**Rich's lesson module checklist**

- ❑ Slides, Lab 10 and Project posted
- ❑ WB converted from PowerPoint
- ❑ Print out agenda slide and annotate page numbers

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

- ❑ Lock turnin directory at midnight
- ❑ allscripts updated
- ❑ myscript in depot
- ❑ flowers and riddle in bin
- ❑ sample myscripts for Benji and Homer

- ❑ Backup slides, CCC info, handouts on flash drive
- ❑ Spare 9v battery for mic
- ❑ Key card for classroom door

# Welcome to CIS 90 Introduction to UNIX/Linux

Shell commands

Secure logins

Navigate file tree

Files and directories

vi editor

Run programs/scripts

Pipes

Filters

Environment variables

Mail

Scheduling tasks

Processes

Permissions

## 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

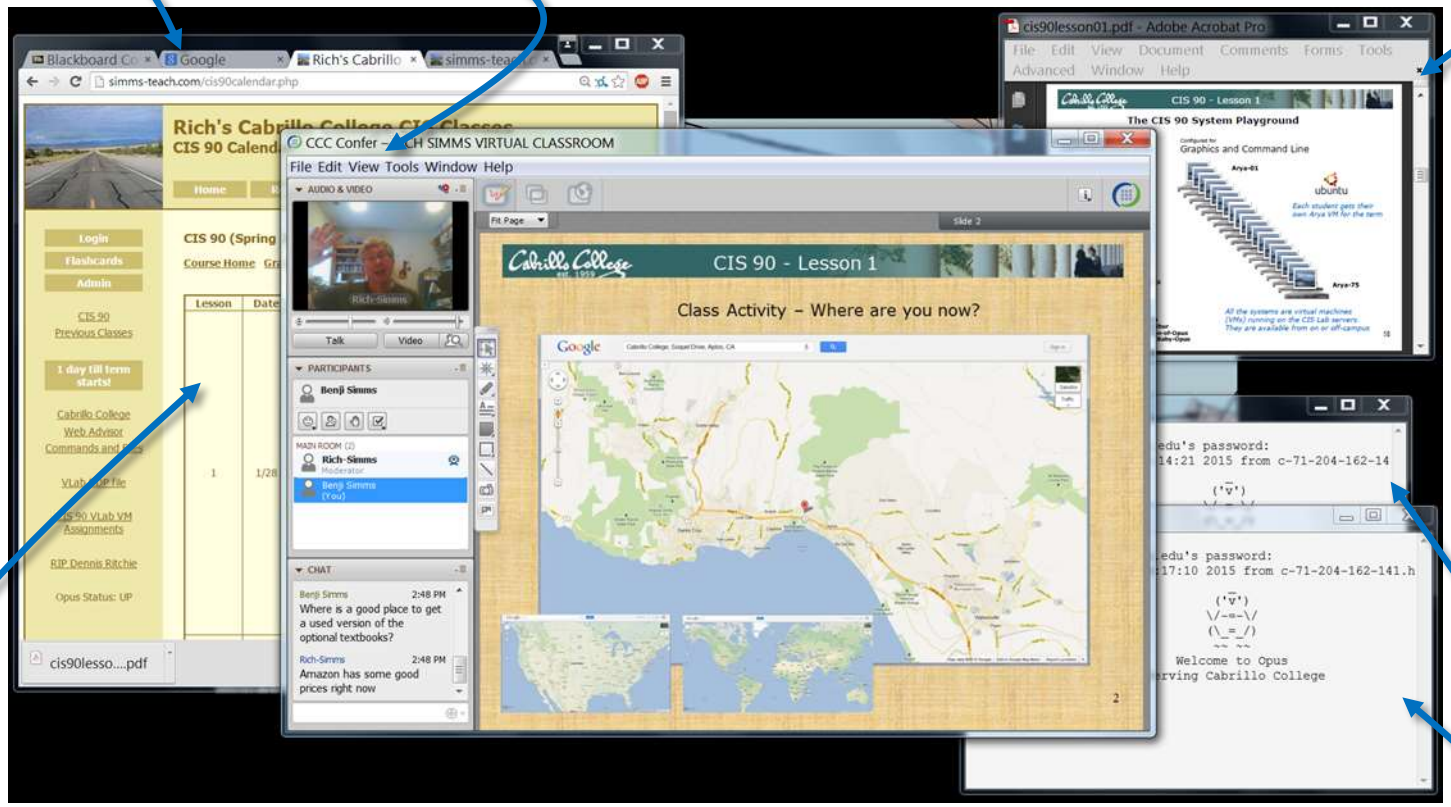
And thanks to:
- John Govsky for many teaching best practices: e.g. the First Minute quizzes, the online forum, and the point grading system (http://teacherjohn.com/)

**Student checklist for laying out screen when attending class**

- ❑ Browse to the CIS 90 website Calendar page
  1. http://simms-teach.com
  2. Click CIS 90 link on left panel
  3. Click Calendar link near top of content area
  4. Locate today's lesson on the Calendar
- ❑ Download the presentation slides for today's lesson for easier viewing
- ❑ Click Enter virtual classroom to join CCC Confer session
- ❑ Connect to Opus using Putty or ssh command

## Student checklist for laying out screen when attending class

- ❑ *Google*
- ❑ *CCC Confer*
- ❑ *Downloaded PDF of Lesson Slides*

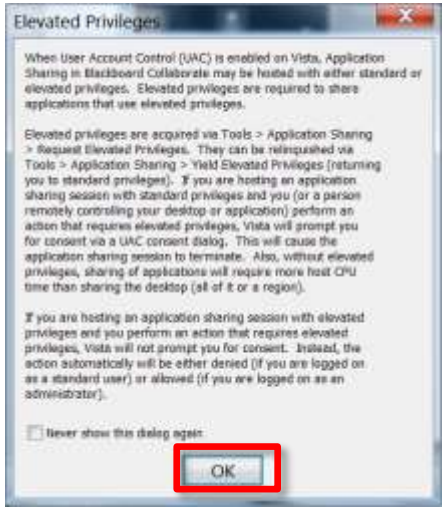



- ❑ *CIS 90 website Calendar page*
- ❑ *One or more login sessions to Opus*

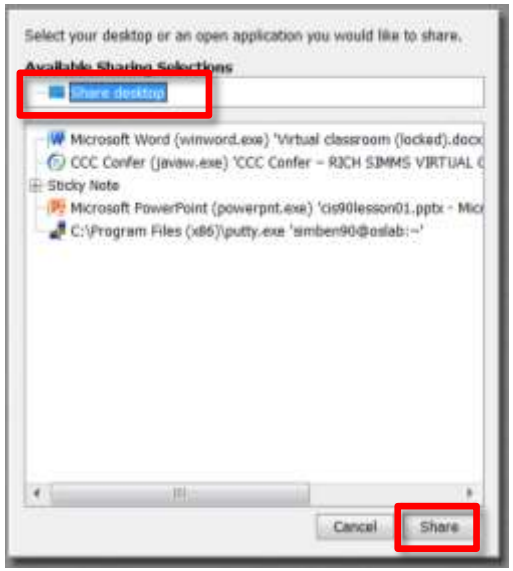
## Student checklist for sharing desktop with classmates

1) Instructor gives you sharing privileges


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



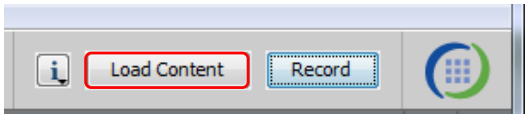

3) Click OK button.




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

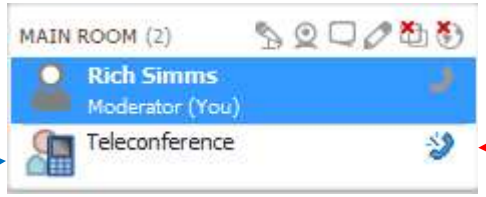
## Rich's CCC Confer checklist - setup

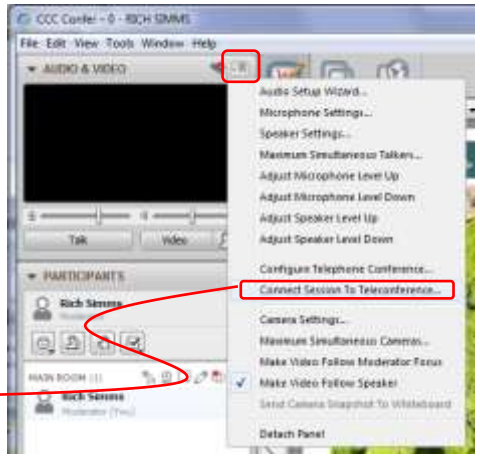
[ ] Preload White Board



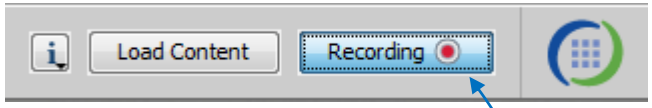

[ ] Connect session to Teleconference

*Session now connected to teleconference*



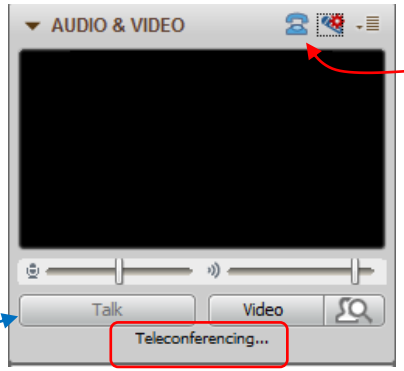
[ ] Is recording on?




*Red dot means recording*

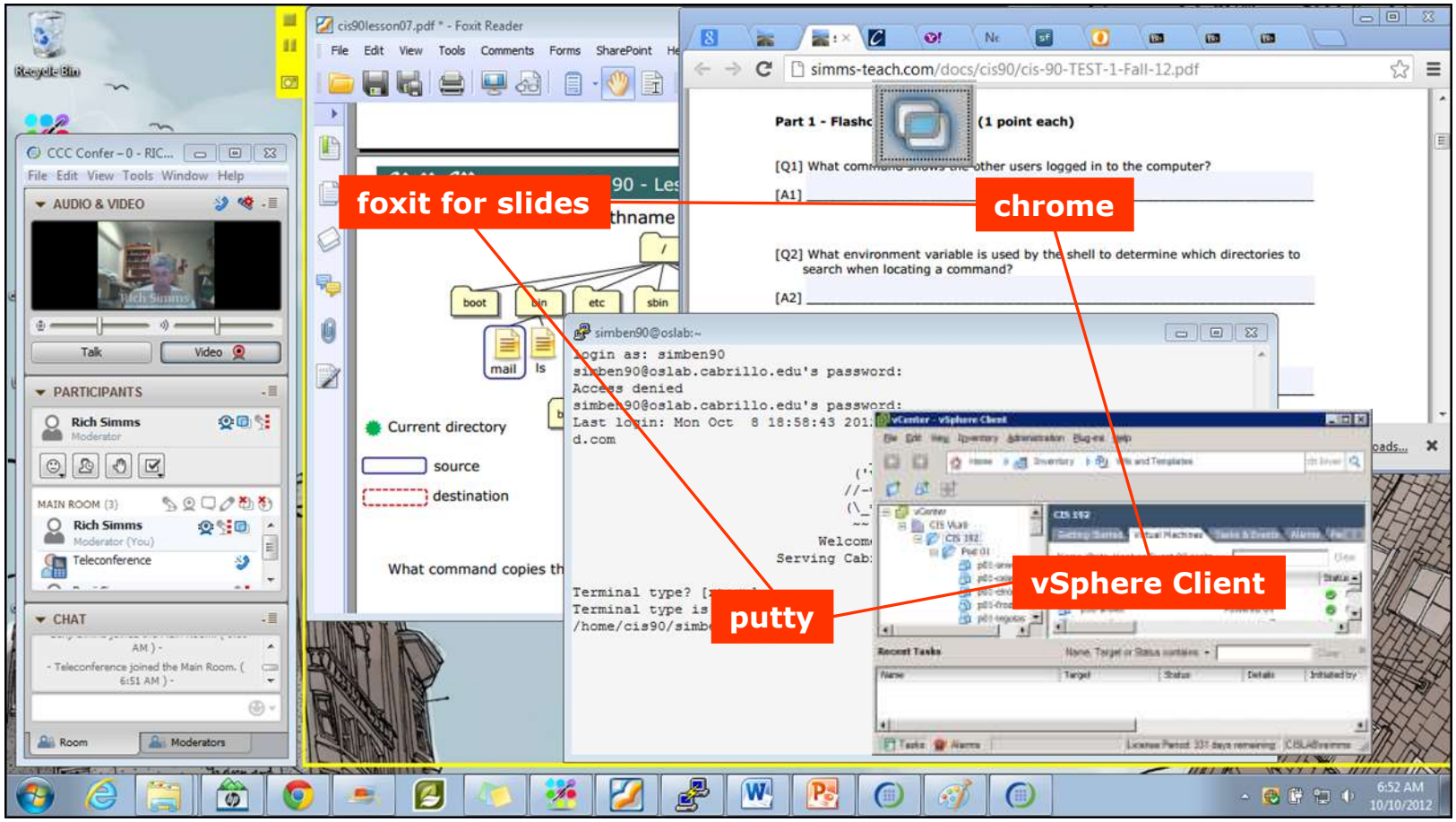
[ ] Use teleconferencing, not mic

*Should be greyed out*



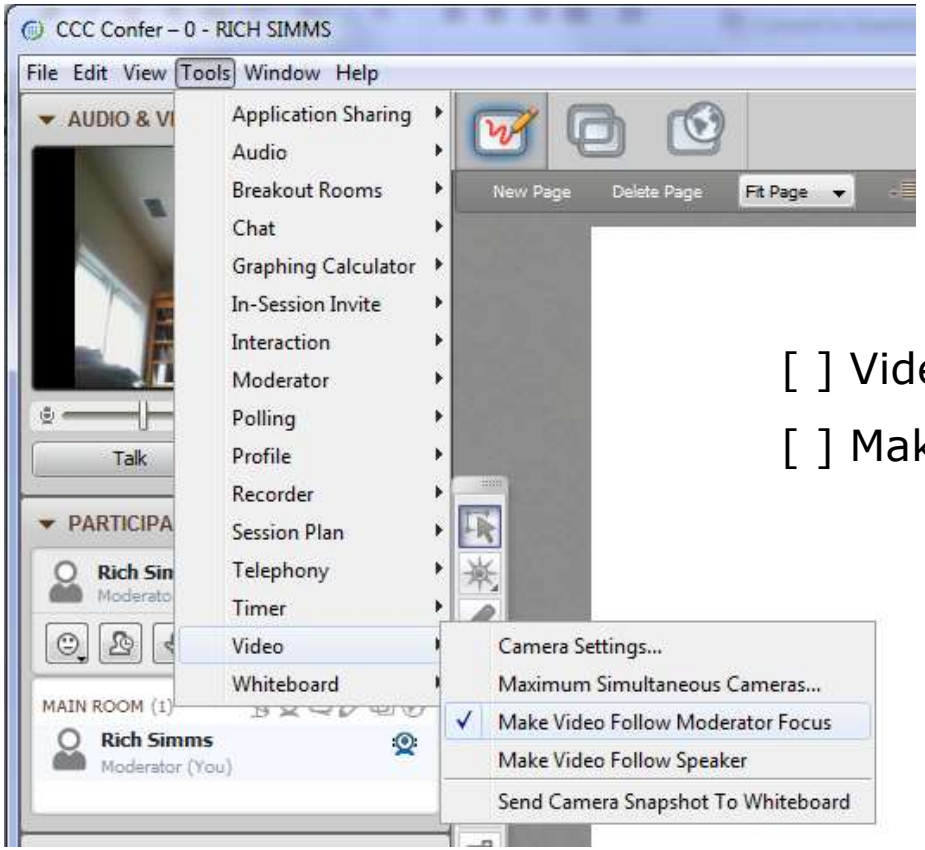

*Should show as this live "off hook" telephone handset icon and the Teleconferencing ... message displayed*

## Rich's CCC Confer checklist - screen layout and share




[ ] layout and share apps

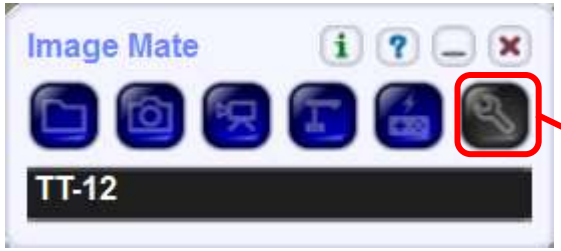
## Rich's CCC Confer checklist - webcam setup

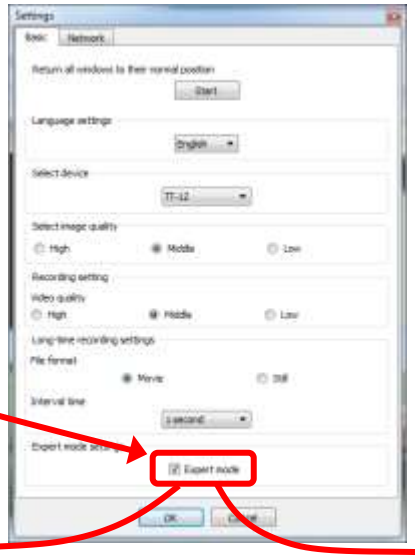



[ ] Video (webcam)

[ ] Make Video Follow Moderator Focus

## Rich's CCC Confer checklist - Elmo



*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 down to view side table


Elmo rotated up to view white board

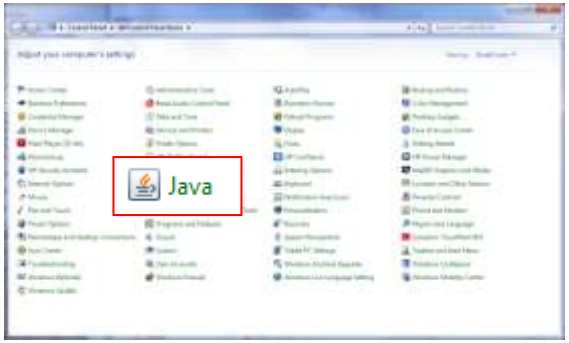

*Run and share the Image Mate program just as you would any other app with CCC Confer*

## Rich's CCC Confer checklist - universal fix

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

# 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.*

# CIS 90 - Lesson 12

Instructor: **Rich Simms**
Dial-in: **888-886-3951**
Passcode: **136690**


Chris

Jeremy

Jennifer

Joaquin

Joseph


Lisa


May


Sundance

Charlie

Sean

Brenda

Anthony

Will H.


