Rich's lesson module checklist

Last modified: 3/6/2018

- ❑ Zoom recording named and published for previous lesson

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

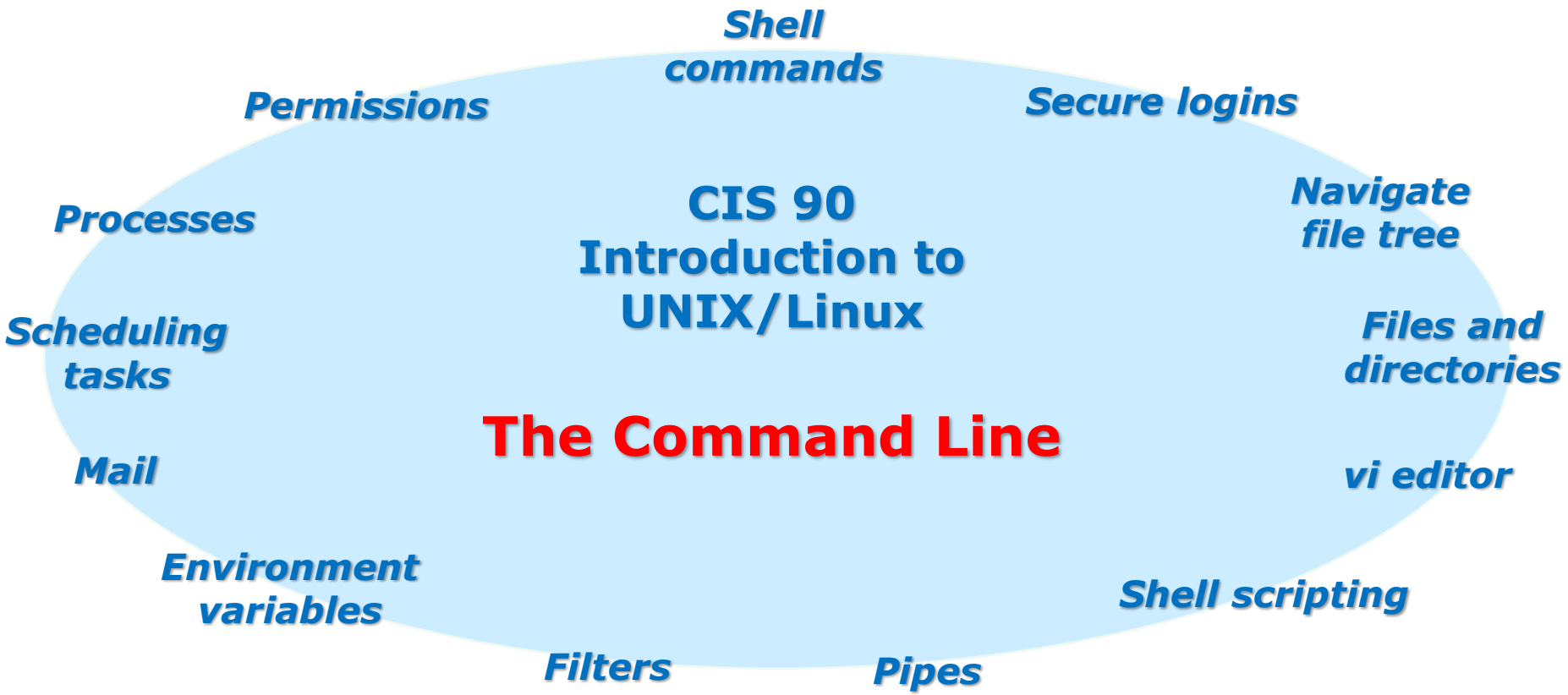
- ❑ No 1st minute quiz today (test instead)
- ❑ Flash cards
- ❑ Calendar page updated

- ❑ Lab 5
- ❑ Put sonnet6 & bigfile in depot/

- ❑ Real Test 1 configured on canvas (availability, accommodations, password)
- ❑ Real Test 1 Q16, Q22 and Q30 updated
- ❑ Real Test 1 Q29 scheduled
- ❑ Real Test 1 systems access and shutdown scheduled
- ❑ Practice Test 1 systems shutdown scheduled (OVH is on EDT) at T-30

- ❑ 9V backup battery for microphone
- ❑ Backup slides, CCC info, handouts on flash drive
- ❑ Key card for classroom door

- ❑ https://zoom.us
- ❑ Putty + Slides + Chrome
- ❑ Enable/Disable attendee sharing
  ^ > Advanced Sharing Options > Only Host
- ❑ Enable/Disable attended annotations
  Share > More > Disable Attendee Sharing



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.

