Lesson Module Checklist

- Slides
- Converted WB

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

- Lab tested
- Put sonnet6 & bigfile in depot

- Real test 1 staged on blackboard
- Test 1 system configured, tested and ready

- 9V backup battery for microphone
- Backup slides, CCC info, handouts on flash drive

Student checklist

1) Browse to the CIS 90 website Calendar page
   - http://simms-teach.com
   - Click CIS 90 link on left panel
   - Click Calendar link near top of content area
   - Locate today's lesson on the Calendar

2) Download the presentation slides for today's lesson for easier viewing

3) Click Enter virtual classroom to join CCC Confer session

4) Connect to Opus using Putty or ssh command

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/)

First Minute Quiz

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

No Quiz today ... test instead

For credit email answers to:

risimms@cabrillo.edu

within the **first few minutes of class**

CIS 90 - Lesson 6

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


Francisco

Leila

Justin

Jesus

Shenghong

Paul

Roberto


Sam


Navin


Jimmy

Luis

Tommy


Adrian


Ann


Cameron

Cody

Alejandrino


Deane

Nadia


Richard Z.

Gabriel


Ryan


Takashi


Jeff


Nick


Jonathan

Shea

Dylan

Joshua

Richard I.


Aaron


Nicole

James

Matthew

Abraham

Chris

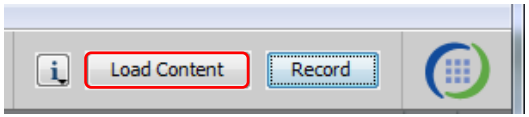
Ronald

Scott

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

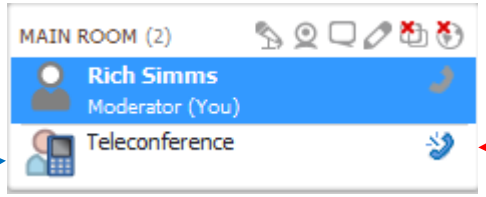
Instructor CCC Confer checklist

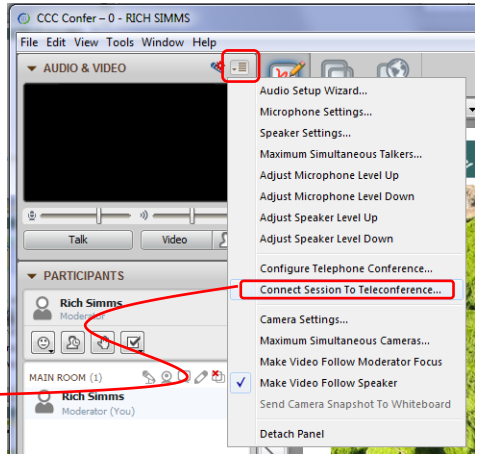
[ ] Preload White Board



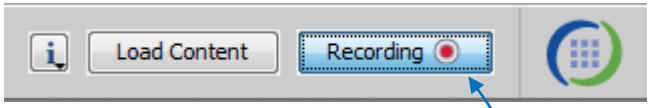
[ ] Connect session to Teleconference

Session now connected to teleconference





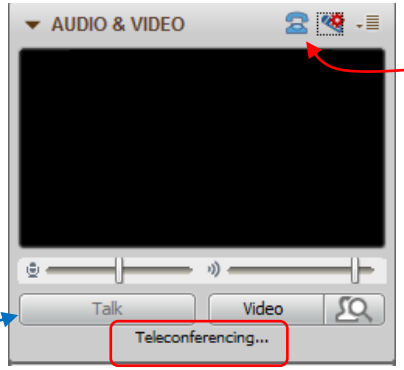
[ ] Is recording on?