Josh

Michael

Danny


Vic

William D.

Taylor


Thomas

Miguel


Tony

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

# 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)**

# The Shell Environment

| Objectives | Agenda |
| --- | --- |
| • Be able to set, view and unset shell variables<br>• Describe the difference between the set and env commands<br>• Explain the importance of the export command.<br>• Describe three actions that are handled by the .bash_profile file<br>• Define user-defined aliases<br>• Explain the . (dot) command and the exec command. | • Quiz<br>• Questions<br>• More on vi<br>• Submitting Lab 9 & pathnames<br>• Tangent on spell<br>• Personal dictionaries<br>• Lab 9 subtle things<br>• Housekeeping<br>• Final project preview<br>• Variables vs Files<br>• Shell variables<br>• Environment variables<br>• Shell environment<br>• Variables and child processes<br>• Aliases<br>• bash startup files<br>• .bash_profile<br>• .bashrc<br>• . and exec<br>• Grok this lesson<br>• Assignment<br>• Wrap up |

# Questions

# Questions?

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

Lesson material?

Labs? Tests?

How this course works?

*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。<br>*He who asks a question is a fool for five minutes; he who does not ask a question remains a fool forever.* |

# More on vi

# Activity

What is the difference between **:q!** and **:!q** commands in vi?

```
18. KEYBOARD:          Whar ya hang the dang keys.
19. SOFTWARE:          Them dang plastic forks and knifs.
20. MOUSE:             Whut eats the grain in the barn.
21. MAINFRAME:         Holds up the barn roof.
:!q
```

```
18. KEYBOARD:          Whar ya hang the dang keys.
19. SOFTWARE:          Them dang plastic forks and knifs.
20. MOUSE:             Whut eats the grain in the barn.
21. MAINFRAME:         Holds up the barn roof.
:q!
```

*Write your answer in the chat window*

# Esc :!q vs Esc :q!

```
18. KEYBOARD:          Whar ya hang the dang keys.
19. SOFTWARE:          Them dang plastic forks and knifs.
20. MOUSE:             Whut eats the grain in the barn.
21. MAINFRAME:         Holds up the barn roof.
:!q
```

*This will attempt to run a command "q" in the bash shell*

```
18. KEYBOARD:          Whar ya hang the dang keys.
19. SOFTWARE:          Them dang plastic forks and knifs.
20. MOUSE:             Whut eats the grain in the barn.
21. MAINFRAME:         Holds up the barn roof.
:q!
```

*This will quit vi without saving any changes made*

*Editing vocab in one login session*

simben90@oslab:~/edits

```
echnology for Mountain Folk
BYTE:           Whut them dang flys do.
CHIP:           Munchies fer the TV.
DOT MATRIX:     Old Dan Matrix's wife.
DOWNLOAD:       Gettin the farwood off the truk.
ENTER:          Northerner talk few "C'mon in y'all"
FLOPPY DISC:    Whatcha git from tryin to carry too much farwood.
HARD DRIVE:     Gettin home in the winter time.
KEYBOARD:       Whar ya hang the dang keys.
LAP TOP:        Whar the kitty sleeps.
LOG OFF:        Don't add no more wood.
LOG ON:         Makin a wood stove hotter.
MAINFRAME:      Holds up the barn roof.
MEGA HERTZ:     When yer not kerful gettin the farwood.
MICRO CHIP:     Whut's in the bottom of the munchie bag.
MODEM:          Whut cha did to the hay fields.
MONITOR:        Keepin an eye on the wood stove.
MOUSE PAD:      That hippie talk fer the rat hole.
MOUSE:          Whut eats the grain in the barn.
PORT:           Fancy Flatlander wine.
PROMPT:         Whut the mail ain't in the winter time.
RAM:            That thar thing whut splits the farwood
@
```

simben90@oslab:~/edits

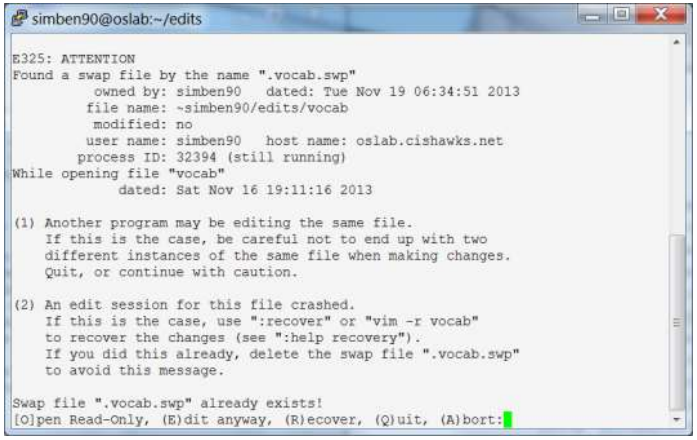
```
E325: ATTENTION
Found a swap file by the name ".vocab.swp"
          owned by: simben90   dated: Tue Nov 19 06:34:51 2013
         file name: ~simben90/edits/vocab
          modified: no
         user name: simben90   host name: oslab.cishawks.net
        process ID: 32394 (still running)
While opening file "vocab"
             dated: Sat Nov 16 19:11:16 2013

(1) Another program may be editing the same file.
    If this is the case, be careful not to end up with two
    different instances of the same file when making changes.
    Quit, or continue with caution.

(2) An edit session for this file crashed.
    If this is the case, use ":recover" or "vim -r vocab"
    to recover the changes (see ":help recovery").
    If you did this already, delete the swap file ".vocab.swp"
    to avoid this message.

Swap file ".vocab.swp" already exists!
[O]pen Read-Only, (E)dit anyway, (R)ecover, (Q)uit, (A)bort:
```

*Attempting to edit vocab in another session before the original edit session was ended*

*the .swp file for vocab*

```
/home/cis90/simben $ cd edits
/home/cis90/simben/edits $ ls -a
.    better_town   small_town   temp       text.fxd   .vocab.swp   words
..   lab09         spellk       text.err   vocab      women
/home/cis90/simben/edits $
```

When you edit a file with vi it copies your original file to a temporary *.swp* file. Any changes made happen to the .swp file instead of the original file. The **:w** command updates the contents of the original file with the contents of the *.swp* file.

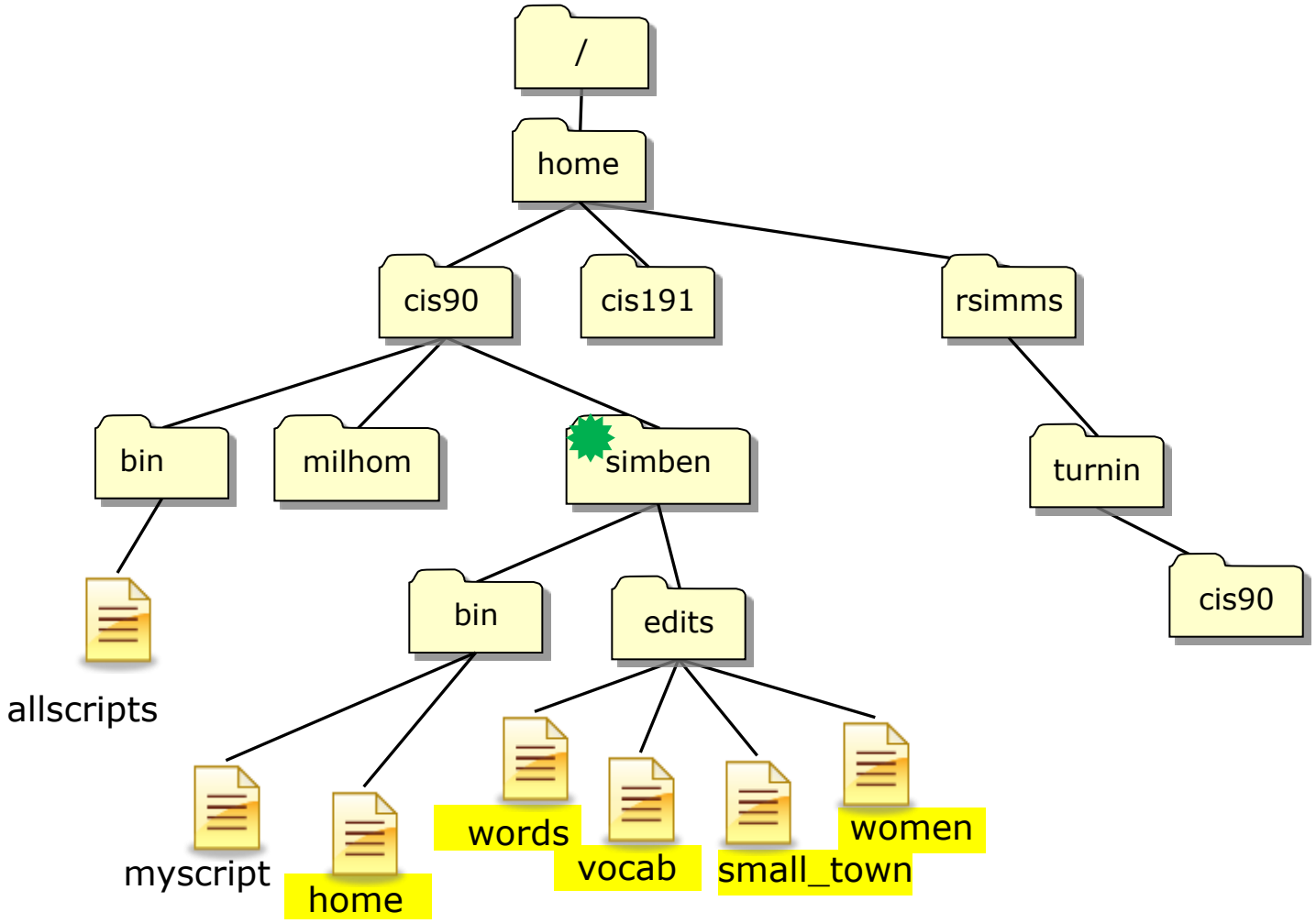



If you get this ATTENTION message it means the temporary .swp file still exists. You may be editing the same file in another session or your original editing session was disconnected before finishing. To get rid of this message you need to remove the .swp file.

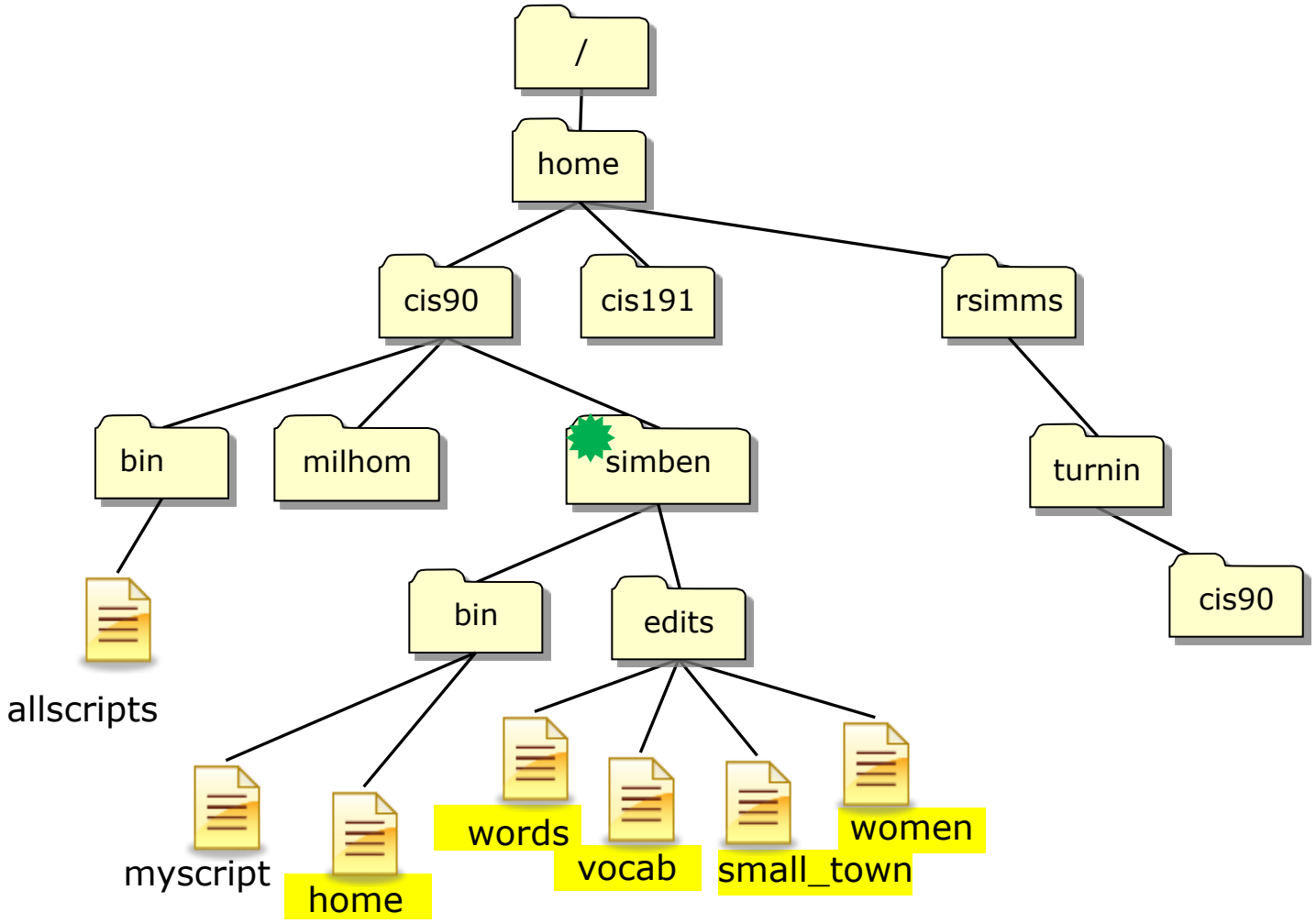
# Submitting Lab 9 & Pathnames!

## REMINDER

- You must **ALWAYS** use **VALID PATHNAMES** when specifying files as **ARGUMENTS** on a command.
- Pathnames can be relative or absolute.
- A common mistake in the past on Lab 9 is to ignore error messages and not submit all the file content requested.

