



## Rich's lesson module checklist

*Last modified: 03/06/2019*

- Zoom recording named and published for previous lesson
- Slides and lab posted
- Print out agenda slide and annotate page numbers
- No 1<sup>st</sup> minute quiz today (test instead)
- Flash cards
- Calendar page updated
- Lab 5 ready
  - Put sonnet6 & bigfile in depot/
  - Future **fixes**
    - test01.graded not incorporated
    - Move labs rather than copy them
- Real Test 1
  - Configured on canvas (availability, accommodations, password)
  - Real Test 1 Q16, Q22 and Q30 verified
  - 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: <https://web.archive.org/web/20140209023942/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. John's site: <http://teacherjohn.com/>
- Jaclyn Kostner for many webinar best practices: e.g. mug shot page.



## Student checklist - Before class starts

Rich's Cabrillo College CIS Classes  
CIS 90 Calendar

CIS 90 (Fall 2014) Calendar

Course Dates: [Genda](#) [Calendar](#)

[CIS 90](#)

Lesson	Date	Topics	Links
	9/2	<p><b>Class and Linux Overview</b></p> <ul style="list-style-type: none"> <li>Understand how the course will work</li> <li>High-level overview of computers, operating systems, and virtual machines</li> <li>Overview of LINUX/Linux market and architecture</li> <li>Using SSH for remote network exits</li> <li>Using terminals and the command line</li> </ul> <p><b>Methods</b></p> <p><a href="#">Presentation slides (download)</a></p> <p><a href="#">Enter virtual classroom</a></p> <p><b>Supplemental</b></p> <ul style="list-style-type: none"> <li>PowerPoint: Logging into Opus (download)</li> </ul> <p><b>Assignments</b></p> <ul style="list-style-type: none"> <li>Student Survey</li> <li>Lab 1</li> </ul> <p><b>ECE Certificate</b></p> <p>Quiz 1</p> <p>Commands</p>	<p>(day)</p> <p>2:45 p163-172 p164-172 (night)</p>

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.

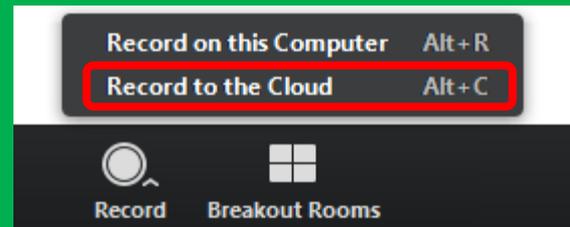
The screenshot shows a Zoom meeting interface with several windows open. The main window displays a login page for 'Rich's Cabrillo College CIS 90' with the text 'Get into the car' overlaid. Other windows include the Google homepage, the CIS 90 website's 'CIS 90 Calendar' page, and a PDF of lesson slides titled 'CIS 90 - Lesson 1' with the subtitle '90 System Playground'. The Zoom meeting controls at the bottom show 'Unmute', 'Start Video', 'Invite', 'Participants', 'Share Screen', 'Chat', 'Record', and 'Leave Meeting'.

CIS 90 website Calendar page

One or more login sessions to Opus-II

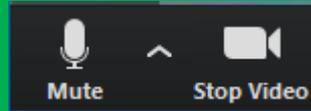


# Start



# Start Recording

Audio Check



Start Recording

# Audio & video Check



Instructor: **Rich Simms**  
Dial-in: **669-900-6833 (toll)**  
Meeting ID: **426 283 384**



Nick



Ryan



Erik



Matt



David



Jon



Cheryl



Wais



Tanisha



Daniel



Ohunayo



Sequoia



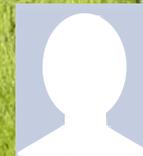
Scott



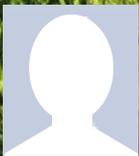
Lucky



Cole



Shane



Jim



Joseph



Mark



Adina

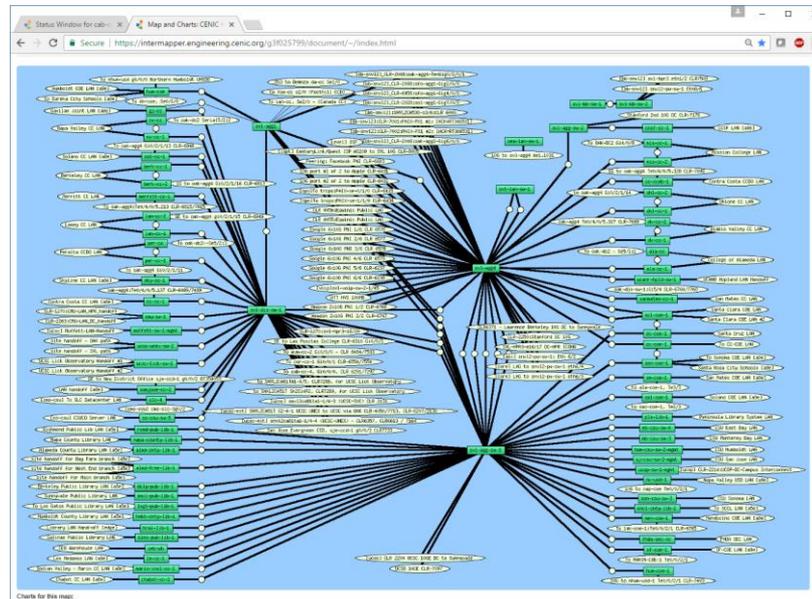


Evie



Cody

# Network Check



[https://intermapper.engineering.cenic.org/g3f025799/  
document/~!/index.html](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](mailto:risimms@cabrillo.edu)

within the **first few minutes of class**

# Managing Files

## Objectives

- Be able to create, copy, move, remove and link files

## Agenda

- Guest Speaker, Denise Moss
- 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