Red dot means recording

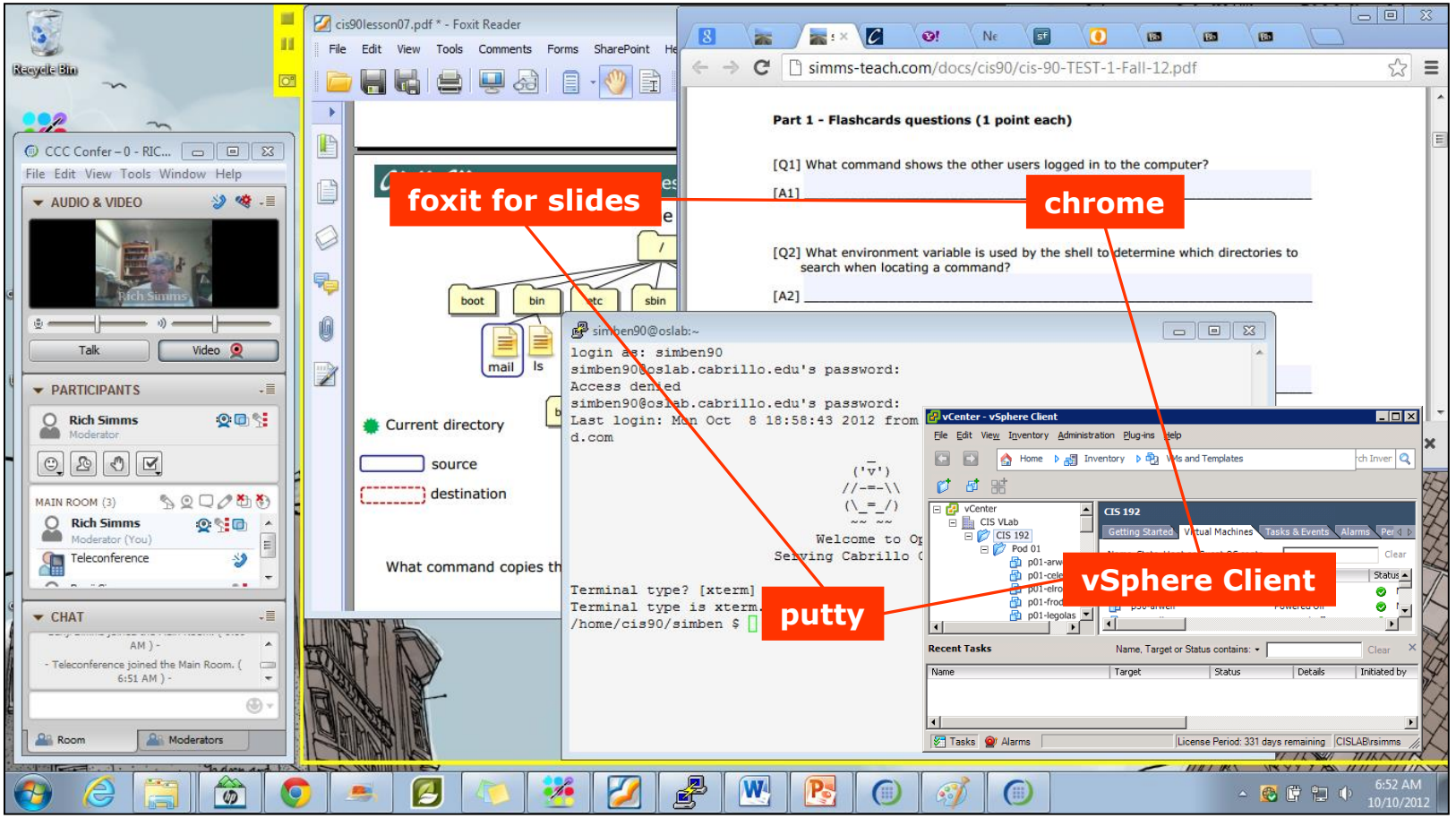
[ ] Use teleconferencing, not mic

Should be greyed out



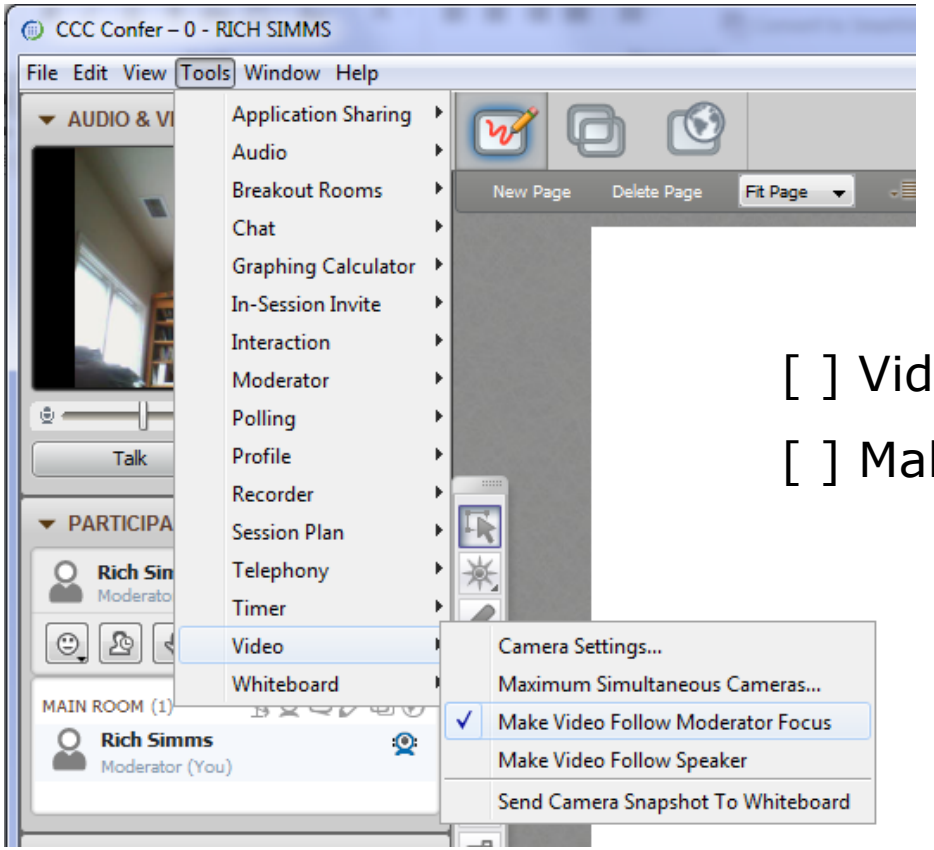
Should show as this live "off hook" telephone handset icon and the Teleconferencing … message displayed

Instructor CCC Confer checklist



[ ] layout and share apps

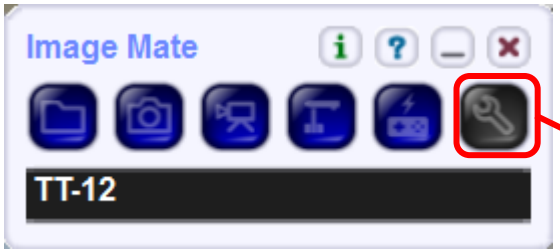
Instructor CCC Confer checklist

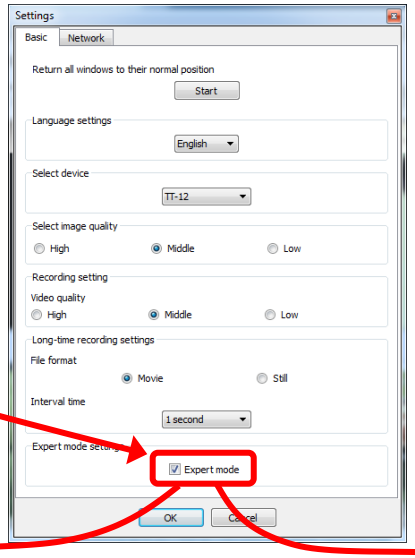


[ ] Video (webcam)

[ ] Make Video Follow Moderator Focus

Using Elmo with CCC Confer



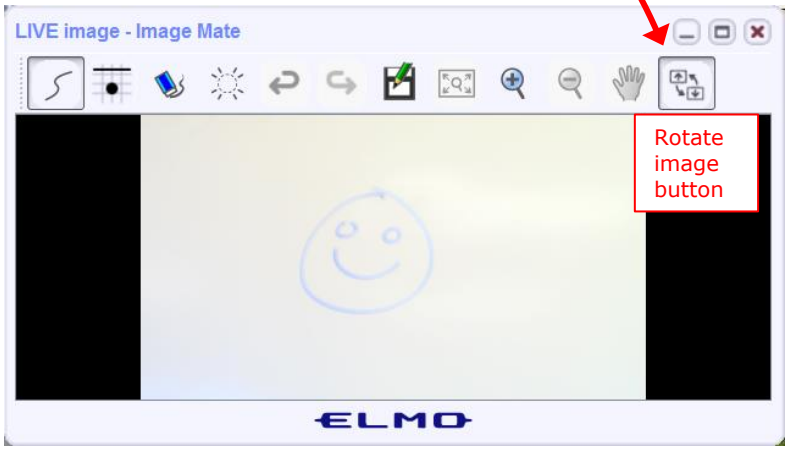


The "rotate image" button is necessary if you use both the side table and the white board.

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

Elmo rotated down to view side table

Elmo rotated up to view white board

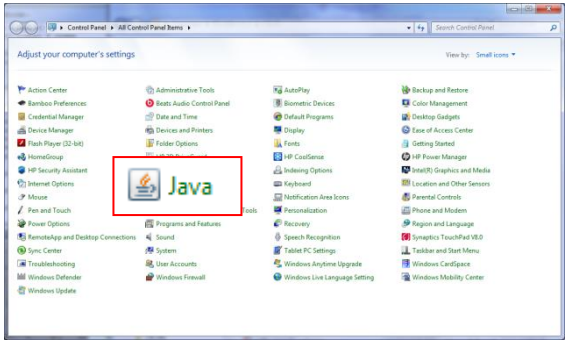


Run and share the Image Mate program just as you would any other app with CCC Confer

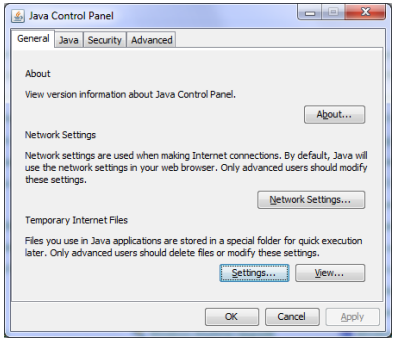
Instructor CCC Confer checklist

Universal Fix for CCC Confer:
1) Shrink (500 MB) and delete Java cache
2) Uninstall and reinstall latest Java runtime

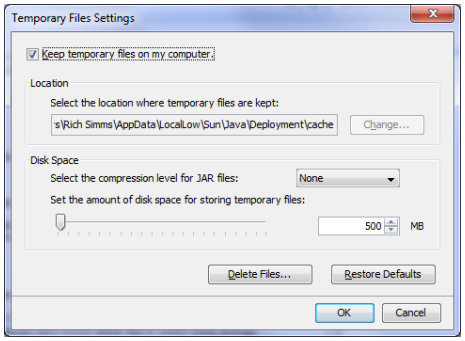
Control Panel (small icons)