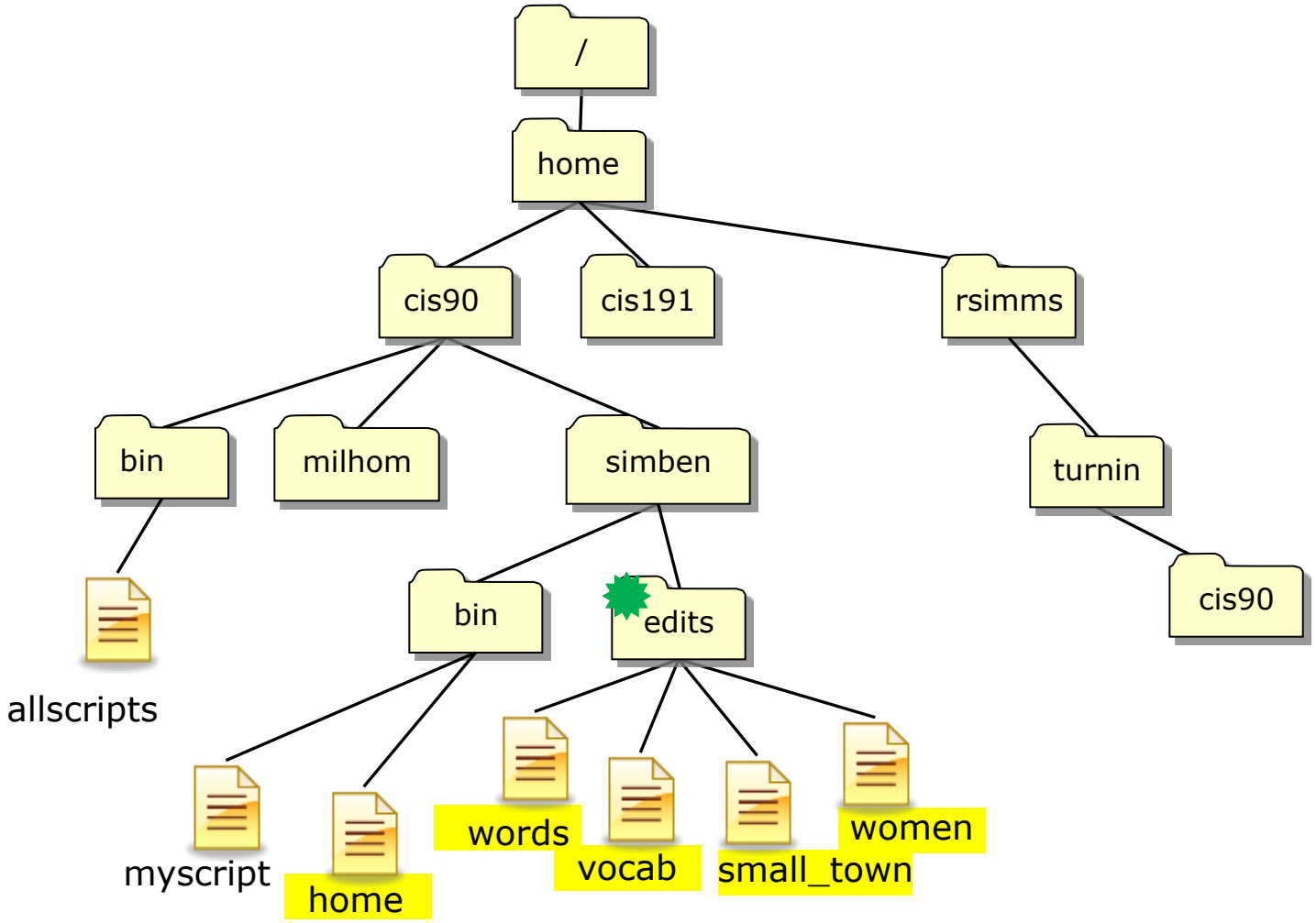



*From ✸ how could Benji concatenate the highlighted files into a file named lab09 in his home directory?*

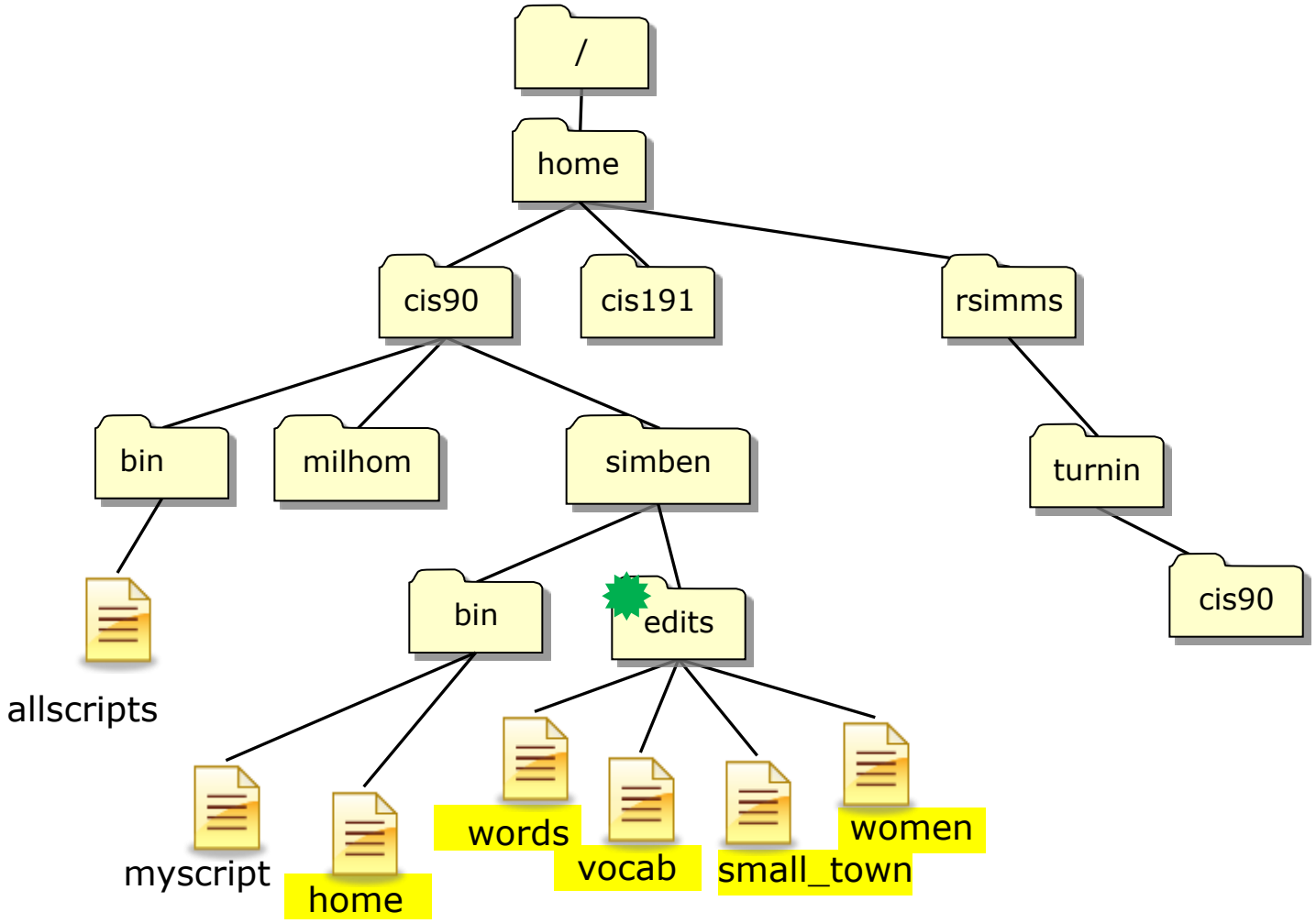



*From ✸ how could Benji concatenate the highlighted files into a file named lab09 in his home directory?*

```
cat bin/home edits/words edits/vocab edits/small_town edits/women > lab09
```

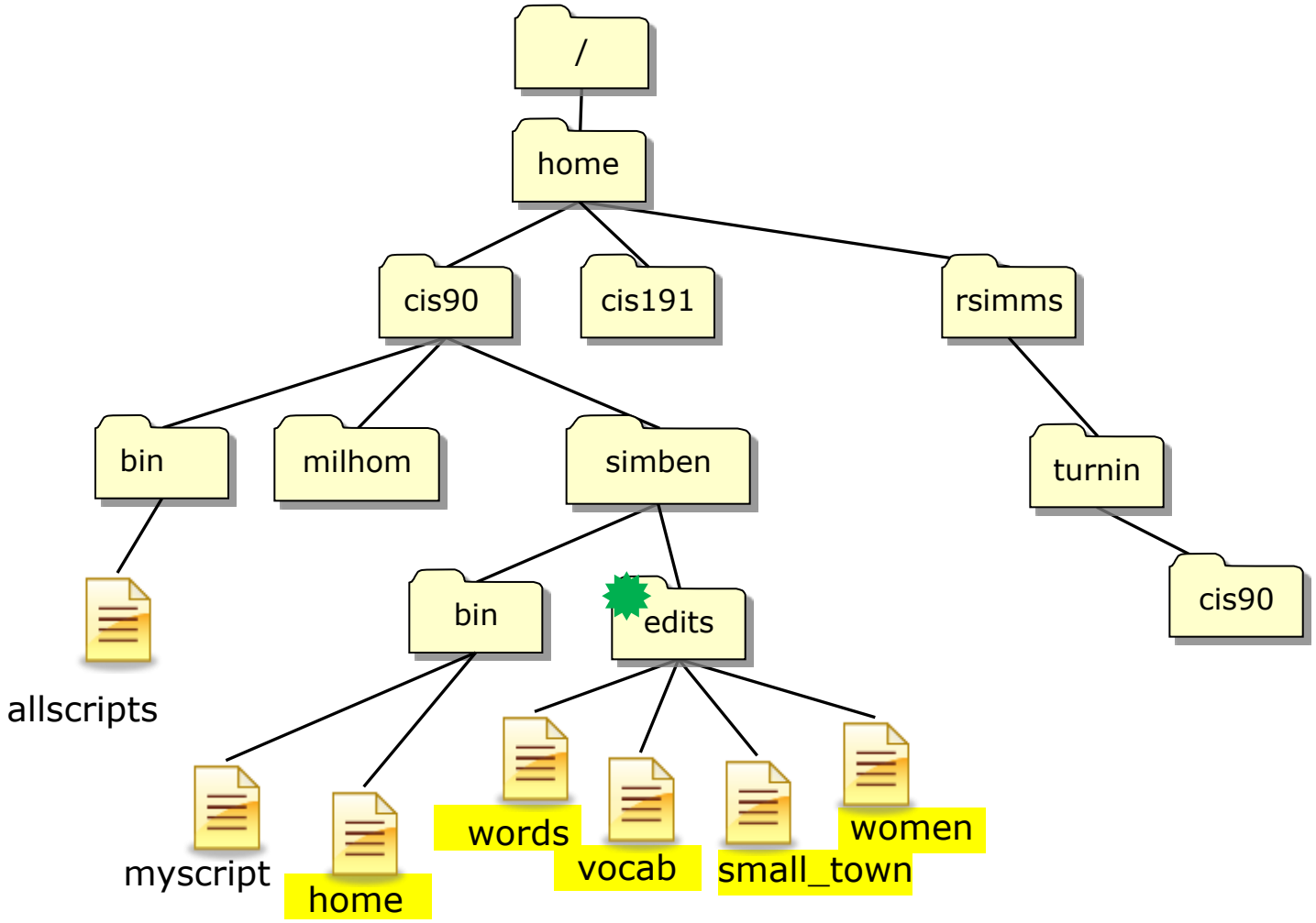



*From ✸ how could Benji concatenate the highlighted files into a file named lab09 in his home directory?*



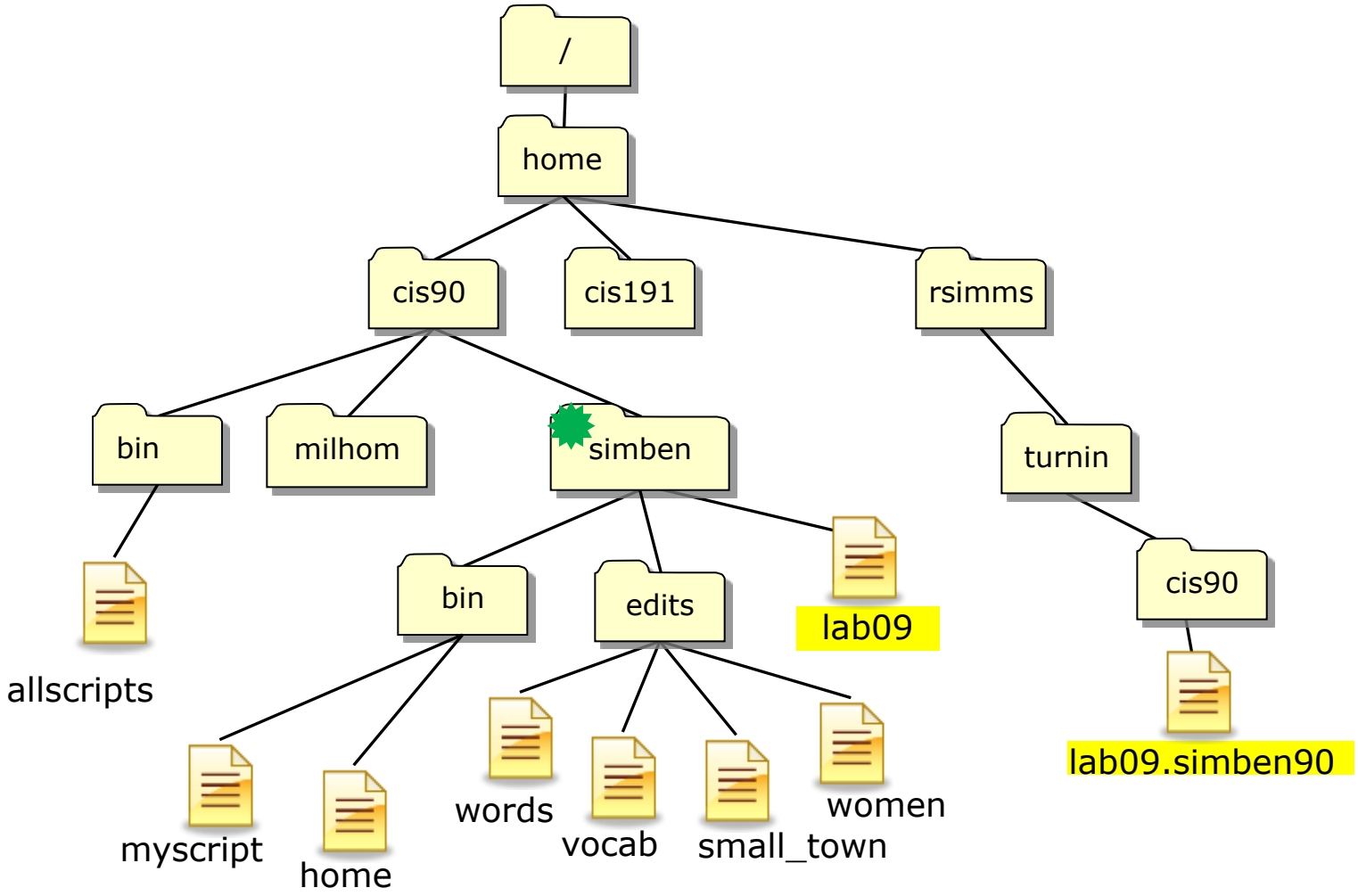

*From ✸ how could Benji concatenate the highlighted files into a file named lab09 in his home directory?*

```
cat words vocab small_town women ../bin/home > ../lab09
```




*From ✸ how could Benji concatenate the highlighted files into a file named lab09 in his home directory?*

```
cat words vocab small_town women ~/bin/home > ~/lab09
```




*From ✸ how could Benji submit his work to Rich's turnin/cis90 directory*

```
cp lab09 /home/rsimms/turnin/cis90/lab09.$LOGNAME
```

# A Tangent on Spell
## (from last lesson)

# Soquel is not in the UNIX dictionary

```
/home/cis90/simben $ echo Benji lives in Soquel > address
/home/cis90/simben $ cat address
Benji lives in Soquel

/home/cis90/simben $ spell address
Soquel
```

*Question: How can we add Soquel to the UNIX dictionary so it is ignored in future spell checks?*

## Question: How can we add Soquel to the UNIX dictionary so it is ignored in future spell checks?

```
/home/cis90/simben $ man spell
No manual entry for spell
```

*Hmmm. No man page for spell - weird!*

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

*Where is it on our path?*

```
/home/cis90/simben $ file /usr/bin/spell
/usr/bin/spell: Bourne shell script text executable
```

*So what kind of file is it?*

```
/home/cis90/simben $ cat /usr/bin/spell
#!/bin/sh

# aspell list mimicks the standard unix spell program, roughly.

cat "$@" | aspell list --mode=none | sort -u
```

*Ah ha, it's a script, so lets look at it …*

*Well … son of a gun, the actual command is **aspell!***

## Question: How can we add Soquel to the UNIX dictionary so it is ignored in future spell checks?

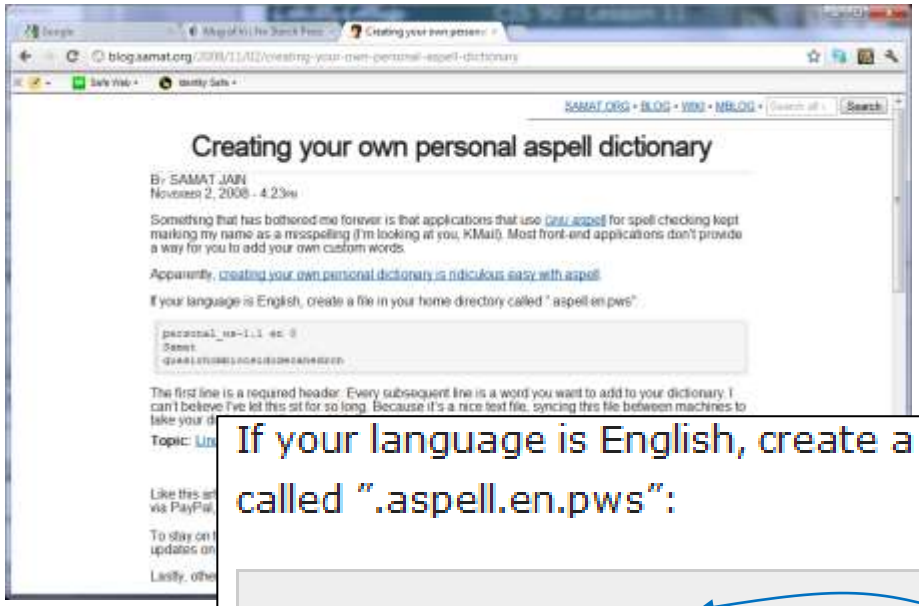
```
ASPELL(1)              Aspell Abbreviated User's Manual              ASPELL(1)

NAME
       aspell - interactive spell checker

SYNOPSIS
       aspell [options] <command>

DESCRIPTION
       aspell  is  a utility that can function as an ispell -a replacement,
       as an independent spell checker, as  a  test  utility  to  test  out
       Aspell features, and as a utility for managing dictionaries.

<snipped>

       --home-dir=<directory>
              Directory Location for personal wordlist files.

       --per-conf=<file name>
              Personal configuration file.  This file overrides options found in the
              global config file.
```