**Unit 3**

**Electronic Mail**

- Guest speaker: Denise Moore on OTC (On-The-Job) training programs
- Learn how to use the LINC communication tools write and /bin/mail
- Overview on and-to and mail

**Materials**

- Presentation slides ([download](#))

**Supplemental**

- Howto #318: Accessing vlab ([download](#))

**Assignment**

- Read/skim Lesson 3 slides

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

If you haven't already,  
download the lesson slides

## Class Activity

	<ul style="list-style-type: none"><li>• <a href="#">Read/skim Lesson 1 slides</a></li><li>• <a href="#">Student Survey</a></li><li>• <a href="#">Lab 1</a></li></ul>
	<b>ConferZoom</b> <ul style="list-style-type: none"><li>• <a href="#">Enter virtual classroom</a></li><li>• <a href="#">Class archives</a></li></ul>
	<b>Quiz 1</b>
	<b>Commenda</b> <ul style="list-style-type: none"><li>• Understand how the UNIX login operation</li></ul>

<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

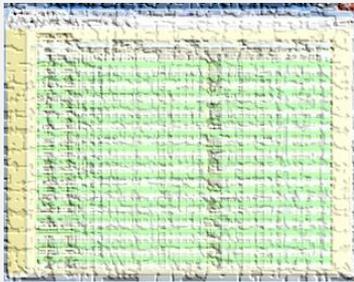
他問一個問題，五分鐘是個傻子，他不問一個問題仍然是一個傻瓜永遠。

*He who asks a question is a fool for five minutes; he who does not ask a question remains a fool forever.*

## Review your progress in the course

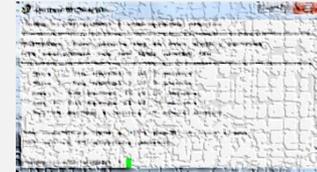
### Check the website Grades page

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



### Or check on Opus-II

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



Written by Jesse Warren a past CIS 90 Alumnus

- **Send me your survey to get your LOR codename.**
- **Graded labs and tests are in your home directories.**

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**

### Points that could have been earned:

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

## Extra Credit

In lesson slides  
(search for 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`



### On the website

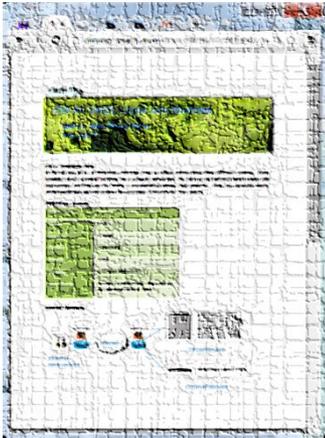
<http://simms-teach.com/cis90grades.php>

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>

• **Website content review** - The first person to email the instructor pointing out an error or typo on this website will get one point of extra credit for each unique error. The email must specify the specific document or web page, pinpoint the location of the error, and specify what the correction should be. Duplicate errors count as a single point. This does not apply to pre-published material that has been updated but not yet presented in class. (Up to 20 points total)

## Lab Assignments -- Pearls of Wisdom



- Don't wait till the last minute to start.
- Plan for things to go wrong and give yourself time to ask questions and get answers.
- The *slower* you go the *sooner* you will be finished.
- A few minutes reading the forum can save you hour(s).
- Line up materials, references, equipment and software ahead of time.
- It's best if you fully understand each step as you do it. Use Google or refer back to lesson slides to understand the commands you are using.
- Keep a growing cheat sheet of commands and examples.
- Study groups are very productive and beneficial.
- Use the forum to collaborate, ask questions, get clarifications and share tips you learned while doing a lab.
- **Late work is not accepted** so submit what you have for partial credit.

## Getting Help When Stuck on an Assignment

- Google the topic/error message.
- Search the Lesson Slides (they are PDFs) for a relevant example on how to do something.
- Check the forum. Someone else may have run into the same issue and found a way past it. If not start a new topic, explain what you are trying to do and what you have tried so far.
- Talk to a tutor/assistant at the CTC (room 1403) or CIS Lab (STEM Center).
- Come see me during my office or lab hours:

<https://www.cabrillo.edu/salsa/listing.php?staffId=1426>

**I'm in the CTC (room 1403) every Tuesday from 3:30-6:00 pm.**

- 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!