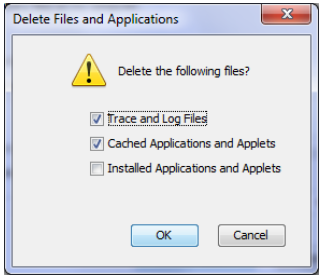
General Tab > Settings…



500MB cache size



Delete these



Google Java download

Managing Files

Objectives	Agenda
• Be able to create, copy, move, remove and link files	• Questions • Housekeeping • Managing files • Wrap up • Test

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.*

Lab 4 Post Mortem

Lab 4 results

Answers in /home/cis90/answers

01
02
03 XXXX
04 X
05 XX
06 XX
07 XXXX
08 XX
09 XXX
10 XXXXXXXXXX
11 XX
12 XXXXXXXX
13 X
14 XXXX
15 XXXXXXX
16 XXXXXXX
17 XXXX
18 XXX
19 XXX
20 XXXXXXXXXXX
21 X
22 XXXXXXXXXXXX
23 XXXXX
24 XXXXXXXXX
25 XXXX
26 XXXX
27 XXXXX
28 XXXX
29 XXXXXXXXXXXXXX
30 XXXXXXXXXXXXXXXXX
31 XXXXXXXXXXXX
32 XXXXXXXXXXX
33 XXXXXXXXXXXXXXXXX

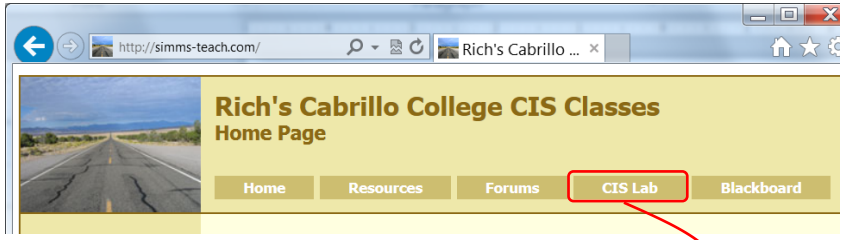
33 labs submitted

3 labs not submitted

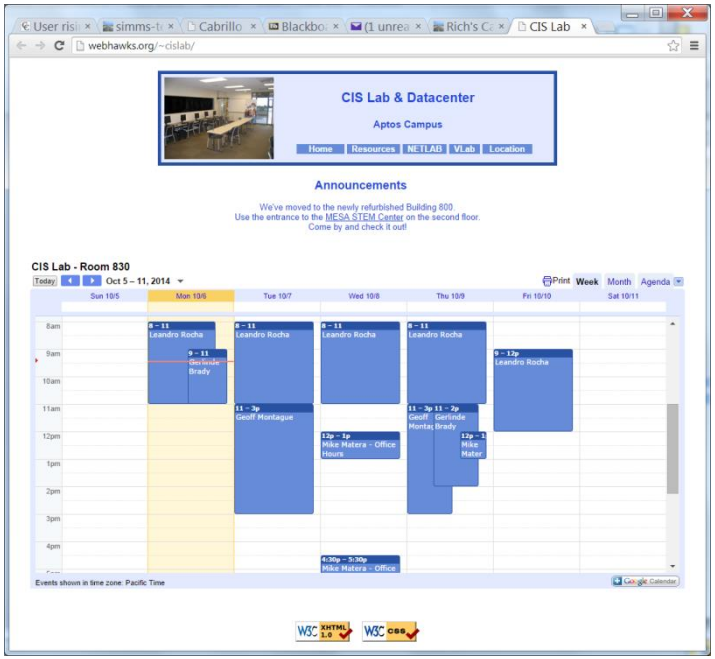
Each X = one incorrect or missing answer

CIS Lab Schedule

http://webhawks.org/~cislab/



If you would like some additional help come over to the CIS Lab.



Leandro and Geoff are both CIS 90 Alumni.

Michael is the other Linux instructor.

Or hang around after class. Rich has his office hours right after each class in Room 828.

CIS 90 Tutoring Available

http://www.cabrillo.edu/services/tutorials/

Matt Smithey

All students interested in tutoring in CIS 90, 172, and 81 classes need to come directly to the Tutorials Center to schedule, register and fill out some paperwork. This is just a one-time visit.

The tutoring will take place at the STEM center.

Housekeeping

No Labs due today

Test 1 will become available at 3:00 PM

- Using Blackboard
- Online timed test - 60 minutes long
- Working students may take test this evening but it must be started before 11:00 PM

Perkins/VTEA Survey

Carl D. Perkins Vocational and Technical Education Act

POSTREPLY | Search this topic... | Search | 2 posts • Page 1 of 1

Carl D. Perkins Vocational and Technical Education Act

by **Rich Simms** » Wed Sep 24, 2014 7:24 am

The Carl D. Perkins Vocational and Technical Education Act was originally authorized by Congress in 1984. It was reauthorized in 1998 and again in 2006. This act provides federal funding for improving career technical education (CTE) within the United States in order to help the economy.

For Cabrillo College to receive a portion of this funding students in technical classes must fill out a survey. The more surveys completed the more funds the college will receive. The survey only needs to be completed once per term by each student.

This survey can be completed online using web advisor:

Log on to WEBADVISOR at https://wave.cabrillo.edu

Select "STUDENTS: Click Here" (navy blue bar)
- Under "Academic Profile" Click on "Student Update Form"
- Use drop down list under "Select the earliest term for which you are registered" and click on the current term.
- Select "SUBMIT"

Scroll down to the "Career Technical Information"
- Answer questions by clicking on the circle to the left of your "Yes" or "No" answers
- You can get details about a question by clicking on blue underlined phrase
- After answering all questions Select "SUBMIT"

Then "LOG OUT"

Thank you for taking a few minutes to help Cabrillo College CS/CIS programs!

- Rich

Rich Simms

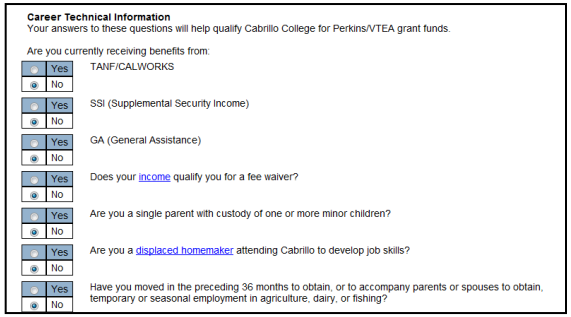
Posts: 1401
Joined: Sat Jan 16, 2010 6:47 pm

http://oslab.cis.cabrillo.edu/forum/viewtopic.php?f=101&t=3191

This is an important source of funding for Cabrillo College.

*Send me an email stating you completed this survey for **three points extra credit!***

THIS MAY BE THE LAST CHANCE!