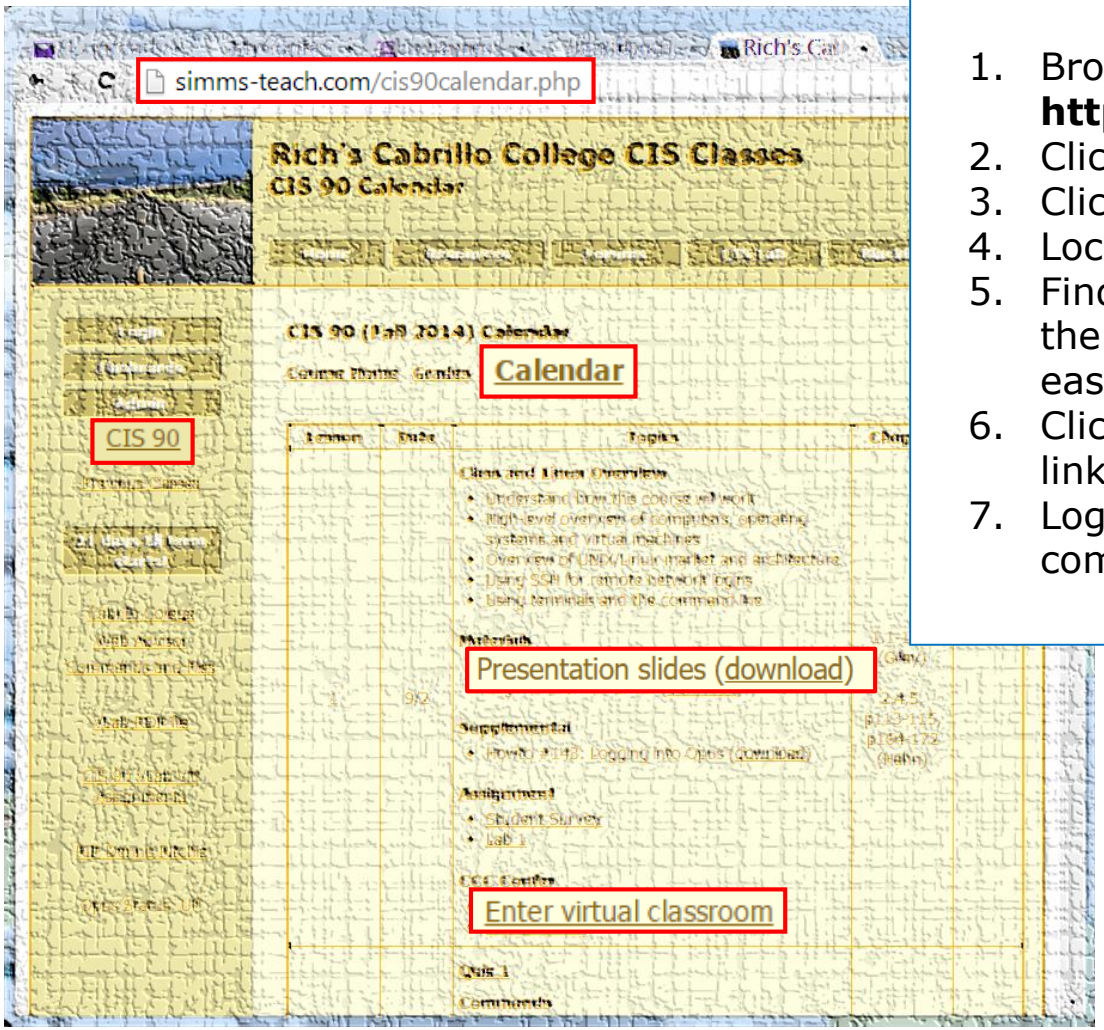
Introductions and Credits

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/)

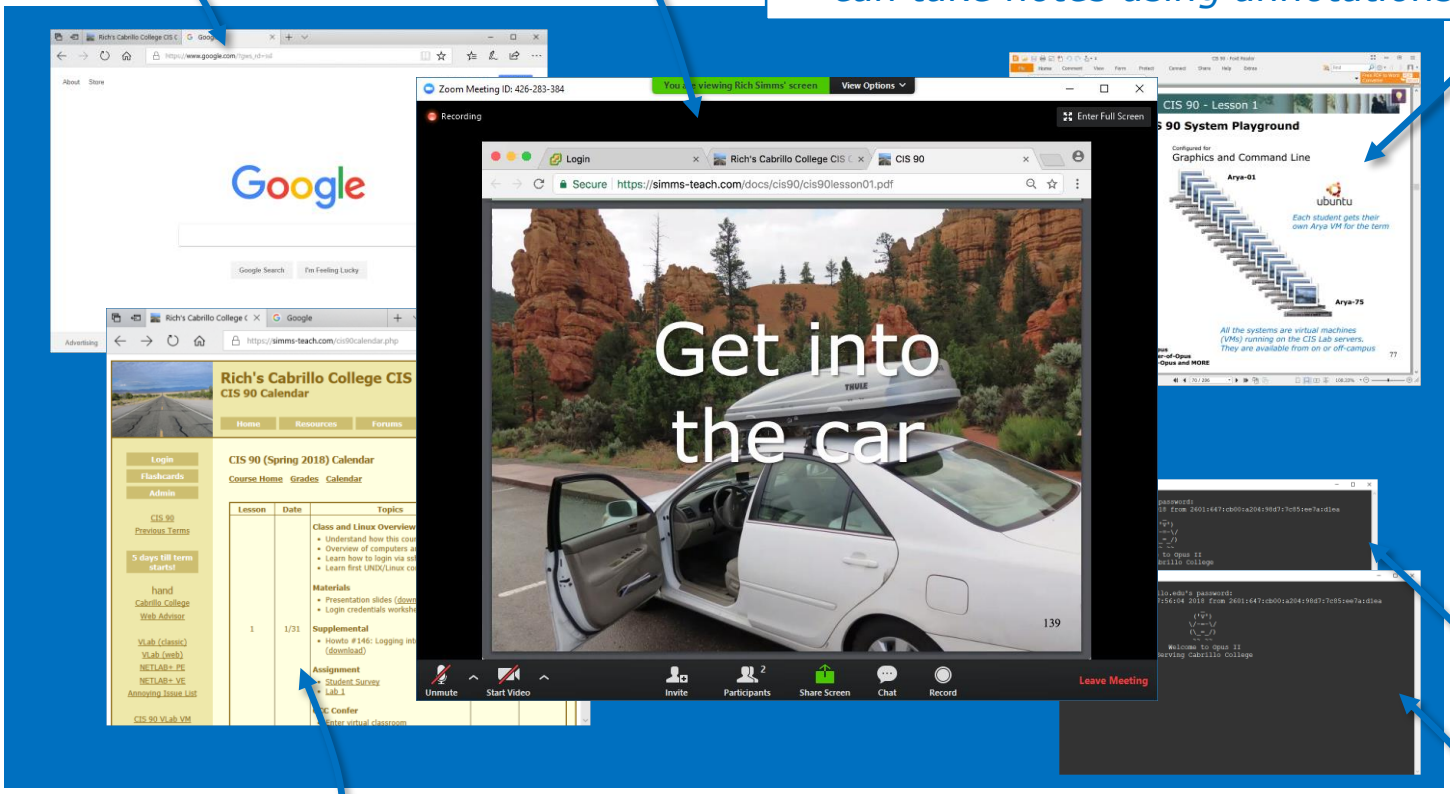
Student checklist - Before class starts



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

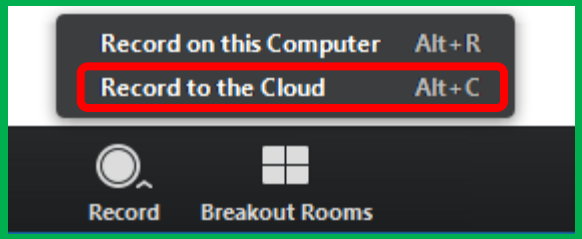
Student checklist - Before class starts

- ❑ *Google*
- ❑ *ConferZoom*
- ❑ *Downloaded PDF of Lesson Slides. I like Foxit Reader so I can take notes using annotations.*



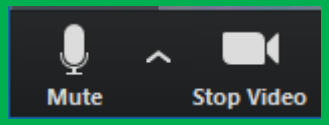
- ❑ *CIS 90 website Calendar page*
- ❑ *One or more login sessions to Opus-II*

Start



Start Recording

Audio Check



Start Recording

Audio & video Check

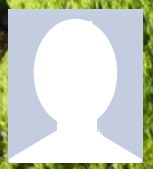
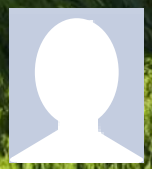
Instructor: **Rich Simms**
Dial-in: **408-638-0968 (toll)**
Meeting ID: **426 283 384**











