun-hwa-iii ~]$
```

Answer: BASH shell script

Answer

On Sun-Hwa-III, how many directories does the shell have to search to locate the **icecream** command on your path?

Echo the PATH environment variable to see the order of the directories on the path

```
simben90@Sun-Hwa-III:~$ type icecream  
icecream is hashed (/usr/local/bin/icecream)
```

```
simben90@Sun-Hwa-III:~$ echo $PATH  
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games
```

Note the colon character : is used to delimit one directory from the next

Answer: Two

1) /usr/local/sbin

2) /usr/local/bin ←

Answer

On Sun-Hwa-III, is **icecream** a standard UNIX command?

*Use the **man** command to see if there is any documentation on **icecream***

```
[simben90@sun-hwa-iii ~]$ man icecream
```

```
No manual entry for icecream
```

```
See 'man 7 undocumented' for help when manual pages are not available.
```

Answer: NO

Answer

Is Sun-Hwa-iii a Linux or UNIX system?

*Use the **uname** command to show the name of the kernel*

```
[simben90@sun-hwa-iii ~]$ uname  
Linux
```

Answer: Linux

Answer

What distro has been installed on Sun-Hwa-iii?

*Use **cat /etc/issue** or **cat /etc/*-release**
to show the distro*

```
[simben90@sun-hwa-iii ~]$ cat /etc/issue
Ubuntu 14.04 LTS \n \l
[simben90@sun-hwa-iii ~]$
```

Answer: Ubuntu 14.04

Terminals

Hardware Terminals



Teletype (TTY)



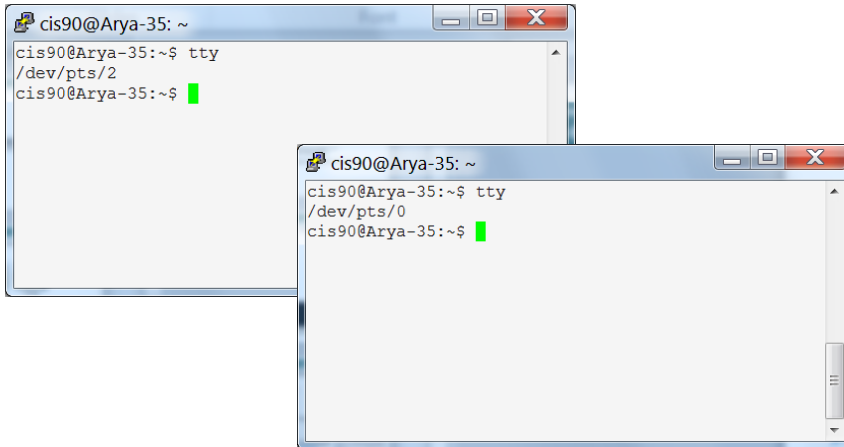
VT100



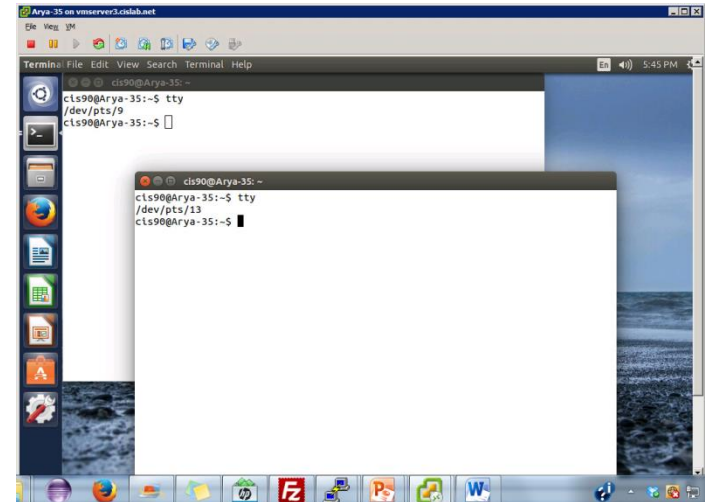
Terminals were used in the old days to interact with "minicomputers" and "mainframe" computers.

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

Software Terminals



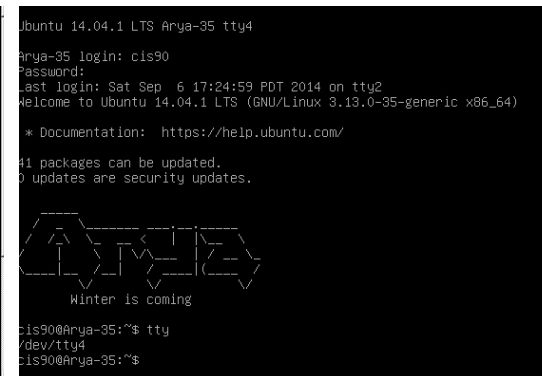
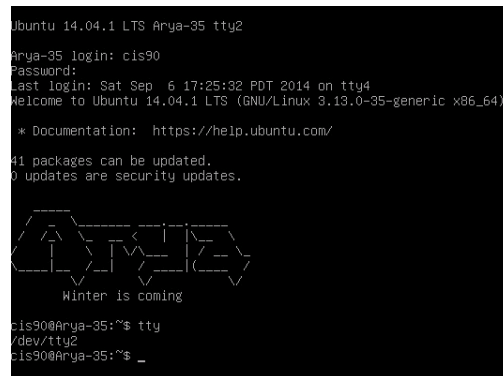
Terminal emulators like PuTTY (with scroll bars, colors, customizable backgrounds, fonts and sizes) for Windows



Graphical terminals (with scroll bars, colors, customizable backgrounds, fonts and sizes) built into Linux/Mac computers

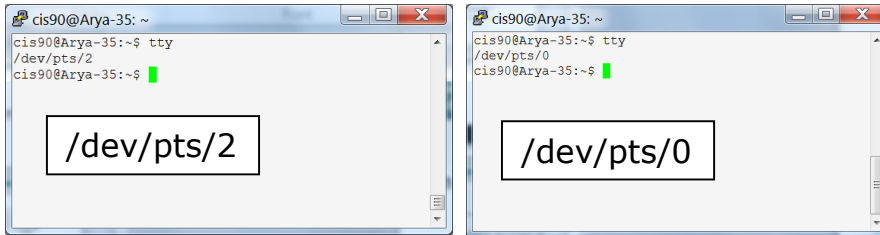
Virtual terminals (use ctrl-alt-fn)

Bare bones, no scroll bars,
also called a console



Various terminal devices on an Arya VM

Terminal emulators (e.g. Putty)



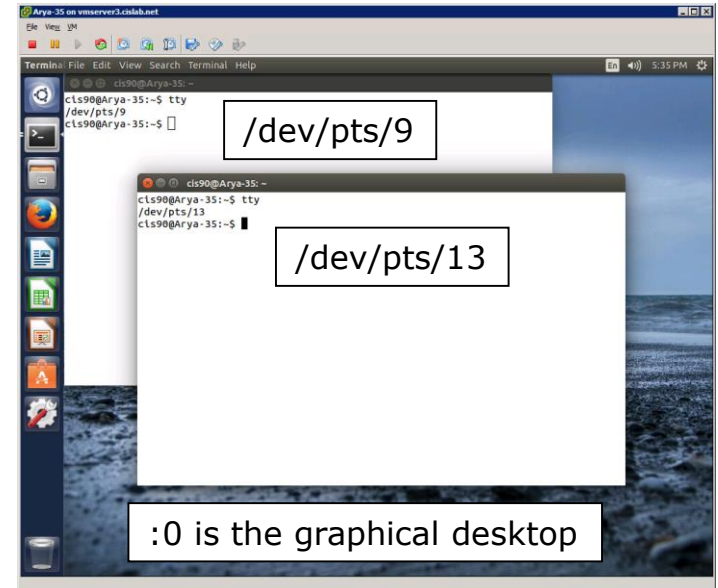
```
cis90@Arya-35:~$ who
cis90    tty4      2014-09-06 17:25
cis90    tty2      2014-09-06 17:25
cis90    pts/2     2014-09-06 17:20 (enterprise.cis.cabrillo.edu)
cis90    :0        2014-09-06 17:20 (:0)
cis90    pts/0     2014-09-06 17:21 (2601:9:6680:53b:4d09:e2b6:e7fc:d999)
cis90    pts/9     2014-09-06 17:22 (:0)
cis90    pts/13    2014-09-06 17:23 (:0)
```

pts=pseudo terminal,

tty=teletype

:n=an X window display number

Graphical terminals on graphical desktop



Virtual terminals



Housekeeping



Lab 2 due tonight

- Use **history -a** before every **submit**.
 - ❖ If you neglect to do this, the history snapshot you send me to grade will not have the latest commands you issued.
- Submit as many times as you wish up to 11:59PM Opus time. You must submit your work to get credit.
- No credit for late work. Submit what you have for partial credit if you run out of time.
- You can optionally use the **verify** command to see what you submitted for grading.
 - ❖ To grade, I will check your submitted history to see if you used all the commands asked for in Lab 2 as well as your answers to the three questions.

Grades posted on website

<http://simms-teach.com/cis90grades.php>

Current Progress		Quizzes & Tests										Forum										Labs										Extra		Total Grade																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Extra Credit


SS
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se. Another 90 points is available from **extra credit** assignments. Students c
erall progress on the chart below. Contact the instructor by email with any que

				Forum				Labs										Final
Q	T1	T2	T3	F1	F2	F3	F4	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	Project
3	30	30	30	20	20	20	20	30	30	30	30	30	30	30	30	30	30	60
								30										
								30										

Typos and HowTo's

*Note the caps
on extra credit.*



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95 days till term ends!

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[Quick Ref](#)
[VM Repairs](#)
[GAH!](#)

CIS 90 Extra Credit


[Course Home](#) [Grades](#)

General Options

Any combination of the following can be done to earn extra credit up to the maximum amount shown on the Grades page:

- **Web site content review** - The first person to email the instructor pointing out an error or typo on this website will get one point of extra credit per content error found. This includes any errors found on the instructor's downloaded materials that have been covered in class. It does not include lesson PowerPoints or Labs that have not yet been covered in class but are pre-published on the website. **(Up to 20 points total)**
- **Develop new Howtos** - Investigate and develop a Howto on a new topic area you are interested in. At the Instructor's discretion and your permission, these Howtos will be published on this web site on the Resources page. Make a proposal first to the instructor on the topic area and to determine the amount of extra credit. Submittals must follow the format of the instructor's Howtos on the Resources web page and be web publishable. **(Up to 20 points per Howto)**
- **Optional activities in lab assignments** - Some of the lab assignments will have optional activities that can be worked for extra credit.
- **Lab assignments** - Some courses may have one or more extra credit labs. Check the Calendar web page. (Point amount varies)

Extra Credit Howtos



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101 days till term ends!

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[Static IPs](#)

Links

Instructors

- [Programming Master Ed](#)
- [Linux Master Jim](#)
- [Web Master John](#)
- [Network Master Gerlinde](#)
- [Network Master Rick](#)

Clubs

- [GNU Linux Users Group](#)

Departments

- [CNSA](#)
- [CIS](#)
- [CS](#)

Crib Sheets

- [Ollie Wright \(CIS 90\)](#)

Getting Linux

- [Linux ISOs](#)
- [Kernels](#)
- [RPMs](#)

Tools and Software

- [Apache](#)
- [Bastille](#)
- [cygwin](#)
- [DIAG](#)
- [diagnostics](#)
- [DOS boot disks](#)
- [John the Ripper](#)
- [MSDN Academic Alliance](#)
- [Netfilter](#)
- [Putty SSH Tools](#)
- [Tripwire](#)
- [VMware Server](#)
- [Wireshark](#)

Standards

- [IETF \(RFCs\)](#)
- [IEEE](#)

Documentation

- [TLDP](#)
- [LINFO](#)
- [Commands](#)
- [Summary](#)
- [vi summary](#)


Howtos

- [email](#)
- [DNS](#)
- [Ethernet \(NIC drivers\)](#)
- [NIS](#)
- [PPP](#)
- [NFS](#)


Student Howtos

- [Marc Romansky \(Accessing VMware remotely via Linksys Router\)](#)
- [Marc Romansky \(Accessing VMware with PuTTY\)](#)
- [Marcos Valdebenito \(VirtualBox\)](#)
- [Michael Wicherski \(Permissions\)](#)
- [Michael Wicherski \(/bin/mail\)](#)

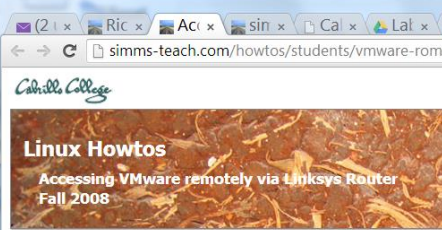
If you have a strong interest in a topic write a Howto on it to share what you've learned and earn some extra credit at the same time



Wifi Penetration
Wireless Communication and Computer/Network Forensics



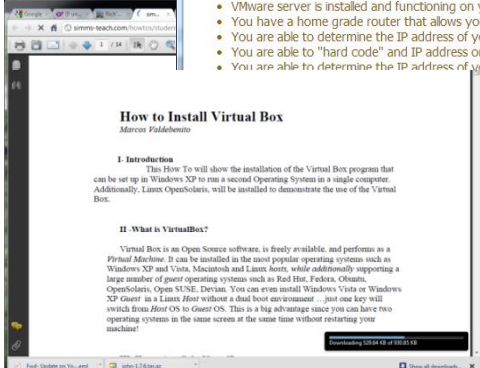
**Understanding /bin/mail :
Lost Student versus /bin/mail**



Linux Howtos
Accessing VMware remotely via Linksys Router
Fall 2008

Assumptions

- VMware server is installed and functioning on your home system.
- You have a home grade router that allows you to configure port forward
- You are able to determine the IP address of your home based system
- You are able to "hard code" and IP address on your VMware host system
- You are able to determine the IP address of your Virtual Machine



How to Install Virtual Box
Marcos Valdebenito

I. Introduction
This How To will show the installation of the Virtual Box program that can be set up in Windows XP to run a second Operating System in a single computer. Additionally, Linux OpenSUSE, will be installed to demonstrate the use of the Virtual Box.