*CIS Labs always involve some troubleshooting!*

# Help Available! In the CTC and CIS Lab

## Rich's Cabrillo College CIS Classes CIS 90 Calendar

Home

Resources

Forums

**Tutors**

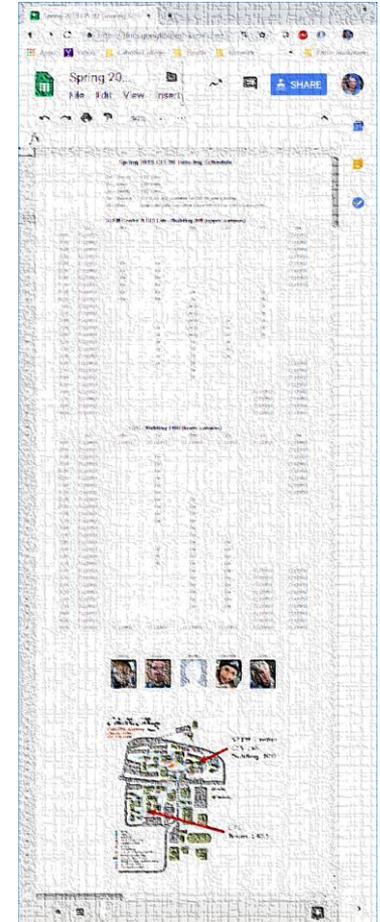
Canvas

Cabrillo College  
Cabrillo Gallery  
Library #1002  
831-479-6308

CIS Lab  
in STEM Center  
Building 800

*To see tutor  
schedule, click  
the Tutors link  
on the  
website.*

*Instructors, tutors  
and equipment are  
available for CIS  
students to work on  
assignments.*



CTC  
Room 1403

# Help Available! In the CTC and CIS Lab

**Rich's Cabrillo College CIS Classes**  
CIS 90 Calendar

Home Resources Forums **Tutors** Canvas

*To see tutor schedule, click the  
Tutors link on the website.*



*The CIS Lab is in the STEM  
center (Building 800)*



*Room 1403 is in the  
CTC (Building 1400)*



# 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](mailto:risimms@cabrillo.edu)

# Housekeeping





Pause/Stop Recording

# 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](mailto:risimms@cabrillo.edu)

# Overlap Students

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



Resume/Stop 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

## Real 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.

1. opus-ii.cis.cabrillo.edu (port 2220).
2. sun-hwa-vii.cis.cabrillo.edu (port 22)
3. son-of-opus.simms-teach.com (port 2220)
4. 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 !!

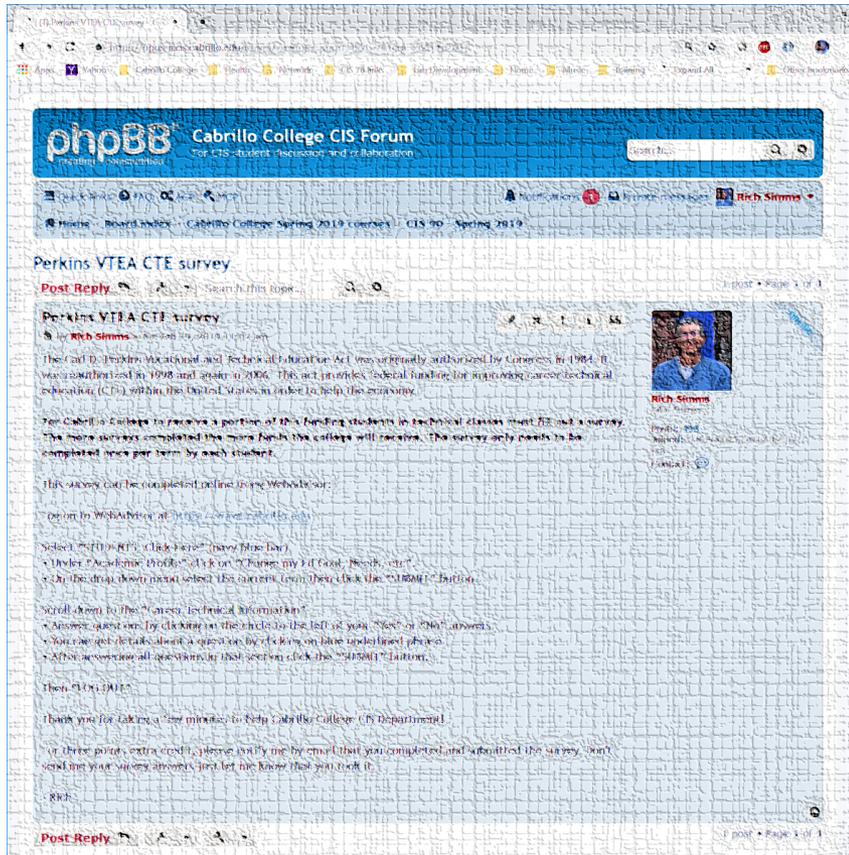
This test must be completed in one sitting. The submittal will be made automatically when the time is up. If you submit early by accident you will not be able to re-enter and continue. If that happens don't panic! Just email the instructor any remaining answers before the time is up.

# CIS Fundraising "Bake Sale"

*Donate by answering seven questions on an online CTE survey!*

## Perkins VTEA CTE Survey

**SURVEYS ARE DUE FRIDAY, MARCH 8TH (or before)**



This is an important source of funding for Cabrillo College.

Send me an email stating you completed the "VTEA survey" for **three points extra credit!**

Even if you took the survey in another CIS class!