*There must be a way to add Soquel … the man page indicates it is possible but has no examples … lets try google instead*

## Googling "linux aspell personal dictionary"

*Bingo! Thank you Samat Jain!*

http://blog.samat.org/2008/11/02/creating-your-own-personal-aspell-dictionary




If your language is English, create a file in your home directory called ".aspell.en.pws":

```
personal_ws-1.1 en 0
Samat
quasirhombicosidodecahedron
```

*Add this line to the top*

*Now add any words you wish for the aspell program to ignore when doing spelling checks*

# Adding words to the UNIX dictionary

```
/home/cis90/simben $ echo "personal_ws-1.1 en 0" > .aspell.en.pws
/home/cis90/simben $ echo Soquel >> .aspell.en.pws

/home/cis90/simben $ spell address
/home/cis90/simben $
```

*This is how you would add Soquel to your own custom dictionary to be used with the spell command*

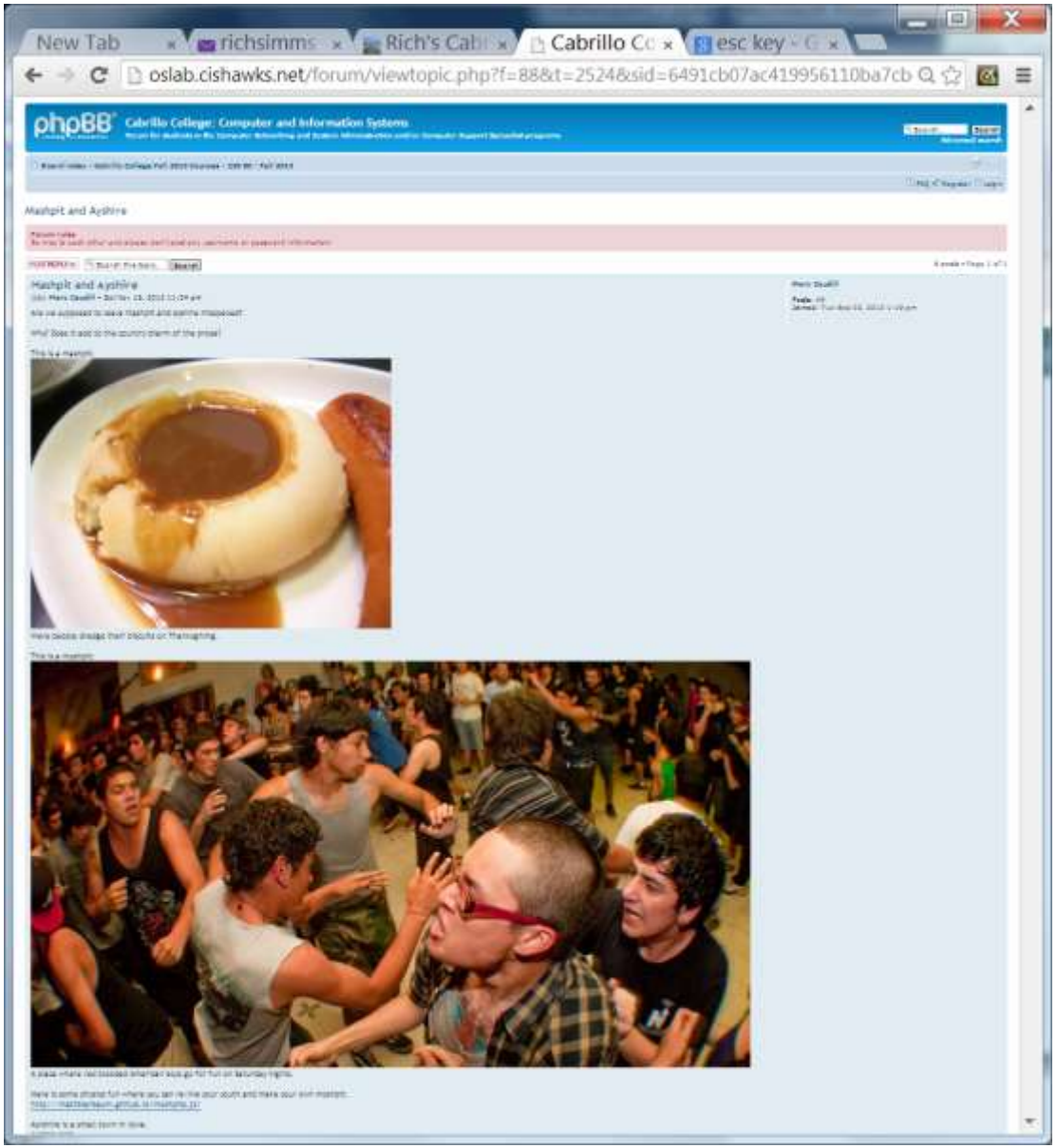
*This is FYI and not required for Lab 9*

```
/home/cis90/simben $ cat edits/spellk
Spell Check


Eye halve a spelling chequer
It came with my pea sea
It plainly marques four my revue
Miss steaks eye kin knot sea.
Eye strike a key and type a word
And weight four it two say
Weather eye am wrong oar write
It shows me strait a weigh.
As soon as a mist ache is maid
It nose bee fore two long
And eye can put the error rite
Its rare lea ever wrong.
Eye have run this poem threw it
I am shore your pleased two no
Its letter perfect awl the weigh
My chequer tolled me sew.

/home/cis90/simben $ spell edits/spellk
chequer
```

How would you add "chequer" (the British spelling) to your personal dictionary?

*Copy the commands used into the chat window when finished*

# Ayshire moshpit and personal dictionaries


New Tab
richsimms
Rich's Cab
Cabrillo Co
esc key
oslab.cishawks.net/forum/viewtopic.php?f=88&t=2524&sid=6491cb07ac419956110ba7cb
phpBB
Cabrillo College: Computer and Information Systems
Mashpit and Ayshire
Mashpit and Ayshire

*moshpit?*

*Ayshire?*

urban DICTIONARY

**1. moshpit**

a place at a gig where you can dance with however the f[bleeped] you want with a bunch of people you don't know. the dancing will often include punches aimed in the air NOT at the person nearest to you however usually results in full contact. can be dangerous however everyone with a ticket should feel welcome in the mosh pit.

Merriam-Webster
m-w.com

**mosh pit** *noun*

Definition of MOSH PIT

: an area in front of a stage where very physical and rough dancing takes place at a rock concert

See mosh pit defined for English-language learners »

First Known Use of MOSH PIT

1988

**Ayrshire**

The Ayrshire breed originated in the County of Ayr in Scotland, prior to 1800. The county is divided into the three districts of Cunningham, in the more northern part; Kyle, which lies in the center, and Carrick, which forms the southern part of the county. During its development, it was referred to first as the Dunlop, then the Cunningham, and finally, the Ayrshire. How the different strains of cattle were crossed to form the breed known as Ayrshire is not exactly known. There is good evidence that several breeds were crossed with native cattle to create the foundation animals of the breed. In Agriculture, Ancient and Modern, published in 1866, Samual Copland describes the native cattle of the region as "diminutive in size, ill-fed, and bad milkers." Prior to 1800 many of the cattle of Ayrshire were black, although by 1775 browns and mottled colors started to appear.

Ayrshires are red and white, and purebred Ayrshires only produce red and white offspring. Actually, the red color is a reddish-brown mahogany that varies in shade from very light to very dark. On some bulls, the mahogany color is so dark that it appears almost black in contrast to the white. There is no discrimination or registry restriction on color patterns for Ayrshires. The color markings vary from nearly all red to nearly all white. The spots are usually very jagged at the edges and often small and scattered over the entire body of the cow. Usually, the spots are distinct, with a break between the red and the white hair. Some Ayrshires exhibit a speckled pattern of red pigmentation on the skin covered by white hair. Brindle and roan color patterns were once more common in Ayrshires, but these patterns are rare today. [Oklahoma State University]

# Add more to your custom word list

```
cd
echo "moshpit" >> .aspell.en.pws
echo "Ayshire" >> .aspell.en.pws

spell edits/small_town
```

*Note: Please leave the two words Ayshire and moshpit (or mashpit) in the file words when you submit Lab 9*

# Lab 9
# Subtle Things

(but very important)

*In Lab 9 you create a script named home in your edits/ directory*

```
/home/cis90/simben/edits $ cat home
cd
clear
echo This is the home directory of $LOGNAME
echo ========================================
ls -F
```

# WHY?

*From your home directory*

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

*Move home from edits/ to bin/*

```
/home/cis90/simben $ mv edits/home bin/
```

*Again, from your home directory*

```
/home/cis90/simben $ home
This is the home directory of simben90
========================================
bag/          etc/          lab07         monster2    snap2
bigfile       expressions   lab07.bak     monster3    tempdir/
```

*< snipped >*

*From your home directory, the script does not work until it is moved from edits/ into bin/*

**QUESTION: From your home directory, why does the home script work only after moving it from the edits/ directory to the bin/ directory?**

**Answer: The edits/ directory is not on the path but the local bin/ directory is**

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

*Remember the six steps of the shell*

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

*If the shell is unable to locate the command on the path it prints "command not found"*

# Because

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

*By moving the script into the user's local bin directory, which is on the path, the command can now be run from anywhere on the system*


# Housekeeping

# Previous material and assignment

1. Lab 9 due 11:59PM tonight

2. Five posts due 11:59PM tonight

*Reminder:*
*Only posts in the CIS 90 forum during the most recent posting period are counted. Excess posts in past quarters are not carried forward.*

# Heads up on Final Exam

Test #3 (final exam) is MONDAY Dec 14 1-3:50PM

| | | | | |
|---|---|---|---|---|
| **Monday** | 12/14 | **Test #3 (the final exam)**<br>**Time**<br>• MONDAY 1:00PM - 3:50PM in Room 828<br>**Materials**<br>• Test (blackboard)<br>**CCC Confer**<br>• Enter virtual classroom<br>• Class archives | | 5 posts<br>Lab X1<br>Lab X2 |

*Extra credit labs and final posts due by 11:59PM*

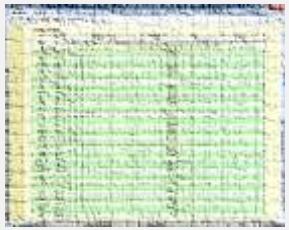
- All students will take the test at the same time. The test must be completed by 3:50PM.
- Working and long distance students can take the test online via CCC Confer and BlackBoard.
- **Working students will need to plan ahead to take time off from work for the test.**

# Where to find your grades

***Send me your survey to get your LOR code name.***

## The CIS 90 website Grades page

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



**Points that could have been earned:**

| | |
|---|---|
| 8 quizzes: | 24 points |
| 8 labs: | 240 points |
| 2 tests: | 60 points |
| 2 forum quarters: | 40 points |
| **Total:** | **364 points** |

| 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**

## Or check on Opus

**checkgrades** *codename*

*(where codename is your LOR codename)*

Written by Jesse Warren a past CIS 90 Alumnus

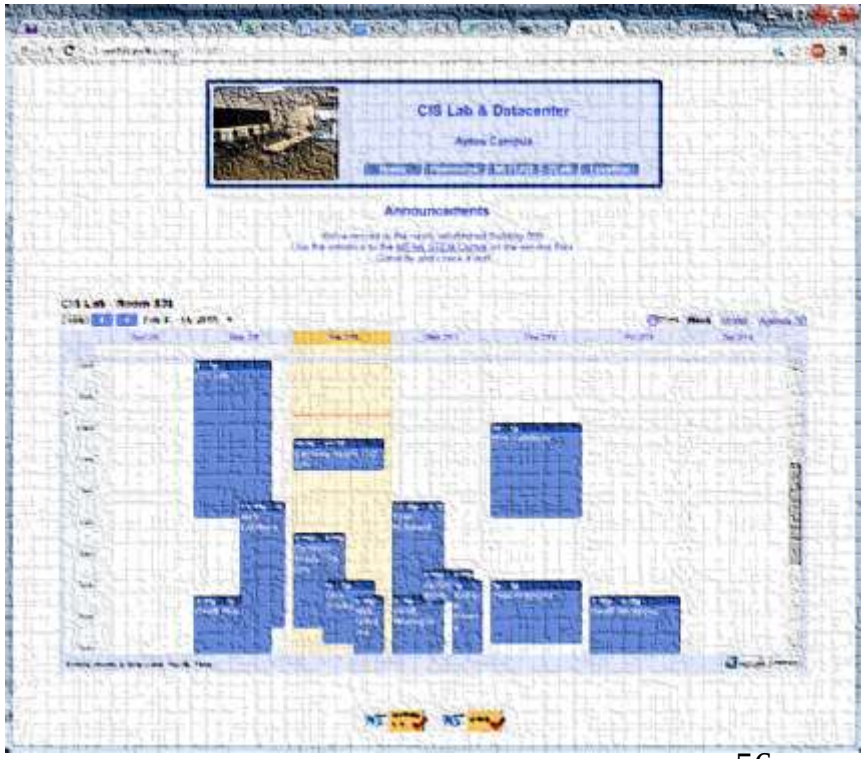
**grades** *codename*

*(where codename is your LOR codename)*

Written by Sam Tindell a past CIS 90 Alumnus.
Try his tips, schedule and forums scripts as well!

# Would you like some help learning Linux?


*If you would like some additional come over to the CIS Lab. There are student lab assistants and instructors there to help you.*