II. What is VirtualBox?
Virtual Box is an Open Source software, is freely available, and performs as a Virtual Machine. It can be installed in the most popular operating systems such as Windows XP and Vista, Macintosh and Linux hosts, while additionally supporting a large number of guest operating systems such as Red Hat, Fedora, Ubuntu, OpenSUSE, Open SUSE, Debian. You can even install Windows Vista or Windows XP Guest in a Linux host without a dual boot environment... just one key will switch from Host OS to Guest OS. This is a big advantage since you can have two operating systems in the same screen at the same time without restarting your machine!

More Extra Credit

<http://simms-teach.com/cis90grades.php>

For some flexibility, personal preferences or family emergencies there is an additional 90 points available of extra credit activities.

On the forum

Be sure to monitor the forum as I may post extra credit opportunities without any other notice!

In lesson slides



On some labs

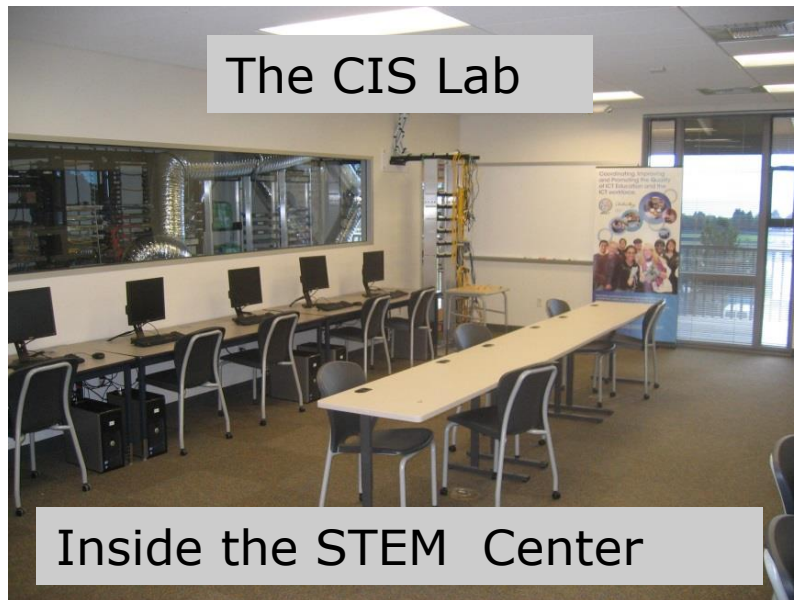
Extra credit (2 points)

For a small taste of what you would learn in CIS 191 let's add a new user to your Arya VM. Once added we will see how the new account is represented in `/etc/passwd` and `/etc/shadow`.

1. Log into your Arya VM as the cis90 user. Make sure it's your VM and not someone else's.
2. Install the latest updates:
`sudo apt-get update`
`sudo apt-get upgrade`
3. Add a new user account for yourself. You may make whatever username you wish. The example below shows how Benji would make the same username he uses on Opus:
`sudo useradd -G sudo -c "Benji Simms" -m -s /bin/bash simben90`

Help Available in the CIS Lab

Instructors, lab assistants and equipment are available for CIS students to work on assignments.



CIS 90 Student Lab Assistants



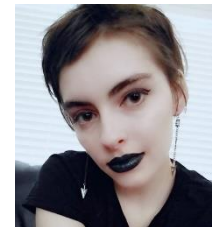
Kevin

T/Th 1:30-4:30
W 12:30-4:30



Roberto

T/Th 3:30-7:30



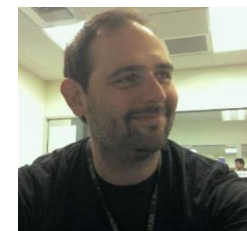
Tess

T/F 2-6:30
W/Th 12-5

Linux Instructors



Rich Simms
M 9-11:30



Mike Matera

Rich's Cabrillo College CIS Classes Home Page

Home

Resources

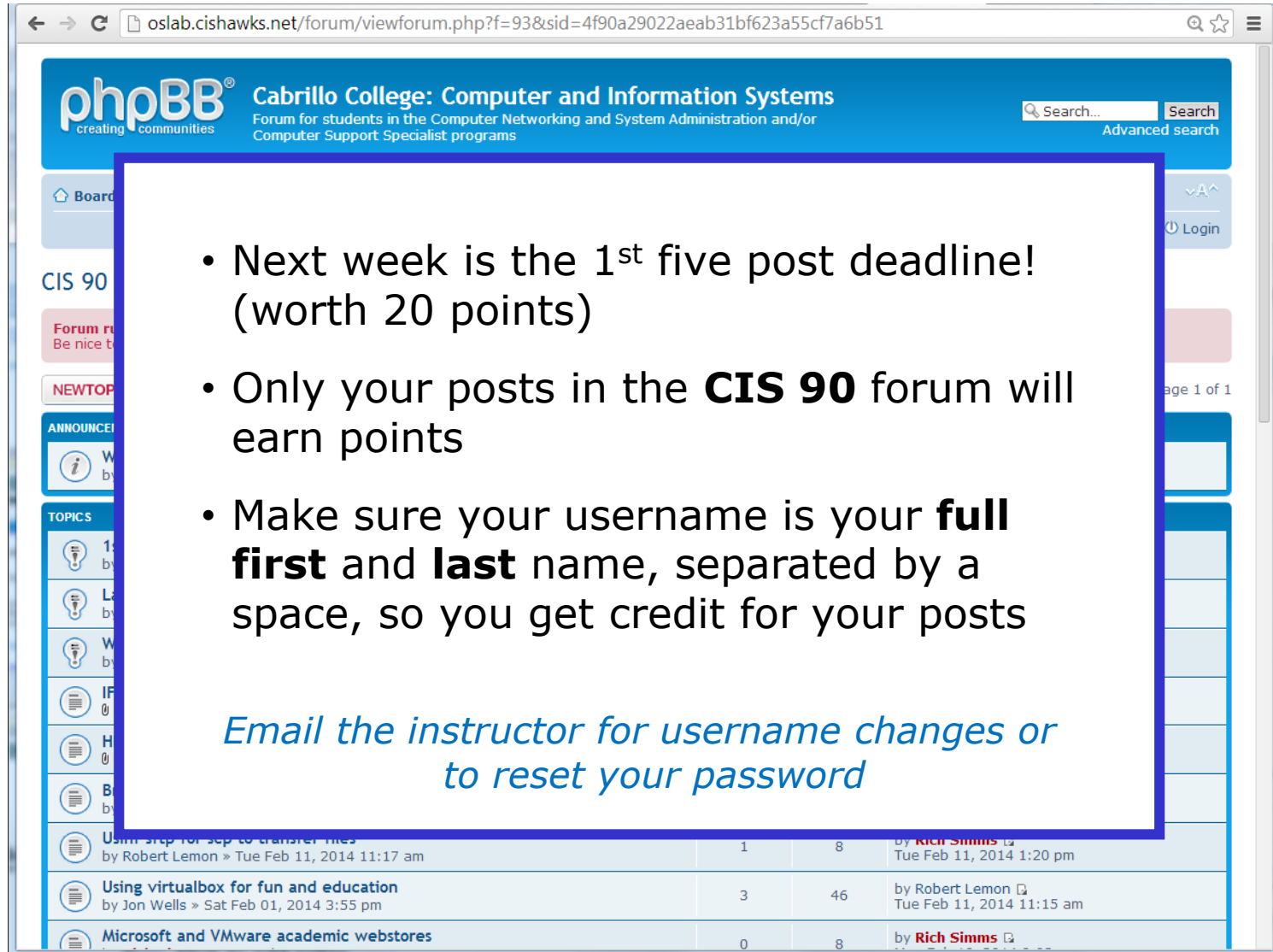
Forums

CIS Lab

Canvas

Note, Carter, a CIS 90 alumnus, is volunteering this term to help CIS 90 students with questions. His hours are on the white board in the CIS Lab.

Forum



The screenshot shows a web browser window with the URL `oslab.cishawks.net/forum/viewforum.php?f=93&sid=4f90a29022aeab31bf623a55cf7a6b51`. The forum header is blue and contains the phpBB logo, the text "Cabrillo College: Computer and Information Systems", and a search bar. A blue box with a white border is overlaid on the forum content, containing the following text:

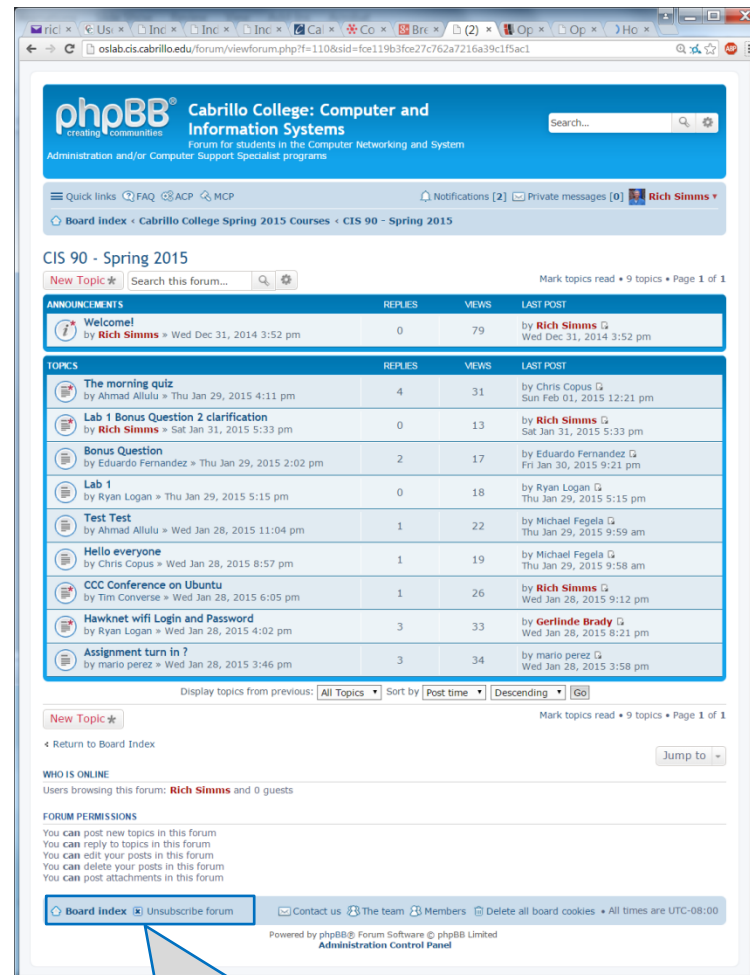
- Next week is the 1st five post deadline! (worth 20 points)
- Only your posts in the **CIS 90** forum will earn points
- Make sure your username is your **full first** and **last** name, separated by a space, so you get credit for your posts

Below the list, the text *Email the instructor for username changes or to reset your password* is displayed in blue. The forum's left sidebar shows the "CIS 90" forum selected, and the right sidebar shows "Page 1 of 1". The forum topic list at the bottom includes:

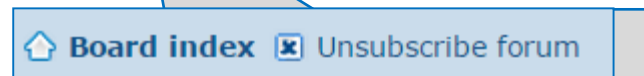
Topic	Replies	Views	Author	Date
Using step for step to transfer files	1	8	by Robert Lemon	Tue Feb 11, 2014 11:17 am
Using virtualbox for fun and education	3	46	by Robert Lemon	Tue Feb 11, 2014 11:15 am
Microsoft and VMware academic webstores	0	8	by Rich Simms	

Subscribe to the CIS 90 forum to get notifications

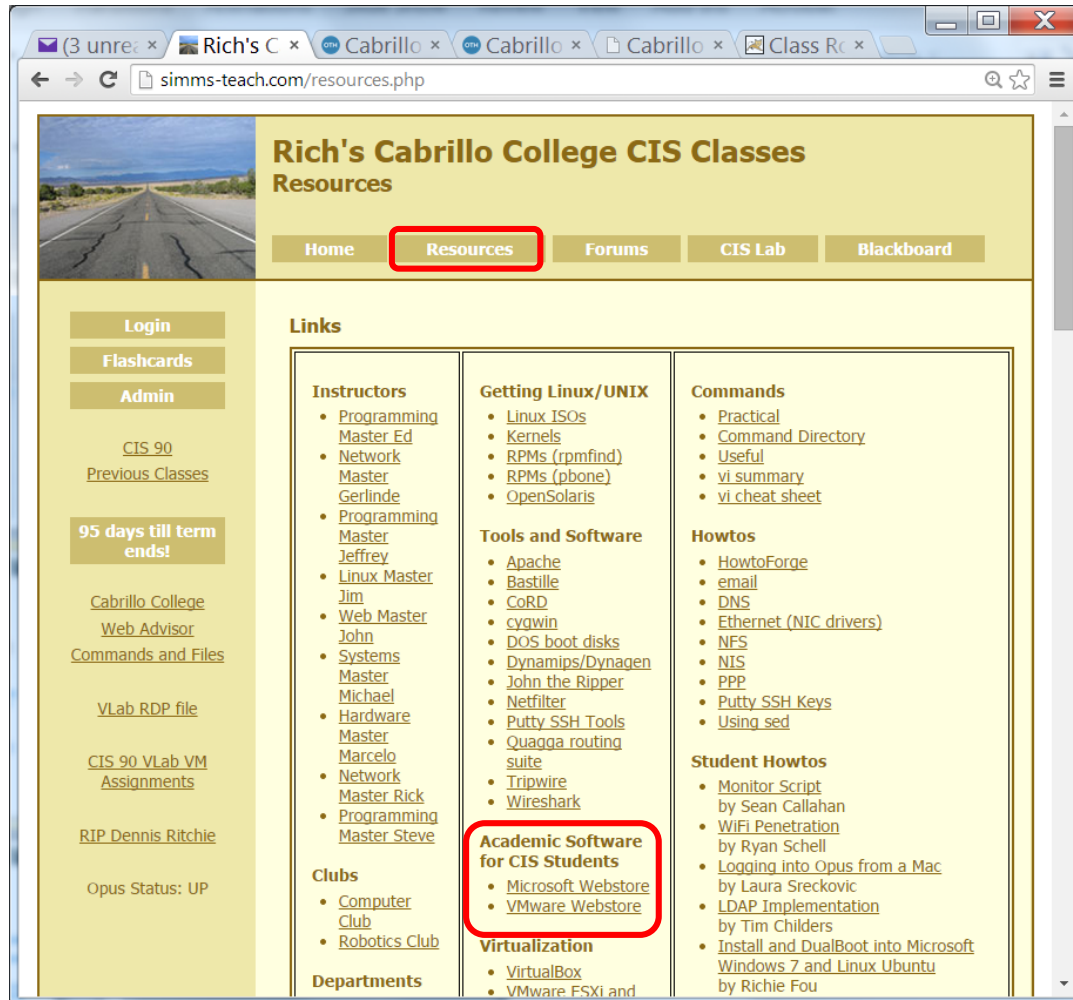
- 1) Login to the forum
- 2) Go to the CIS 90 forum
- 3) Click the "Subscribe" link at the bottom so that it changes to "Unsubscribe"
- 4) Now you will get notified of replies and new posts by email



It should look like this when you are subscribed



Software for eligible CIS students



Rich's Cabrillo College CIS Classes Resources

Home Resources Forums CIS Lab Blackboard

Login
Flashcards
Admin

CIS 90
Previous Classes

95 days till term ends!

Cabrillo College
Web Advisor
Commands and Files

VLab RDP file

CIS 90 VLab VM Assignments

RIP Dennis Ritchie

Opus Status: UP

Links

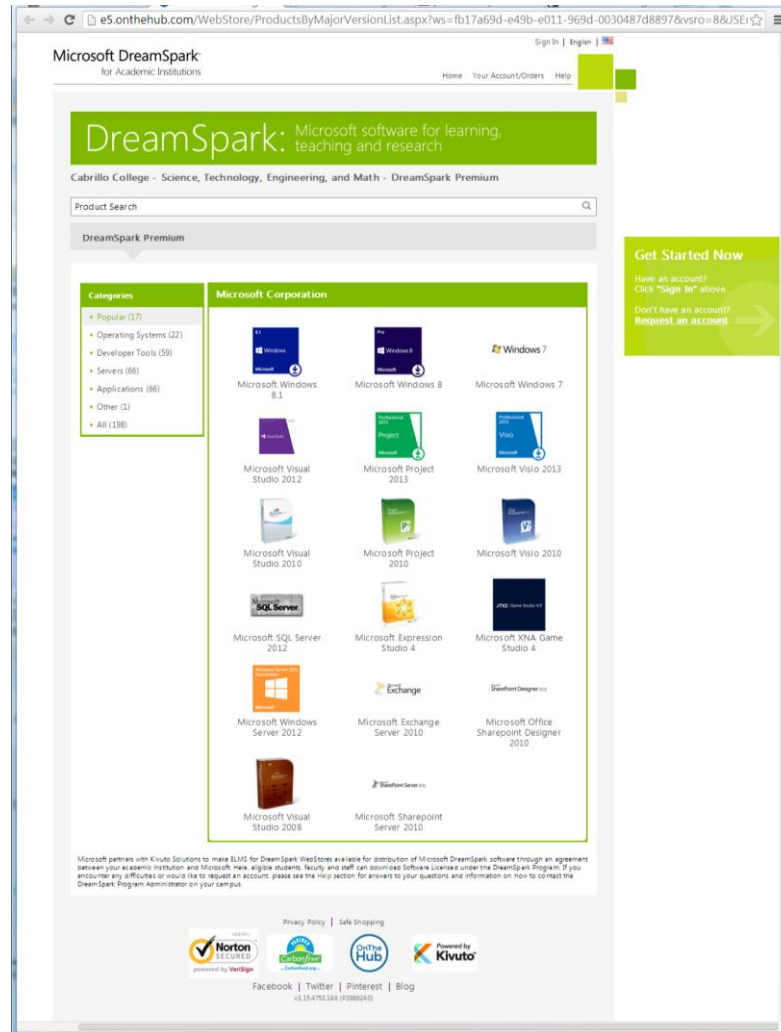
Instructors <ul style="list-style-type: none"> Programming Master Ed Network Master Gerlinde Programming Master Jeffrey Linux Master Jim Web Master John Systems Master Michael Hardware Master Marcelo Network Master Rick Programming Master Steve Clubs <ul style="list-style-type: none"> Computer Club Robotics Club Departments	Getting Linux/UNIX <ul style="list-style-type: none"> Linux ISOs Kernels RPMS (rpmfind) RPMS (phone) OpenSolaris Tools and Software <ul style="list-style-type: none"> Apache Bastille CoRD cygwin DOS boot disks Dynamips/Dynagen John the Ripper Netfilter Putty SSH Tools Quagga routing suite Tripwire Wireshark Academic Software for CIS Students <ul style="list-style-type: none"> Microsoft Webstore VMware Webstore Virtualization <ul style="list-style-type: none"> VirtualBox VMware ESXi and 	Commands <ul style="list-style-type: none"> Practical Command Directory Useful vi summary vi cheat sheet Howtos <ul style="list-style-type: none"> HowtoForge email DNS Ethernet (NIC drivers) NFS NIS PPP Putty SSH Keys Using sed Student Howtos <ul style="list-style-type: none"> Monitor Script by Sean Callahan WiFi Penetration by Ryan Schell Logging into Opus from a Mac by Laura Sreckovic LDAP Implementation by Tim Childers Install and DualBoot into Microsoft Windows 7 and Linux Ubuntu by Richie Fou
---	---	--



How to obtain Microsoft and VMware software for academic use



Microsoft products for CIS students



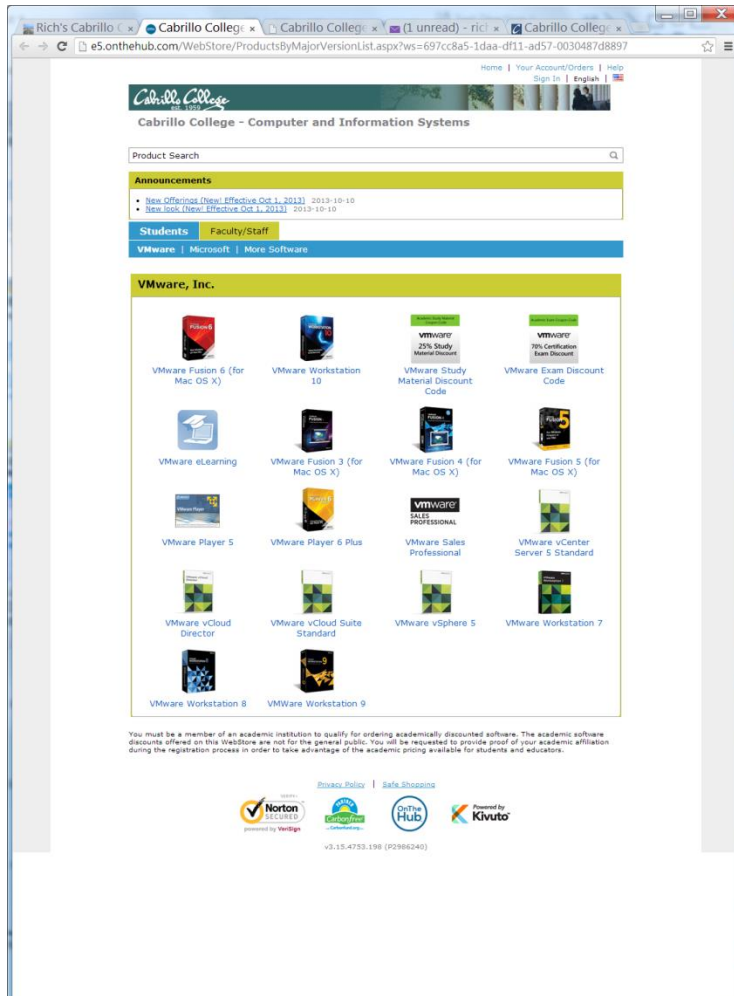
Accounts for students enrolled in CIS 90 have been created using your WebAdvisor email addresses.

Link is on website Resources page in Tools and Software section.

Licensed for educational use only.

Happy downloading!

VMware products for CIS students



Accounts for students enrolled in CIS 90 have been created using your WebAdvisor email addresses.

Link is on website Resources page in Tools and Software section

Licensed for educational use only.

Happy downloading!



Course Expectations Check

Expectation Check

Skills you should be comfortable performing

Navigating <http://simms-teach.com>

- Enter the CCC Confer Virtual Classroom
- Watch video recordings of previous lessons
- Download and search lessons PDFs
- Review your graded work and monitor your current grade status
- Find out when any assignment is due
- Find when any quiz and test will be held
- Find the answers for graded labs and quizzes
- Read and make forum posts
- Obtain Microsoft and VMware products at no cost for academic use
- Locate your personal Arya system

Navigating systems

- Log into Opus from home or school using SSH
- Log into Arya and other VMs from Opus using SSH
- Use Arya's graphical desktop via VLab
- Change Virtual (TTY) Terminals on your Arya

Using the shell

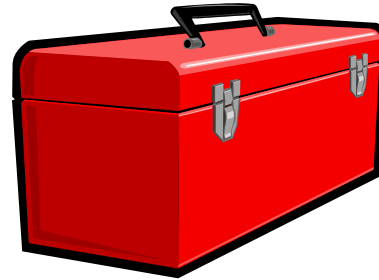
- Use any of the Lesson 1 and 2 commands
- Parse any shell command
- Get documentation on any command
- Identify the four key components of the UNIX/Linux architecture
- Identify the six steps the shell performs for every command
- Temporarily change your shell prompt
- Set and show values of shell variables like PATH, TERM and PS1

If you have any questions on these skills, post a question on the forum!

Notes to Rich



If there is enough time do some of the practice questions in the Backup section



More commands for your toolbox



Lesson 3 commands for your toolbox

write

- "chat" with another user by writing to their terminal

mesg

- enable/disable writes to your terminal

irssi

- Chat using IRC protocol

mail

- send and read email



Write Command

Use the write command to chat with another user