Career Technical Information	
Your answers to these questions will help quality Cabrillo College for Perkins/VTEA grant funds.	
Are you currently receiving benefits from:	
<input type="radio"/> Yes	TANF/CALWORKS
<input type="radio"/> No	
<input type="radio"/> Yes	SSI (Supplemental Security Income)
<input type="radio"/> No	
<input type="radio"/> Yes	GA (General Assistance)
<input type="radio"/> No	
<input type="radio"/> Yes	Does your <u>income</u> qualify you for a fee waiver?
<input type="radio"/> No	
<input type="radio"/> Yes	Are you a single parent with custody of one or more minor children?
<input type="radio"/> No	
<input type="radio"/> Yes	Are you a <u>displaced homemaker</u> attending Cabrillo to develop job skills?
<input type="radio"/> No	
<input type="radio"/> Yes	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?
<input type="radio"/> No	

<https://opus-ii.cis.cabrillo.edu/forum/viewtopic.php?f=8&t=701>



# Managing Files



## Lesson 6 commands for your toolbox:

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

Redirecting stdout:

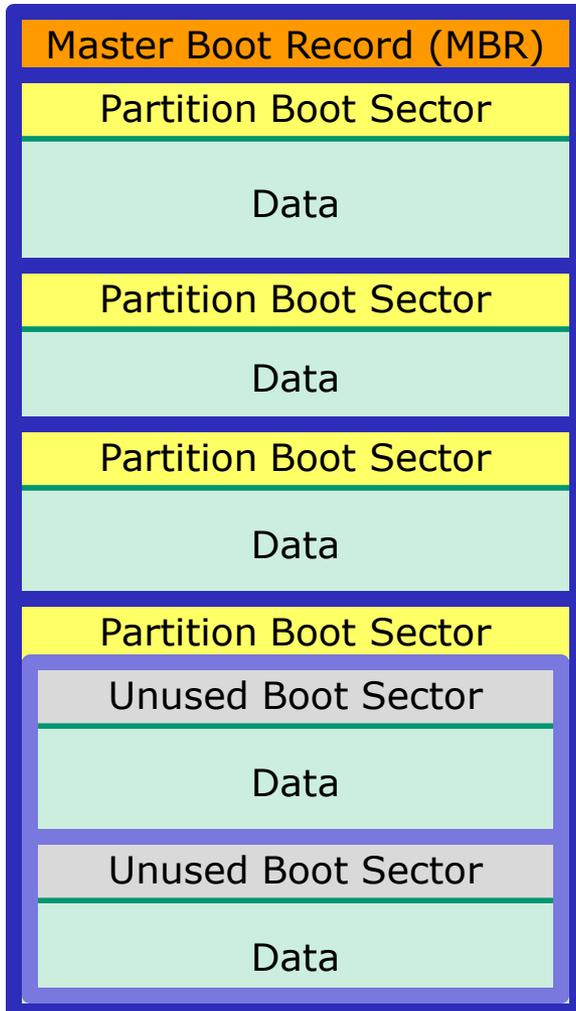
> ***filename*** - redirecting stdout to create/empty a file



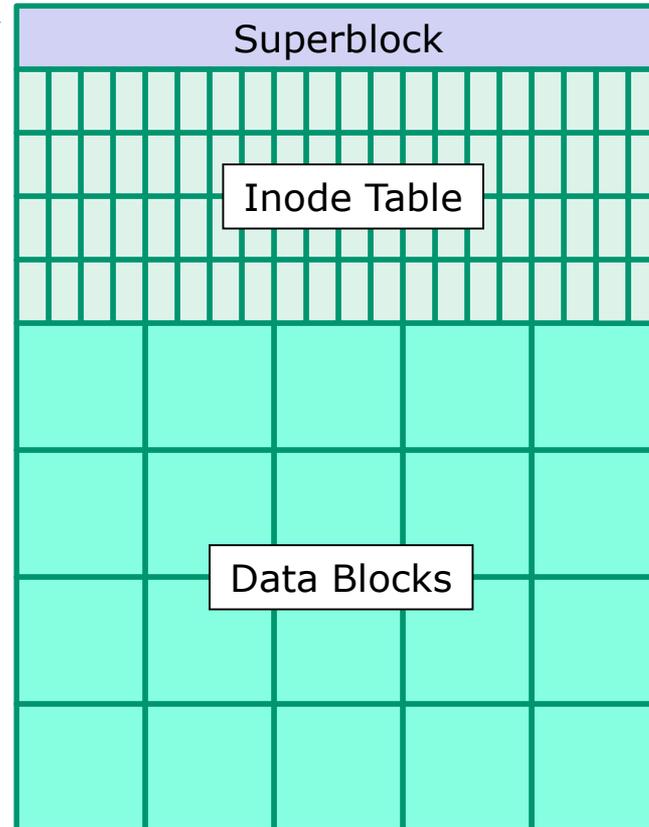
# File Systems

## 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.



ext3 file system





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

bigfile 19470  
bin 9628  
letter 9662

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 ptomaine poisoning last night after dinner.