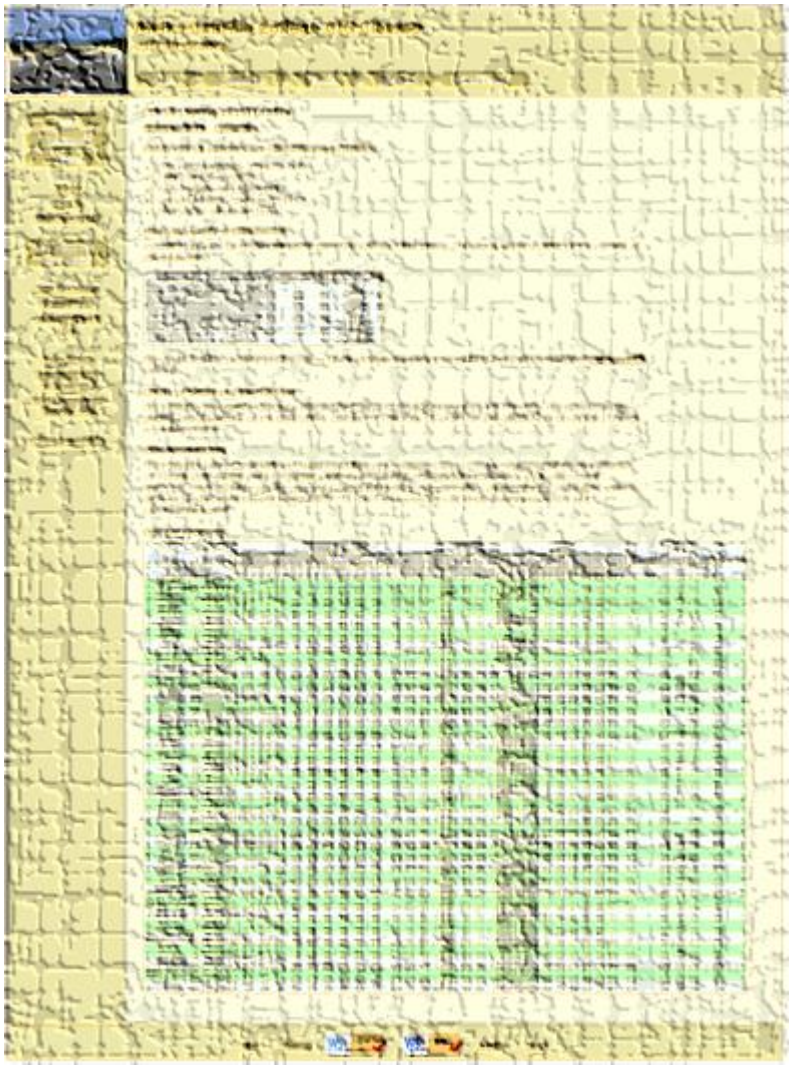


Career Technical Information
Your answers to these questions will help qualify Cabrillo College for Perkins/VTEA grant funds.

Are you currently receiving benefits from:

○ Yes ◉ No	TANF/CALWORKS
○ Yes ◉ No	SSI (Supplemental Security Income)
○ Yes ◉ No	GA (General Assistance)
○ Yes ◉ No	Does your income qualify you for a fee waiver?
○ Yes ◉ No	Are you a single parent with custody of one or more minor children?
○ Yes ◉ No	Are you a displaced homemaker attending Cabrillo to develop job skills?
○ Yes ◉ No	Have you moved in the preceding 36 months to obtain, or to accompany parents or spouses to obtain, temporary or seasonal employment in agriculture, dairy, or fishing?

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



GRADES

Be sure and check your progress on the Grades page as the course continues on.

Send me a student survey if you haven't already to get your LOR secret code name.

Current Point Tally

As of 10/06/2014

Points that could have been earned:	
4 quizzes:	12 points
4 labs:	120 points
1 forum quarter:	20 points
Total:	**152 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

If you are not happy with your current standing contact the instructor ASAP

Jesse's checkgrades python script

http://oslab.cabrillo.edu/forum/viewtopic.php?f=31&t=773&p=2966

```
/home/cis90/simben $ checkgrades smeagol

Remember, your points may be zero simply because the
assignment has not been graded yet.

Quiz 1: You earned 3 points out of a possible 3.
Quiz 2: You earned 3 points out of a possible 3.
Quiz 3: You earned 3 points out of a possible 3.


Forum Post 1: You earned 20 points out of a possible 20.

Lab 1: You earned 28 points out of a possible 30.
Lab 2: You earned 30 points out of a possible 30.
Lab 3: You earned 30 points out of a possible 30.


You've earned 6 points of extra credit.

You currently have a 103% grade in this class. (123 out of
119 possible points.)
```

Use your LOR code name as an argument on the checkgrades command

Jesse is a CIS 90 Alumnus. He wrote this python script when taking the course. It mines data from the website to check how many of the available points have been earned so far.

Managing Files

New commands for your toolbox:

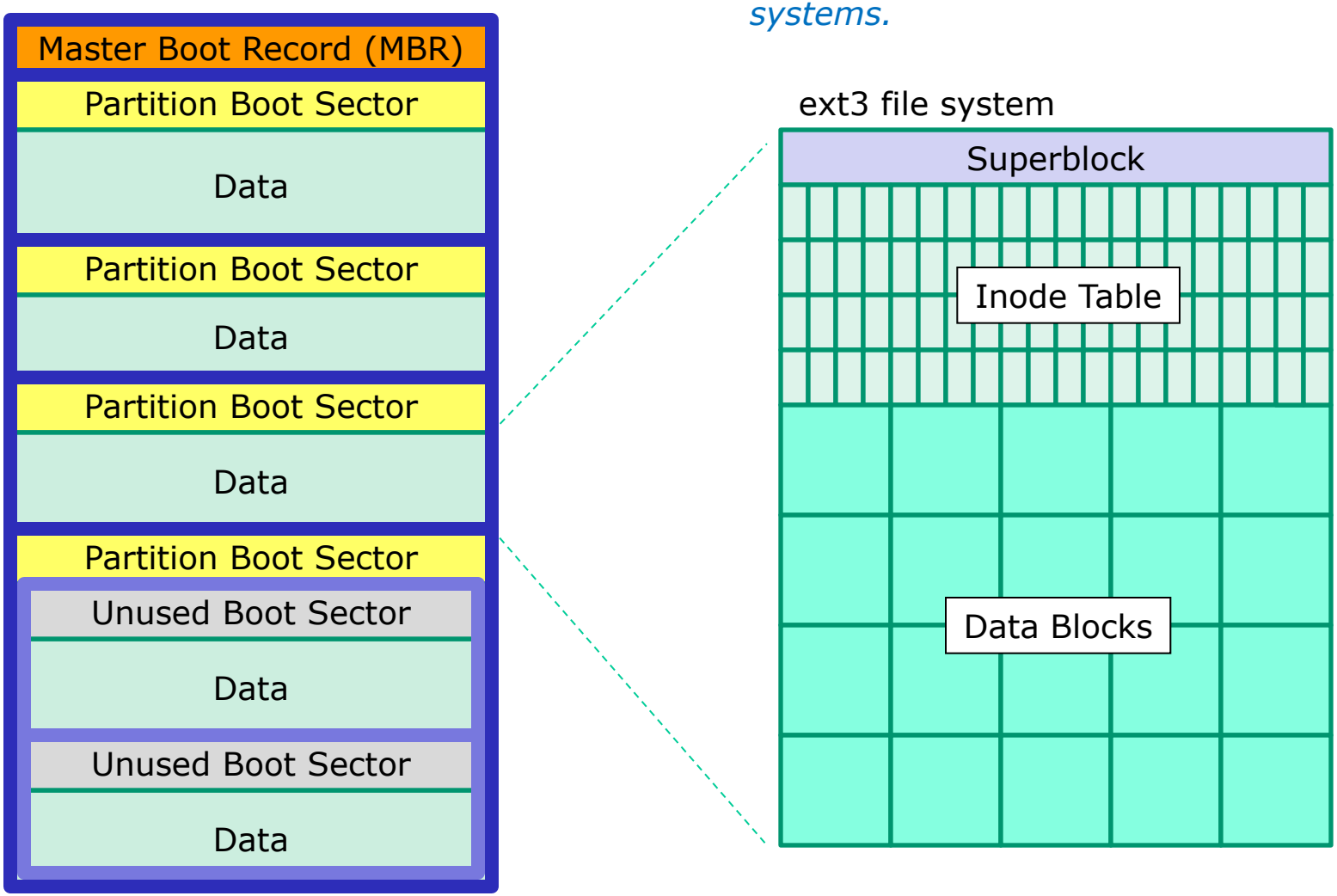
touch	*to make a file (or update the timestamp)*
mkdir	*to make a directory*
cp	*to copy a file*
mv	*to mv or rename a file*
rmdir	*to remove a directory*
rm	*to remove a file*
ln	*to create a link*
tree	*to visual list a directory*