```
simben90@oslab:~
/home/cis90/simben $ write milhom90
What's up?

Message from milhom90@oslab.cishawks.net on pts/1 at 09:30 ...
Not much ... want to run around and bark for awhile?
Sure, meet you in the park in 5 mins
Ok
EOF
/home/cis90/simben $ ^C
/home/cis90/simben $
```

```
milhom90@oslab:~
Message from simben90@oslab.cishawks.net on pts/0 at 09:30 ...
What's up?
write simben90
Not much ... want to run around and bark for awhile?
Sure, meet you in the park in 5 mins
Ok
/home/cis90/milhom $ EOF
/home/cis90/milhom $
```

write milhom90

What's up?

Sure, meet you in the park in 5 mins

<Ctrl-D>

write simben90

**Not much ... want to run around and
bark for awhile?**

OK

<Ctrl-D>

write command

send a message to another user

Syntax:

write *username [ttyname]*

- Use *ttyname* if there are multiple logins by the target username
- The receiver sees:

Message from *yourname@yourhost* on *yourtty* at *hh:mm* ...

- Each line you type gets sent to the other user's terminal
- To end sending message type Ctrl-D (Hold down Ctrl and tap D key)
 - The receiver will see an EOF (end of file) at the end
- If the receiver wants to reply then they must use the **write** command as well
- Use **mesg n** (to block incoming messages)
- Use **mesg y** (to allow incoming messages)

write command

send a message to another user

Where is the write command?

```
/home/cis90/simben $ type write  
write is /usr/bin/write
```

Answer: It's in the /usr/bin directory

What kind of file is the write command?

```
/home/cis90/simben $ file /usr/bin/write  
/usr/bin/write: setgid ELF 32-bit LSB shared object, Intel  
80386, version 1 (SYSV), dynamically linked (uses shared  
libs), for GNU/Linux 2.6.18, stripped
```

Answer: It's a binary executable

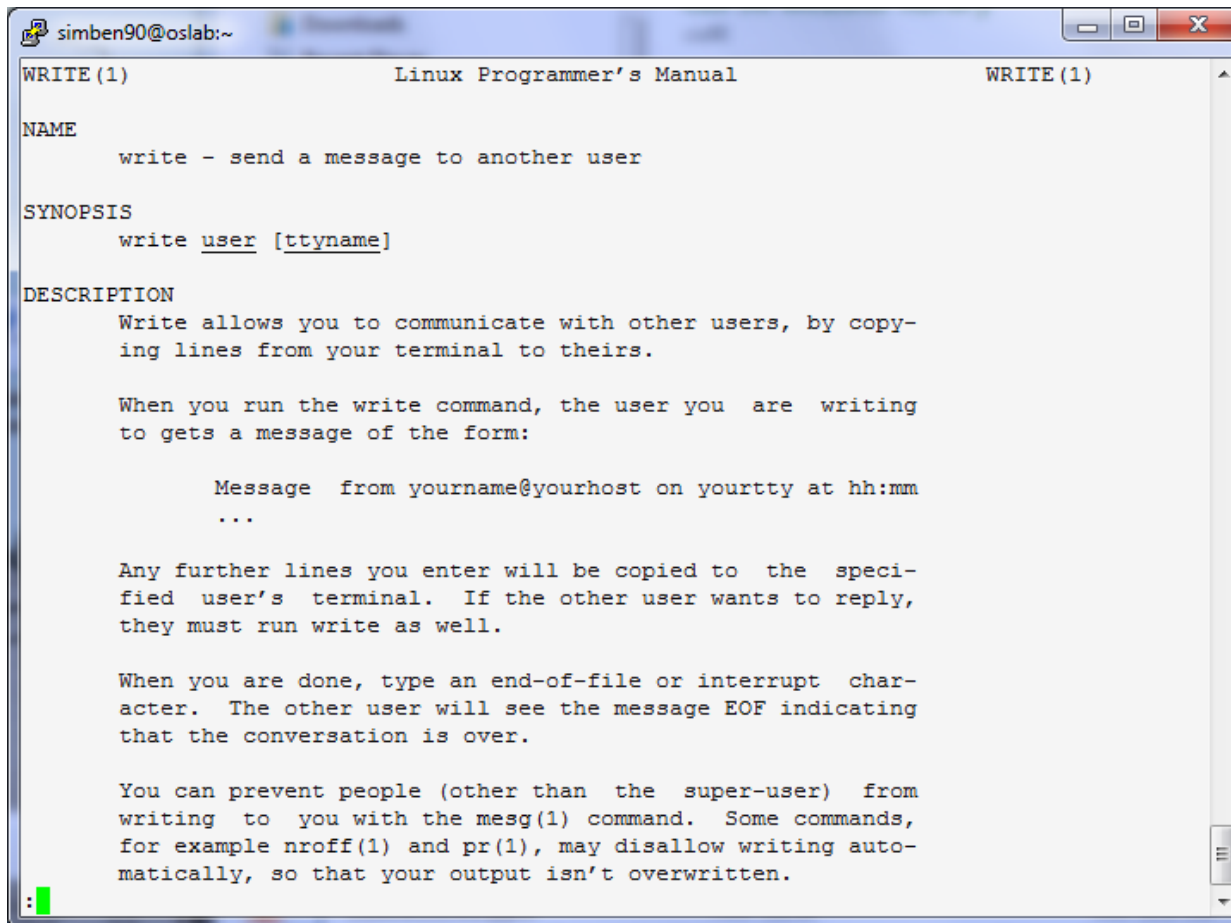
ELF = Executable and Linkable Format

LSB=Least Significant Bit type of bit order

write command

send a message to another user

```
/home/cis90/simben $ man write
```



The screenshot shows a terminal window titled 'simben90@oslab:~'. The terminal displays the output of the 'man write' command. The output is formatted as a man page with sections: NAME, SYNOPSIS, and DESCRIPTION. The NAME section states 'write - send a message to another user'. The SYNOPSIS section shows 'write user [ttyname]'. The DESCRIPTION section explains that the write command allows communication with other users by copying lines from the terminal to theirs. It also shows the format of the message received: 'Message from yourname@yourhost on yourtty at hh:mm ...'. The terminal window has a standard Linux desktop environment with window controls at the top.

```
simben90@oslab:~  
WRITE (1)                                Linux Programmer's Manual                                WRITE (1)  
  
NAME  
    write - send a message to another user  
  
SYNOPSIS  
    write user [ttyname]  
  
DESCRIPTION  
    Write allows you to communicate with other users, by copy-  
    ing lines from your terminal to theirs.  
  
    When you run the write command, the user you are writing  
    to gets a message of the form:  
  
        Message from yourname@yourhost on yourtty at hh:mm  
        ...  
  
    Any further lines you enter will be copied to the speci-  
    fied user's terminal. If the other user wants to reply,  
    they must run write as well.  
  
    When you are done, type an end-of-file or interrupt char-  
    acter. The other user will see the message EOF indicating  
    that the conversation is over.  
  
    You can prevent people (other than the super-user) from  
    writing to you with the mesg(1) command. Some commands,  
    for example nroff(1) and pr(1), may disallow writing auto-  
    matically, so that your output isn't overwritten.
```

Use the **man** command to review how the write command works.

write command

simben90 writes to milhom90



*Benji, uses the **who** command to see the current users logged into Opus. He sees his friend Homer is logged in twice.*

```
/home/cis90/simben $ who
srelau98 pts/0      2012-09-11 06:36 (anice-34-27-241-136.wanadoo.fr)
simben90 pts/1      2012-09-11 06:47 (42-15-94-107.dsl.com)
alvdes98 pts/2      2012-09-11 07:49 (c-25-14-136-111.comcast.net)
milhom90 pts/3      2012-09-11 08:03 (42-15-94-107.dsl.com)
milhom90 pts/4      2012-09-11 08:09 (42-15-94-107.dsl.com)
```



*Homer, ever curious, uses the **tty** command to see what terminal device he is currently using*

```
/home/cis90/milhom $ tty
/dev/pts/4
/home/cis90/milhom $
```

write command

simben90 writes to milhom90



```
/home/cis90/simben $ write milhom90
```

```
write: milhom90 is logged in more than once; writing to pts/4
```

1) Benji enters this



```
/home/cis90/milhom $
```

```
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...
```

2) Homer sees this appear on his terminal

write command

simben90 writes to milhom90



```
/home/cis90/simben $ write milhom90  
write: milhom90 is logged in more than once; writing to pts/4  
What do you think of the new CentOS distro?
```

1) Benji enters this



```
/home/cis90/milhom $  
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...  
What do you think of the new CentOS distro?
```

2) Homer sees this appear on his terminal

write command

simben90 writes to milhom90



```
/home/cis90/milhom $
```

```
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...  
What do you think of the new CentOS distro?
```

```
write simben90
```

1) Homer enters this



```
/home/cis90/simben $ write milhom90
```

```
write: milhom90 is logged in more than once; writing to pts/4  
What do you think of the new CentOS distro?
```

```
Message from milhom90@oslab.cabrillo.edu on pts/4 at 09:55 ...
```

2) and Benji sees this appear on his terminal

write command

simben90 writes to milhom90



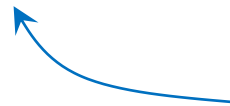
```
/home/cis90/milhom $
```

```
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...
```

```
What do you think of the new CentOS distro?
```

```
write simben90
```

```
What's with the periods on the long listing permissions?
```



1) Homer enters this



```
/home/cis90/simben $ write milhom90
```

```
write: milhom90 is logged in more than once; writing to pts/4
```

```
What do you think of the new CentOS distro?
```

```
Message from milhom90@oslab.cabrillo.edu on pts/4 at 09:55 ...
```

```
What's with the periods on the long listing permissions?
```



2) and Benji sees this appear on his terminal

write command

simben90 writes to milhom90



```
/home/cis90/simben $ write milhom90
write: milhom90 is logged in more than once; writing to pts/4
What do you think of the new CentOS distro?
```

```
Message from milhom90@oslab.cabrillo.edu on pts/4 at 09:55 ...
What's with the periods on the long listing permissions?
```

```
I think it's SELinux
```

1) Benji enters this



```
/home/cis90/milhom $
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...
What do you think of the new CentOS distro?
write simben90
What's with the periods on the long listing permissions?
I think it's SELinux
```

2) Homer sees this appear on his terminal 113

write command

simben90 writes to milhom90



```
/home/cis90/milhom $  
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...  
What do you think of the new CentOS distro?  
write simben90  
What's with the periods on the long listing permissions?  
I think it's SELinux  
Talk to you later, I'm going to bark a little and take a nap
```

1) Homer enters this



```
/home/cis90/simben $ write milhom90  
write: milhom90 is logged in more than once; writing to pts/4  
What do you think of the new CentOS distro?  
  