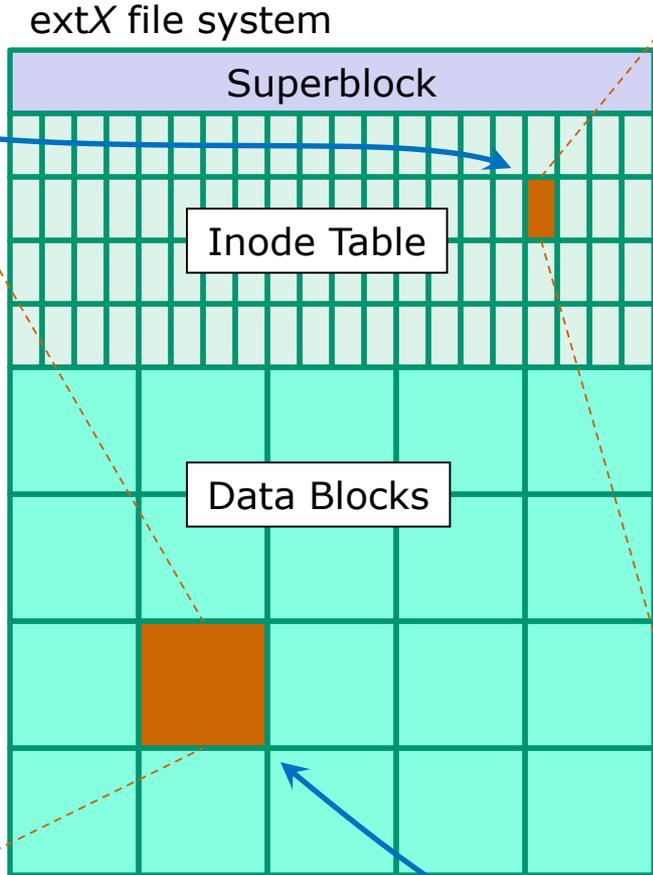
Now I don't want this to scare you, but my bunk mate has malaria. You remember Jeffrey Hardy? Their about to organize a searching party.

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



9662	inode number
-	Type
rw-r--r--	Permissions
1	Number of links
simben90	User
cis90	Group
1044	Size
2001-07-20	Modification time
2012-09-17	Access Time
2012-08-01	Change time
Pointer(s) to data blocks	Pointer(s) to data blocks

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



# Listing Files & Directories

# Listing Files & Directories

Command syntax:

**ls** [*options*] *pathname*

- List a file or the contents of a directory.
- The pathname can be absolute or relative.
- If no pathname is specified the current directory will be used.
- List multiple files or directories if multiple pathnames are supplied as arguments.
- Useful options:
  - a** shows all files including hidden.
  - l** for a long listing.
  - R** for a recursive listing.
  - d** for list the directory itself rather than its contents.
  - t** sort by modification date
  - S** sort by size
  - i** show the inode numbers

*Use the man  
command to see  
many more  
useful options*

## Activity

- Do a short listing of the *Miscellaneous* directory:

```
cd  
ls Miscellaneous
```

- Do a long listing showing all files (including hidden) in the *Miscellaneous* directory:

```
ls -la Miscellaneous
```

- Do a long listing of the *Miscellaneous* directory itself:

```
ls -ld Miscellaneous
```

*Remember directories  
are files too!*

*Which file is bigger, Miscellaneous or Miscellaneous/fruit?  
Write your answer in the chat window.*

## Activity

- Do a recursive short listing of the *Poems* directory:

```
cd  
ls -R Poems/
```

- Do a recursive long listing, showing inode numbers, of the *Poems* directory:

```
ls -liR Poems/
```

- Do a long listing of Maya Angelou's poem file named *woman*:

```
ls -l Poems/Angelou/woman
```

*Is the woman file a regular file or a symbolic link?  
Write your answer in the chat window.*

# The tree command

```
/home/cis90/simben $ tree Lab2.0
```

```
Lab2.0
```

```
├── 386  
├── afile  
├── A_long_name  
├── annual\ report  
├── file.9  
├── junk.old.bak  
├── README  
├── sTrAnGeNeSs  
└── this_years_annual_report
```