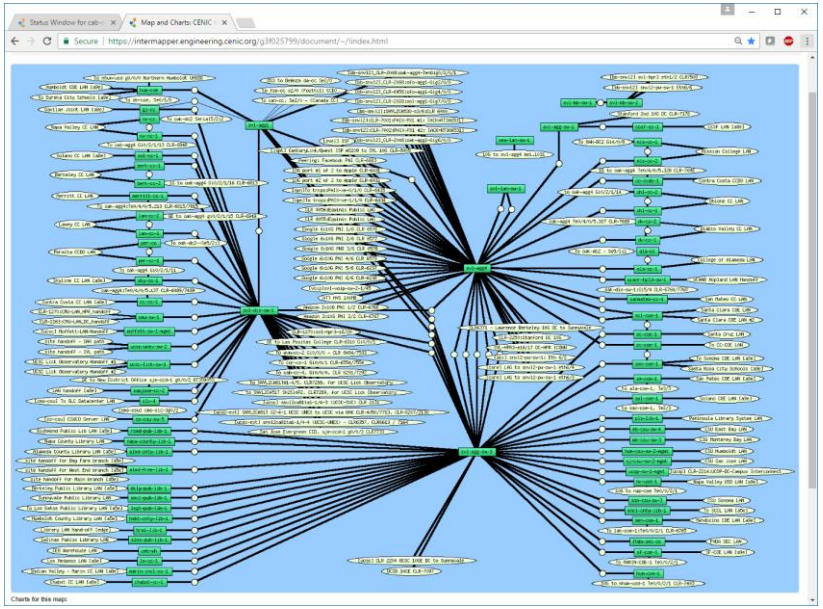
Brandon, Shane, Dan, Kage, Nathan K., Jo Anne, Darren, Laine, Luis, Christian

Jetta, Cesar, Paul, Hilary, Fritz, Jake, Richard, Nate P., Ciarán, November

Henry, Elena, David, Claudius, Edgar, Adam, Nathanael T., Clara

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

Network Check



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

First Minute Quiz

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

No Quiz today ... test instead

For credit email answers to:

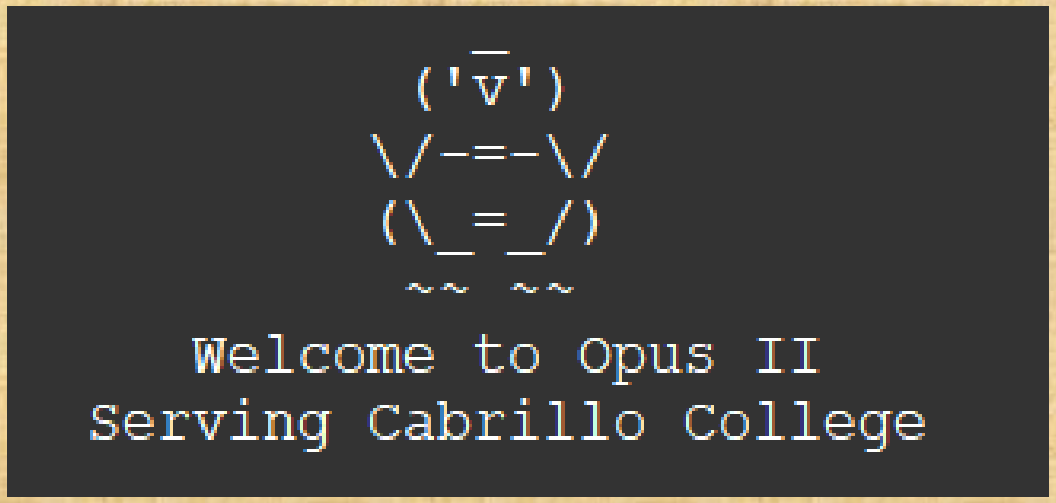
risimms@cabrillo.edu

within the **first few minutes of class**

Managing Files

Objectives	Agenda
• Be able to create, copy, move, remove and link files	• Questions • Housekeeping • Managing files • Creating directories • Creating regular files • Listing files • Copying files • Moving Files • Removing files • Linking files • Assignment • Wrap up • Test #1

Class Activity



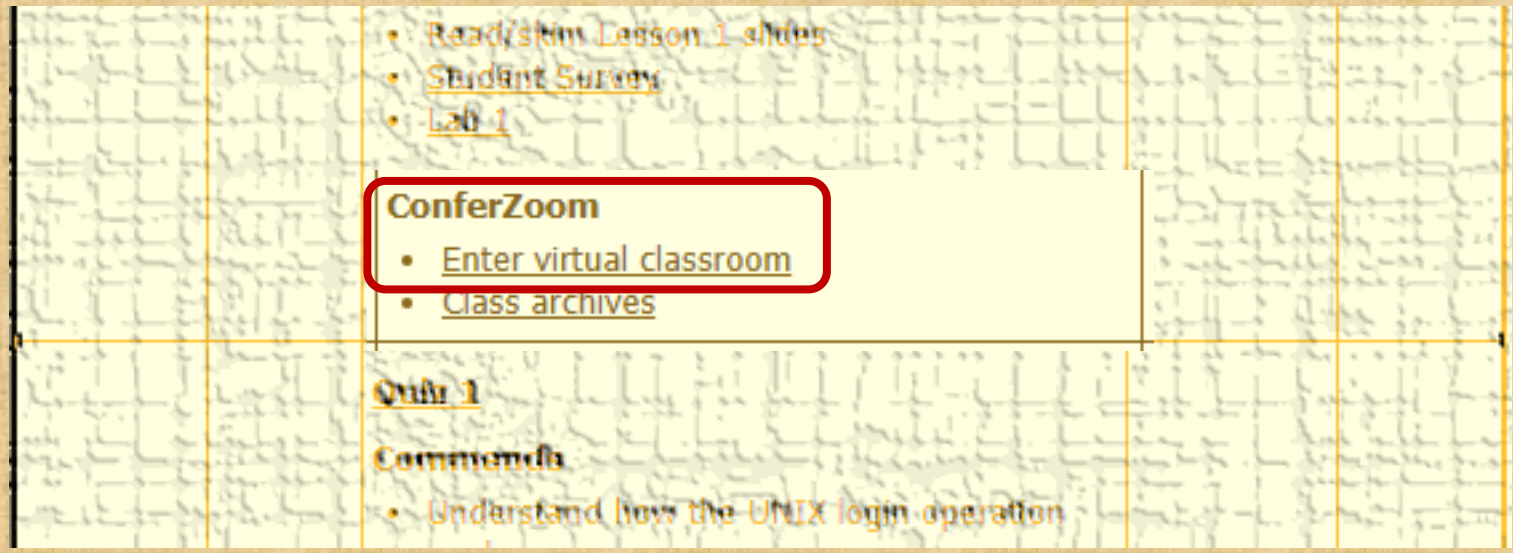
If you haven't already, log into Opus-II

Class Activity

https://simms-teach.com/cis90calendar.php

If you haven't already, download the lesson slides

Class Activity



https://simms-teach.com/cis90calendar.php

If you haven't already, join ConferZoom classroom

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

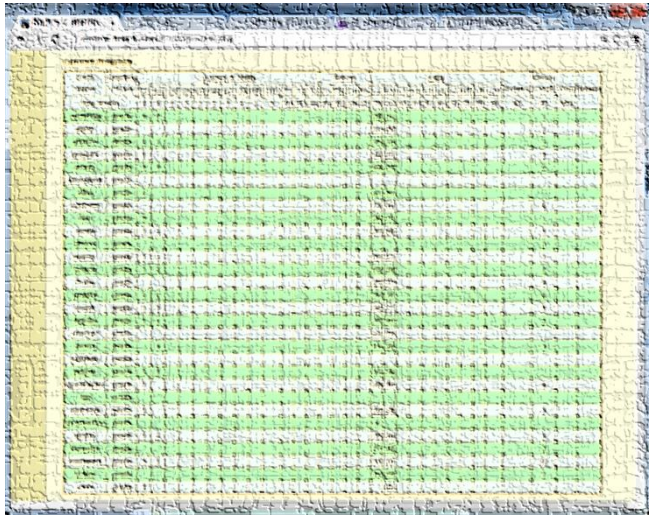
If you don't ask, you don't get.
- Mahatma Gandhi

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.*

Where to find your grades

Send me your survey to get your LOR code name.