Redirecting stdout:

> *filename*	*redirecting stdout to create/empty a file*

File Systems
Linux

The hard drive is partitioned and the data areas can be formatted as a file system. Linux typically uses ext2, ext3 and ext4 file systems. Windows uses FAT32 and NTFS file systems.



UNIX Files
The three elements of a file

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

filename

+

```
/home/cis90/simben/Poems $ ls -li twister
102625 -rw-r--r-- 1 simben90 cis90 151 Jul 20  2001 twister
```

inode number — *inode information*

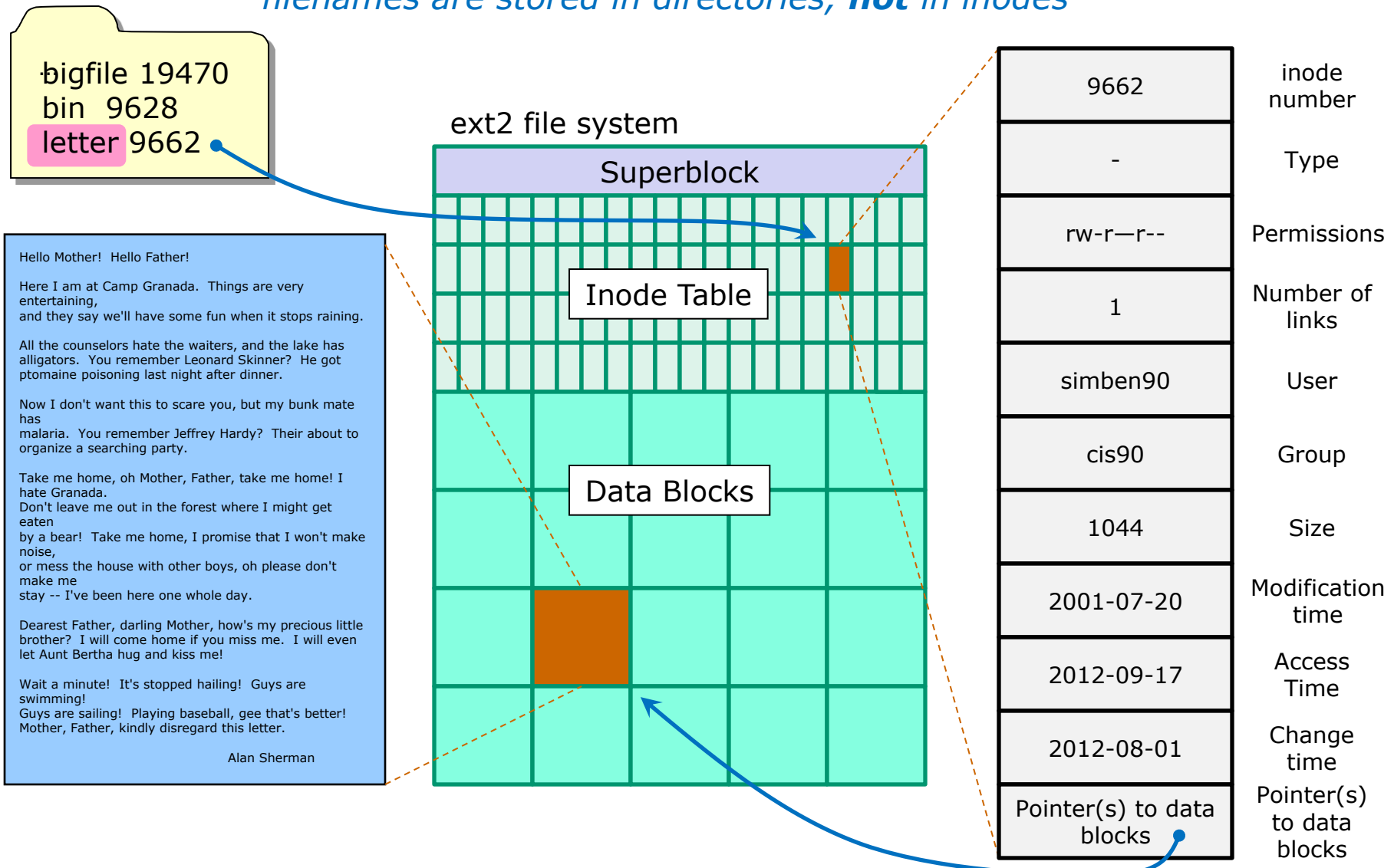
inode

+

```
/home/cis90/simben/Poems $ cat twister
A tutor who tooted the flute,
tried to tutor two tooters to toot.
Said the two to the tutor,
"is it harder to toot?  Or to
tutor two tooters to toot?"
```

data

*filenames are stored in directories, **not** in inodes*




```
/home/cis90/simben $ ls -il letter
9662 -rw-r--r--. 1 simben90 cis90 1044 Jul 20  2001 letter
```

Creating Files

Creating Files

Command syntax:

touch <*new-filename*>

- creates an empty ordinary file(s), or if the file already exists, it updates the time stamp.

mkdir <*new-directory-name*>

- creates an empty directory(s)
- options: -p (to create nested directories)

echo "*string***" >** <*new-filename*>

- Creates or overwrites a text file

Creating Files

The touch command

touch *<new-name>*

creates one or more empty regular files, or if the file already exists, it updates the time stamp.