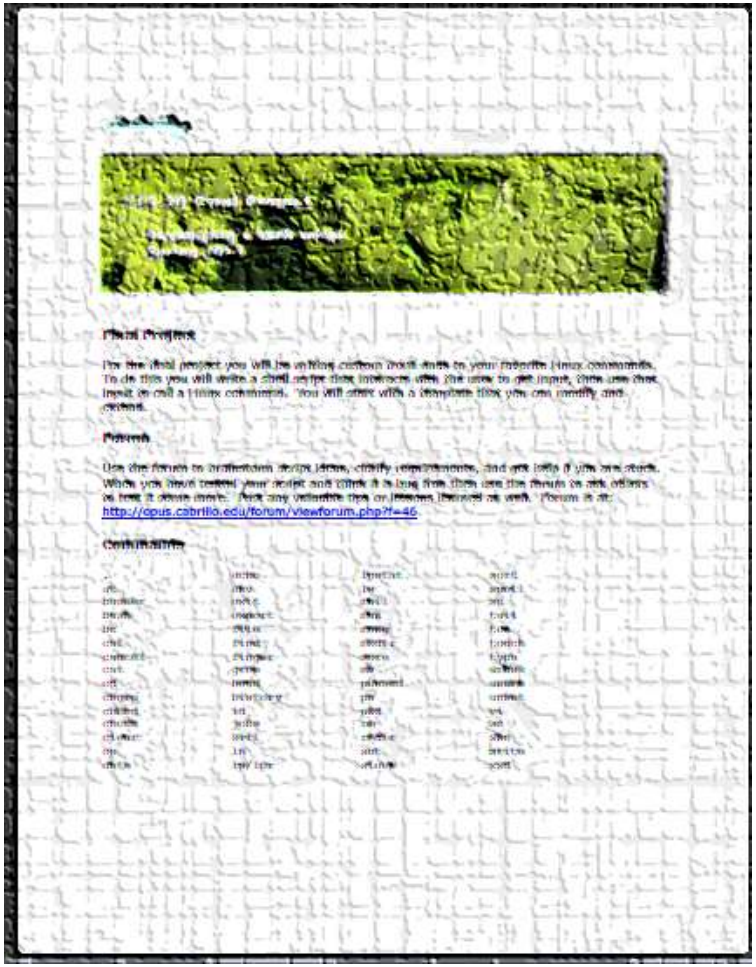

*Tess, Michael, and Sam are CIS 90 Alumni.*

*Mike Matera is the other Linux instructor.*

*I'm in there Mondays.*

# final project *preview*

# Final Project

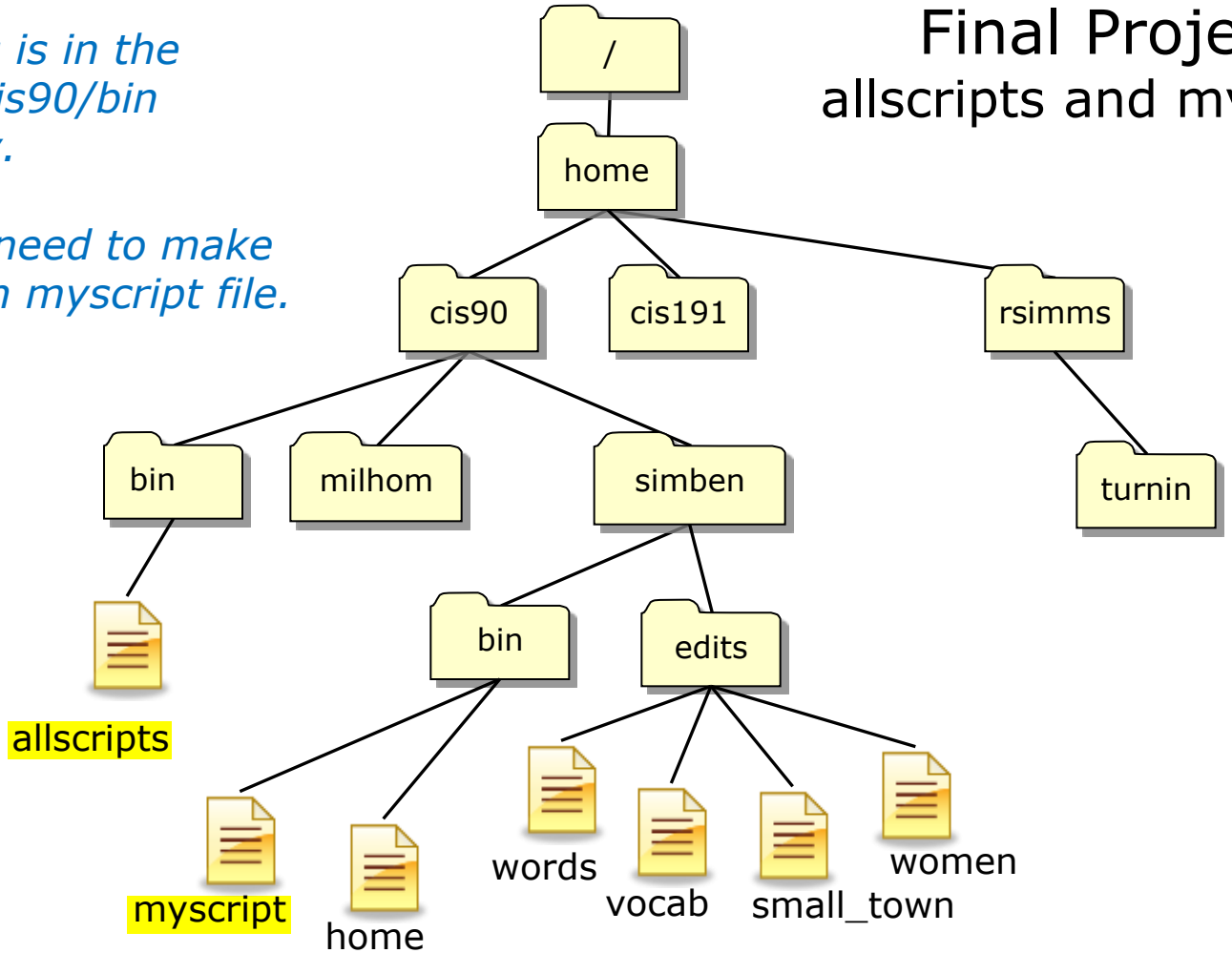



*You now have the necessary skills to begin the final project!*

# Final Project
## allscripts and myscript

*allscripts is in the /home/cis90/bin directory.*

*You will need to make your own myscript file.*




```
/home/cis90/simben $ ls -l /home/cis90/bin/allscripts  bin/myscript
-rwxr-xr-x 1 simben90 cis90 4296 Nov 13 13:07 bin/myscript
-rwxr-xr-x 1 rsimms   staff 4381 Nov 13 18:17 /home/cis90/bin/allscripts
```

# The **allscripts** bash script

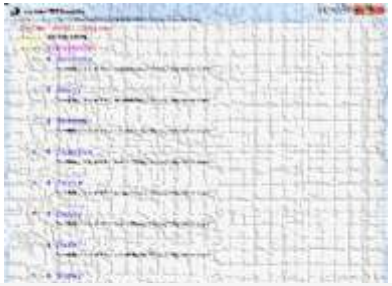
**vi /home/cis90/bin/allscripts**

```
simben90@oslab:~
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
  clear
  echo -n "
  ***********************************************************
  *            Fall 2015 CIS 90 Online Projects             *
  ***********************************************************
  1) Anthony
  2) Benji
  3) Brenda
  4) Charlie
  5) Chris
  6) Danny
  7) Duke
  8) Homer
  9) Jennifer
  10) Jeremy
  11) Joaquin
  12) Joseph
  13) Josh
  14) Lisa
  15) May
  16) Michael
  17) Miguel
  18) Sean
  19) Sundance
  20) Taylor
  21) Thomas
  22) Tony
  23) Vic
  24) Will H.
  25) William D.

  99) Exit

  Enter Your Choice: "
                                                  8,3          Top
```

*The first part of **allscripts** uses a long **echo** command to print a selection menu of the CIS 90 students.*

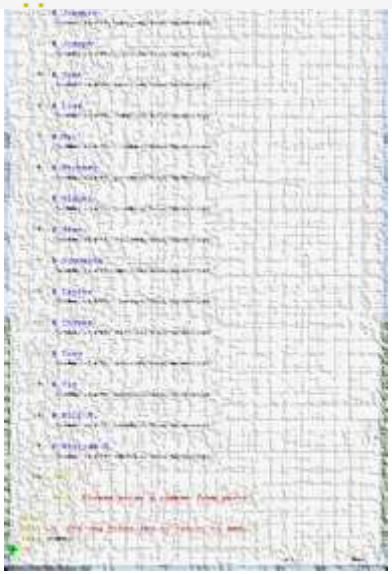
# The **allscripts** bash script

**vi /home/cis90/bin/allscripts**



*The second part of **allscripts** is a long case statement that will run the requested student's **myscript** file located in the student's bin directory.*

```
2) # Benji
   /home/cis90/simben/bin/myscript
```



*Note the use of an absolute path to run each students script*

# The **allscripts** bash script

Running **allscripts** looks like this

```
simben90@oslab:~

*********************************************************
*            Fall 2015 CIS 90 Online Projects           *
*********************************************************
1) Anthony
2) Benji
3) Brenda
4) Charlie
5) Chris
6) Danny
7) Duke
8) Homer
9) Jennifer
10) Jeremy
11) Joaquin
12) Joseph
13) Josh
14) Lisa
15) May
16) Michael
17) Miguel
18) Sean
19) Sundance
20) Taylor
21) Thomas
22) Tony
23) Vic
24) Will H.
25) William D.

99) Exit

Enter Your Choice:
```

*This script has been updated with everyone's name and pathnames to each student's **myscript** file*

# The **myscript** bash script

**vi ~/bin/myscript**

simben90@oslab:~

```
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
        clear
        echo -n "
                CIS 90 Final Project
        1) Task 1
        2) Task 2
        3) Task 3
        4) Task 4
        5) Task 5
        6) Exit

        Enter Your Choice: "
        read RESPONSE
        case $RESPONSE in
          1)    # Commands for Task 1
                ;;
          2)    # Commands for Task 2
                ;;
          3)    # Commands for Task 3
                ;;
          4)    # Commands for Task 4
                ;;
          5)    # Commands for Task 5
                ;;
          6)    exit 0
                ;;
          *)    echo "Please enter a number between 1 and 6"
                ;;
        esac
        echo -n "Hit the Enter key to return to menu "
        read dummy
done
~
                                                        1,1           All
```

*Every student will be creating a **myscript** file in their bin directory for the final project.*

*Your initial **myscript** file will look like this in vi*

*vi understands shell scripts and will use color syntax styling.*

# Final Project

Getting Started

1) On Opus, copy the *myscript* file in the class *depot/* directory to your *bin/* directory:
   **cd**
   **cp ../depot/myscript bin/**

2) Give your script execute permissions with:
   **chmod +x bin/myscript**

3) Run the script:
   **myscript**

# Final Project

**myscript**

```
milhom90@oslab:~

                CIS 90 Final Project
        1) Task 1
        2) Task 2
        3) Task 3
        4) Task 4
        5) Task 5
        6) Exit

        Enter Your Choice:
```

**vi myscript**

```
milhom90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
        clear
        echo -n "
                CIS 90 Final Project
        1) Task 1
        2) Task 2
        3) Task 3
        4) Task 4
        5) Task 5
        6) Exit

        Enter Your Choice: "
                                        1,1           Top
```

*Running and viewing the generic myscript file*

# Final Project Getting Started

**myscript**

```
milhom90@oslab:~

            Rumpelstilskin's Final Project
      1) My favorite color
      2) Task 2
      3) Task 3
      4) Task 4
      5) Task 5
      6) Exit

      Enter Your Choice:
```

**vi myscript**

```
milhom90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
        clear
        echo -n "
                Rumpelstilskin's Final Project
        1) My favorite color
        2) Task 2
        3) Task 3
        4) Task 4
        5) Task 5
        6) Exit

        Enter Your Choice: "
"myscript" 37L, 567C written                    10,21-28      Top
```

*Edit the menu title*

*Edit the first option choice*

*Editing the menu title and option*

# Final Project Getting Started

**myscript**

```
milhom90@oslab:~

                Rumpelstilskin's Final Project
        1) My favorite color
        2) Task 2
        3) Task 3
        4) Task 4
        5) Task 5
        6) Exit

        Enter Your Choice: 1
Hit the Enter key to return to menu
```

**vi myscript**

```
milhom90@oslab:~/bin
        Enter Your Choice: "
        read RESPONSE
        case $RESPONSE in
          1)    # Commands for Task 1
                ;;
          2)    # Commands for Task 2
                ;;
          3)    # Commands for Task 3
                ;;
          4)    # Commands for Task 4
                ;;
          5)    # Commands for Task 5
                ;;
          6)    exit 0
                ;;
          *)    echo "Please enter a number between 1 and 6"
                ;;
                                                33,4-18        80%
```

*Running Task 1 doesn't do anything yet*

# Final Project Getting Started

**myscript**

```
milhom90@oslab:~

                Rumpelstilskin's Final Project
        1) My favorite color
        2) Task 2
        3) Task 3
        4) Task 4
        5) Task 5
        6) Exit

        Enter Your Choice: 1
What is your name? Homer
What is your favorite color? Green
Hi Homer, your fovorite color is Green!
Hit the Enter key to return to menu
```

**vi myscript**

```
milhom90@oslab:~/bin
        1) My favorite color
        2) Task 2
        3) Task 3
        4) Task 4
        5) Task 5
        6) Exit

        Enter Your Choice: "
        read RESPONSE
        case $RESPONSE in
          1)    # favorite color mini-script
                echo -n "What is your name? "
                read name
                echo -n "What is your favorite color? "
                read color
                echo "Hi $name, your favorite color is $color!"
                ;;
"myscript" 42L, 794C written                    26,4-18       36%
```

*Modify the comment line*

*Add these lines*

*We've implemented a simple task for option 1*

# Final Project Getting Started

*A new command*

```
read RESPONSE
case $RESPONSE in
  1)     # favorite color mini-script
         echo -n "What is your name? "
         read name
         echo -n "What is your favorite color? "
         read color
         echo "Hi $name, your favorite color is $color!"
         ;;
```

*another new command*

# Final Project Getting Started

*case statement begins here*

```
read RESPONSE
case $RESPONSE in
  1)     # favorite color mini-script
         echo -n "What is your name? "
         read name
         echo -n "What is your favorite color? "
         read color
         echo "Hi $name, your favorite color is $color!"
         ;;
```

*First case ends here*

*First case of case statement starts here*

# Final Project Getting Started

*A variable ($ means "the value of")*

```
read RESPONSE
case $RESPONSE in
  1)     # favorite color mini-script
         echo -n "What is your name? "
         read name
         echo -n "What is your favorite color? "
         read color
         echo "Hi $name, your favorite color is $color!"
         ;;
```

*another variable*

*another variable*

*Variables ($ means "the value of")*

# Final Project Getting Started

```
read RESPONSE
case $RESPONSE in
  1)     # favorite color mini-script
         echo -n "What is your name? "
         read name
         echo -n "What is your favorite color? "
         read color
         echo "Hi $name, your fovorite color is $color!"
         ;;
```

*Comments begin with a #*

# Variables vs Files

# Variables vs Files

We use **variables** to reference data in memory. For example: PS1, PATH, LOGNAME, color, name


We use **filenames** to reference data on hard drives. For example: */etc/passwd, sonnet1, letter*

# Shell Variables

# Shell Variables

LOGNAME
LANG
SHELL
HOME
SSH_TTY
PWD
EUID
BASH_VERSION
LINES
COLORS
PPID
IFS
consoletype
SHELLOPTS
MAILCHECK
HOSTNAME
BASH_ENV
USER
BASH
PS4
TERM
PIPESTATUS
GROUPS
HISTFILESIZE
OPTIND
BASH_VERSINFO
UID
BASH_ARGV
PATH
PS1
SSH_CONNECTION
tmpid
SHLVL
HISTFILE
OSTYPE
USERNAME
BASH_ARGC
HISTSIZE
BASH_LINENO
LESSOPEN
OPTERR
SSH_CLIENT
HOSTTYPE
LS_COLORS
CVS_RSH
COLUMNS
INPUTRC
BASH_SOURCE
PROMPT_COMMAND
_
MACHTYPE
PS2
SSH_ASKPASS
DIRSTACK
MAIL
G_BROKEN_FILENAMES



*Note the convention of using upper case*

# View all shell variables

```
/home/cis90/simben/Poems $ set
BASH=/bin/bash
BASH_ARGC=()
BASH_ARGV=()
BASH_ENV=/home/cis90/simben/.bashrc
BASH_LINENO=()
BASH_SOURCE=()
BASH_VERSINFO=([0]="3" [1]="2" [2]="25" [3]="1"
[4]="release" [5]="i686-redhat-linux-gnu")
BASH_VERSION='3.2.25(1)-release'
COLORS=/etc/DIR_COLORS.xterm
COLUMNS=80
CVS_RSH=ssh
DIRSTACK=()
EUID=1160
GROUPS=()
G_BROKEN_FILENAMES=1
HISTFILE=/home/cis90/simben/.bash_history
HISTFILESIZE=1000
HISTSIZE=1000
HOME=/home/cis90/simben
HOSTNAME=opus.cabrillo.edu
HOSTTYPE=i686
IFS=$' \t\n'
IGNOREEOF=10
INPUTRC=/etc/inputrc
LANG=en_US.UTF-8
LESSOPEN='|/usr/bin/lesspipe.sh %s'
LINES=24
LOGNAME=simben
```

*The **set** command, with no arguments, will show all shell variables and their values*

```
LS_COLORS='no=00:fi=00:di=00;34:ln=00;36:pi=40;33:so=00;35
:bd=40;33;01:cd=40;33;01:or=01;05;37;41:mi=01;05;37;41:ex=
00;32:*.cmd=00;32:*.exe=00;32:*.com=00;32:*.btm=00;32:*.ba
t=00;32:*.sh=00;32:*.csh=00;32:*.tar=00;31:*.tgz=00;31:*.a
rj=00;31:*.taz=00;31:*.lzh=00;31:*.zip=00;31:*.z=00;31:*.Z
=00;31:*.gz=00;31:*.bz2=00;31:*.bz=00;31:*.tz=00;31:*.rpm=
00;31:*.cpio=00;31:*.jpg=00;35:*.gif=00;35:*.bmp=00;35:*.x
bm=00;35:*.xpm=00;35:*.png=00;35:*.tif=00;35:'
MACHTYPE=i686-redhat-linux-gnu
MAIL=/var/spool/mail/simben
MAILCHECK=60
OLDPWD=/home/cis90/simben
OPTERR=1
OPTIND=1
OSTYPE=linux-gnu
PATH=/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/home/
cis90/simben/../bin:/home/cis90/simben/bin:.
PIPESTATUS=([0]="0")
PPID=26514
PROMPT_COMMAND='echo -ne
"\033]0;${USER}@${HOSTNAME%%.*}:${PWD/#$HOME/~}"; echo -ne
"\007"'
PS1='$PWD $'
PS2='> '
PS4='+ '
PWD=/home/cis90/simben/Poems
SHELL=/bin/bash
SHELLOPTS=braceexpand:emacs:hashall:histexpand:ignoreeof:i
nteractive-comments:monitor
SHLVL=1
SSH_ASKPASS=/usr/libexec/openssh/gnome-ssh-askpass
TERM=xterm
UID=1160
USER=simben
USERNAME=
_=env
consoletype=pty
```