The CIS 90 website



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

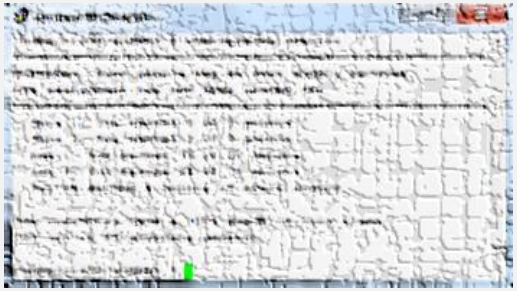
Percentage	Total Points	Letter Grade	Pass/No Pass
90% or higher	504 or higher	A	Pass
80% to 89.9%	448 to 503	B	Pass
70% to 79.9%	392 to 447	C	Pass
60% to 69.9%	336 to 391	D	No pass
0% to 59.9%	0 to 335	F	No pass

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

On Opus-II

checkgrades *codename*

(where codename is your LOR codename)



Written by Jesse Warren a past CIS 90 Alumnus

Points that could have been earned:

4 quizzes:	12 points
4 labs:	120 points
1 forum quarter:	20 points
Total:	**152 points**

Extra Credit

On the forum

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

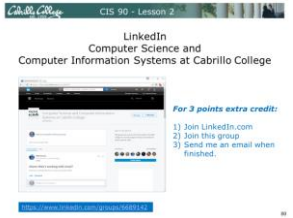
On some labs

Extra credit (2 points)

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

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

In lesson slides (search for extra credit)

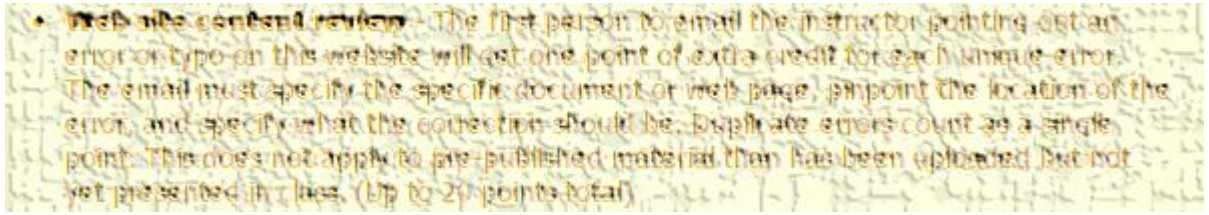


On the website

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

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

http://simms-teach.com/cis90extracredit.php



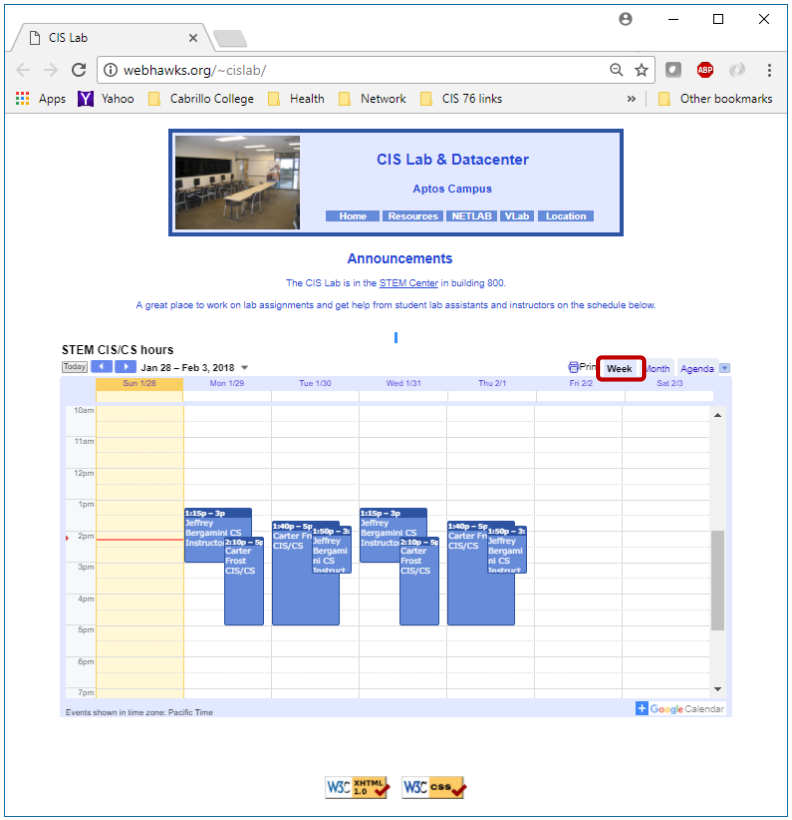
Getting Help When Stuck on a Lab Assignment

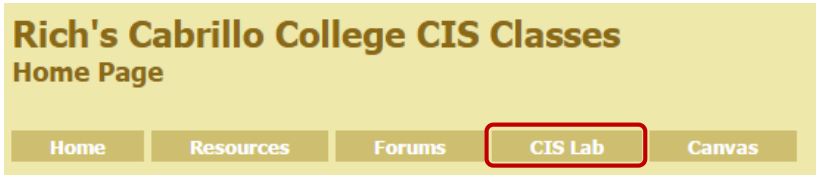
- Google the topic/error message.
- Search the Lesson Slides (they are PDFs) for a relevant example on how to do something.
- Post a question on the forum. Explain what you are trying to do and what you have tried so far.
- Talk to a STEM center tutor/assistant.
- Come see me during my office or lab hours. I will be in the CTC (room 1403) every Wednesday afternoon from 3-5:30.
- Make use of the Open Questions time at the start of every class.
- Make a cheat sheet of commands and examples so you never again get stuck on the same thing!

Expect to do a LOT of troubleshooting in this course!

Help Available in the CIS Lab

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





To see schedule, click the CIS Lab link on the website and use the "Week" calendar view

CTC - Building 1400
On lower campus

I will be in the CTC (room 1403) every Wednesday afternoon from 3-5:30

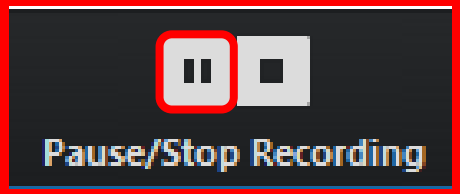
The slippery slope

1) If you didn’t submit the last lab ...
2) If you were in class and didn’t submit the last quiz ...
3) If you didn’t send me the student survey assigned in Lesson 1 ...
4) If you haven't made a forum post in the last quarter of the course ...