Message from milhom90@oslab.cabrillo.edu on pts/4 at 09:55 ...  
What's with the periods on the long listing permissions?  
I think it's SELinux  
Talk to you later, I'm going to bark a little and take a nap
```

2) and Benji sees this appear on his terminal

write command

simben90 writes to milhom90



```
/home/cis90/milhom $  
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...  
What do you think of the new CentOS distro?  
write simben90  
What's with the periods on the long listing permissions?  
I think it's SELinux  
Talk to you later, I'm going to bark a little and take a nap  
Ctrl-D ← 1) Homer issues a Ctrl-D (holds down Ctrl  
key, then taps D key)  
/home/cis90/milhom $
```



```
/home/cis90/simben $ write milhom90  
write: milhom90 is logged in more than once; writing to pts/4  
What do you think of the new CentOS distro?  
  
Message from milhom90@oslab.cabrillo.edu on pts/4 at 09:55 ...  
What's with the periods on the long listing permissions?  
I think it's SELinux  
Talk to you later, I'm going to bark a little and take a nap  
EOF ← 2) and Benji sees this appear on his terminal
```

write command

simben90 writes to milhom90



```
/home/cis90/simben $ write milhom90
write: milhom90 is logged in more than once; writing to pts/4
What do you think of the new CentOS distro?
```

```
Message from milhom90@oslab.cabrillo.edu on pts/4 at 09:55 ...
What's with the periods on the long listing permissions?
I think it's SELinux
Talk to you later, I'm going to bark a little and take a nap
EOF
```

bye ← 1) Benji enters this



```
/home/cis90/milhom $
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...
What do you think of the new CentOS distro?
write simben90
```

```
What's with the periods on the long listing permissions?
I think it's SELinux
```

```
Talk to you later, I'm going to bark a little and take a nap
```

```
/home/cis90/milhom $ bye ← 2) Homer sees this written to his terminal
```

write command

simben90 writes to milhom90



```
/home/cis90/simben $ write milhom90
write: milhom90 is logged in more than once; writing to pts/4
What do you think of the new CentOS distro?
```

```
Message from milhom90@oslab.cabrillo.edu on pts/4 at 09:55 ...
What's with the periods on the long listing permissions?
I think it's SELinux
Talk to you later, I'm going to bark a little and take a nap
EOF
bye
Ctrl-D
```

1) Benji issues a Ctrl-D (holds down Ctrl key, then taps D key)

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



```
/home/cis90/milhom $
Message from simben90@oslab.cabrillo.edu on pts/1 at 09:52 ...
What do you think of the new CentOS distro?
write simben90
What's with the periods on the long listing permissions?
I think it's SELinux
Talk to you later, I'm going to bark a little and take a nap
/home/cis90/milhom $ bye
EOF
```

2) and Homer sees this appear on his terminal

mesg command

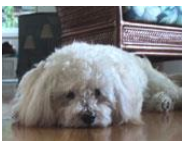
mesg y enables and **mesg n** disables writes to your terminal



```
/home/cis90/milhom $ mesg n
```



1) Homer disables writes to his terminal so he can take his nap



```
/home/cis90/simben $ write milhom90  
write: milhom90 has messages disabled
```

2) Benji discovers that Homer is no longer accepting messages

who command

The -T option shows who is writeable

The -T option shows users messages status

```
/home/cis90/simben $ who -T
srelau98 + pts/0          2012-09-11 06:36 (anice-34-27-241-136.wanadoo.fr)
simben90 + pts/1          2012-09-11 06:47 (42-15-94-107.dsl.com)
alvdes98 + pts/2          2012-09-11 07:49 (c-25-14-136-111.comcast.net)
milhom90 - pts/3          2012-09-11 08:03 (42-15-94-107.dsl.com)
milhom90 - pts/4          2012-09-11 08:09 (42-15-94-107.dsl.com)
```

+ indicate writes to this user are enabled and - indicates writes to this user are blocked

```
/home/cis90/simben $ ls -l /dev/pts*
total 0
crw--w----. 1 srelau98 tty 136, 0 Sep 11 08:15 0
crw--w----. 1 simben90 tty 136, 1 Sep 11 08:25 1
crw--w----. 1 alvdes98 tty 136, 2 Sep 11 08:25 2
crw-------. 1 milhom90 tty 136, 3 Sep 11 08:19 3
crw-------. 1 milhom90 tty 136, 4 Sep 11 08:19 4
c------. 1 root root 5, 2 Jul 30 21:25 ptmx
```

We will learn about file wildcards and permissions later.

This is a just a preview showing that write permission is removed from /dev/pts/3 and /dev/pts/4 for the tty group.

Class Activity

Students, login to Opus if you haven't already

- Use the write command to "chat" with your pair mate.
e.g. **write** *username*
- Ask your pair mate for their real first name and put that in the chat window.
- End the chat session with Ctrl-D

Note to Rich:

Run **pairs** alias (script in /home/rsimms/cis90/lab03/scripts directory)

IRC

irssi

Chat with multiple users via IRC server

Syntax:

irssi

/connect *hostname*

Connect to IRC server

/join *#channel*

Join channel

/part

Leave channel

/nick *your-nickname*

Set your display name

/names

See others in channel

message

Public chat message

/msg *nickname message*

Private chat message

alt 1

Main window

alt 2

Public chat window

alt 3

Private chat window

/disconnect

Disconnect from IRC server

/exit

Exit irssi

Follow me

Students, login to Opus if you haven't already

```
irssi
/connect eh-irc
/join #cis90
/nick Benji
Hello world
/names
/msg Benji Hey Benji
 1
 2
 3
/exit
```

Use your own name here

Basic Mail

Sending Mail

UNIX mail

Sending messages

mail *recipient1 recipient2 ... recipientN*

The mail command can be used to send an email to one or more recipients. Each argument designates a recipient specified by a username (in /etc/passwd), a normal email address, or an alias (in /etc/aliases).

Examples:

mail rsimms *username as argument*

mail simben90 prites90 mcgmon90 *multiple usernames as arguments*

mail richsimms@yahoo.com feredu90 *regular email address and
username as arguments*

mail \$LOGNAME *your username, specified using a variable, as argument*

mail cis90-students *an alias (used as a distribution list)
for all CIS 90 students*

UNIX mail

Sending messages

```
/home/cis90/simben $ type mail  
mail is /bin/mail
```

The mail program is on the path and in the /bin directory.

```
/home/cis90/simben $ file /bin/mail  
/bin/mail: symbolic link to `mailx'
```

It is a "symbolic link" (we learn about these later) to the mailx program.

```
/home/cis90/simben $ type mailx  
mailx is /bin/mailx
```

The mailx program file is also in the /bin directory.

```
/home/cis90/simben $ file /bin/mailx  
/bin/mailx: ELF 32-bit LSB executable, Intel 80386, version 1  
(SYSV), dynamically linked (uses shared libs), for GNU/Linux  
2.6.18, stripped
```

The mailx program is a binary executable.

UNIX mail

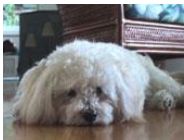
Sending messages

As an example, Benji sends an email to Homer (a user on Opus) and Rich (using his Yahoo email address)

Homer
(milhom90)



Rich
(richsimms@yahoo.com)



Benji
(simben90)

```
/home/cis90/simben $ mail milhom90 richsimms@yahoo.com
```

```
Subject: Where is the old bone
```

```
I can't find my old bone. Let me know if you see it.
```

```
Thanks,
```

```
Benji
```

```
.
```

```
EOT
```

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

Use Ctrl-D or a single period to end the message (End Of Text)

Recipients can be Opus users (just specify their username) or regular email addresses.

Class Exercise

UNIX mail

- Login to Opus
- Send me a message

```
/home/cis90/simben $ mail rsimms  
Subject: Hello  
This mail program is pretty crazy!  
.  
/home/cis90/simben $
```

Notes to Rich



[] - Send out Welcome letter

use **welcome** alias or

~rsimms/cis90/lab03/scripts/uhist/mail-welcome

[] - Test cis90-students alias

Reading Mail

UNIX mail

Reading messages

Syntax:

mail

To read mail, enter the mail command with no arguments. The mail command has its own mini-shell with its own set of mail oriented commands.

UNIX Mail

Reading messages



Homer
(milhom90)

```
/home/cis90/milhom $
```

```
You have new mail in /var/spool/mail/milhom90
```

Homer notices he has received new mail and runs the mail command to see what has arrived

```
/home/cis90/milhom $ mail
```

```
Heirloom Mail version 12.4 7/29/08. Type ? for help.
```

```
"/var/spool/mail/milhom90": 1 message 1 new
```

```
>N 1 Benji Simms Tue Sep 11 12:59 22/830 "Where is the old bone"
```

```
& 1
```

He types 1 to read message 1

```
Message 1:
```

```
From simben90@oslab.cabrillo.edu Tue Sep 11 12:59:27 2012
```

```
Return-Path: <simben90@oslab.cabrillo.edu>
```

```
From: Benji Simms <simben90@oslab.cabrillo.edu>
```

```
Date: Tue, 11 Sep 2012 12:59:27 -0700
```

```
To: richsimms@yahoo.com, milhom90@oslab.cabrillo.edu
```

```
Subject: Where is the old bone
```

```
User-Agent: Heirloom mailx 12.4 7/29/08
```

```
Content-Type: text/plain; charset=us-ascii
```

```
Status: R
```

```
I can't find my old bone. Let me know if you see it.
```

```
Thanks,
```

```
Benji
```

The N signifies a new message

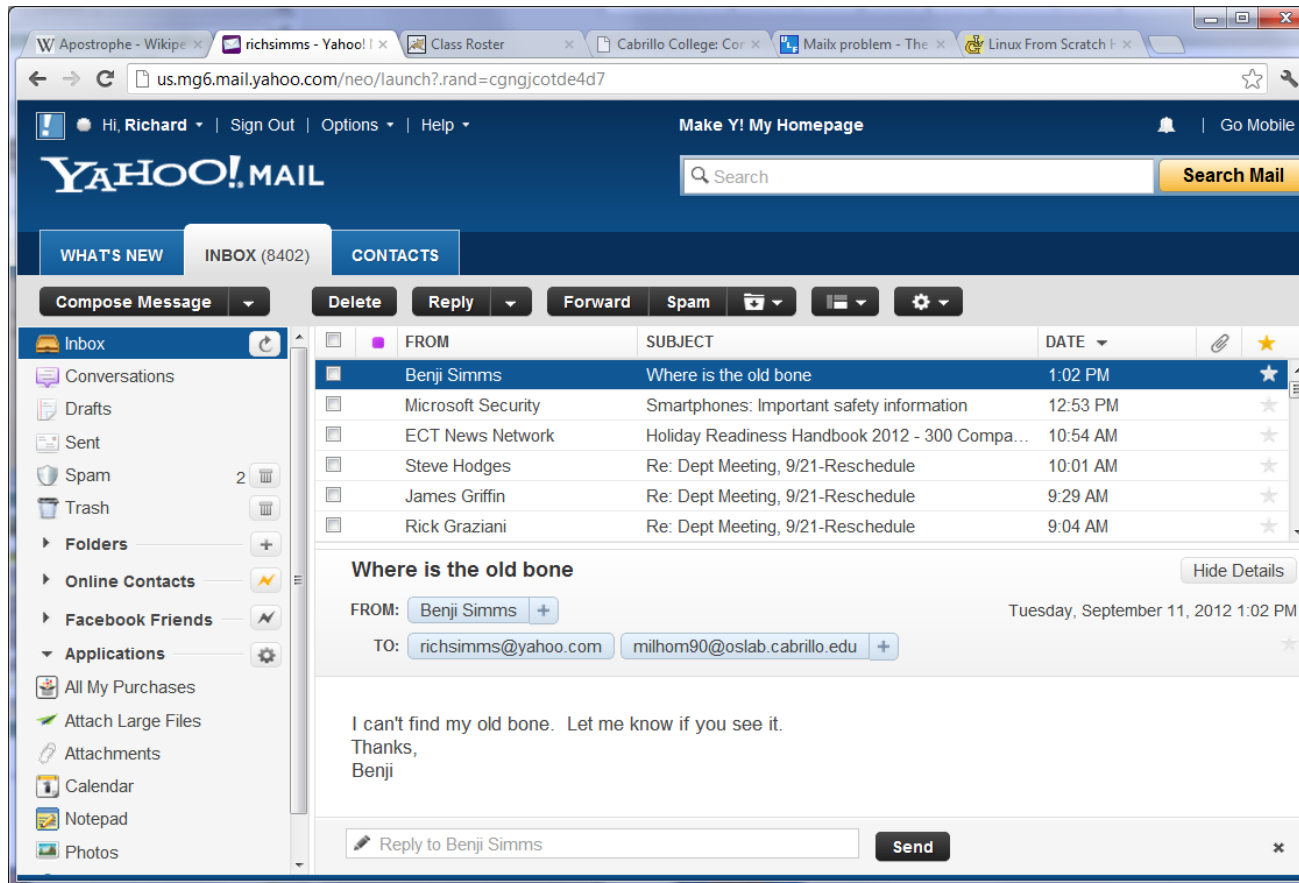
The & is the mail prompt

UNIX mail

Reading messages sent from UNIX mail



Rich
(richsimms@yahoo.com)



Rich reads the email from Benji using Yahoo mail (a mail user agent)

Class Exercise

UNIX mail

- Read your own mail by typing the **mail** command by itself
- Enter the number of the message to print a message.
1
2
- Use the **q** command to exit

Tip: You can just hit the Enter key by itself to read the next unread message.

Replying to Mail

UNIX Mail

Replying to messages



Homer
(milhom90)

< continued from above >

I can't find my old bone. Let me know if you see it.
Thanks,
Benji

& **r 1**
To: milhom90@oslab.cabrillo.edu richsimms@yahoo.com
simben90@oslab.cabrillo.edu
Subject: Re: Where is the old bone

Benji Simms <simben90@oslab.cabrillo.edu> wrote:

> I can't find my old bone. Let me know if you see it.
> Thanks,
> Benji

I think its under the sink
- Homer

.

EOT

&

*After reading the message
from Benji, Homer replies
with the mail **r** command
(for reply to all).*

UNIX Mail

Benji gets the reply from Homer



Benji
(simben90)

```
You have mail in /var/spool/mail/simben90
/home/cis90/simben $ mail
Heirloom Mail version 12.4 7/29/08.  Type ? for help.
"/var/spool/mail/simben90": 1 message 1 unread
>U 1 Homer Miller          Tue Sep 11 13:35  30/1096  "Re: Where is the old bone"
& 1
Message 1:
From milhom90@oslab.cabrillo.edu  Tue Sep 11 13:35:30 2012
Return-Path: <milhom90@oslab.cabrillo.edu>
From: Homer Miller <milhom90@oslab.cabrillo.edu>
Date: Tue, 11 Sep 2012 13:35:30 -0700
To: simben90@oslab.cabrillo.edu, richsimms@yahoo.com,
    milhom90@oslab.cabrillo.edu
Subject: Re: Where is the old bone
User-Agent: Heirloom mailx 12.4 7/29/08
Content-Type: text/plain; charset=us-ascii
Status: RO

Benji Simms <simben90@oslab.cabrillo.edu> wrote:

> I can't find my old bone.  Let me know if you see it.
> Thanks,
> Benji
I think its under the sink
- Homer
```

*Benji notices he
has new mail
which he reads
using the mail
command (with no
arguments) and
then typing the
message number
he wants to read*



Rich
(richsimms@yahoo.com)

UNIX Mail

The screenshot shows a web browser window with multiple tabs. The active tab is 'richsimms - Yahoo! Mail'. The address bar shows 'us.mg6.mail.yahoo.com/neo/launch?.rand=cgngjcotde4d7'. The page header includes 'Hi, Richard', 'Sign Out', 'Options', 'Help', 'Make Y! My Homepage', and 'Go Mobile'. The main header features the 'YAHOO! MAIL' logo and a search bar.

The left sidebar shows the 'INBOX (8403)' selected, with a list of folders including Conversations, Drafts, Sent, Spam, Trash, Folders, Online Contacts, Facebook Friends, Applications, All My Purchases, Attach Large Files, Attachments, Calendar, Notepad, Photos, and Unsubscriber.

The main content area displays a list of emails in the inbox. The selected email is from Homer Miller with the subject 'Re: Where is the old bone' and a timestamp of 1:38 PM. Below the list, the email content is shown, including the 'FROM' and 'TO' fields, and the body text which is a reply to a previous email.

FROM	SUBJECT	DATE
Homer Miller	Re: Where is the old bone	1:38 PM
Benji Simms	Where is the old bone	1:02 PM
Microsoft Security	Smartphones: Important safety information	12:53 PM
ECT News Network	Holiday Readiness Handbook 2012 - 300 Compa...	10:54 AM
Steve Hodnes	Re: Dent Meeting 9/21-Reschedule	10:01 AM

Re: Where is the old bone

FROM: Homer Miller
TO: simben90@oslab.cabrillo.edu, richsimms@yahoo.com, milhom90@oslab.cabrillo.edu

Benji Simms <simben90@oslab.cabrillo.edu> wrote:

> I can't find my old bone. Let me know if you see it.
> Thanks,
> Benji
I think its under the sink
- Homer

Reply to Homer Miller

*Since Homer
replied to all,
Rich also gets a
copy*

Class Exercise

UNIX mail

- Use **ls /home/cis90** to see all CIS 90 home directories (add "90" to get the usernames) or the **who** command and send an email to three other CIS 90 students (your choice) in one message.

Hint: use **mail** *user1 user2 user3*

- Reply to any emails you get (run **mail** and use the **r** command)

Saving Mail to a Folder

UNIX Mail

Saving messages

```
/home/cis90/simben $ mail
Heirloom Mail version 12.4 7/29/08. Type ? for help.
"/var/spool/mail/simben90": 1 message 1 new
>N 1 Homer Miller      Tue Sep 11 21:04 21/830  "Salsa"
& 1
Message 1:
From milhom90@oslab.cabrillo.edu Tue Sep 11 21:04:16 2012
Return-Path: <milhom90@oslab.cabrillo.edu>
From: Homer Miller <milhom90@oslab.cabrillo.edu>
Date: Tue, 11 Sep 2012 21:04:16 -0700
To: simben90@oslab.cabrillo.edu
Subject: Salsa
User-Agent: Heirloom mailx 12.4 7/29/08
Content-Type: text/plain; charset=us-ascii
Status: R

Don't forget, salsa class tonight at the Palomar
- Homer

& s 1 archives
"archives" [New file] 23/851
& q
```

Benji checks for new mail

Prints the first (and only) message

Saves this message to a folder named "archives"

Browsing a mailbox file (folder)

UNIX mail

Browse mailbox files using the -f option

use the f option to specify a mailbox file (folder)

`/home/cis90/simben $ mail -f archives`

Heirloom Mail version 12.4 7/29/08. Type ? for help.

"archives": 5 messages 4 new

	1	Homer Miller	Tue Sep 11 21:04	22/841	"Salsa"
>N	2	Homer Miller	Tue Sep 11 21:25	20/790	"Hola"
N	3	Rich Simms	Tue Sep 11 21:58	20/752	"Treasure"
	4	Rich Simms	Tue Sep 11 22:01	21/798	"Lab Hours on Monday"
N	5	Rich Simms	Tue Sep 11 22:01	20/796	"Where were you last summer?"

&

Opening a mailbox file named archives which has multiple messages

More on Mail

Forwarding Mail

mail commands

Forwarding a message with ~m

```
rsimms@opus:~$ mail
Mail version 8.1 6/6/93.  Type ? for help.
"/var/spool/mail/rsimms": 5 messages 1 unread
>U  1  jimg@opus.cabrillo.e  Sun Jun 22 13:53  22/836  "Hot days and servers"
    2  simmsmar@opus.cabril  Thu Jul 24 12:28  19/739  "Don't forget to bring"
    3  simmsben@opus.cabril  Thu Jul 24 12:27  17/708  "Nisene Hike"
    4  rsimms@opus.cabrillo  Thu Jul 24 12:33  21/819  "Re: Hot days and serv"
    5  roddyduk@opus.cabril  Thu Jul 24 15:41  19/702  "Salsa"
& m simmsben
Subject: re: Salsa
Hi Benji,

Did you see this:
~m5
Interpolating: 5
(continue)

Later,

- Rich
.
Cc:
&
```

*This is how
you forward
message 5*

```
simmsben@opus:~$ mail
/home/cis90/simmsben $ mail
Mail version 8.1 6/6/93.  Type ? for help.
"/var/spool/mail/simmsben": 1 message 1 new
>N  1  rsimms@opus.cabrillo  Thu Jul 24 18:51  33/935  "re: Salsa"
& p 1
Message 1:
From rsimms@opus.cabrillo.edu  Thu Jul 24 18:51:55 2008
Date: Thu, 24 Jul 2008 18:51:55 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
To: simmsben@opus.cabrillo.edu
Subject: re: Salsa

Hi Benji,

Did you see this:

From roddyduk@opus.cabrillo.edu  Thu Jul 24 15:41:35 2008
Date: Thu, 24 Jul 2008 15:41:35 -0700
From: Duke Roddy <roddyduk@opus.cabrillo.edu>
To: rsimms@opus.cabrillo.edu
Subject: Salsa

You and Elizabeth coming to the Palomar this Friday?
Let me know,
- Duke

Later,

- Rich
&
```

mail commands

Alternate ways to forward a message

There is an easier way to forward a message with the latest version of mailx!

I wonder who will be the first person to find out how its done and post the solution to the forum?

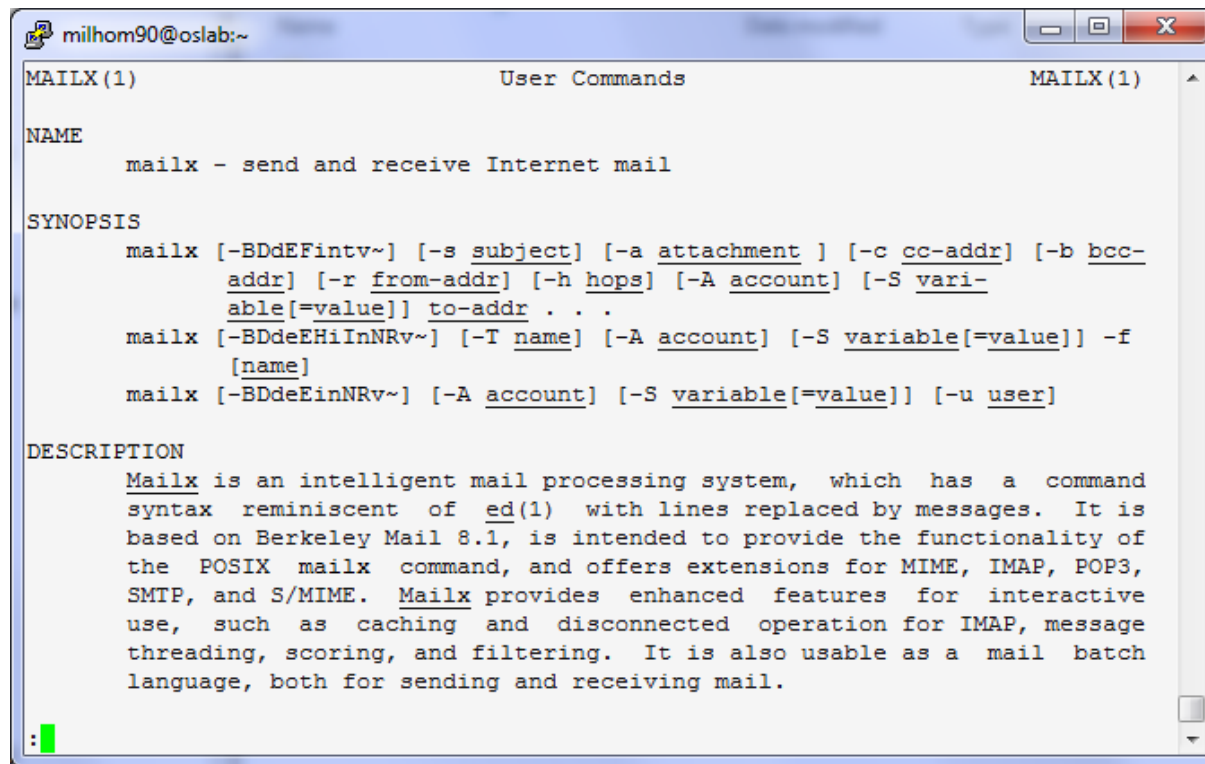


Mail

Documentation

man page for mail

```
/home/cis90/milhom $ man mail
```



```

MAILX(1)                                User Commands                                MAILX(1)

NAME
    mailx - send and receive Internet mail

SYNOPSIS
    mailx [-BDdEFintv~] [-s subject] [-a attachment] [-c cc-addr] [-b bcc-
        addr] [-r from-addr] [-h hops] [-A account] [-S vari-
        able[=value]] to-addr . . .
    mailx [-BDdEHInNRv~] [-T name] [-A account] [-S variable[=value]] -f
        [name]
    mailx [-BDdEinNRv~] [-A account] [-S variable[=value]] [-u user]

DESCRIPTION
    Mailx is an intelligent mail processing system, which has a command
    syntax reminiscent of ed(1) with lines replaced by messages. It is
    based on Berkeley Mail 8.1, is intended to provide the functionality of
    the POSIX mailx command, and offers extensions for MIME, IMAP, POP3,
    SMTP, and S/MIME. Mailx provides enhanced features for interactive
    use, such as caching and disconnected operation for IMAP, message
    threading, scoring, and filtering. It is also usable as a mail batch
    language, both for sending and receiving mail.
  
```

In the bash shell, use the man command for extensive documentation on mail

Mail ? command

& ?

	mail commands	
type <message list>		type messages
next		goto and type next message
from <message list>		give head lines of messages
headers		print out active message headers
delete <message list>		delete messages
undelete <message list>		undelete messages
save <message list> folder		append messages to folder and mark as saved
copy <message list> folder		append messages to folder without marking them
write <message list> file		append message texts to file, save attachments
preserve <message list>		keep incoming messages in mailbox even if saved
Reply <message list>		reply to message senders
reply <message list>		reply to message senders and all recipients
mail addresses		mail to specific recipients
file folder		change to another folder
quit		quit and apply changes to folder
xit		quit and discard changes made to folder
!		shell escape
cd <directory>		chdir to directory or home if none given
list		list names of all available commands

A <message list> consists of integers, ranges of same, or other criteria separated by spaces. If omitted, mail uses the last message typed.

&

Use the ? command to see a short list of common mail commands

Listing messages (headers)

mail h (headers) command

e.g. list my current folder)

```
rsimms@oslab:~/cis90/misc/uhist
& h
> 1 Rich Simms      Fri Feb 19 10:50  17/659  "Test"
   2 Rich Simms      Wed Apr 28 15:52  24/721  "another get well mess"
   3 Jim Griffin     Sat May  1 14:11  28/1131  "Re: Get well soon"
   4 Christopher Botos Wed Sep  1 21:44 152/10825 "Re: Cabrillo CIS 90 u"
   5 Jason Hamil     Wed Sep  1 21:48 191/9909  "RE: Cabrillo CIS 90 u"
   6 Laura Pirkle    Wed Sep  1 22:46 217/9590  "Re: Cabrillo CIS 90 u"
   7 Adriana Plastina Wed Sep  1 22:58 1028/77247 "picture of my face f"
   8 Saulius Zilis   Wed Sep  1 23:12  34/2112  "Re: Cabrillo CIS 90 u"
   9 dennis anti     Thu Sep  2 00:22 178/9983  "Re: Cabrillo CIS 90 u"
  10 francisco cardenas Thu Sep  2 15:15 3166/192496
  11 Jennifer Parrish Tue Sep  7 22:59 3288/201881 "Re: Cabrillo CIS 90"
  12 Rudy Perez      Wed Sep  8 13:15  46/2182  "ccconfer class listin"
  13 francisco cardenas Wed Sep  8 13:15  47/2356  "quiz"
  14 James Garibay    Wed Sep  8 13:32 3153/191560
  15 Jim Griffin     Tue Aug 17 20:20  22/1016  "Opus mail"
  16 Rudy Perez      Thu Sep  2 17:17 2529/192676 "student survey"
  17 Rich Simms      Tue Sep 14 20:26  88/7804  "Re: Saulius"
  18 Mike Delfin     Wed Sep 15 15:06  15/634  "Re: Welcome"
  19 Mike Delfin     Wed Sep 15 15:08  17/636  "Re: Welcome"
& █
```

*Use the **h** command to show messages the current folder*

mail h (headers) command

e.g. list my current folder)

N = New message, a U = Unread message

```
simben90@oslab:~
& h
N 1 Homer Miller      Tue Sep 11 21:25  20/790  "Hola"
N 2 Rich Simms        Tue Sep 11 21:58  20/752  "Treasure"
> 3 Rich Simms        Tue Sep 11 22:01  20/788  "Lab Hours on Monday"
N 4 Rich Simms        Tue Sep 11 22:01  20/796  "Where were you last summer?"
& █
```

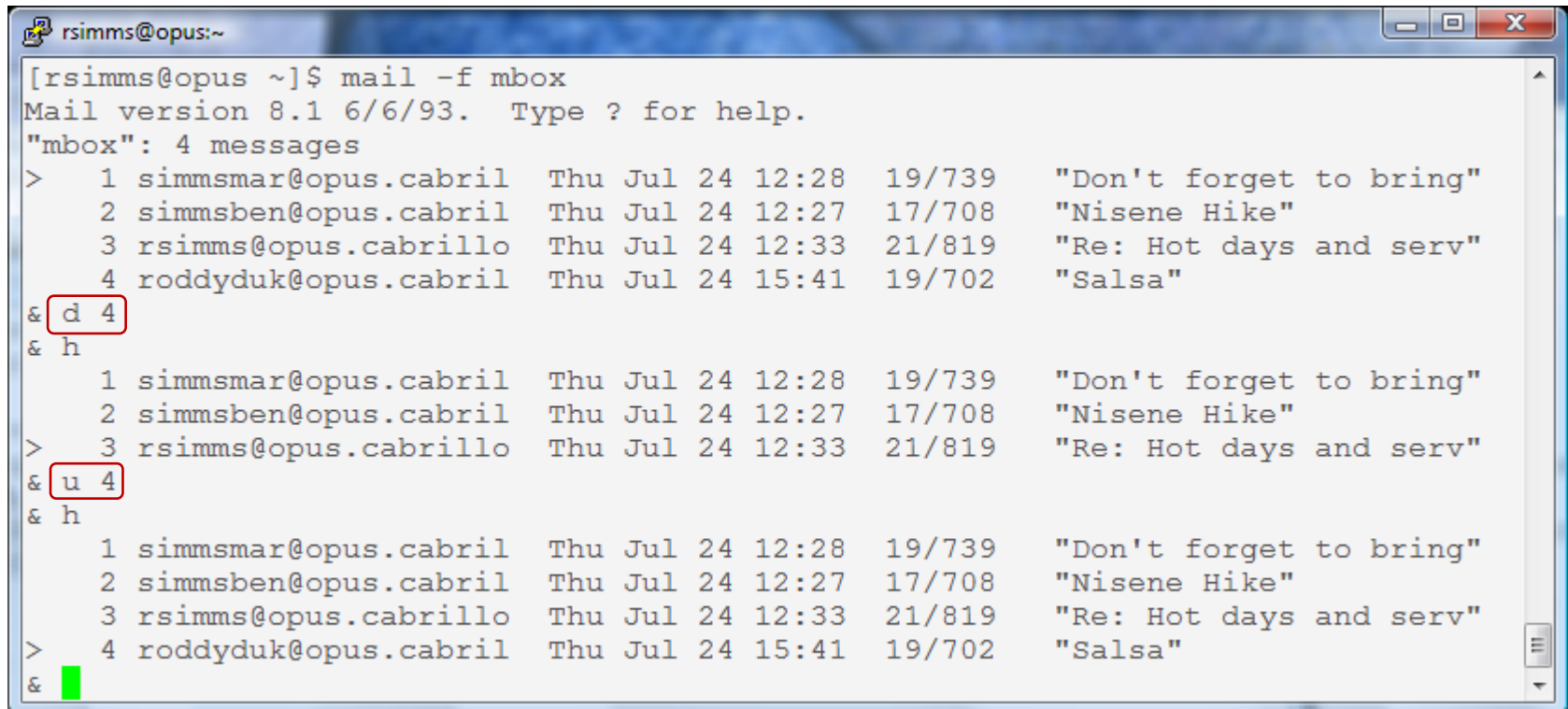
& is mail prompt for next command

> points to the current message (last one printed)

Deleting Messages

mail commands

(d)elelete and (u)ndelete