# Using Shell Variables

- Shell variables names consist of alpha-numeric characters.
- Variables defined by the Operating System are uppercase, e.g. TERM, PS1, PATH
- The **set** command will display all the shell's current variables and their values.
- Shell variables are initialized using the assignment operator:
  For example: **TERM=vt100**
  Note: Quotes must be used for white space: **VALUE="any value"**
- Variables may be viewed using the echo command:
  e.g. **echo $TERM**
  The $ in front of a variable name denotes the value of that variable.
- To remove a variable, use the unset command: **unset PS1**
- Shell variables hold their values for the duration of the session i.e. until the shell is exited

# Showing the values of variables

*Think of the $ metacharacter as "the value of"*

Use: **echo $***varname*

*Example 1*

```
[rsimms@nosmo ~]$ echo $PATH
/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/usr/X11R6/bin:/home/rsimms/bin
```

*Example 2*

```
[rsimms@nosmo ~]$ echo $TERM
xterm
```

*Example 3*

```
[rsimms@nosmo ~]$ echo $HOME
/home/rsimms
```

*Example 4*

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

*Using the echo command and the $ to show the values of variables*

# Setting the values of variables

Use: *varname=value*
(no spaces please around the =)

*Do NOT use the $ when setting a variable*

*Example 1*

```
[rsimms@nosmo ~]$ PS1="By your command >"
By your command >
By your command >PS1="What can I do for you $LOGNAME? "
What can I do for you rsimms?
What can I do for you rsimms?
```

*Example 2*

```
/home/cis90/simben/bin $ river="The Amazon"
/home/cis90/simben/bin $ echo $river
The Amazon
/home/cis90/simben/bin $ echo river
river
```

# Creating Shell Variables

1

```
/home/cis90/simmen/bin $ echo $defrost $ac $fan

/home/cis90/simmen/bin $
```

*the value of a variable that has not been created is null*

2

```
/home/cis90/simmen/bin $ defrost=on
/home/cis90/simmen/bin $ ac=off
/home/cis90/simmen/bin $ fan=medium
```

*create some new shell variables and assign values*

3

```
/home/cis90/simmen/bin $ echo $defrost $ac $fan
on off medium

/home/cis90/simmen/bin $ echo defrost ac fan
defrost ac fan
```

*print the **values** of the shell variables*

*print the **names** of the shell variables*

# Shell Variables

```
/home/cis90/simben $ defrost=on
/home/cis90/simben $ ac=off
/home/cis90/simben $ fan=medium
/home/cis90/simben $ set
```

```
BASH=/bin/bash
BASH_ARGC=()
BASH_ARGV=()
BASH_ENV=/home/cis90/simben/.bashrc
BASH_LINENO=()
BASH_SOURCE=()
BASH_VERSINFO=([0]="3" [1]="2" [2]="25" [3]="1" [4]="release" [5]="i686-redhat-linux-gnu")
BASH_VERSION='3.2.25(1)-release'
COLORS=/etc/DIR_COLORS.xterm
COLUMNS=84
CVS_RSH=ssh
DIRSTACK=()
EUID=1156
GROUPS=()
G_BROKEN_FILENAMES=1
HISTFILE=/home/cis90/simben/.bash_history
HISTFILESIZE=1000
HISTSIZE=1000
HOME=/home/cis90/simben
HOSTNAME=opus.cabrillo.edu
HOSTTYPE=i686
IFS=$' \t\n'
IGNOREEOF=10
INPUTRC=/etc/inputrc
LANG=en_US.UTF-8
LESSOPEN='|/usr/bin/lesspipe.sh %s'
LINES=39
LOGNAME=simben
LS_COLORS='no=00:fi=00:di=00;34:ln=00;36:pi=40;33:so=00;35:bd=40;33;01:cd=40;33;01:or=01;05;37;41:mi=01;05;37;41:ex=00;32:*.cmd=00;32:*.exe=00;32:*.com=00;32:*.btm=00;32:*.bat=00;32:*.sh=00;32:*.csh=00;32:*.tar=00;31:*.tgz=00;31:*.arj=00;31:*.taz=00;31:*
.lzh=00;31:*.zip=00;31:*.z=00;31:*.Z=00;31:*.gz=00;31:*.bz2=00;31:*.bz=00;31:*.tz=00;31:*.rpm=00;31:*.cpio=00;31:*.jpg=00;35:*.gif=00;35:*.bmp=00;35:*.xbm=00;35:*.xpm=00;35:*.png=00;35:*.tif=00;35:'
MACHTYPE=i686-redhat-linux-gnu
MAIL=/var/spool/mail/simben
MAILCHECK=60
OLDPWD=/home/cis90/simben/edits
OPTERR=1
OPTIND=1
OSTYPE=linux-gnu
PATH=/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/home/cis90/simben/../bin:/home/cis90/simben/bin:.
PIPESTATUS=([0]="0")
PPID=7254
PROMPT_COMMAND='echo -ne "\033]0;${USER}@${HOSTNAME%%.*}:${PWD/#$HOME/~}"; echo -ne "\007"'
PS1='$PWD $ '
PS2='> '
PS4='+ '
PWD=/home/cis90/simben
SHELL=/bin/bash
SHELLOPTS=braceexpand:emacs:hashall:histexpand:ignoreeof:interactive-comments:monitor
SHLVL=1
SSH_ASKPASS=/usr/libexec/openssh/gnome-ssh-askpass
SSH_CLIENT='63.249.103.107 19509 22'
SSH_CONNECTION='63.249.103.107 19509 207.62.186.9 22'
SSH_TTY=/dev/pts/1
TERM=xterm
UID=1156
USER=simben
USERNAME=
_=
ac=off
consoletype=pty
defrost=on
fan=medium
```

*Note: Any new variables you initialize will show up in the output of the **set** command*

*font reduced for the other variables to fit on slide*

# Shell Variables

*Using grep to find a variable in the output of the set command*

```
/home/cis90/simben $ set | grep defrost
defrost=on
```

*The output of the set command is piped to the grep command which displays only lines containing "defrost"*

# Class Activity

Create and initialize three new variables:

**defrost=on**
**ac=off**
**fan=medium**

Show the names of the variables:

**echo defrost ac fan**

Show the values of the variables:

**echo $defrost $ac $fan**

Display all variables and locate yours:

**set**
**set | grep defrost**
**set | grep ac**
**set | grep fan**

*Paste the output from **set | grep fan** in the chat window*

# Removing Shell Variables

To remove a variable, use the unset command: **unset PS1**

```
/home/cis90/simben $ echo  $defrost  $ac  $fan
on off medium
```

*show values*

```
/home/cis90/simben $ unset defrost
/home/cis90/simben $ echo  $defrost  $ac  $fan
off medium
```

*remove one of the variables*

```
/home/cis90/simben $ unset ac fan
/home/cis90/simben $ echo  $defrost  $ac  $fan

/home/cis90/simben $
```

*remove remaining variables*

# Class Exercise

Delete your three new variables:

**unset defrost**
**unset ac fan**

Show the names of the variables:

**echo defrost ac fan**

Show the values of the variables:

**echo $defrost $ac $fan**
**echo "defrost=$defrost"**

*Paste the output from **echo "defrost=$defrost"** into the chat window*

# Shell Variables

*Variables are often used in scripts when you need a temporary placeholder to store some data*

1

```
/home/cis90/simben $ vi funscript
/home/cis90/simben $ cat funscript
#!/bin/bash
echo -n "Turn the Air Conditioning on or off? "
read ac
echo "Air Conditioning set to $ac"
exit
```

*Create a script that uses a variable named "ac" to hold the status of an air conditioner.*

*Prompt the user and input what they type into the this variable.*

2

```
/home/cis90/simben $ chmod +x funscript
```

*Add execute permissions so the script can be run*

3

```
/home/cis90/simben $ ./funscript
Turn the Air Conditioning on or off? off
Air Conditioning set to off
```

*Run the script*

# Class Exercise

Now make this little user dialog script:

**vi funscript**

*insert the following lines then save*

```
#!/bin/bash
echo -n "Turn the Air Conditioning on or off? "
read ac
echo "Air Conditioning set to $ac"
exit
```

**chmod +x funscript**

**./funscript**

*Do a long listing on funscript and paste the output into the chat window*

# Environment Variables

# Environment Variables

**SHELL** **SSH_TTY** **LOGNAME** **HOME** **LANG** **PWD**

EUID

BASH_VERSION LINES COLORS PPID

IFS

consoletype SHELLOPTS

MAILCHECK **BASH_ENV** **HOSTNAME**

**USER** BASH PS4 **TERM** PIPESTATUS GROUPS

HISTFILESIZE OPTIND

BASH_VERSINFO

UID

BASH_ARGV **PATH** PS1

**SSH_CONNECTION**

tmpid

**SHLVL** HISTFILE

OSTYPE

BASH_ARGC **USERNAME**

**HISTSIZE** BASH_LINENO **LESSOPEN**

OPTERR

**SSH_CLIENT**

HOSTTYPE **LS_COLORS** **CVS_RSH**

COLUMNS **INPUTRC**

BASH_SOURCE

PROMPT_COMMAND _ MACHTYPE

PS2

DIRSTACK **MAIL** **SSH_ASKPASS**

**G_BROKEN_FILENAMES**

*Use the **env** to see which of the shell variables have been exported and therefore are environment variables (shown in bold/green above)*

# View all Environment (exported) Variables

```
[simben@opus ~]$ env
HOSTNAME=opus.cabrillo.edu
SHELL=/bin/bash
TERM=xterm
HISTSIZE=1000
SSH_CLIENT=63.249.103.107 20807 22
SSH_TTY=/dev/pts/0
USER=simben
LS_COLORS=no=00:fi=00:di=00;34:ln=00;36:pi=40;33:so=00;35:bd=40;33;01:cd=40;33;01:or=01;05;37;41:mi=01;05
;37;41:ex=00;32:*.cmd=00;32:*.exe=00;32:*.com=00;32:*.btm=00;32:*.bat=00;32:*.sh=00;32:*.csh=00;32:*.tar=
00;31:*.tgz=00;31:*.arj=00;31:*.taz=00;31:*.lzh=00;31:*.zip=00;31:*.z=00;31:*.Z=00;31:*.gz=00;31:*.bz2=00
;31:*.bz=00;31:*.tz=00;31:*.rpm=00;31:*.cpio=00;31:*.jpg=00;35:*.gif=00;35:*.bmp=00;35:*.xbm=00;35:*.xpm=
00;35:*.png=00;35:*.tif=00;35:
USERNAME=
PATH=/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/home/cis90/simben/../bin:/home/cis90/simben/bin:.
MAIL=/var/spool/mail/simben
PWD=/home/cis90/simben
INPUTRC=/etc/inputrc
LANG=en_US.UTF-8
fan=medium
SSH_ASKPASS=/usr/libexec/openssh/gnome-ssh-askpass
HOME=/home/cis90/simben
SHLVL=2
BASH_ENV=/home/cis90/simben/.bashrc
LOGNAME=simben
CVS_RSH=ssh
SSH_CONNECTION=63.249.103.107 20807 207.62.186.9 22
LESSOPEN=|/usr/bin/lesspipe.sh %s
G_BROKEN_FILENAMES=1
_=/bin/env
```

*The env command by itself will list all the environment (exported) variables*

# View all Environment (exported) Variables

```
[simben@opus ~]$ export
declare -x BASH_ENV="/home/cis90/simben/.bashrc"
declare -x CVS_RSH="ssh"
declare -x G_BROKEN_FILENAMES="1"
declare -x HISTSIZE="1000"
declare -x HOME="/home/cis90/simben"
declare -x HOSTNAME="opus.cabrillo.edu"
declare -x INPUTRC="/etc/inputrc"
declare -x LANG="en_US.UTF-8"
declare -x LESSOPEN="|/usr/bin/lesspipe.sh %s"
declare -x LOGNAME="simben"
declare -x
LS_COLORS="no=00:fi=00:di=00;34:ln=00;36:pi=40;33:so=00;35:bd=40;33;01:cd=40;33;01:or=01;05;37;41:mi=01;05;37
;41:ex=00;32:*.cmd=00;32:*.exe=00;32:*.com=00;32:*.btm=00;32:*.bat=00;32:*.sh=00;32:*.csh=00;32:*.tar=00;31:*
.tgz=00;31:*.arj=00;31:*.taz=00;31:*.lzh=00;31:*.zip=00;31:*.z=00;31:*.Z=00;31:*.gz=00;31:*.bz2=00;31:*.bz=00
;31:*.tz=00;31:*.rpm=00;31:*.cpio=00;31:*.jpg=00;35:*.gif=00;35:*.bmp=00;35:*.xbm=00;35:*.xpm=00;35:*.png=00;
35:*.tif=00;35:"
declare -x MAIL="/var/spool/mail/simben"
declare -x OLDPWD
declare -x
PATH="/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/home/cis90/simben/../bin:/home/cis90/simben/bin:."
declare -x PWD="/home/cis90/simben"
declare -x SHELL="/bin/bash"
declare -x SHLVL="2"
declare -x SSH_ASKPASS="/usr/libexec/openssh/gnome-ssh-askpass"
declare -x SSH_CLIENT="63.249.103.107 20807 22"
declare -x SSH_CONNECTION="63.249.103.107 20807 207.62.186.9 22"
declare -x SSH_TTY="/dev/pts/0"
declare -x TERM="xterm"
declare -x USER="simben"
declare -x USERNAME=""
```

*The **export** command by itself will list all the exported (environment) variables.*

*Similar to **env** command but different output format*

# Using Environment (exported) Variables

- Environment variables are a special subset of the shell variables.
- Environment variables are shell variables that have been *exported*.
- The **env** command will display the current environment variables and their values. Using the **export** command with no arguments will also show all the environment variables.
- The **export** command is used to make a shell variable into an environment variable.

  **dog=benji; export dog**
  or **export dog=benji**

- The **export -n** command is used to make an environment variable back into a normal shell variable. E.g. **export -n dog** makes dog back into a regular shell variable.
- **Child processes are provided copies of the parent's environment variables.**
- **Any changes made by the child will not affect the parent's copies.**

# Shell (Environment) Variables

## export command - show all exported variables

*To create your own environment variable use the **export** command*

1

```
/home/cis90/simben $ env | wc -l
29
/home/cis90/simben $ export | wc -l
29
```

*There are currently 29 environment (exported) variables*

2

```
/home/cis90/simben $ fan=medium
/home/cis90/simben $ export fan
```

*Create a new shell variable named fan and export it so it becomes an environment variable*

3

```
/home/cis90/simben $ env | wc -l
30
/home/cis90/simben $ export | wc -l
30
```

*Now there are 30 environment variables*

4

```
[simben@opus ~]$ export | grep fan
declare -x fan="medium"
[simben@opus ~]$ env | grep fan
fan=medium
[simben@opus ~]$ set | grep fan
fan=medium
```

*use grep to show fan is an environment (exported) shell variable*

*use grep to show fan is a shell variable*

# Class Exercise

Recreate the variable named fan:

**fan=high**

Show that fan is now one of your shell variables:

**set | grep fan**

Show that fan is not exported:

**env | grep fan**

Now export fan:

**export fan**
**env | grep fan**

*Paste the output from **env | grep fan** into the chat window*

# Shell Environment

# The Shell Environment

- The shell environment can be customized using the environment variables.
- Commands in the shell environment can be customized using aliases.
- Aliases and environment variable settings can be made permanent using the hidden .*bash_profile* and .*bashrc* files in the users home directory.
- Environment variables can be exported so they are available to child processes.

# Shell (Environment) Variables

## Some famous environment variables

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

# Class Exercise

Echo three environment variables as follows:

**echo "I'm in $PWD using $SHELL and my username is $LOGNAME"**

*Paste the output you get into the chat window*

# bash shell tip

## changing the prompt

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

The prompt string can have any combination of text, variables and these codes.

# Customizing the shell prompt with PS1

| PS1 settings | Result |
|---|---|
| `PS1='$PWD $'` | `/home/cis90/simben/Poems $` |
| `PS1="\w $"` | `~/Poems $` |
| `PS1="\W $"` | `Poems $` |
| `PS1="\u@\h $"` | `simben90@opus $` |
| `PS1='\u@\h $PWD $'` | `simben90@opus /home/cis90/simben/Poems $` |
| `PS1='\u@\$HOSTNAME $PWD $'` | `simben90@opus.cabrillo.edu /home/cis90/simben/Poems $` |
| `PS1='\u \! $PWD $'` | `simben90 825 /home/cis90/simben/Poems $` |
| `PS1="\d [\u@\h \W/] \$ "` | `Mon Nov 16 [simben90@oslab Poems/] $` |
| `PS1="Enter command: "` | `Enter command:` |

Important: Use single quotes around variables that change. For example if you use $PWD with double quotes, the prompt will **not** change as you change directories!