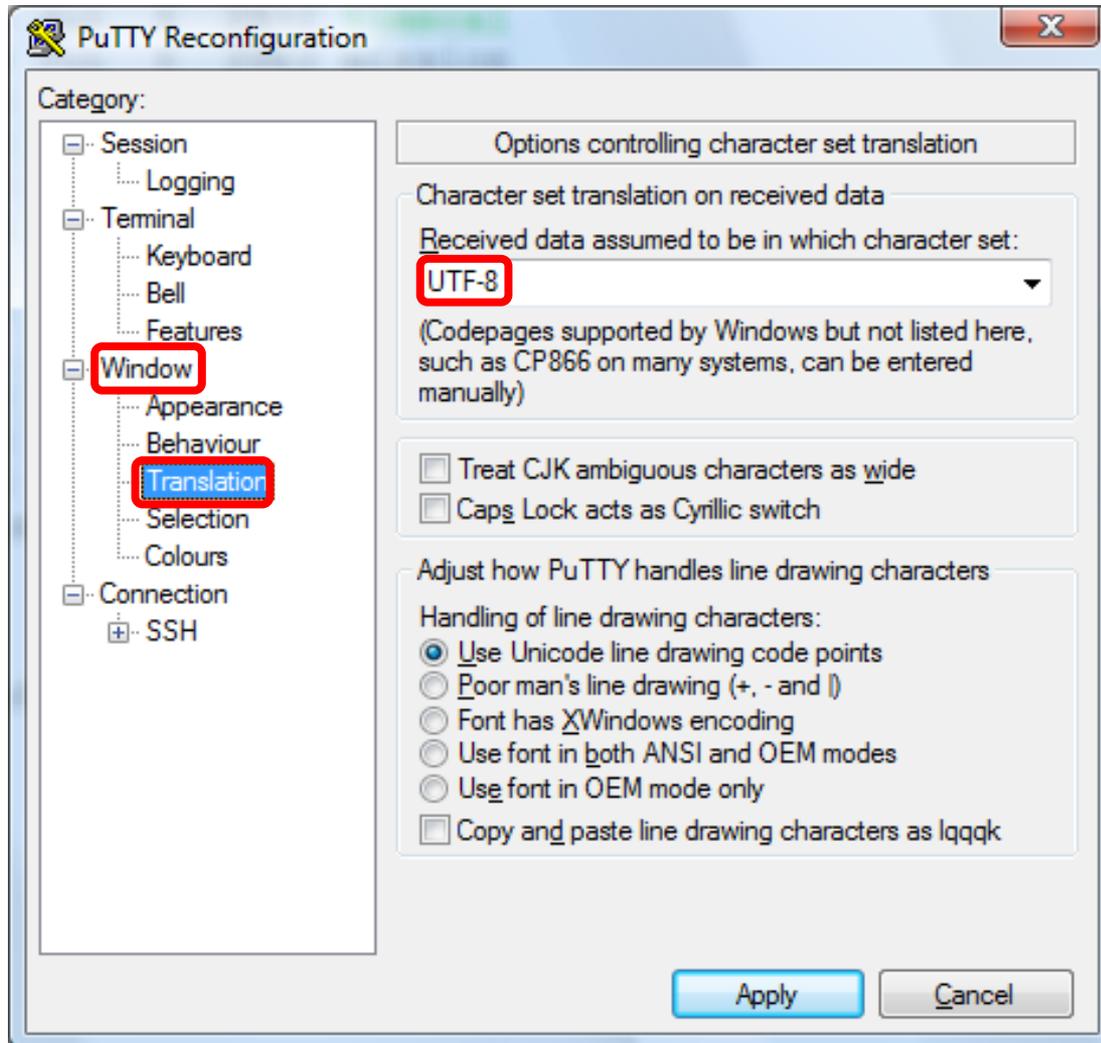
```
0 directories, 9 files
```

```
/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 for UTF-8 so the tree command can use the line drawing symbols.*

## Activity

- Make a tree diagram of your local *bin* directory:

```
cd  
tree bin
```

- Make a tree diagram of the *Dickenson* and *Angelou* directories in *Poems*:

```
tree Poems/Neruda/ Poems/Angelou/
```

- Make a tree diagram of your home directory:

```
tree
```

*Which poet, Maya Angelou or Pablo Neruda wrote the dog poem?*

# Managing Regular Files



## Lesson 6 commands managing regular files

- NEW touch** - create an empty regular file
- NEW mv** - rename a file
- NEW rm** - remove a file permanently
- NEW >** - Redirecting stdout to create, overwrite or empty a file

# Creating files with the touch command

## Command syntax:

**touch** *pathname*

- Creates an empty regular file.
- The pathname can be absolute or relative.
- Multiple pathnames can be specified as arguments which result in multiple regular files being created.
- If the file already exists, the time stamp is updated.

# Renaming a file with the mv command

## Command syntax:

**mv** *oldPathname newPathname*

- Renames a file or directory.
- The inode does not change.
- The pathname can be absolute or relative.

# Removing a file with the rm command

## Command syntax:

**rm** [*options*] *pathname*

- Removes a file PERMANENTLY.
- The pathname can be absolute or relative.
- Multiple pathnames can be specified as arguments which result in multiple regular files being removed.
- Useful options:
  - i = prompt before remove

# Create a regular file using the touch command

```
/home/cis90/simben $ ls -l Rome
ls: cannot access Rome: No such file or directory
```

```
/home/cis90/simben $ touch Rome
/home/cis90/simben $ ls -l Rome
-rw-rw-r--. 1 simben90 cis90 0 Oct  1 18:50 Rome
```

*The file type  
is a regular  
file*

*The file owner  
is simben90*

*The file size is 0  
bytes (an empty file)*



# Create, rename and remove a regular file

```
/home/cis90/simben $ touch Rome
```

```
/home/cis90/simben $ ls -li R*
```

```
16814721 -rw-rw-r--. 1 simben90 cis90 0 Oct 3 09:26 Rome
```

```
/home/cis90/simben $ mv Rome Remus
```

```
/home/cis90/simben $ ls -li R*
```

```
16814721 -rw-rw-r--. 1 simben90 cis90 0 Oct 3 09:26 Remus
```

```
/home/cis90/simben $ rm -i Remus
```

```
rm: remove regular empty file 'Remus'? no
```

```
/home/cis90/simben $ rm Remus
```

```
/home/cis90/simben $ ls -li R*
```

```
ls: cannot access R*: No such file or directory
```

## Activity

Now you try it!