A new file, named sawyer is created in the current working directory

```
/home/cis90/simben $ ls -l sawyer
ls: sawyer: No such file or directory

/home/cis90/simben $ touch sawyer
/home/cis90/simben $ ls -l sawyer
-rw-rw-r-- 1 simben90 cis90 0 Mar 18 06:34 sawyer
```

The file type is a regular file

The file owner is simben90 (Benji)

The file size is 0 bytes (an empty file)

Creating Files

The touch command

Multiple files can be created with one command

```
/home/cis90/simben $ ls -l a b c
ls: a: No such file or directory
ls: b: No such file or directory
ls: c: No such file or directory

/home/cis90/simben $ touch a b c
/home/cis90/simben $ ls -l a b c
-rw-rw-r-- 1 simben90 cis90 0 Mar 17 09:27 a
-rw-rw-r-- 1 simben90 cis90 0 Mar 17 09:27 b
-rw-rw-r-- 1 simben90 cis90 0 Mar 17 09:27 c
```

multiple arguments allowed

Creating Files
The touch command

The last modified timestamp for sawyer is updated if the file already exists

```
/home/cis90/simben $ ls -l sawyer
-rw-rw-r-- 1 simben90 cis90 0 Mar 18 06:34 sawyer

/home/cis90/simben $ touch sawyer
/home/cis90/simben $ ls -l sawyer
-rw-rw-r-- 1 simben90 cis90 0 Mar 18 06:40 sawyer
```

Last modified

Last modified timestamp updated

Creating Files

The mkdir command

mkdir *<new-name>*

creates one or more new directories

Create a new directory named island

```
/home/cis90/simben $ ls -l island
ls: island: No such file or directory

/home/cis90/simben $ mkdir island
/home/cis90/simben $ ls -ld island
drwxrwxr-x 2 simben90 cis90 4096 Mar 18 06:43 island
```

*Note: Use the **d** option on the **ls** command to list information about the directory itself rather than directory contents*

The basic file type is a directory

The file owner is a simben90 (Benji)

The file size is 4096 bytes

Creating Files

The mkdir command

Create multiple directories at once

```
/home/cis90/simben $ mkdir redhat debian slackware
/home/cis90/simben $ ls -ld  redhat/ debian/  slackware/
drwxrwxr-x 2 simben90 cis90 4096 Mar 17 09:36 debian/
drwxrwxr-x 2 simben90 cis90 4096 Mar 17 09:36 redhat/
drwxrwxr-x 2 simben90 cis90 4096 Mar 17 09:36 slackware/
```

*Note: Use the **d** option on the **ls** command to list information about the directory itself rather than directory contents*

Creating Files
The mkdir command

Create nested directories (one directory inside another)

```
/home/cis90/simben $ mkdir africa/ghana
mkdir: cannot create directory `africa/ghana': No
  such file or directory

/home/cis90/simben $ mkdir -p africa/ghana
/home/cis90/simben $ ls africa
ghana
```

*Need to use the **p** option to create new parent directories as needed*

Creating Files

Redirection to stdout

echo "string" > newfile Creates or overwrites a text file

Creating a file named accra and adding some text to it

```
/home/cis90/simben $ cd africa
/home/cis90/simben/africa $ ls
ghana
/home/cis90/simben/africa $ cd ghana
/home/cis90/simben/africa/ghana $ echo Population 1,658,937 > accra
/home/cis90/simben/africa/ghana $ cat accra
Population 1,658,937
```

Output of the echo command is redirected from the screen to a file named accra

Creating Files

Redirection to stdout

Be careful!

```
/home/cis90/simben/africa/ghana $ cat accra
Population 1,658,937
/home/cis90/simben/africa/ghana $ > accra
/home/cis90/simben/africa/ghana $ cat accra
/home/cis90/simben/africa/ghana $
```

The redirection character > will create the file named if that file does not exist.

If the file does exist it will be emptied without warning!

Class Exercise

- In your home directory create a directory named *characters* inside a directory name *island*.

```
mkdir -p island/characters
```

- In the directory named *characters* create three files:

```
cd island/characters
echo "Katherine Anne Austin" > kate
echo "James Ford" > sawyer
echo "Hugo Reyes" > hurley
```

- Print all files with **cat ***
- Empty the file *hurley*

```
> hurley
```

Listing Files

Listing Files

Short listing

```
/home/cis90/simben $ ls island
characters
```

Short recursive listing

```
/home/cis90/simben $ ls -R island
island:
characters
```

Directory name
Contents of directory

```
island/characters:
hurley  kate  sawyer
```

Sub-directory pathname
Contents of sub-directory

Managing the UNIX/Linux File System

Long listing

```
/home/cis90/simben $ ls -l island
total 8
drwxrwxr-x 2 simben90 cis90 4096 Mar 18 07:25 characters
```

Long recursive listing

```
/home/cis90/simben $ ls -lR island
island:
total 8
drwxrwxr-x 2 simben90 cis90 4096 Mar 18 07:25 characters

island/characters:
total 24
-rw-rw-r-- 1 simben90 cis90 11 Mar 18 07:25 hurley
-rw-rw-r-- 1 simben90 cis90 22 Mar 18 07:25 kate
-rw-rw-r-- 1 simben90 cis90 11 Mar 18 07:25 sawyer
```

Directory name

Contents of directory

Sub-directory pathname

Contents of sub-directory

Managing the UNIX/Linux File System

Making a directory tree diagram

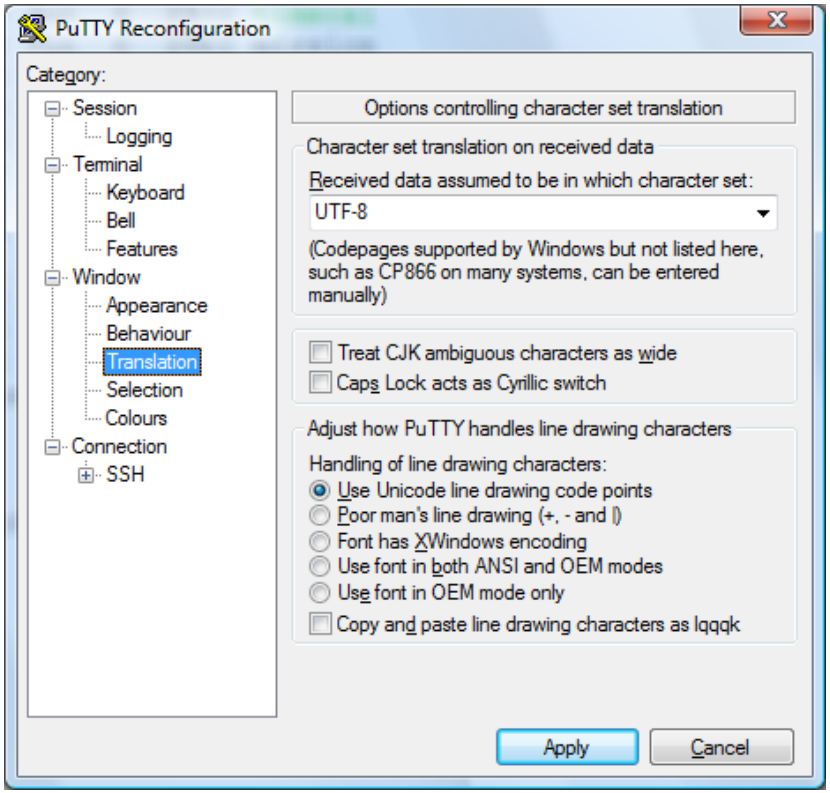
```
/home/cis90/simben $ tree island
island
`-- characters
    |-- hurley
    |-- kate
    `-- sawyer

1 directory, 3 files
/home/cis90/simben $
```

Putty must be configured to use the UTF-8 translation to show line drawing characters

Managing the UNIX/Linux File System

Putty may need to be configured UTF-8 for tree command



Class Exercise

- Return to your home directory with:

```
cd
```

- Do a long listing of the *island* directory with:

```
ls island
```

- Do a long recursive listing of the *island* directory with:

```
ls -lR island
```