# Class Exercise

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

Make a new prompt using one or more of the special prompt codes:

**PS1="***make your own prompt here***"**

*Paste your new prompt into the chat window*

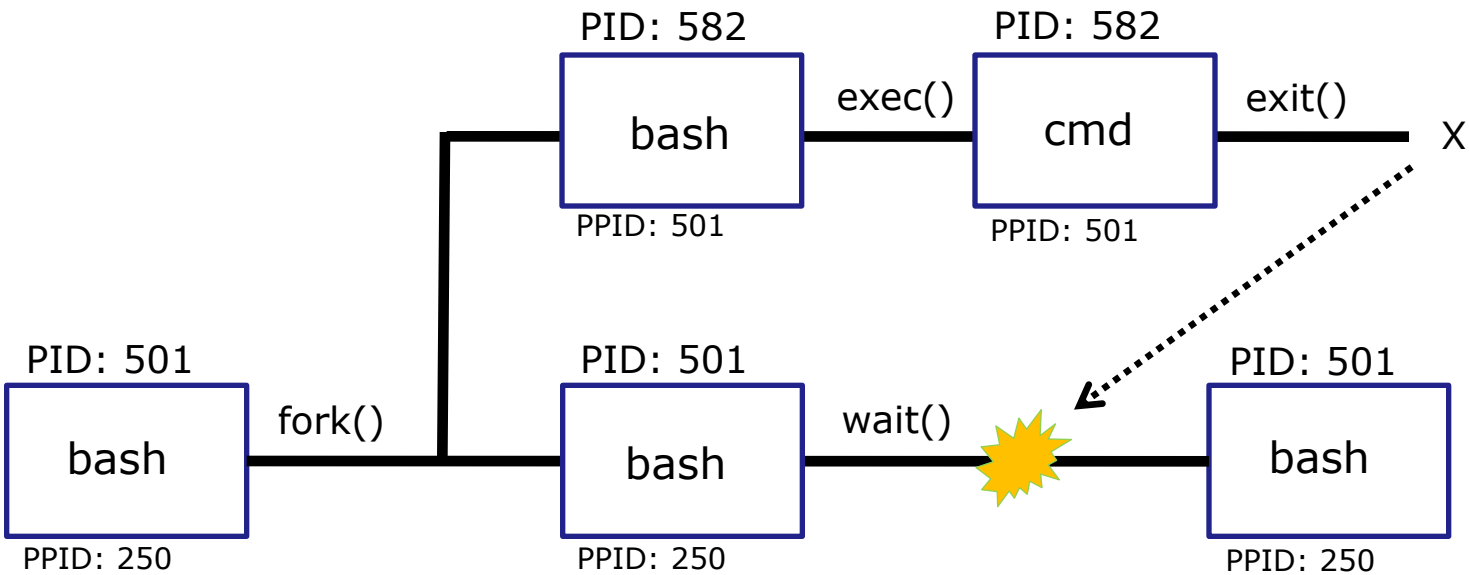
# Variables and child processes

# The rules of the road for variables

1. When a shell forks a child, only copies of exported variables are made available to the child.

2. A child can modify the variables it receives but those modifications will not change the parent's variables.

# exporting variables




- When a shell forks a child, only copies of exported variables are made available to the child.
- A child can modify the variables it receives but those modifications will not change the parent's variables.

# The rules of the road for variables

1. When a shell forks a child, only copies of exported variables are made available to the child.

2. A child can modify the variables it receives but those modifications will not change the parent's variables.

# Only exported variables are available to the child

1 parent

```
/home/cis90/simben $ window=down
/home/cis90/simben $ echo $window $LOGNAME
down simben90
```

*Create a new variable named window*

2 parent

```
/home/cis90/simben $ env | grep window
/home/cis90/simben $ set | grep window
window=down

/home/cis90/simben $ env | grep LOGNAME
LOGNAME=simben90
/home/cis90/simben $ set | grep LOGNAME
LOGNAME=simben90
```

*window is a shell variable that has **not** been exported.*

*LOGNAME is an environment variable that has been exported.*

3 child

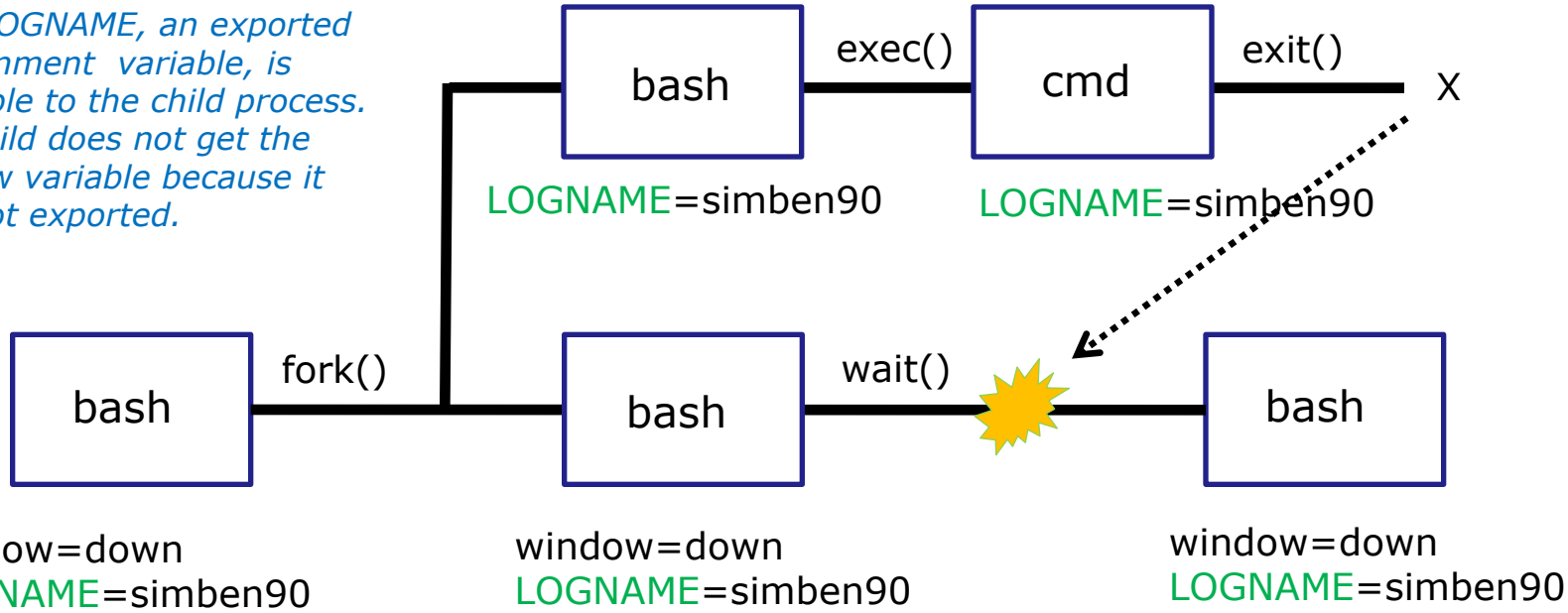
```
/home/cis90/simben $ bash
[simben@opus ~]$ echo $window $LOGNAME
simben90
[simben@opus ~]$ exit
exit
```

*Running the bash command starts another bash process as a child of the current bash process. LOGNAME has a value, but there is no window variable.*

*IMPORTANT OBSERVATION: Only LOGNAME, an exported environment variable, is available to the child process. The child does not get the window variable because it was not exported.*

# Only exported variables are available to the child

*IMPORTANT OBSERVATION: Only LOGNAME, an exported environment variable, is available to the child process. The child does not get the window variable because it was not exported.*




- When a shell forks a child, not all of the variables are passed on to the child.
- Only copies of the parent's exported variables are passed to the child.

# The rules of the road for variables

1. When a shell forks a child, only copies of exported variables are made available to the child.

2. A child can modify the variables it receives but those modifications will not change the parent's variables.

# Changes made by the child do not affect the parent

1 *parent*

```
/home/cis90/simben $ echo $window
down
/home/cis90/simben $ export window
```

*export window so it is available to children*

2 *child*

```
/home/cis90/simben $ bash
[simben@opus ~]$ echo $window
down
```

*a copy of window is now available to the child process*

3 *child*

```
[simben@opus ~]$ window=up
[simben@opus ~]$ echo $window
up
[simben@opus ~]$ exit
exit
```

*the child modifies the window variable*

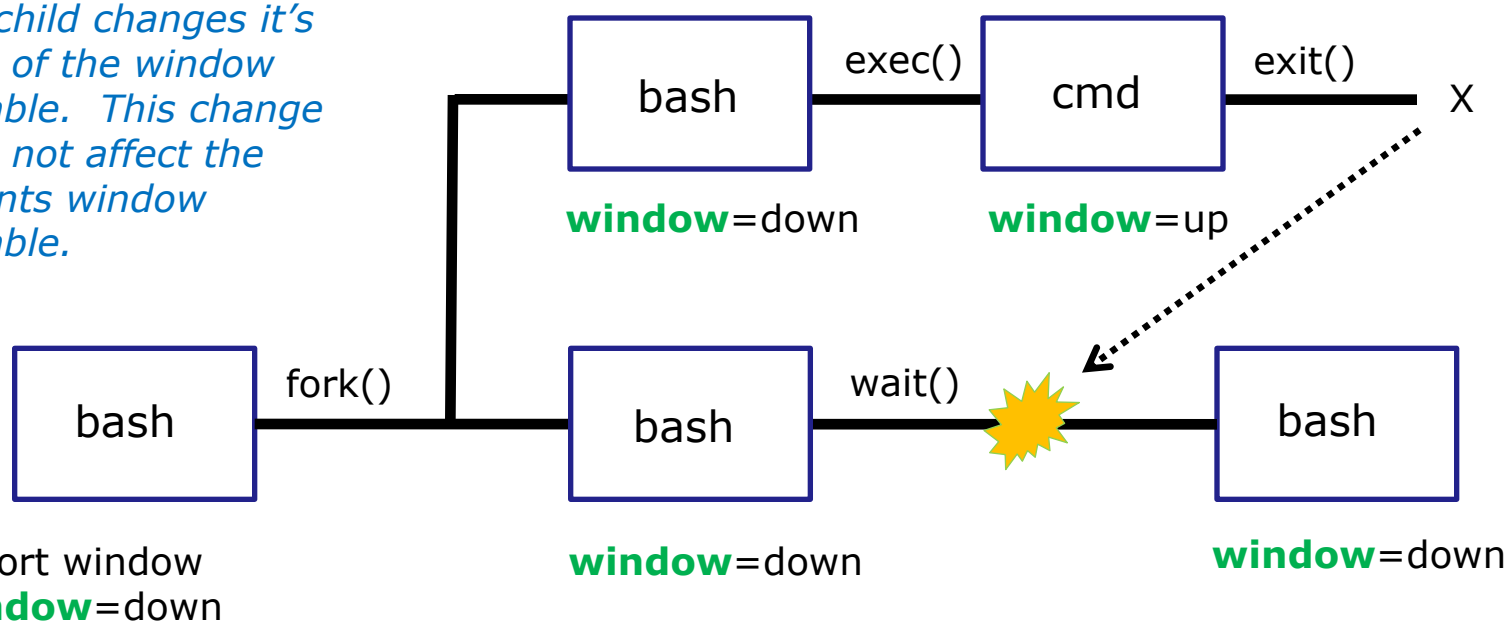
4 *parent*

```
/home/cis90/simben $ echo $window
down
```

*The modifications made by the child do not affect the parent's variable*

# Changes made by the child do not affect the parent

*The child changes it's copy of the window variable. This change does not affect the parents window variable.*




- A child can modify the variables it receives but those modifications will not change the parent's variables.

# Class Exercise

Look at the commands in this executable script:

```
/home/cis90/simben $ chmod +x var-rules
/home/cis90/simben $ cat var-rules
echo "The variable named berry is set to: \"$berry\""
cd /tmp
```

What would be the output of running the script as follows:

```
berry=raspberry
var-rules
```

*Paste your answer into the chat window*

# Class Exercise

Look at the commands in this executable script:

```
/home/cis90/simben $ chmod +x var-rules
/home/cis90/simben $ cat var-rules
echo "The variable named berry is set to: \"$berry\""
cd /tmp
```

What would be the output of running the script as follows:

```
berry=raspberry
export berry
var-rules
```

*Paste your answer into the chat window*

# Class Exercise

Look at the commands in this executable script:

```
/home/cis90/simben $ chmod +x var-rules
/home/cis90/simben $ cat var-rules
echo "The variable named berry is set to: \"$berry\""
cd /tmp
```

What directory would you be in after running the script as follows:

```
berry=raspberry
var-rules
```

*Paste your answer into the chat window*

# Aliases

# alias command
## (a shell builtin)

```
alias [-p] [name[=value] ...]
              Alias with no arguments or with the -p option prints the list
              of aliases in the form alias name=value on  standard  output.
              When  arguments  are  supplied,  an alias is defined for each
              name whose value is given.  A trailing space in  value causes
              the  next  word to be checked for alias substitution when the
              alias is expanded.  For each name in the  argument  list  for
              which  no  value is supplied, the name and value of the alias
              is printed.  Alias returns true unless a name  is  given  for
              which no alias has been defined.

              Note  aliases  are not expanded by default in non-interactive
              shell, and it can be enabled by  setting  the  expand_aliases
              shell option using shopt.
```

*Now you can give your own name to commands!*

# alias command

*Example: Make a new name for the cp command*

1
```
/home/cis90/simben $ alias copy=cp
/home/cis90/simben $ copy lab09 /home/rsimms/turnin/cis90/lab09.$LOGNAME
/home/cis90/simben $
```

2
```
/home/cis90/simben $ type copy
copy is aliased to `cp'
/home/cis90/simben $
```

*The **type** command shows that copy is an alias*

3
```
/home/cis90/simben $ alias copy
alias copy='cp'
/home/cis90/simben $
```

*The **alias** command (without an "=" sign) shows what the alias is*

4
```
/home/cis90/simben $ unalias copy
/home/cis90/simben $ alias copy
-bash: alias: copy: not found
```

*Use **unalias** command to remove an alias*

# alias command

*Example: Make an alias, called s, that prints the first 5 lines of small_town*

1

```
/home/cis90/simben $ alias s="clear; head -n5 ~/edits/small_town"
/home/cis90/simben $ s
HOW SMALL IS SMALL?

YOU KNOW WHEN YOU'RE IN A SMALL TOWN WHEN...
   The airport runaway is terraced.
   The polka is more popular than a moshpit on Saturday night.
/home/cis90/simben $
```

2

```
/home/cis90/simben $ type s
s is aliased to `clear; head -n5 ~/edits/small_town'
/home/cis90/simben $ alias s
alias s='clear; head -n5 ~/edits/small_town'
```

*The **type** and **alias** commands show that s is an alias*

3

```
/home/cis90/simben $ unalias s
/home/cis90/simben $
```

*Use **unalias** command to remove an alias*

# alias an alias

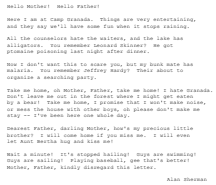
*Yes, an alias can be made using another alias*

1

```
/home/cis90/simben $ alias show=cat
/home/cis90/simben $ alias mira=show
```

*Make **show** an alias of **cat***
*Make **mira** an alias of **show***

```
/home/cis90/simben $ show letter
```


Hello Mother!  Hello Father!

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

All the counselors hate the waiters, and the lake has
alligators.  You remember Leonard Skinner?  He got
promaine poisoning last night after dinner.

Now I didn't want this to scare you, but my bunk mate has
malaria.  You remember Jeffrey Hardy?  They's about to
organize a searching party.

Take me home, oh Mother, Father, take me home! I hate Granada.
Don't leave me out in the forest where I might get eaten
by a bear!  Take me home, I promise that I won't make noise,
or mess the house with other boys, oh please don't make me
stay -- I've been here one whole day.

Dearest Father, darling Mother, how's my precious little
brother?  I will come home if you miss me.  I will even
let Aunt Bertha hug and kiss me!

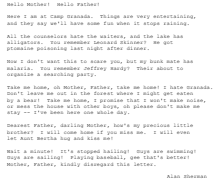
Wait a minute!  It's stopped hailing!  Guys are swimming!
Guys are sailing!  Playing baseball, gee that's better!
Mother, Father, kindly disregard this letter.

Alan Sherman

*reduced size to fit on page*

2

```
/home/cis90/simben $ mira letter
```


Hello Mother!  Hello Father!

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

All the counselors hate the waiters, and the lake has
alligators.  You remember Leonard Skinner?  He got
promaine poisoning last night after dinner.

Now I didn't want this to scare you, but my bunk mate has
malaria.  You remember Jeffrey Hardy?  They's about to
organize a searching party.

Take me home, oh Mother, Father, take me home! I hate Granada.
Don't leave me out in the forest where I might get eaten
by a bear!  Take me home, I promise that I won't make noise,
or mess the house with other boys, oh please don't make me
stay -- I've been here one whole day.

Dearest Father, darling Mother, how's my precious little
brother?  I will come home if you miss me.  I will even
let Aunt Bertha hug and kiss me!