Please contact me by email, see me during my office hours or when I'm in the CTC

Email: risimms@cabrillo.edu

Housekeeping



Pause Recording

Audio Check

Roll Call

If you are watching the archived video please email me to let me know you were here.

risimms@cabrillo.edu

Overlap Students

Don't forget to update the Google Docs Log when watching the recording

Resume Recording

Audio Check

No labs due today

Test 1 will become available at 11:00 AM today

- Open book, open notes, open computer.
- You must work alone and not help or receive help from others.
- Online timed 60 minute test using Canvas
- Online "archive watching" students that work can take it later today but it must be completed by 11:59 PM.
- Practice test systems shutdown 30 minutes before real test starts!

Next week:

- Quiz 5
- Lab 5 is due

Test 1 Instructions

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.

INSTRUCTIONS:
Every question on the test was designed to be answered using one of the systems below.
opus-ii.cis.cabrillo.edu (port 2220).
sun-hwa-vii.cis.cabrillo.edu (port 22)
son-of-opus.simms-teach.com (port 2220)
arya-xx (port 22) - Select xx for your own Arya.

Each question begins with [*system name*] so you know which system you should be logged into to answer the question.

All systems are accessible using ssh from opus-ii. For sun-hwa-vii and son-of-opus login using your original opus-ii credentials. For arya, use the generic cis90 account.

IF YOU GET STUCK on a question you can ask or email the instructor for the answer and forfeit the point. The instructor will be available during class and be online between 8-10 PM in the evening for online or long distance students.

Please KEEP YOUR ANSWERS TO A SINGLE LINE ONLY !!

This test must be completed in one sitting. The submittal will be made automatically when the time is up. If you submit early by accident you will not be able to re-enter and continue. If that happens don't panic! Just email the instructor any remaining answers before the time is up.

Linux Computer Home Loans

https://docs.google.com/a/cabrillo.edu/spreadsheets/d/1ljwkXZ7BYcCCo3UwqHz0EPm2I3OMSYMYrfYv43C2MBc/edit?usp=sharing

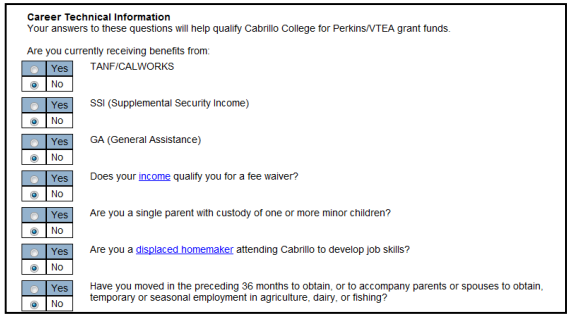
If interested click the Google Docs link above and request access to the sign-up sheet. Based on the number of requests I'll determine how long they can be checked out for.

Perkins/VTEA Survey

https://opus-ii.cis.cabrillo.edu/forum/viewtopic.php?f=6&t=349

This is an important source of funding for Cabrillo College.

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



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?

Managing Files

Lesson 6 commands for your toolbox:

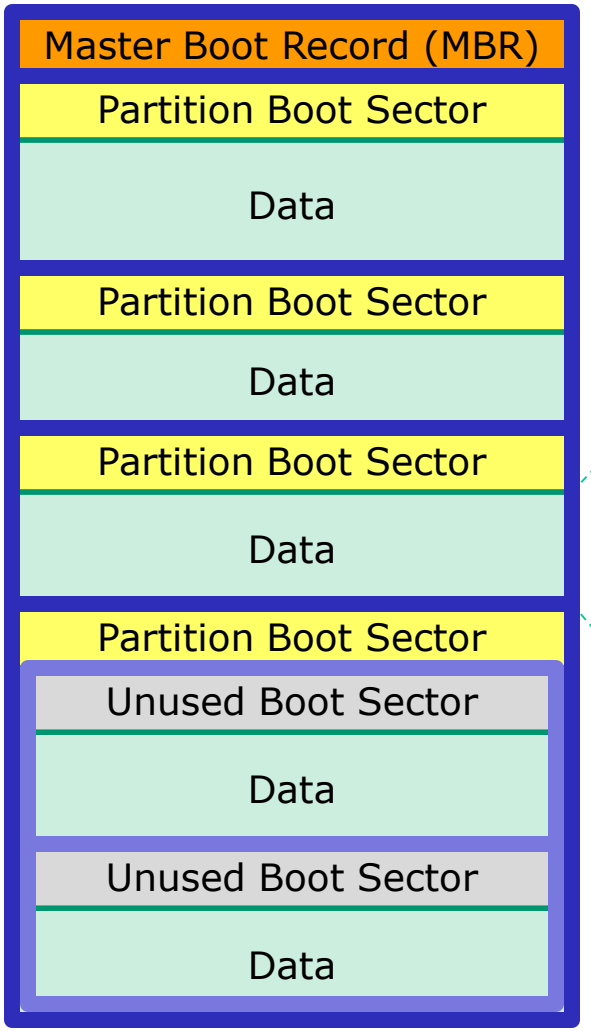
touch	- make a file (or update the timestamp)
mkdir	- make a directory
cp	- copy a file
mv	- move or rename a file
rmdir	- remove a directory
rm	- remove a file
ln	- create a link
tree	- visual list a directory

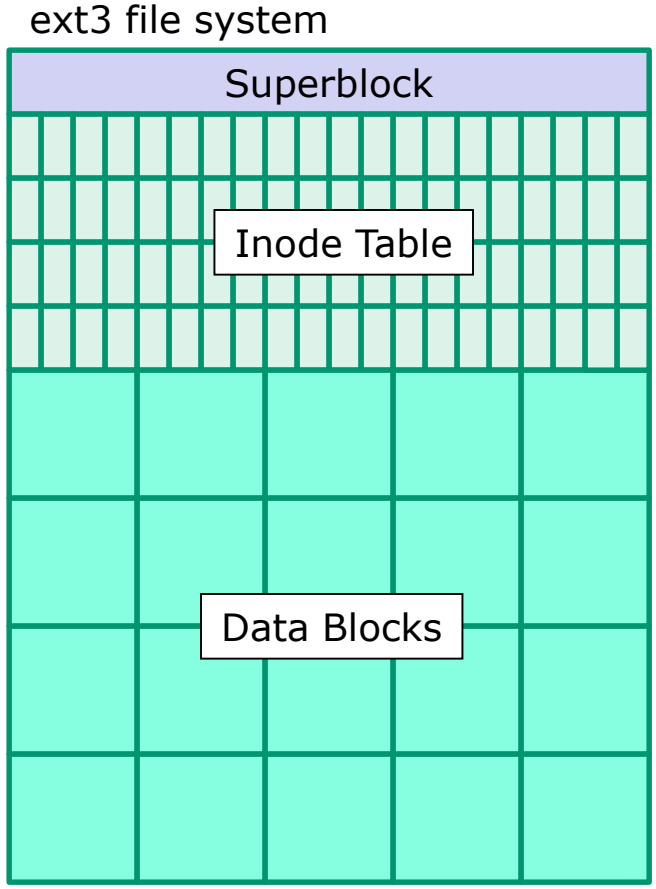
Redirecting stdout:

> 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 ext[234] and XFS 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*

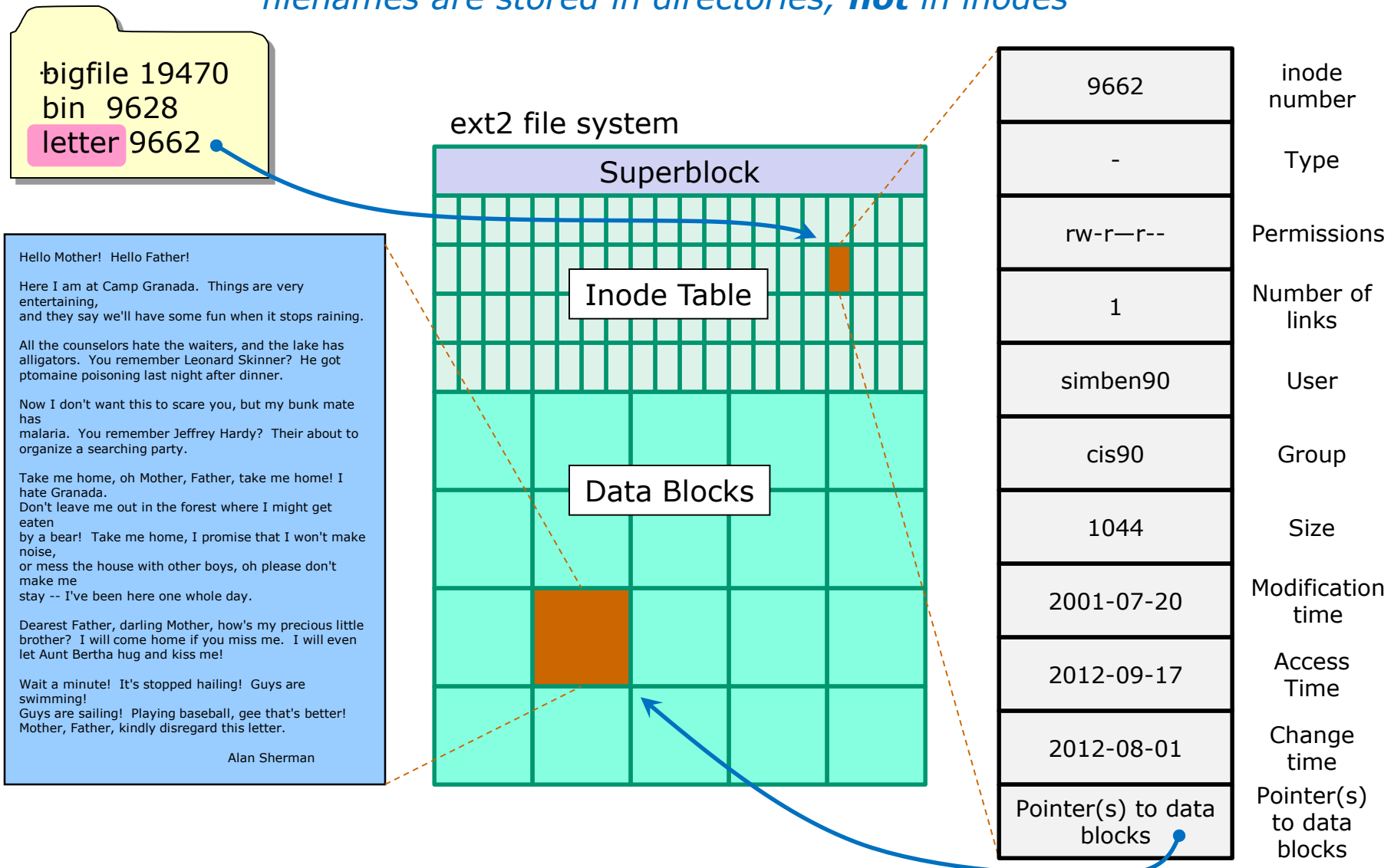
inode

+

```
/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 Directories

Creating Directories

Command syntax:

mkdir *newdirectory*

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

Remember, everything in Unix is a file … even directories!

Creating Directories

The mkdir command

mkdir *newdirectory*

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

The file size is 4096 bytes

Creating Directories

The mkdir command

Create multiple directories at once

```
/home/cis90/simben $ mkdir redhat debian slackware
/home/cis90/simben $
/home/cis90/simben $
/home/cis90/simben $
/home/cis90/simben $
/home/cis90/simben $
/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 directories themselves rather than their contents*

Column 1 of the long listing shows the basic file type is a "d" for directory

Creating Directories

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
```

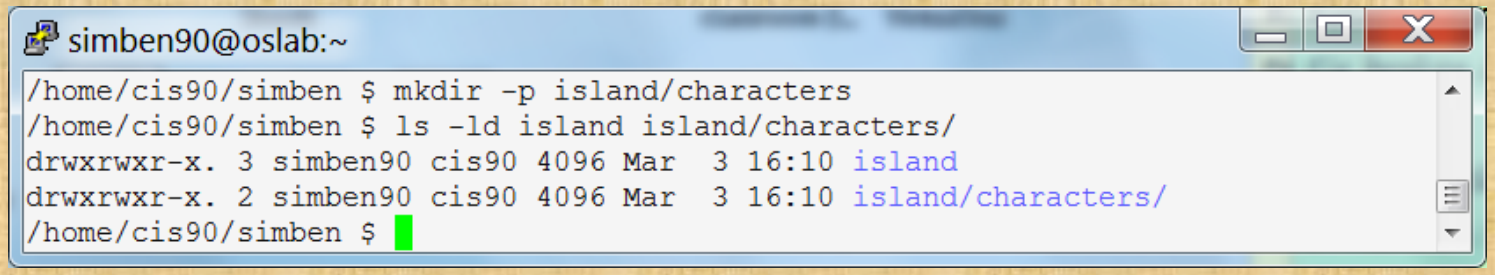
*Need to use the **p** option to create new parent directories as needed*

Activity

In your home directory create a directory named *characters* inside a directory named *island* then list both new directories:

```
mkdir -p island/characters

ls -ld island island/characters/
```



Creating Regular Files

Creating Files

Command syntax:

touch *newfile*

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

echo "*string***" >** *newfile*

- Creates or overwrites a text file

Creating Files

The touch command

touch *newfile*

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