- Make tree diagram of the *island* directory with:

```
tree island
```

Copying Files

Copying files

The **cp** command

Command syntax:

cp *<source file> <target file>*

cp *<source file> <target directory>*

cp *<source file> <target directory>/<target file>*

cp *<source file> <source file> <target directory>*

options: **-i -r**

i = warn before overwriting target files
r = recursive (copies all source sub-directories)

*Where: <source file> <target file> <target directory> are **absolute** or **relative** pathnames*

Copying files

Copy one file to another

cp *<source file> <target file>*

```
/home/cis90/simben $ cd
/home/cis90/simben $ cd island/characters/
/home/cis90/simben/island/characters $ ls
hurley  kate  sawyer
/home/cis90/simben/island/characters $ echo "Hugo Reyes" > hurley
```

Make a copy of the hurley file

```
/home/cis90/simben/island/characters $ cp hurley hurley.bak
/home/cis90/simben/island/characters $ ls
hurley  hurley.bak  kate  sawyer
```

Copying files

Copy multiple files to a directory

cp *<source file> <source file> <target directory>*

```
/home/cis90/simben/island/characters $ ls
hurley  hurley.bak  kate  sawyer
```

Make a new directory called backup

```
/home/cis90/simben/island/characters $ mkdir backup
```

Copy three files of the four files to the new directory

```
/home/cis90/simben/island/characters $ cp hurley kate sawyer backup/
/home/cis90/simben/island/characters $ ls backup
hurley  kate  sawyer
```

Copying files

Copy multiple files to a directory

cp *<source file> <source file> <target directory>*

*While parsing the shell expands * to hurley hurley.bak kate sawyer*

Copy all files to the new directory

```
/home/cis90/simben/island/characters $ cp * backup/
cp: omitting directory `backup'
```

*Although * matches backup, it is not included in the copy*

List the four files in the new directory

```
/home/cis90/simben/island/characters $ ls backup/
hurley  hurley.bak  kate  sawyer
```

Note: copying a file to an existing file will overwrite that file without warning!

Copy files

The i (interactive) option to warn about overwrites

```
/home/cis90/simben/island/characters $ ls h*
hurley  hurley.bak
/home/cis90/simben/island/characters $ cp -i hurley hurley.bak
cp: overwrite `hurley.bak'? yes
/home/cis90/simben/island/characters $
```

*The **i** option provides some interaction with the user before overwriting a file*

Copying files

The r (recursive) option to copy an entire tree branch

```
/home/cis90/simben/island/characters $ cd ..
/home/cis90/simben/island $ ls
characters
```

This directory does not exist yet

```
/home/cis90/simben/island $ cp -r characters players
/home/cis90/simben/island $ ls -R players
players:
backup  hurley  hurley.bak  kate  sawyer

players/backup:
hurley  hurley.bak  kate  sawyer
/home/cis90/simben/island $
```

A recursive copy will copy everything in a directory (including all files and nested subdirectories) to another directory

Class Exercise

- Change to your *island* directory using an absolute path

```
cd /home/cis90/simben/island/characters/
```

Use your own username

- Make a backup copy of *kate*

```
cp kate kate2
```

- Copy *hurley* and overwrite *kate* using interactive mode

```
cp -i hurley kate
cat kate
```

(Respond with **yes** to overwrite)

- Restore *kate* from the backup copy

```
cp kate2 kate
cat kate
```

Moving Files

Moving Files

The **mv** command

Command syntax:

mv *<source file> <target file>*

mv *<source file> <target directory>*

mv *<source file> <target directory>**/**<target file>*

mv *<source file> <source file> <target directory>*

options: **-i**
i = warn before overwriting

*Where: <source file> <target file> <target directory> are **absolute** or **relative** pathnames*

Moving Files

Renaming a file with the **mv** command

mv *<original name> <new name>*

This is how you rename files in UNIX/Linux!

oops … typo!

```
/home/cis90/simben $ touch iPhone iPad ProLiant Pavilion Powerege

/home/cis90/simben $ mv Powerege PowerEdge

/home/cis90/simben $ ls iP* P[ra]* Pow*
iPad  iPhone  Pavilion  PowerEdge  ProLiant
```

typo fixed by renaming file

successfully renamed

Moving Files

Moving a file into a directory

mv *<source file> <target directory>*

```
/home/cis90/simben $ mkdir Apple HP Dell
```
Make some new directories

```
/home/cis90/simben $ mv iPhone Apple/
/home/cis90/simben $ mv iPad Apple/
```
Move one file at a time into one of the new directories

```
/home/cis90/simben $ ls Apple
iPad  iPhone
```
List the new directory the files were moved into

Moving Files

Moving multiple files into a directory

mv *<source file> <source file> <target directory>*

```
/home/cis90/simben $ mv ProLiant Pavilion PowerEdge HP/
```

Moving multiple files at once into a directory

Moving Files

The **mv** command

Listing the contents of multiple directories to verify file moves

```
/home/cis90/simben $ ls Apple HP Dell
Apple:
iPad  iPhone

Dell:
PowerEdge

HP:
Pavilion  ProLiant
```

```
/home/cis90/simben $ tree Apple HP Dell
Apple
|-- iPad
`-- iPhone
HP
|-- Pavilion
`-- ProLiant
Dell
`-- PowerEdge

0 directories, 5 files
```

Class Exercise

- Change to your *island* directory using an relative path

```
cd
cd island/characters/
```

- Rename *kate* to *katherine*

```
mv kate katherine
cat katherine
```

- Create a new file named *jin* and rename it to be hidden

```
touch jin
mv jin .jin
```

(verify with `ls` and `ls -a`)

Removing Files

Removing Files

The **rm** and **rmdir** commands

Removing files:

rm <*file-pathname*> **...**

The … (ellipses) mean you can specify more than one filename per command

options: **-i -r -f**

i = prompt before remove
r = recursive (delete subdirectories)
f = force (never prompt)

rmdir <*directory-pathname*> **...**

Directories must be empty for this to work

Removing Files

The **rm** and **rmdir** commands

Remove a file:

```
/home/cis90/simben $ touch junk1 junk2 junk3 junk4
/home/cis90/simben $ ls junk*
junk1  junk2  junk3  junk4

/home/cis90/simben $ rm junk1
/home/cis90/simben $ ls junk*
junk2  junk3  junk4
```

Create four test files

Remove one of them

Note: the file is removed without warning!

Removing Files

Using the i option to interactively remove multiple files

Remove one or more files interactively:

```
/home/cis90/simben $ rm -i junk*
rm: remove regular empty file `junk2'? y
rm: remove regular empty file `junk3'? n
rm: remove regular empty file `junk4'? n

/home/cis90/simben $ ls junk*
junk3  junk4
```

Remove just the junk2 file

Verify it was removed

Removing Files
The **rmdir** command

Use **rmdir** to remove a directory

```
/home/cis90/simben $ mkdir junkdir1   Make a test directory
/home/cis90/simben $ touch junkdir1/junk6   Put a test file in new directory

/home/cis90/simben $ rmdir junkdir1   Try to remove non-empty directory
rmdir: junkdir1: Directory not empty

/home/cis90/simben $ rm junkdir1/junk6   Remove file in directory
/home/cis90/simben $ rmdir junkdir1   Remove empty directory
/home/cis90/simben $
```

Directories must be empty to be removed by rmdir

Class Exercise

- Change to your home directory

```
cd
```

- Create some test files

```
touch junk1  junk2  junk3  junk4
ls junk*
```

- Remove one

```
rm junk1
ls junk*
```

- Remove the others

```
rm junk[234]
ls junk*
```

linking files

Linking files

The **ln** command

Command syntax:

ln <*existing-name*> <*new-name*>

options: -s

s = symbolic link (like Windows shortcut)