```
cd
```

```
touch Rome
```

```
ls -li R*
```

*Notice whether or not the  
inode number changed*

```
mv Rome Remus
```

```
ls -li R*
```

```
rm -i Remus (when prompted Enter n for no)
```

```
ls -li Remus
```

```
rm Remus
```

```
ls -li Remus
```

*Who generated the error message, **bash** or **ls**, on the last command above? Put your answer in the chat window.*

## Activity

Google: Places that start with an "R"

Pick five places you like that start with an "R" and in your home directory use the **touch** command create files named after them. For example:

```
cd
```

```
touch Rome
```

```
touch Rheims
```

```
touch Recife Ranier Rapid_City
```

List your places using a short and long listing:

```
ls R*
```

```
ls -l R*
```

*When finished put the name of one of your places in the chat window.*

## Activity

Pick one of your place files and do a long listing:

```
/home/cis90/simben $ ls -l Rome  
-rw-rw-r--. 1 simben90 cis90 0 Oct 1 18:50 Rome
```

Wait five seconds or more seconds and touch the file you picked:

```
/home/cis90/simben $ touch Rome
```

Now do another long listing of the same file:

```
/home/cis90/simben $ ls -l Rome  
-rw-rw-r--. 1 simben90 cis90 0 Oct 1 18:56 Rome
```

*What changed in the second long listing?  
Write your answer in the chat window.*

# Creating files by redirecting output

## Command syntax:

**echo** "*some text string*" > *pathname*

- If the file specified by the pathname does not exist it is created.
- If the file specified by the pathname already exists it is EMPTIED and then OVERWRITTEN! \*\*\* Be Careful \*\*\*

# Creating files by redirecting output

```
/home/cis90/simben $ echo "hummmmmmm" > Giraffe
/home/cis90/simben $ cat Giraffe
hummmmmmm
/home/cis90/simben $
```

```
/home/cis90/simben $ ls -l Giraffe
-rw-rw-r--. 1 simben90 cis90 10 Oct  2 10:03 Giraffe
```

*The file type  
is a regular  
file*

*The file owner  
is simben90*

*The file size  
is 10 bytes*

# Overwriting files by redirecting output

```
/home/cis90/simben $ echo "hummmmmmm" > Giraffe  
/home/cis90/simben $ cat Giraffe  
hummmmmmm
```

```
/home/cis90/simben $ echo "yabba dabba doo" > Giraffe  
/home/cis90/simben $ cat Giraffe  
yabba dabba doo
```

*The Giraffe file contents get overwritten!*

# Overwriting files by redirecting output

```
/home/cis90/simben $ echo "yabba dabba doo" > Giraffe
/home/cis90/simben $ cat Giraffe
yabba dabba doo
/home/cis90/simben $ > Giraffe
/home/cis90/simben $ cat Giraffe
/home/cis90/simben $
```

*Be Careful!*

*The Giraffe file contents are emptied!*

## Activity

Google: Animals that start with an "G"

1. Pick three animals you like starting with a "G" and use **echo** with redirection to create files named after them. For example:

```
echo "hum" > Giraffe
```

```
echo "naaaaaaaaaaaa" > Goat
```

```
echo "honk honk honk" > Goose
```

2. Show the data contents of your animal files:

```
cat G*
```

```
head -n1 G*
```

*When finished write one of your animal names in chat window.*

## Activity

1) Do a long listing of your animal files:

```
ls -l G*
```

*Write the name and size of your largest animal file in the chat window.*

2) **Overwrite** your largest animal file, for example:

```
cat Goose  
echo oops > Goose  
cat Goose  
ls -l G*
```

*Note: You may not have a Goose file, just use the name of your largest animal file.*

*What happened to your largest file?  
Write your answer in the chat window.*

## Activity

1) Do a long listing of your animal files:

```
ls -l G*
```

*Write the name and size of your smallest animal file in the chat window.*

2) **Empty** your smallest animal file, for example:

```
cat Giraffe  
> Giraffe  
cat Giraffe  
ls -l G*
```

*Note: You may not have a Giraffe file, just use the name of your smallest animal file.*

*Write the name and updated size of your smallest file in the chat window.*

## Activity

Restore your animal files using the up arrow to recall the previous commands, for example:

```
echo "hum" > Giraffe  
echo "naaaaaaaaaaaa" > Goat  
echo "honk honk honk" > Goose
```

*Write "places restored" in chat window when finished*



# Managing Directories



## Lesson 6 commands managing directories

- NEW** **mkdir** - create a new directory
- NEW** **mv** - rename a directory
- NEW** **rmdir** - permanently remove an empty directory
- NEW** **rm** - remove a non-empty directory



# Creating Directories

## Command syntax:

**mkdir** [*options*] *pathname*

- Creates an empty directory.
- The pathname can be absolute or relative.
- Creates multiple directories if multiple pathnames are supplied as arguments.
- Options:
  - **-p** is used to create nested directories without having to create each subdirectory individually first.

*Remember, everything in Unix is a file ... even directories!*

# Renaming a directory with the mv command

## Command syntax:

**mv** *oldPathname newPathname*

- Renames a file or directory.
- The inode does not change.
- The pathname can be absolute or relative.

*Remember, everything in Unix is a file ... even directories!*

# Removing Directories

## Command syntax:

**rmdir** *pathname*

- Removes an empty directory.
- The pathname can be absolute or relative.
- Removes multiple directories if multiple pathnames are supplied as arguments.

*Remember, everything in Unix is a file ... even directories!*



# Removing a directory with the rm command

## Command syntax:

**rm** [*options*] *pathname*

*Be Careful!*

- Removes a directory PERMANENTLY.
- The pathname can be absolute or relative.
- Multiple pathnames can be specified as arguments which result in multiple regular directories being removed.
- Useful options:
  - i** = prompt before remove
  - r** = recursively remove non-empty directories and sub-directories
  - f** = force, do no prompt user before removing

# Creating Directories

## The mkdir command