```
rsimms@opus:~  
[rsimms@opus ~]$ mail -f mbox  
Mail version 8.1 6/6/93. Type ? for help.  
"mbox": 4 messages  
> 1 simmsmar@opus.cabrill Thu Jul 24 12:28 19/739 "Don't forget to bring"  
2 simmsben@opus.cabrill Thu Jul 24 12:27 17/708 "Nisene Hike"  
3 rsimms@opus.cabrillo Thu Jul 24 12:33 21/819 "Re: Hot days and serv"  
4 roddyduk@opus.cabrill Thu Jul 24 15:41 19/702 "Salsa"  
& d 4  
& h  
1 simmsmar@opus.cabrill Thu Jul 24 12:28 19/739 "Don't forget to bring"  
2 simmsben@opus.cabrill Thu Jul 24 12:27 17/708 "Nisene Hike"  
> 3 rsimms@opus.cabrillo Thu Jul 24 12:33 21/819 "Re: Hot days and serv"  
& u 4  
& h  
1 simmsmar@opus.cabrill Thu Jul 24 12:28 19/739 "Don't forget to bring"  
2 simmsben@opus.cabrill Thu Jul 24 12:27 17/708 "Nisene Hike"  
3 rsimms@opus.cabrillo Thu Jul 24 12:33 21/819 "Re: Hot days and serv"  
> 4 roddyduk@opus.cabrill Thu Jul 24 15:41 19/702 "Salsa"  
&
```

*Messages can be deleted (and undeleted) with **d** and **u** commands*

Mailbox files (folders)

UNIX mail

The dead.letter mail file

```
/home/cis90/simben $ mail bogus
Subject: Dead stuff
I doubt you will get this because you don't exist!
.
EOT
You have mail in /var/spool/mail/simben90
/home/cis90/simben $ /home/cis90/simben/dead.letter... Saved message in
/home/cis90/simben/dead.letter

/home/cis90/simben $ mail -f dead.letter
Heirloom Mail version 12.4 7/29/08.  Type ? for help.
"dead.letter": 1 message
> 1 To bogus          Tue Sep 17 10:04  18/562  "Dead s"
& d 1
& q
"dead.letter" complete
/home/cis90/simben $
```

Undeliverable mail is placed in your dead.letter file. You can cat this file or open it with the mail command

UNIX mail

The mail folders are ascii text files

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

```
archives      empty          Lab2.1  Miscellaneous  proposal2    text.err
bigfile       Hidden         letter  mission        proposal3    text.fxd
bin           lab01.graded  log     Poems          small_town   timecal
dead.letter   Lab2.0         mbox    proposal1      spellk       what_am_i
```

```
/home/cis90/simben $ ls /var/mail/simben90
```

```
/var/mail/simben90
```

1 & 4: User's can create there own mail folder files, giving them any name they like, such as archives and mbox

```
/home/cis90/simben $ file archives dead.letter mbox /var/spool/mail/simben90
```

```
1) archives:          ASCII mail text
2) dead.letter:       ASCII mail text
3) mbox:              ASCII mail text
4) /var/spool/mail/simben90: ASCII mail text
```

*Mail files are text files that you can **cat** or open with **mail -f***

2) All undeliverable messages go into a user's dead.letter file

3) All incoming new messages are initially placed in the /var/mail/<username> file

UNIX mail

The mail folders are ascii text files

Mail files are ASCII text files. You can cat them out or open them with the mail command.

```
/home/cis90/simben $ cat archives
```

```
From milhom90@oslab.cishawks.net Mon Sep 16 18:52:53 2013
Return-Path: <milhom90@oslab.cishawks.net>
Received: from oslab.cishawks.net (localhost [127.0.0.1])
    by oslab.cabrillo.edu (8.14.4/8.14.4) with ESMTP id r8H1q rmw008499
    for <simben90@oslab.cishawks.net>; Mon, 16 Sep 2013 18:52:53 -0700
Received: (from milhom90@localhost)
    by oslab.cishawks.net (8.14.4/8.14.4/Submit) id
    for simben90; Mon, 16 Sep 2013 18:52:53 -0700
From: Homer Miller <milhom90@oslab.cishawks.net>
Message-Id: <201309170152.r8H1qrJZ008497@oslab.cishawks
Date: Mon, 16 Sep 2013 18:52:53 -0700
To: simben90@oslab.cishawks.net
Subject: Fwd: Hot Potato
User-Agent: Heirloom mailx 12.4 7/29/08
MIME-Version: 1.0
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
Status: O
```

```
----- Original Message -----
From: Rich Simms <rsimms@oslab.cishawks.net>
Date: Sun, 15 Sep 2013 15:41:49 -0700
To: milhom90@oslab.cishawks.net
Subject: Hot Potato
```

You got it ... forward it on! - Rich

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

```
/home/cis90/simben $ mail -f archives
```

```
Heirloom Mail version 12.4 7/29/08. Type ? for help.
"archives": 1 message 1 unread
>U 1 Homer Miller Mon Sep 16 18:52 28/1002 "Fwd: H"
& 1
Message 1:
From milhom90@oslab.cishawks.net Mon Sep 16 18:52:53 2013
Return-Path: <milhom90@oslab.cishawks.net>
From: Homer Miller <milhom90@oslab.cishawks.net>
Date: Mon, 16 Sep 2013 18:52:53 -0700
To: simben90@oslab.cishawks.net
Subject: Fwd: Hot Potato
User-Agent: Heirloom mailx 12.4 7/29/08
Content-Type: text/plain; charset=us-ascii
Status: RO
```

```
----- Original Message -----
From: Rich Simms <rsimms@oslab.cishawks.net>
Date: Sun, 15 Sep 2013 15:41:49 -0700
To: milhom90@oslab.cishawks.net
Subject: Hot Potato
```

You got it ... forward it on! - Rich

```
& q
"archives" complete
/home/cis90/simben $
```

Class Exercise

UNIX mail

- Send yourself several test messages with different subjects:

mail \$LOGNAME

mail \$LOGNAME

- Now read your mail

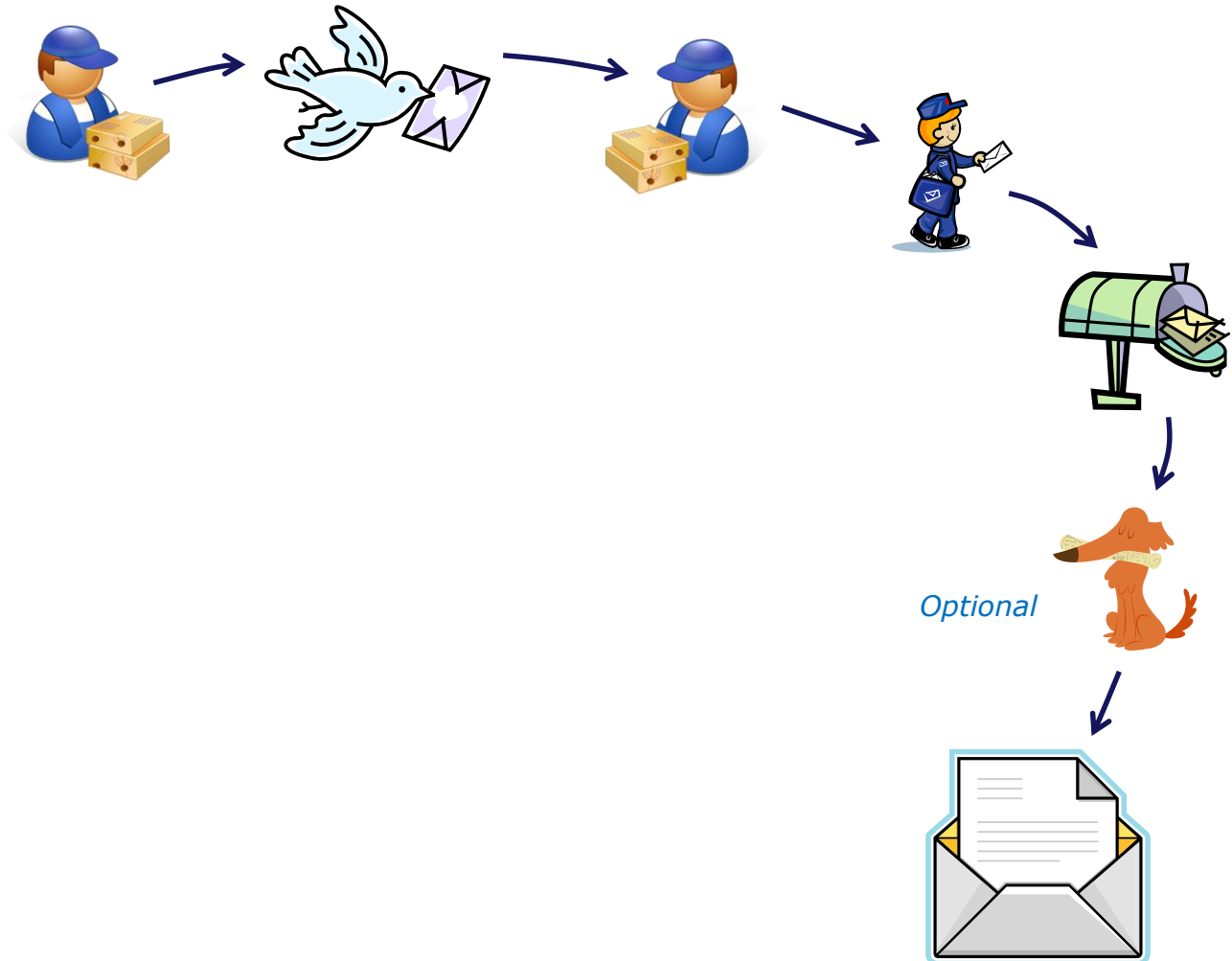
mail

- Use the **h** command to list the message headers
- Read all your messages by entering each message number
- Use the **d** command to delete one of the messages
- Use the **s** command to save one message to a folder named archives
- Use **q** to quit mail
- Read the mail in your archives with **mail -f archives**
- Use **q** to quit mail

end-to-end
email
(if time)



end-to-end email

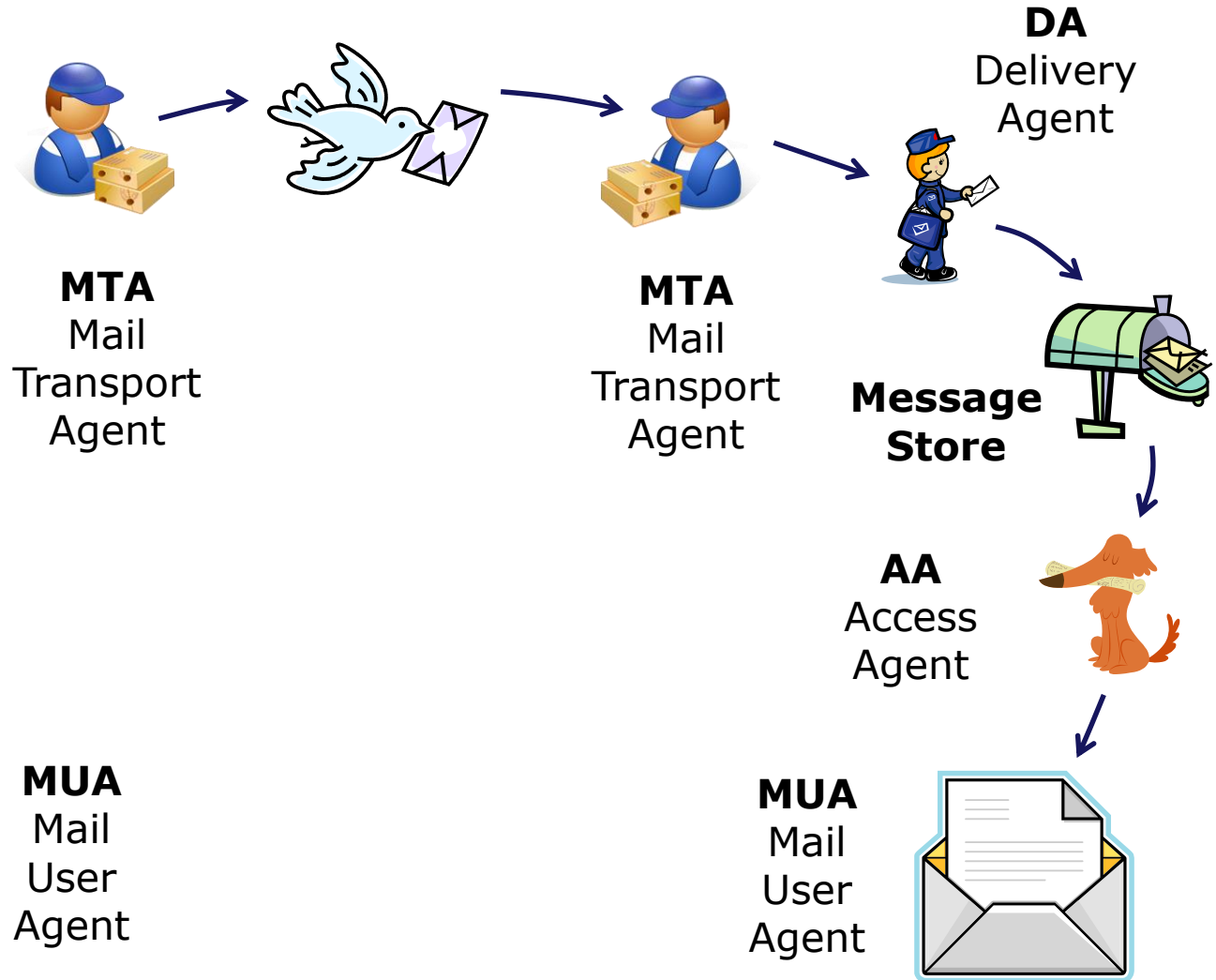


compose and send message

open and read message



end-to-end email

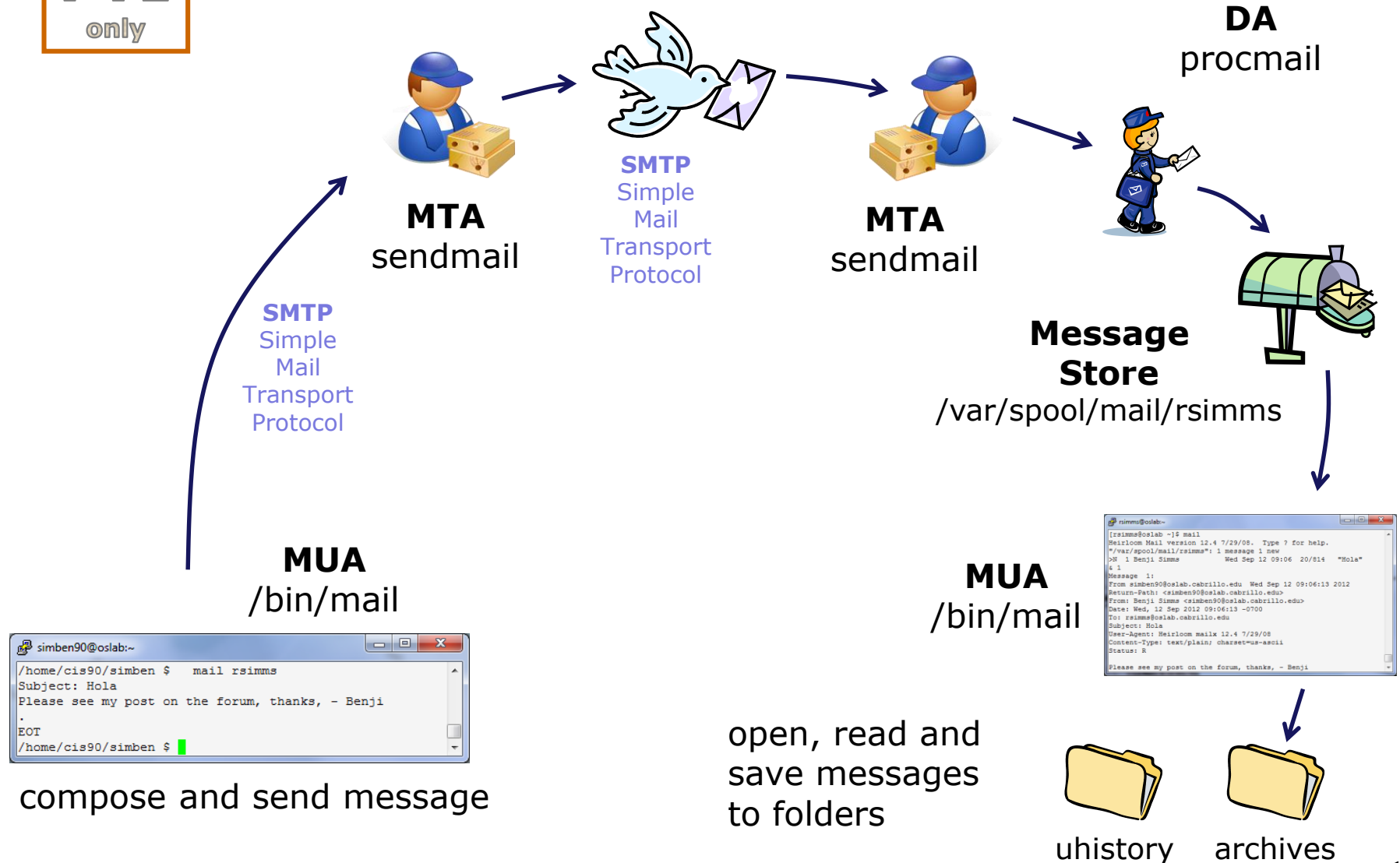


compose and send message

open and read message

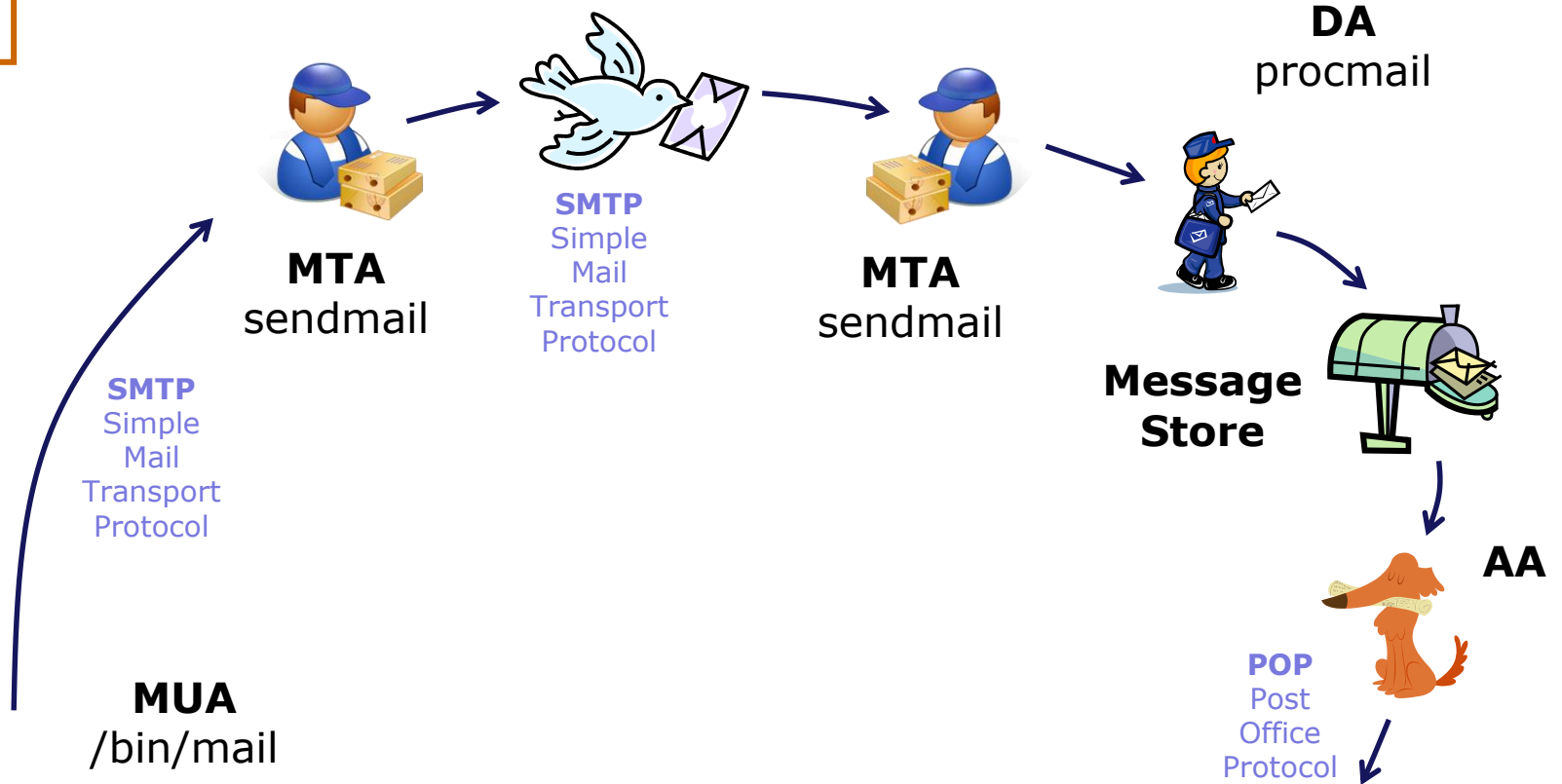
FYI
only

end-to-end email: example Implementation





end-to-end email: example Implementation



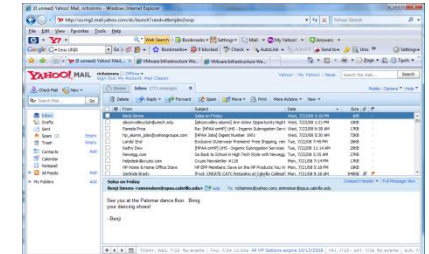
```