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

Alan Sherman

*reduced size to fit on page*

*Now, either **show letter** or **mira letter** will cat out the letter file*

3

```
/home/cis90/simben $ unalias show
/home/cis90/simben $ alias mira
alias view='show'
/home/cis90/simben $ mira letter
-bash: show: command not found
/home/cis90/simben $
```

*It can be broken too*

# single and double quotes (**very subtle**)

*You can control whether bash does filename expansion when you create the alias or … when the alias is used*

```
$ ac=on
$ fan=medium
$ defrost=off
```

*double*

*single*

1

```
$ alias p="echo $ac $fan $defrost"
$ alias p
alias p='echo on medium off'
```

```
$ alias p='echo $ac $fan $defrost'
$ alias p
alias p='echo $ac $fan $defrost'
```

2

```
$ p
on medium off
```

```
$ p
on medium off
```

3

```
$ ac=off
```

```
$ ac=off
```

4

```
$ p
on medium off
```

```
$ p
off medium off
```

*Note: using single quotes prevents bash from expanding the variables when creating up the alias*

# Class Exercise

## Make some aliases

Make an alias named **showpath** that shows the shell path:

```
alias showpath="echo $PATH"
mypath
```

Make an alias named **whereonpath** that shows where on the path a command is:

```
alias whereonpath="type -a"
whereonpath ls
whereonpath tty
whereonpath bogus
```

*Paste the output of **whereonpath tty** into the chat window*

# bash startup files

# bash startup files

*Only executed when logging in*

**/etc/profile** (system wide)

- adds root's special path

**/etc/profile.d/*.sh** (system wide)

- kerberos directories added to path
- adds color, vi aliases
- language, character sets

**.bash_profile** or **.profile** (user specific)

- set up your path, prompt and other environment variables

**.bashrc** (user specific)

- add your new aliases here

*Edit these files to customize your shell environment*

**/etc/bashrc** (system wide)

- changes umask to 0002 for regular users
- sets final prompt string

*Note: The Debian family (Ubuntu, Mint, Raspian, etc.) uses .profile instead of .bash_profile*

# .bash_profile

(Red Hat family)

# .profile

(Debian family)

# .bash_profile

- The *.bash_profile* is a shell script that sets up a user's shell environment.
- This script is executed each time the user logs in.
- The *.bash_profile* is used for initializing shell variables and running basic commands like umask or set -o options.
- This script also runs the user's *.bashrc* file

*The Debian family uses .profile instead of .bash_profile*

# .bash_profile for CIS 90 (runs only at login)

```
[simben@opus ~]$ cat .bash_profile
# .bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
        . ~/.bashrc
fi

# User specific environment and startup programs

PATH=$PATH:$HOME/../bin:$HOME/bin:.
BASH_ENV=$HOME/.bashrc
USERNAME=""
PS1='$PWD $ '
export USERNAME BASH_ENV PATH
umask 002
set -o ignoreeof
stty susp ^F
eval `tset -s -m vt100:vt100 -m :\?${TERM:-ansi} -r -Q `

[simben@opus ~]$
```

*sources the .bashrc file*

*Appends the CIS 90 bin, the user's bin and the "current" directories to the path*

*The special prompt used for CIS 90 students is specified*

*variables are exported*

*umask value is set*

*EOF's are ignored*

*Suspend character redefined from Z to F*

*Terminal type is requested and set*

# .bashrc

# .bashrc

- The *.bashrc* is a shell script that is executed during user login and whenever a new shell is invoked
- Good place to add user defined aliases

# .bashrc

The *.bashrc* is a shell script that is executed during user login and whenever a new shell is invoked. This file usually contains the user defined aliases.

```
[simben@opus ~]$ cat .bashrc
# .bashrc

# User specific aliases and functions

# Source global definitions
if [ -f /etc/bashrc ]; then
        . /etc/bashrc
fi
alias print="echo -e"
[simben@opus ~]$
```

*sources the /etc/bashrc file*

*creates a print alias, the -e option enables interpretation of backslash escapes*

# Class Exercise

## Modify .bashrc

Add a new permanent alias to your bash environment

```
alias me="finger $LOGNAME"
```

When finished logout and login again and verify the alias is permanent.

# . and exec

# . and exec

In normal execution of a UNIX command, shell-script or binary, the child process is unable to affect the login shell environment.

Sometimes it is desirable to run a shell script that will initialize or change shell variables in the parent environment. To do this, the shell (bash) provides a **.** (dot) or **source** command, which instructs the shell to execute the shell script itself, without spawning a child process to run the script, and then continue on where it left off.

**. *myscript***
**source *myscript*** } *equivalent*

In this example, the commands in the file script are run by the parent shell, and therefore, any changes made to the environment will last for the duration of the login session.

If a UNIX command is run using the **exec** command, the bash code in the process is overlaid by the command code, when finished the process will terminate

**exec clear**

This will have the effect of clearing the screen and logging off the computer

# Grok this lesson?

```
/home/cis90/simben $ vi /home/cis90/bin/flowers
```

simben90@oslab:~

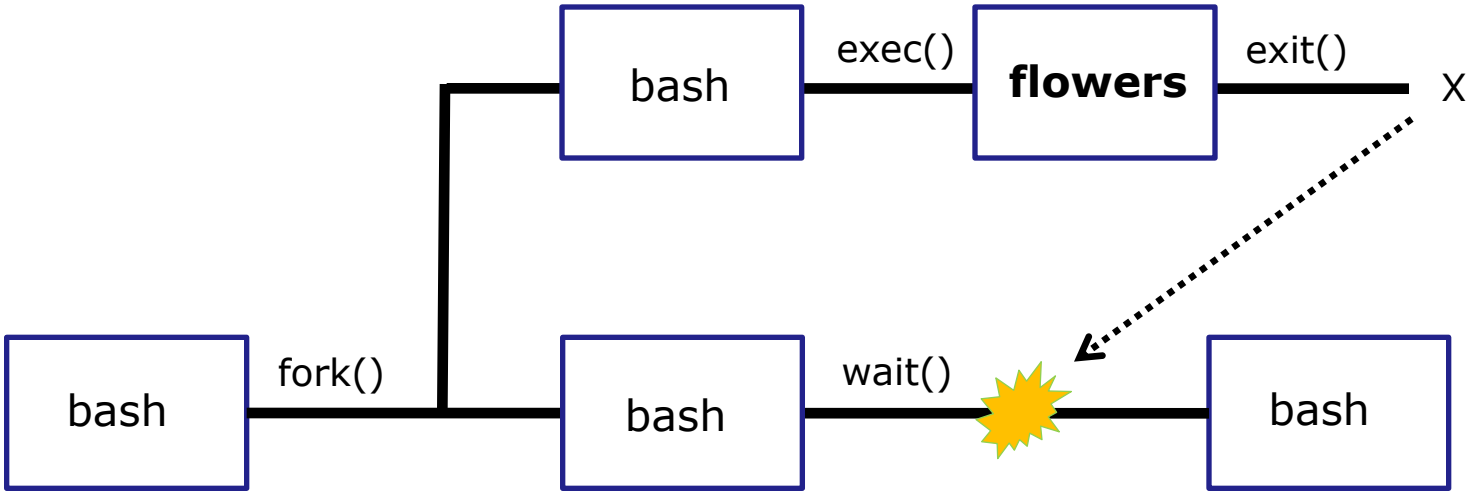
```
#!/bin/bash
#
# Useful alias:
#   alias go='echo roses are \"$roses\" and violets are \"$violets\"'
#
echo
echo "==> Entering child process <==="
ps
echo "==> showing variables in child <==="
echo "  " roses are '"'$roses'"'
echo "  " violets are '"'$violets'"'
echo "==> setting variables in child <==="
roses=black
violets=orange
echo "==> Leaving child process <==="
echo
~
~
~
~
"/home/cis90/bin/flowers" [readonly] 16L, 372C                    1,1          All
```

*You can copy and paste*

```
/home/cis90/simben $ alias go='echo roses are \"$roses\" and violets are \"$violets\"'
/home/cis90/simben $ go
roses are "" and violets are ""
```

*The **go** alias is used to show the current values of the roses and violets variables*

# running the flowers script




*Use the **flowers** script to test your understanding of how variables are handled with child processes*

# As a convenience create an alias to show variable values

*Note, the double quotes are escaped. We don't want bash to treat them as special metacharacters. We just want the double quotes preserved so they can be seen in the output of the echo command.*

```
/home/cis90/simben $ alias go='echo roses are \"$roses\" and violets
are \"$violets\"'

/home/cis90/simben $ alias go
alias go='echo roses are \"$roses\" and violets are \"$violets\"'

/home/cis90/simben $ go
roses are "" and violets are ""
```

*Since there are no shell variables named roses or violets the echo command prints nothing for them.*

# Create and initialize variables

```
/home/cis90/simben $ go
roses are "" and violets are ""
```

```
/home/cis90/simben $ roses=red
/home/cis90/simben $ go
roses are "red" and violets are ""
```

*Now the roses variable has been created and initialized*

```
/home/cis90/simben $ violets=blue
/home/cis90/simben $ go
roses are "red" and violets are "blue"
```

*Now the violets variable has been created and initialized*

# Unset variables

```
/home/cis90/simben $ unset roses
/home/cis90/simben $ go
roses are "" and violets are "blue"
```

*Now the roses variable no longer exists*

```
/home/cis90/simben $ unset violets
/home/cis90/simben $ go
roses are "" and violets are ""
```

*Now the violets variable no longer exists*

# Create and initialize variables again

```
/home/cis90/simben $ roses=red; violets=blue
/home/cis90/simben $ go
roses are "red" and violets are "blue"
```

*Now both variables have been created and initialized again*

# Run flowers script as a child process

(variables not exported)

```
/home/cis90/simben $ go
roses are "red" and violets are "blue"

/home/cis90/simben $ flowers

==> Entering child process <==
  PID TTY          TIME CMD
28834 pts/0    00:00:00 bash
29447 pts/0    00:00:00 flowers
29454 pts/0    00:00:00 ps
==> showing variables in child <==
   roses are ""
   violets are ""
==> setting variables in child <==
==> Leaving child process <==

/home/cis90/simben $ go
roses are "red" and violets are "blue"
```

*The parent sees roses and violets*

*The child does not see roses or violets*

*The variables are unchanged after running flowers script*

# Run flowers script as a child process

(roses variable exported)

```
/home/cis90/simben $ export roses
/home/cis90/simben $ go
roses are "red" and violets are "blue"

/home/cis90/simben $ flowers

==> Entering child process <==
  PID TTY          TIME CMD
28834 pts/0    00:00:00 bash
29457 pts/0    00:00:00 flowers
29464 pts/0    00:00:00 ps
==> showing variables in child <==
   roses are "red"
   violets are ""
==> setting variables in child <==
==> Leaving child process <==

/home/cis90/simben $ go
roses are "red" and violets are "blue"
```

*The parent sees roses and violets*

*The child now sees roses since it was exported*

*The variables are unchanged after running flowers script*

# Run flowers script as a child process
(script sourced)

```
/home/cis90/simben $ go
roses are "red" and violets are "blue"

/home/cis90/simben $ source flowers

==> Entering child process <==
  PID TTY          TIME CMD
28834 pts/0    00:00:00 bash
29469 pts/0    00:00:00 ps
==> showing variables in child <==
   roses are "red"
   violets are "blue"
==> setting variables in child <==
==> Leaving child process <==

/home/cis90/simben $ go
roses are "black" and violets are "orange"
```

*The parent sees roses and violets*

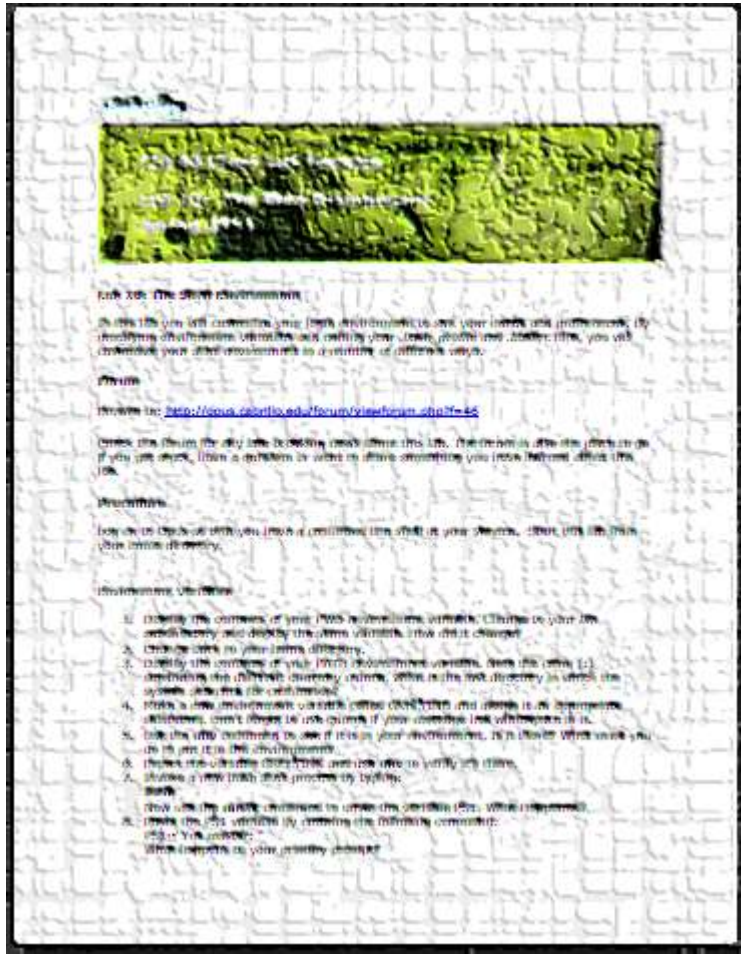
*script is not running as child*

*The script now sees roses and violets because it is running in the parent process*

*The variables are changed after running flowers script*


Assignment

# Lab 10 - the last one!



*You may end up locking yourself out of Opus or seeing other strange things when doing this lab.*

*I'll be monitoring the forum as usual if anyone needs help.*

# Wrap up

# Extra Credit Special

1) Why did the prompt change?

```
/home/cis90/simben $ bash
[simben@opus ~]$ exit
exit
/home/cis90/simben $
```

2) What command could be issued prior to the bash command above that would prevent the prompt from changing?

*For 2 points extra credit, email risimms@cabrillo.edu answers to **both** questions before the next class starts*

New commands:

| | |
|---|---|
| . | - source the commands |
| alias | - create or show an alias |
| unalias | - remove an alias |
| set | - show all variables |
| env | - show environment variables |
| export | - export variable so child can use |
| exec | - replace with new code |
| source | - same as . |

New Files and Directories:

| | |
|---|---|
| .bash_profile | - executed at login |
| .bashrc | - executed at login and new shells |

# Next Class

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

Lab 10

Quiz questions for next class:

- How do you make an alias setting permanent?
- What must you do to a variable so a child can use it?
- How would you use an alias to make a command named copy … that would do what the cp command does?

# Backup

# vi and /bin/mail (review)

# Best Practice - /bin/mail and vi

```
/home/cis90/simben $ mail rodduk90
Subject: Good bones
Hey Duke,
I really appreciate thatbone you sent me last week.
Let me knwo if you want to go mark some fench posts
this weekend.
Later,
Ben
```

*You are composing a message and you spot some typos …*
*CRUD … what can you do?*

# /bin/mail and vi

```
/home/cis90/simben $ mail rodduk90
Subject: Good bones
Hey Duke,
I really appreciate thatbone you sent me last week.
Let me knwo if you want to go mark some fench posts
this weekend.
Later,
Ben
~v
```

*Well … you could try the ~v command*

# /bin/mail and vi

```
simmsben@opus:~
Hey Duke,
I really appreciate that bone you sent me last week.
Let me know if you want to go mark some fench posts
this weekend.
Later,
Ben
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
"/tmp/RecVQYE2" 7L, 141C
```

*The message is loaded into vi where changes or additions can be made. <Esc>:wq is used to save and quit vi*

# /bin/mail and vi

```
/home/cis90/simben $ mail rodduk90
Subject: Good bones
Hey Duke,
I really appreciate thatbone you sent me last week.
Let me knwo if you want to go mark some fench posts
this weekend.
Later,
Ben
~v
(continue)
.
Cc:
/home/cis90/simben $
```

*The earlier text with typos is still showing, however the corrected version is what is actually sent.*

# /bin/mail and vi

```
/home/cis90/rodduk $ mail
Mail version 8.1 6/6/93.  Type ? for help.
"/var/spool/mail/rodduk90": 1 message 1 unread
>U  1 simben90@opus.cabril  Mon Nov 10 20:25  22/782   "Good bones"
& 1
Message 1:
From simben90@opus.cabrillo.edu  Mon Nov 10 20:25:32 2008
Date: Mon, 10 Nov 2008 20:25:32 -0800
From: Benji Simms <simben90@opus.cabrillo.edu>
To: rodduk90@opus.cabrillo.edu
Subject: Good bones

Hey Duke,
I really appreciate that bone you sent me last week.
Let me know if you want to go mark some fence posts
this weekend.
Later,
Ben
```

*The message Duke reads has all the typos fixed!*

```
&
```

# Activity

Try it!

Use /bin/mail and send yourself a message:

**mail $LOGNAME**

Type a few lines into the message then use the **~v** command to correct or change them.

Read the email you sent yourself to see if your changes worked.


Did it work?
Start this activity by putting a red x in CCC Confer.
If you get it to work correctly change your red x to a green checkmark