```
/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

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

Column 1 of the long listing shows the basic file type is a "-" for regular file

Creating Files
The touch command

The "last modified" timestamp 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
```

Wait a few minutes then touch the file to update the timestamp

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

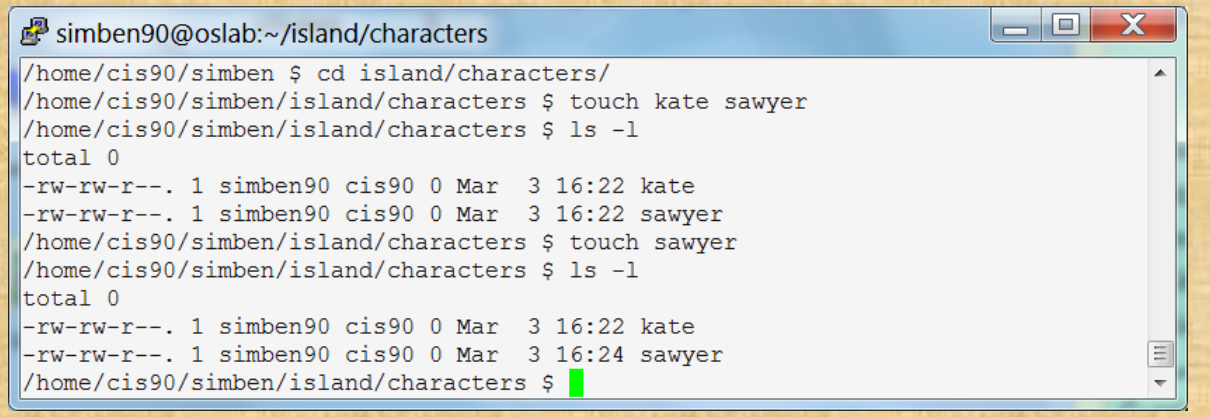
Activity

In the directory named *characters* create 2 new files:

```
cd island/characters
touch kate sawyer
ls -l
```

wait a minute or two

```
touch sawyer
ls -l
```



Creating Files
Redirection to stdout

echo "string" > *file* *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 a new file if the filename does not exist.

However if the file exists already it will be emptied without warning!

Activity

- In the directory named *characters* create a new file:

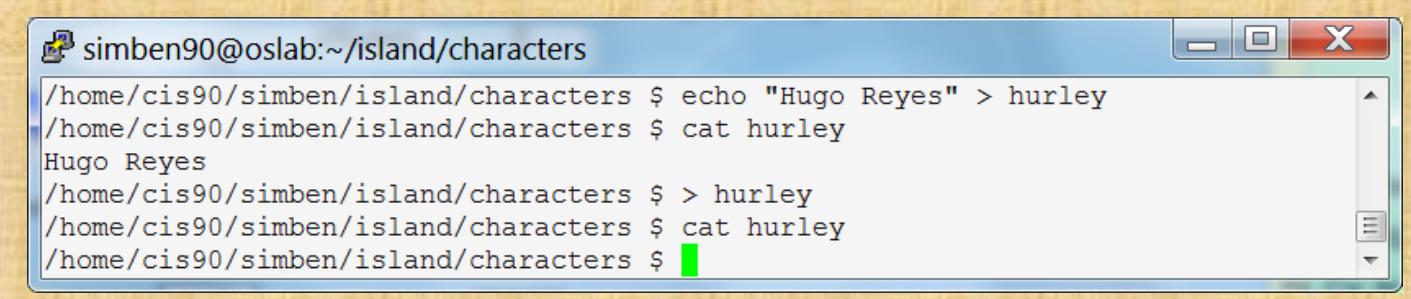
```
echo "Hugo Reyes" > hurley
```

- Print the new file with:

```
cat hurley
```

- Empty the file *hurley*

```
> hurley
cat hurley
```



Listing Files

Listing Files & Directories

Short listing

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

Short recursive listing

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

island/characters:
hurley  kate  sawyer
```

Listing Files & Directories

Long listing

```
/home/cis90/simben $ ls -l island
total 4
drwxrwxr-x. 2 simben90 cis90 4096 Mar  3 16:53 characters
```

Long recursive listing

```
/home/cis90/simben $ ls -lR island
island/:
total 4
drwxrwxr-x. 2 simben90 cis90 4096 Mar  3 16:53 characters

island/characters:
total 0
-rw-rw-r--. 1 simben90 cis90 0 Mar  3 16:53 hurley
-rw-rw-r--. 1 simben90 cis90 0 Mar  3 16:22 kate
-rw-rw-r--. 1 simben90 cis90 0 Mar  3 16:24 sawyer
```

Listing Files & Directories

Making a directory tree diagram

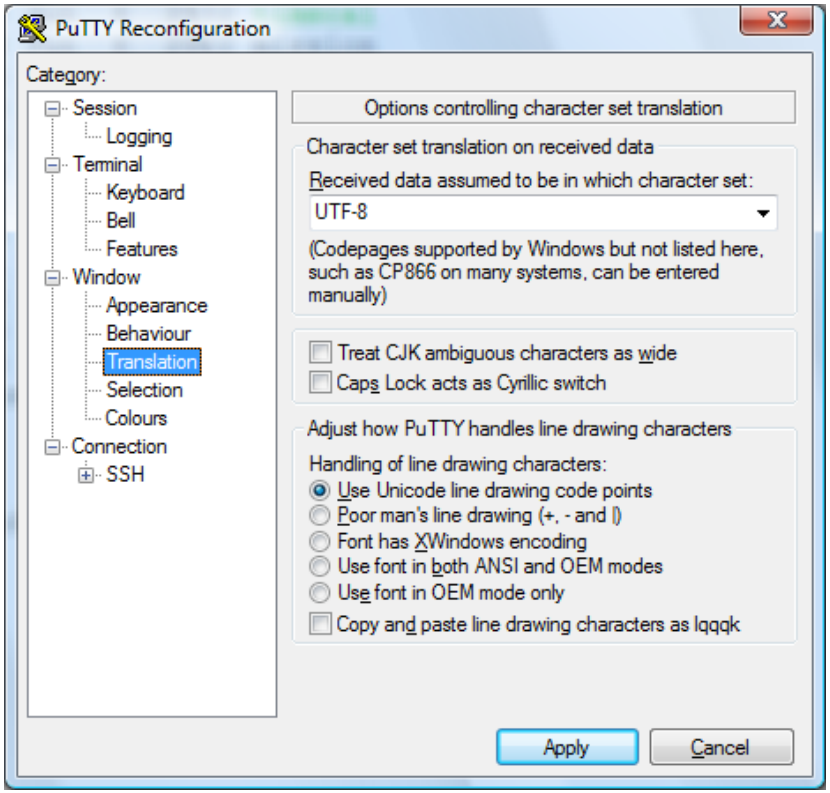
```
/home/cis90/simben $ tree island
island
`-- characters
    |-- hurley
    |-- kate
    `-- sawyer

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



Activity

- 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 *sourcefile targetfile*

cp *sourcefile targetdirectory/*

cp *sourcefile1 sourcefile2 targetdirectory/*

cp *sourcefile targetdirectory/targetfile*

cp *sourcefile sourcefile targetdirectory/*

options: **-i -r**

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

*Where: sourcefile, targetfile, and targetdirectory are **absolute** or **relative** pathnames*

Copying files

Copy one file to another

cp *sourcefile targetfile*