simmsben@opus:~
/home/cis90/simmsben $ mail simmsmar richsimms@yahoo.com
Subject: Salsa on Friday
See you at the Palomar dance floor. Bring
your dancing shoes!

- Benji
.
Cc:
/home/cis90/simmsben $
  
```

compose and send message

MUA
Yahoo Mail



open and read message 166

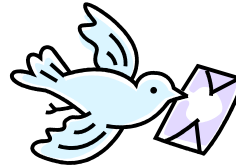
end-to-end email: configuring your MUA (Mail User Agent)



SMTP
Simple
Mail
Transport
Protocol



MTA
Mail
Transport
Agent



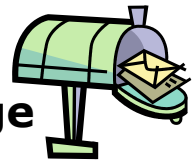
SMTP
Simple
Mail
Transport
Protocol



MTA
Mail
Transport
Agent



DA
Delivery
Agent



**Message
Store**



AA
Access
Agent

POP
Post
Office
Protocol

Example MUA: Windows Mail

This is why you get asked for the SMTP server and the POP3/IMAP server when you set up email on your PC.

Your MUA needs to know this to send and receive messages.

How does one MTA get the IP address of the other MTA?

```
[rsimms@oslab ~]$ dig +short mx gmail.com
10 alt1.gmail-smtp-in.1.google.com.
30 alt3.gmail-smtp-in.1.google.com.
20 alt2.gmail-smtp-in.1.google.com.
40 alt4.gmail-smtp-in.1.google.com.
5 gmail-smtp-in.1.google.com.
[rsimms@oslab ~]$
```

```
[rsimms@oslab ~]$ dig +short gmail-smtp-in.1.google.com.
74.125.25.26
[rsimms@oslab ~]$
```



```
[rsimms@oslab ~]$ dig +short mx hp.com
10 smtp.hp.com.
[rsimms@oslab ~]$ dig +short smtp.hp.com.
15.73.96.120
15.73.212.90
15.73.212.88
15.73.212.87
[rsimms@oslab ~]$
```

Other MUAs MTAs, DAs, AAs



end-to-end email some of the many players



MTA



sendmail, Exim, Microsoft Exchange, Postfix

DA



/bin/mail, procmail, smrsh

AA



imapd, spop

MUA



gmail, /bin/mail, Outlook, Evolution, Yahoo Mail, hotmail

Assignment



Lab 3

Unix history
via command-line email

Notes to Rich



[] - Send out UNIX historical events for Lab 3

use **events** alias or

mail-lab03-events script in **~rsimms/cis90/lab03/scripts/uhist** directory



Lab 3 - Start early and check your Opus email every day!

You will receive a mail message from me with a Unix historical event for a particular year. Save this message to a mailbox called *uhistory*.

The objective of this lab is to use Unix mail to exchange and collect at least 15 individual events with your classmates. There are more students than events so some students will receive the same event.

Start by sending an email to your other classmates with your event and ask them to send you their events. Each time you get a Unix event that you haven't already saved, save it to your *uhistory* mailbox.

Rules:

- Do this lab on Opus using */bin/mail* (the mail command).
- When someone asks you for the date that you received, you must send it to them with the subject being just the year of the event, e.g. 1972. The email message must contain the complete line of event text for that year.
- Each email saved in *uhistory* must be for a single event/year.
- Each email saved in *uhistory* must have a subject that is just the year of the event.

If you receive an email that is missing the event or does not have the year as the subject, reply to the sender and ask them to resend a corrected version.

When you get all the Unix event messages saved in your *uhistory* mailbox you should have up to 22 messages, each with a different date for the Subject field. Delete any duplicate dates you may have.

Lab 3 (and all future labs) must be done on Opus

Tips for Lab 3

Start this lab early in the week and check your mail daily to collect all messages

- Use the **s** command in mail to save a message to your *uhistory* mailbox
- Use **mail -f uhistory** to review your collection
 - Use the **d** command in mail to delete duplicates
- Use the **check3** script to review progress
- You can **submit** your work as many times as you wish up to the deadline. Only the last submittal will be graded. Submit whatever you have completed for partial credit if you run out of time.

Post and read more tips on the forum

A full-page background image showing a sunset over a beach. The sky is filled with vibrant orange, pink, and purple clouds. The sun is low on the horizon, casting a warm glow. To the right, a dark, silhouetted cliff rises from the beach. The foreground shows the wet sand of the beach reflecting the colors of the sky, with some dark rocks scattered about.

Wrap up

New commands:

mail

```
type <message list>
next
from <message list>
headers
delete <message list>
undelete <message list>
save <message list> folder
copy <message list> folder
write <message list> file
preserve <message list>
Reply <message list>
reply <message list>
mail addresses
file folder
quit
xit
!
cd <directory>
list
```

- UNIX mail

```
type messages
goto and type next message
give head lines of messages
print out active message headers
delete messages
undelete messages
append messages to folder and mark as saved
append messages to folder without marking them
append message texts to file, save attachments
keep incoming messages in mailbox even if saved
reply to message senders
reply to message senders and all recipients
mail to specific recipients
change to another folder
quit and apply changes to folder
quit and discard changes made to folder
shell escape
chdir to directory or home if none given
list names of all available commands
```

A <message list> consists of integers, ranges of same, or other criteria separated by spaces. If omitted, mail uses the last message typed.

mesg

- Enable or disable writes to your terminal

write

- Write message to another user

New Files and Directories:

/var/mail

- Message store for mail

/var/mail/*username*

- Incoming mailbox for *username*

Next Class

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

**1st five forum posts
and Lab 3**

Quiz questions for next class:

- What command can you use to "chat" with another user?
- How do you forward a message with /bin/mail?
- What is the dead.letter folder?

Backup



Practice Questions Lessons 1 & 2

Practice Test Questions

What is simben90's uid (user ID) on Opus?

Practice Test Questions

What is simben90's uid (user ID) on Opus?

Benji's uid is 1201

```
/home/cis90/simben $ id simben90  
uid=1201(simben90) gid=190(cis90) groups=190(cis90),100(users)  
/home/cis90/simben $
```

Practice Test Questions

What day of the week was Sept 11, 2001?

Practice Test Questions

What day of the week was Sept 11, 2001?

It was a Tuesday

```
/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 $
```

Practice Test Questions

Where (what directory) does the program file for the **ps** command reside?

Practice Test Questions

Where (what directory) does the program file for the **ps** command reside?

```
/home/cis90/simben $ type ps  
ps is /bin/ps
```

It's in the /bin directory



Practice Test Questions

Parse the following command line. What is the command? How many options and how many arguments are there? What are the options and arguments?

```
ls -l /boot/grub/
```


Practice Test Questions

Parse the following command line. What is the command? How many options and how many arguments are there? What are the options and arguments?

```
ls -l /boot/grub/
```

Command: ls

One option: -l (for long listing)

One argument: /boot/grub

Practice Test Questions

Parse the following command line. What is the command? How many options and how many arguments are there? What are the options and arguments?

```
echo "1 2 3" four 5 six
```

Practice Test Questions

Parse the following command line. What is the command? How many options and how many arguments are there? What are the options and arguments?

```
echo "1 2 3" four 5 six
```

Command: echo

No options

4 arguments:

- *"1 2 3"*
- *four*
- *5*
- *six*

Practice Test Questions

Which program gave you this error message?

```
/home/cis90/simben $ uname-x  
-bash: uname-x: command not found  
/home/cis90/simben $
```

Practice Test Questions

Which program gave you this error message?

```
/home/cis90/simben $ uname-x  
-bash: uname-x: command not found  
/home/cis90/simben $
```

It was the bash program. bash is the shell we are using and it could not find a command named uname-x on the path

Practice Test Questions

Which program gave you this error message?

```
/home/cis90/simben $ uname -x  
uname: invalid option -- 'x'  
Try `uname --help' for more information.  
/home/cis90/simben $
```

Practice Test Questions

Which program gave you this error message?

```
/home/cis90/simben $ uname -x  
uname: invalid option -- 'x'  
Try `uname --help' for more information.  
/home/cis90/simben $
```

It was the uname program. The uname program was loaded into memory. It started to handle its options and discovered an unknown option. It printed the error message and aborted.

Practice Test Questions

What terminal device are you using?

Practice Test Questions

What terminal device are you using?

Use the tty command to find out:

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

Practice Test Questions

What type of terminal are you using?

Practice Test Questions

What type of terminal are you using?

Use the **echo \$TERM** command to find out:

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

This user's terminal type is xterm

Practice Test Questions

What directories make up your path?

Practice Test Questions

What directories make up your path?

Use echo \$PATH to find out:

```
/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:.
```

*/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
.*

*There are 10 directories specified on
this user's path*

Practice Test Questions

Are the **yum**, **useradd**, and **yell** commands on your path?

Practice Test Questions

Are the **yum**, **useradd**, and **yell** commands on your path?