With UNIX there are hard and soft (symbolic) links

Linking files
Hard links

Creating a "hard" link

ln *<existing-name> <new-name>*

```
/home/cis90/simben $ echo "Chocolate Licorice Taffy Jelly Beans" > sweets
/home/cis90/simben $ cat sweets
Chocolate Licorice Taffy Jelly Beans

/home/cis90/simben $ ln sweets dulces
/home/cis90/simben $ ls -il sweets dulces
100176 -rw-rw-r-- 2 simben90 cis90 37 Mar 14 09:29 dulces
100176 -rw-rw-r-- 2 simben90 cis90 37 Mar 14 09:29 sweets
```

Hard link dulces to sweets

same inode

number of hard linked files

*Hard links allows **multiple** filenames for the **same** file. The link count on a long listing tells you how many names the file has.*

Linking files
Hard links

Creating a "hard" link

ln *<existing-name> <new-name>*

```
/home/cis90/simben $ ln sweets candy
/home/cis90/simben $ ls -il sweets dulces candy
100176 -rw-rw-r-- 3 simben90 cis90 37 Mar 14 09:29 candy
100176 -rw-rw-r-- 3 simben90 cis90 37 Mar 14 09:29 dulces
100176 -rw-rw-r-- 3 simben90 cis90 37 Mar 14 09:29 sweets
```

Hard link candy to dulces

same inode

number of hard linked files

```
/home/cis90/simben $ ln sweets bonbons
/home/cis90/simben $ ls -il sweets dulces candy bonbons
100176 -rw-rw-r-- 4 simben90 cis90 37 Mar 14 09:29 bonbons
100176 -rw-rw-r-- 4 simben90 cis90 37 Mar 14 09:29 candy
100176 -rw-rw-r-- 4 simben90 cis90 37 Mar 14 09:29 dulces
100176 -rw-rw-r-- 4 simben90 cis90 37 Mar 14 09:29 sweets
```

Hard link bonbons to sweets

same inode

number of hard linked files

Linking files
Hard links

The . and .. directories are hard links!

```
/home/cis90/simben $ ls -ldi . /home/cis90/simben
98306 drwxr-xr-x 10 simben90 cis90 4096 Mar 14 09:41 .
98306 drwxr-xr-x 10 simben90 cis90 4096 Mar 14 09:41 /home/cis90/simben
```

same inode

number of hard linked files (includes the . file and .. files in sub-directories)

```
/home/cis90/simben $ ls -ldi .. /home/cis90/
2395394 drwxr-x--- 42 rsimms cis90 4096 Mar  6 08:17 ..
2395394 drwxr-x--- 42 rsimms cis90 4096 Mar  6 08:17 /home/cis90/
```

same inode

number of hard linked files (includes the . file and .. files in sub-directories)

*Hard links allows **multiple** filenames for the **same** file.*

Note the hidden . and .. files different filenames for the same directories

Linking files
Hard links

Creating a "hard" link

ln *<existing-name> <new-name>*

```
/home/cis90/simben $ rm sweets
/home/cis90/simben $ ls -il sweets dulces candy bonbons
ls: sweets: No such file or directory
100176 -rw-rw-r-- 3 simben90 cis90 37 Mar 14 09:29 bonbons
100176 -rw-rw-r-- 3 simben90 cis90 37 Mar 14 09:29 candy
100176 -rw-rw-r-- 3 simben90 cis90 37 Mar 14 09:29 dulces
```

same inode

number of hard linked files

Removing one of the hard linked files will not delete any of the other hard links, it will just decrement the number of hard links shown in a long listing

Linking Files
Symbolic "Soft" Links

Creating a "soft" (symbolic) link

ln -s *<existing-name> <new-name>*

The s option for a symbolic link

Creating a symbolic link to the Apache configuration file

```
/home/cis90/simben $ ln -s /etc/httpd/conf/httpd.conf apache

/home/cis90/simben $ ls -li apache /etc/httpd/conf/httpd.conf
 100172 lrwxrwxrwx 1 simben90 cis90    26 Mar 14 09:13 apache -> /etc/httpd/conf/httpd.conf
1280166 -rw-r--r-- 1 root     root  33776 Feb 29 18:45 /etc/httpd/conf/httpd.conf
```

l for symbolic link, - for regular file

Different inodes

Symbolic links are like Windows shortcuts. They are two separate files and it is possible to break the links when the target files get renamed.

Linking Files
Symbolic "Soft" Links

```
/home/cis90/simben $ ls -li apache /etc/httpd/conf/httpd.conf
 100172 lrwxrwxrwx 1 simben90 cis90    26 Mar 14 09:13 apache -> /etc/httpd/conf/httpd.conf
1280166 -rw-r--r-- 1 root     root  33776 Feb 29 18:45 /etc/httpd/conf/httpd.conf


/home/cis90/simben $ head -n 5 apache
#
# This is the main Apache server configuration file.  It contains the
# configuration directives that give the server its instructions.
# See <URL:http://httpd.apache.org/docs/2.2/> for detailed information.
# In particular, see

/home/cis90/simben $ head -n 5 /etc/httpd/conf/httpd.conf
#
# This is the main Apache server configuration file.  It contains the
# configuration directives that give the server its instructions.
# See <URL:http://httpd.apache.org/docs/2.2/> for detailed information.
# In particular, see
```

From Benji's home directory, he can now refer to the Apache configuration file using either apache or /etc/httpd/conf/httpd.conf

Class Exercise

- Create a file named candy using:

```
> candy
```

- Create a hard link to candy named sweets using:

```
ln candy sweets
```

- Create a soft link to candy named dulces using:

```
ln -s candy dulces
```

- List them using:

```
ls -li candy sweets dulces
```

Wrap up (lesson)

New commands:

cp	copy files
ln	link files
mkdir	make directory
mv	move or rename files
rm	remove files
rmdir	remove directory
touch	make/modify a file
tree	draw file tree branch

Redirection:

>	redirects stdout

In this lab you will reorganize your home directory

Be careful. For this lab, the slower you go the sooner you will be done!

Next Class

Assignment: Check Calendar Page on web site to see what is due next week:
http://simms-teach.com/cis90calendar.php

Lab 5 due

Quiz questions for next class:

- What command is used to rename a file?
- If two files are hard linked do they have the same or different inode numbers?
- What option for the rm command provides confirmation when deleting files?

Test 1

Test 1 will become available at 3:00 PM on Blackboard

- Online timed test 60 minutes long
- Working students may take test this evening but it must be started before 11:00 PM

Test 1 HONOR CODE:

- **This test is open book, open notes, and open computer. HOWEVER, you must work alone.**
- **You may not discuss the test questions or answers with others during the test.**
- **You may not ask or receive assistance from anyone other than the instructor when doing this test.**
- **Likewise you may not give any assistance to anyone taking the test.**

Notes to instructor

[ ] Send email on Opus to students

```
~/cis90/test01/q29/mail-q29-T1
```
[at job]

[ ] Logoff users and lock door on practice test system

```
skill -KILL -v pts/xx
cp /etc/nologin.bak /etc/nologin
```
[at job]

[ ] Allow logins on real test system

```
rm /etc/nologin
```
[at job]


Test 1

Backup