```
/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 *sourcefile1 sourcefile2 targetdirectory/*

```
/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 *sourcefile1 sourcefile2 targetdirectory*

Copy all files to the new directory

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

```
/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 *oldfilename newfilename*

mv *file targetdirectory*

mv *file targetdirectory/targetfile*

mv *file1 file2 targetdirectory/*

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

Where: file, targetfile, targetdirectory are ***absolute*** *or* ***relative*** *pathnames*

Moving Files

Renaming a file with the **mv** command

mv *oldfilename newfilename*

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 *file targetdirectory/*

```
/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 *file1 file2 file3 targetdirectory/*

```
/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*

rm *file1 file2* **...**

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*

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 *file* *newlink*

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 *file newlink*

```
/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
```

Create dulces hard link 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 *file newlink*

```
/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

Removing a "hard" link

rm *newlink*

```
/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 *file newlinkfile*

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
```


Assignment

Lab 5

In this lab you will reorganize your home directory

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


Wrap up

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

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

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.

INSTRUCTIONS:
Every question on the test was designed to be answered using one of the systems below.

- opus-ii.cis.cabrillo.edu (port 2220).
- sun-hwa-vii.cis.cabrillo.edu (port 22)
- son-of-opus.simms-teach.com (port 2220)
- arya-xx (port 22) - Select xx for your own Arya.

Each question begins with [*system name*] so you know which system you should be logged into to answer the question.

All systems are accessible using ssh from opus-ii. For sun-hwa-vii and son-of-opus login using your original opus-ii credentials. For arya, use the generic cis90 account.

IF YOU GET STUCK on a question you can ask or email the instructor for the answer and forfeit the point. The instructor will be available during class and be online between 8-10 PM in the evening for online or long distance students.

Please KEEP YOUR ANSWERS TO A SINGLE LINE ONLY !!
This test must be completed in one sitting. The submittal will be made automatically when the time is up. If you submit early by accident you will not be able to re-enter and continue. If that happens don't panic! Just email the instructor any remaining answers before the time is up.

Notes to instructor

[ ] Canvas: Schedule end of **practice** test at *[T-30]*

[ ] Kick off and lock out users on **practice** test system

```
echo "/root/lock-cis90; cp /etc/nologin.bak /etc/nologin" | at [T-30]
```

[ ] Kick off and lock out users on **secondary practice** test system

```
echo "/root/lock-cis90" | at [T-30] (adjusted for timezone)
```

[ ] Canvas: **real** test availability from = *[T-0]*, due & available until = *[splashdown]*

[ ] Canvas: remove password on **real** test on Canvas *[before T-0]*

[ ] Canvas: publish **real** test and moderate any accommodations *[before T-0]*

[ ] Send email on Opus-II to students

```
echo "/home/rsimms/cis90/test01/q29/mail-q29-T1 2 q" | at [T-0]
```

[ ] Allow logins on primary **real** test system

```
echo "/root/unlock-cis90; rm /etc/nologin" | at [T-0]
```

[ ] Allow logins on secondary **real** test system

```
echo "/root/unlock-cis90" | at [T-0]
```

[ ] Kick off and lock out users on **primary** and **secondary real** test systems

```
echo "/root/lock-cis90; cp /etc/nologin.bak /etc/nologin" | at [splashdown]
echo "/root/lock-cis90" | at [splashdown]
```


Test 1

Backup

More Examples

Practice Tasks

For use on Opus-II

Task 1: Create a new directory named *birds* in your home directory. In that new directory create a sub-directory named *Antarctica*. Copy the *penguin* file from the */home/cis90/depot* directory to the new *Antarctica* directory. View the last line of the *penguin* file. Recursively remove the *birds* directory when finished.

```
/home/cis90/simben $ cd
/home/cis90/simben $ mkdir -p birds/Antarctica
/home/cis90/simben $ cp ../depot/penguin birds/Antarctica/
/home/cis90/simben $ tail -n1 birds/Antarctica/penguin
and envy your plumed pride.
/home/cis90/simben $ head -n1 birds/Antarctica/penguin
Magellanic Penguin
/home/cis90/simben $ rm -rf birds/
/home/cis90/simben $
```

Performing Task 1 from the home directory using relative pathnames only.

Practice Tasks

For use on Opus-II

Task 1: Create a new directory named *birds* in your home directory. In that new directory create a sub-directory named *Antarctica*. Copy the *penguin* file from the */home/cis90/depot* directory to the new *Antarctica* directory. View the last line of the *penguin* file. Recursively remove the *birds* directory when finished.

```
/home/cis90/simben $ cd
/home/cis90/simben $ mkdir birds
/home/cis90/simben $ cd birds
/home/cis90/simben/birds $ mkdir Antarctica
/home/cis90/simben/birds $ cd Antarctica
/home/cis90/simben/birds/Antarctica $ cp /home/cis90/depot/penguin .
/home/cis90/simben/birds/Antarctica $ tail -n1 penguin
and envy your plumed pride.
/home/cis90/simben/birds/Antarctica $ cd
/home/cis90/simben $ rm -rf /home/cis90/simben/birds/
/home/cis90/simben $
```

Performing Task 1 by changing directories and using a mix of relative and absolute pathnames.

Practice Tasks

For use on Opus-II

Task 1: Create a new directory named *birds* in your home directory. In that new directory create a sub-directory named *Antarctica*. Copy the *penguin* file from the */home/cis90/depot* directory to the new *Antarctica* directory. View the last line of the *penguin* file. Recursively remove the *birds* directory when finished.

```
/home/cis90/depot $ cd /home/cis90/depot/
/home/cis90/depot $ ls penguin
penguin
/home/cis90/depot $ mkdir -p ~/birds/Antarctica
/home/cis90/depot $ cp penguin ~/birds/Antarctica/
/home/cis90/depot $ tail -n1 ~/birds/Antarctica/penguin
and envy your plumed pride.
/home/cis90/depot $ rm -rf ~/birds
/home/cis90/depot $
```

Performing Task 1 from the /home/cis90/depot directory and using the ~ for the home directory.

Practice Tasks

For use on Opus-II

Task 1: Create a new directory named *birds* in your home directory. In that new directory create a sub-directory named *Antarctica*. Copy the penguin file from the /home/cis90/depot directory to the new *Antarctica* directory. View the last line of the *penguin* file. Recursively remove the *birds* directory when finished.

```
/home/cis90/depot $ cd /home/cis90/depot/
/home/cis90/depot $ ls penguin
penguin
/home/cis90/depot $ mkdir -p ../simben/birds/Antarctica
/home/cis90/depot $ cp penguin ../simben/birds/Antarctica/
/home/cis90/depot $ tail -n1 /home/cis90/simben/birds/Antarctica/penguin
and envy your plumed pride.
/home/cis90/depot $ rm -rf /home/cis90/simben/birds/
/home/cis90/depot $
```

Performing Task 1 from the /home/cis90/depot directory and using relative and absolute pathnames.