```
/home/cis90/simben $ type yum    Yes, on path  
yum is /usr/bin/yum
```

```
/home/cis90/simben $ type useradd Yes, on path  
useradd is hashed (/usr/sbin/useradd)
```

```
/home/cis90/simben $ type yell    No, not on path  
-bash: type: yell: not found
```

Note: "is hashed" means bash has previously searched the path and run this command. The location of the command has been saved in the hash table to speed up subsequent searches.

Practice Test Questions

What is the name of the environment variable that defines your shell prompt?

Practice Test Questions

What is the name of the environment variable that defines your shell prompt?

It's PS1

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

```
/home/cis90/simben $ echo "The PWD variable =" $PWD  
The PWD variable = /home/cis90/simben  
/home/cis90/simben $
```

Both PS1 and PS2 are environment variables

Practice Test Questions

How do you change the shell prompt to `"Enter next command: "` ?

Practice Test Questions

How do you change the shell prompt to "Enter next command: " ?

Set PS1 to new value using "=" sign

```
/home/cis90/simben $  
/home/cis90/simben $ PS1="Enter next command: "  
Enter next command:  
Enter next command: echo $PWD  
/home/cis90/simben  
Enter next command: echo $PS1  
Enter next command:  
Enter next command:
```

Practice Test Questions

How do you restore the original shell prompt so it displays the current directory followed by a \$ and a blank?

Practice Test Questions

How do you change the shell prompt to "Enter next command: "
then change it back again?

To restore the original prompt use:

```
Enter next command: PS1='$PWD $ '
/home/cis90/simben $
```


More Review (variables)

Environment Variables

Use `$` for the "value" of a variable

Analogy: Each variable is a named location. The contents of any location is the "value" of that variable.

```
$ echo $LOGNAME
simmsben
```

```
$ echo HOME
HOME
```

```
$ echo $HOME
/home/cis90/simmsben
```

```
$ echo $SHELL
/bin/bash
```

```
$ echo $HOSTNAME
opus.cabrillo.edu
```



Make your own shell variables

Imagine creating a new variable for use as the fan speed in your car



```
$ echo $FAN
```

Initially it's not defined so if echoed it has a null value

```
$ FAN=HI
$ echo $FAN
HI
$ echo "The fan is set to: " $FAN
The fan is set to: HI
$ FAN=LO
```

Create a variable named FAN and set the value to "HI"

```
$ echo "The fan is set to: " $FAN
The fan is set to: LO
```

Now set the FAN variable to "LO"

Activity

```
/home/cis90/simben $ weather=rain
/home/cis90/simben $ country=Spain
/home/cis90/simben $ location="the plain"
/home/cis90/simben $ echo The $weather in $country stays mainly in $location
The rain in Spain stays mainly in the plain
/home/cis90/simben $
```

When **echo** is loaded into memory and starts to run:

- 1) How many arguments does it receive from the bash shell?
- 2) Does **echo** see "\$weather" or "rain" as one of the arguments it receives?

Write your answers in the chat window

Mini Review

Expectation Check

Commands you should understand and be comfortable using

Lesson/Lab 1		Lesson/Lab 2	
Commands	Files & Directories	Commands	Files & Directories
cal clear date exit history hostname id ps ssh uname tty who who am i	/etc/issue /etc/*-release	apropos banner bash bc cat cd echo env file finger info file ls passwd set type man whatis	/bin /usr/bin /sbin /usr/sbin /etc/passwd /etc/shadow

If you have any questions on these commands, post a question on the forum!

Class Activity

In what file are all the encrypted passwords kept?

Put your answer in the chat window

ssh command

Syntax:

ssh -p *port username@hostname*

Examples:

```
ssh -p 2220 simben90@son-of-opus.simms-teach.com
```

```
ssh -p 22 cis90@rhea.cishawks.net
```

Syntax shortcuts:

- If the port is 22, then it does not need to be specified.
- If the username is the same on the remote system it can be left off.
- If domain suffixes are automatically added they can be left off.

For example Benji could use any of the commands below to log into daughter-of-opus from Opus:

```
ssh -p 22 simben90@daughter-of-opus.cis.cabrillo.edu
```

```
ssh simben90@daughter-of-opus.cis.cabrillo.edu
```

```
ssh daughter-of-opus.cis.cabrillo.edu
```

```
ssh daughter-of-opus
```

Use the ssh command to log into a remote system

Class Activity

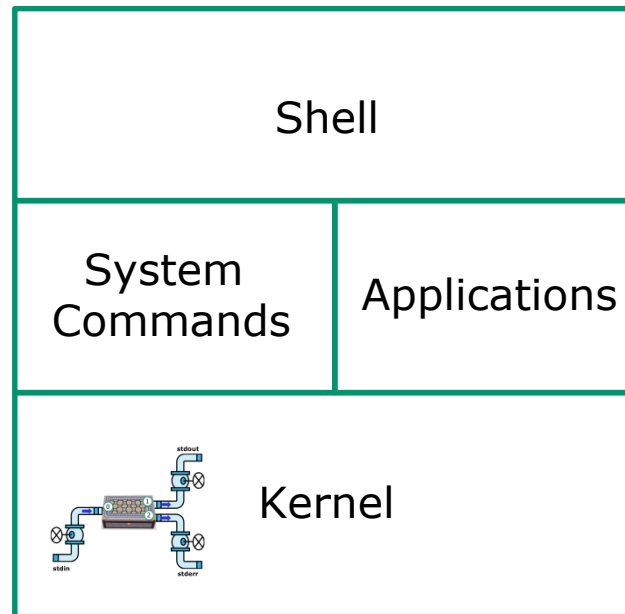
ssh to the Rhea system (port 22) and login as the cis90 user.

What terminal device are you using on Rhea?

Put your answer in the chat window

Key components of the Linux/UNIX architecture

Users interact with the shell to run commands



Commands such as ls, cal, date, tty, id, who, etc.

Web servers, databases, word processors, etc.



The kernel manages processes, memory, file system, and the network stack and interacts with all the hardware components

Class Activity

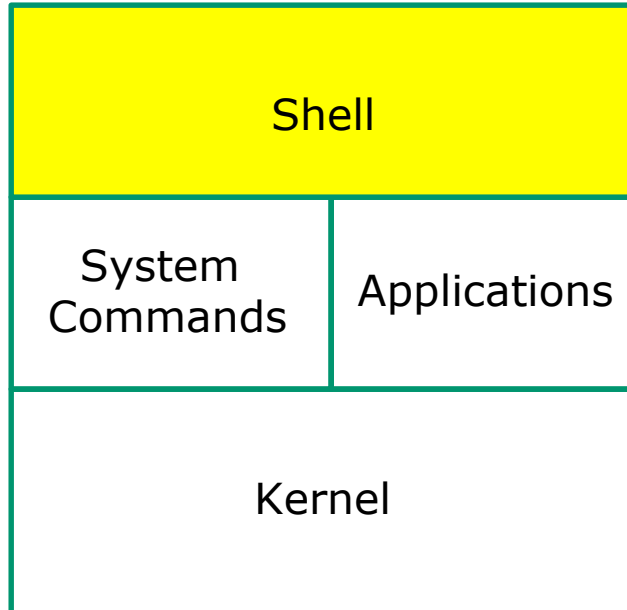
If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

What kernel is running on Rhea?

Put your answer in the chat window



Life of the Shell



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



Class Activity

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

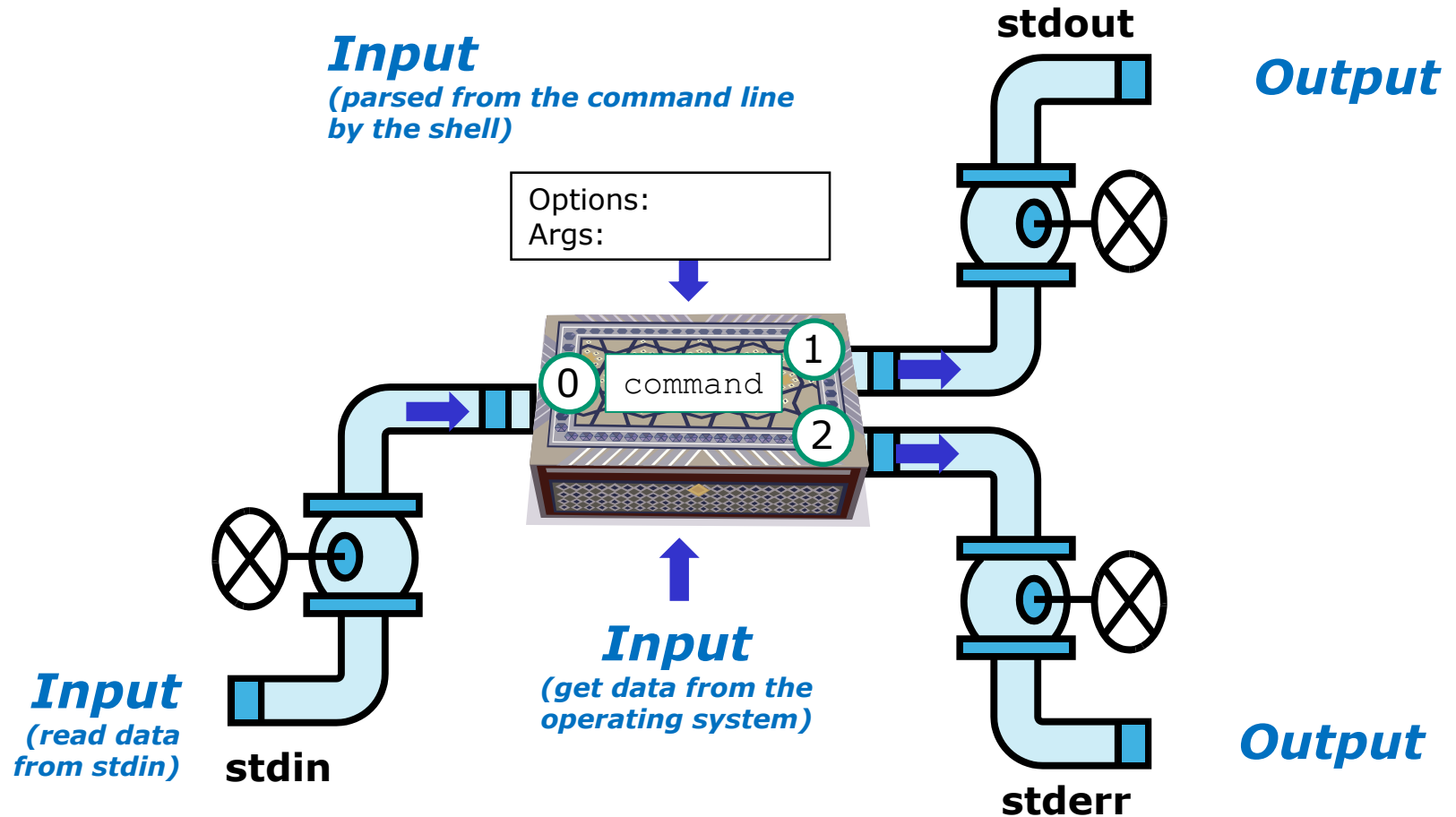
As the cis90 user on Rhea enter this command:

```
ls -lt /usr/games
```

How many directories on the path did the shell have to search to locate the command used above?

Put your answer in the chat window?

Inputs and Outputs



The three file descriptors provided to every process are named **stdin**, **stdout** and **stderr**

Class Activity

As the cis90 user on Rhea enter this command:

```
banner Hola
```

Where does the **banner** command on Rhea get it's input from?

- a) The command line (passed in by the shell)
- b) The keyboard (read from stdin)
- c) The operating system

Put your answer in the chat window

Answer

In what file are all the encrypted passwords kept?

/etc/shadow

ssh to the Rhea system (port 22) and login as the cis90 user.

```
/home/cis90/simben $ ssh cis90@rhea
Password for cis90@rhea:
Last login: Tue Feb  9 15:32:36 2016 from opus.cis.cabrillo.edu
FreeBSD 10.0-RELEASE-p18 (GENERIC) #0: Wed Feb 25 01:08:00 UTC 2015
```

```
$ tty
/dev/pts/0
```

225

Answer

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

What kernel is running on Rhea?

```
/home/cis90/simben $ ssh cis90@rhea
Password for cis90@rhea:
Last login: Tue Feb  9 15:32:36 2016 from opus.cis.cabrillo.edu
FreeBSD 10.0-RELEASE-p18 (GENERIC) #0: Wed Feb 25 01:08:00 UTC 2015
```

< *snipped* >

```
$ uname
FreeBSD
```

 *Free BSD kernel*

Answer

If you haven't already, ssh to the Rhea system (port 22) and login as cis90.

As the cis90 user on Rhea enter this command:

```
ls -lt /usr/games
```

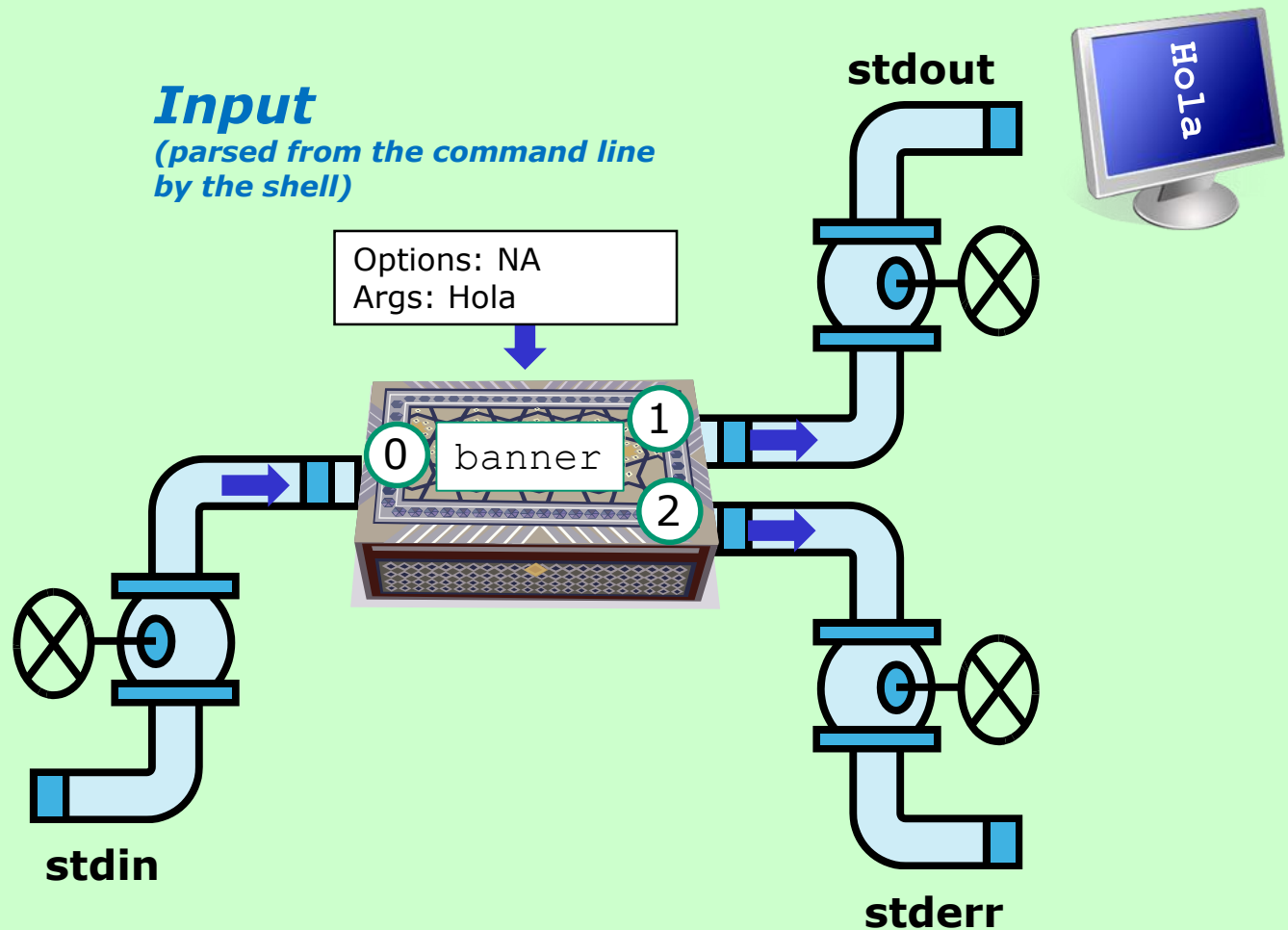
How many directories on the path did the shell have to search to locate the command used above?

```
$ type ls
ls is /bin/ls
$ echo $PATH
/sbin:/bin:/usr/sbin:/usr/bin:/usr/games:/usr/local/sbin:/usr/local/bin:/home/cis90/bin
```

The shell had to search two directories. The first was /sbin and the second was /bin.

Answer

\$ **banner Hola**



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