```
/home/cis90/simben $ ls -l stuff  
ls: cannot access stuff: No such file or directory
```

```
/home/cis90/simben $ mkdir stuff  
/home/cis90/simben $ ls -l stuff  
total 0
```

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

```
/home/cis90/simben $ ls -ld stuff  
drwxrwxr-x. 2 simben90 cis90 6 Oct 2 10:45 stuff
```

*The basic file type is a directory*

*The file owner is a simben90*

*The file size is 6 bytes*

## Activity

1. Make a directory with a misspelled name:

```
cd
```

```
mkdir stugg
```

```
ls -ld st*
```

2. Rename it:

```
mv stugg stuff
```

```
ls -ld st*
```

3. Remove it:

```
rmdir stuff
```

```
ls -ld st*
```

4. Make it again:

```
mkdir stuff
```

```
ls -ld st*
```

*Who owns your new stuff directory?  
Write your answer in the chat window.*

## Activity

1. Change into your new directory:

```
cd stuff
```

2. Create two more directories there:

```
mkdir animals places
```

3. Compare the sizes of your three new directories:

```
ls -ld ../stuff *
```

*Which of the three directories (stuff, animals, places) is the largest?  
Put your answer in the chat window.*

## Activity

1. Try to create a nested set of directories without the -p option:

```
mkdir down/we/go/deep
```

2. Try again with the -p option:

```
mkdir -p down/we/go/deep
```

3. Compare the sizes of your three new directories:

```
ls -ld ../stuff *
```

*Write the size of your animals directory in the chat window.*

# Moving Files

# Moving Files

## The **mv** command

Command syntax:

**mv** *oldfilename newfilename*

**mv** *file targetdirectory*

**mv** *file targetdirectory/targetfile*

**mv** *file1 file2 targetdirectory/*

*Note all arguments  
are either relative or  
absolute pathnames*

options:

**-i** = warn before overwriting

**-v** = verify files moved

## Activity

- Create and empty file named Hank

```
> Hank  
ls H*
```

- Rename the file to Henry:

```
mv Hank Henry  
ls H*
```

- Remove the file using the verbose option:

```
rm -v Henry  
ls H*
```

*Write "Henry removed" in the chat window when finished*

## Activity

- Change to your home directory and list your animal files:

```
cd  
ls G*
```

- View the stuff directory

```
tree stuff
```

- Move the animal files to the *animals* directory in your *stuff* directory using the verbose option:

```
mv -v G* stuff/animals/
```

- View the results

```
ls stuff/animals/  
tree stuff
```

*Write "animals moved" when finished in the chat window*

## Activity

- Change to your *places* directory in your *stuff* directory:

```
cd stuff/places/  
ls
```

- Move the place files to the *places* directory in your *stuff* directory:

```
ls ../../R*  
mv -v ../../R* .  
ls
```

- View the results:

```
cd  
tree stuff
```

*Write "places moved" in the chat window when finished.*

# Copying Files

# Copying files

## The **cp** command



# Geneva

Command syntax:

**cp** *sourcefile targetfile*

**cp** *sourcefile targetdirectory/*

**cp** *sourcefile1 sourcefile2 targetdirectory/*

**cp** *sourcefile targetdirectory/targetfile*

**cp** *sourcefile sourcefile targetdirectory/*

*Note all arguments  
are either relative or  
absolute pathnames*

options:

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

## Activity

- Create a regular file named template

```
echo "Name:  
Street:  
City:  
State:  
Zip: " > template  
cat template
```

- Make a copy of the template file

```
cp template MyAddress  
cat MyAddress
```

*Write "template copied" in the chat window when finished.*

## Activity

- Make a backup your entire *stuff* directory:

```
cd
cp -R stuff stuff.bak
tree stuff
tree stuff.bak
```

- Interactively remove the place files in your places directory:

```
rm -i stuff/places/*      (reply with y to each prompt)
tree stuff
```

- Restore the place files from the backup directory using the verbose option:

```
cd stuff/places/
ls
cp -v ~/stuff.bak/places/* .
ls
```

*Write "places restored" in the chat window when finished.*

# linking files

# Linking files

## The **ln** command

### Command syntax:

**ln** *[options] filename linkname*

options:

s = symbolic link (like Windows shortcut)

*The arguments on the ln command can be either relative or absolute pathnames*

*With UNIX there are hard and soft (symbolic) links*

# 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

```
/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 Create dulces hard link to sweets
/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
```

*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 more "hard" links of the same file

```

/home/cis90/simben $ ln sweets candy           Hard link candy to dulces
/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

```

*same inode*      *number of hard linked files*

```

/home/cis90/simben $ ln sweets bonbons       Hard link bonbons to sweets
/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

```

*same inode*      *number of hard linked files*

# Linking files

## Hard links

Removing a "hard" link

**rm** *pathname*

```
/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** *pathname newLinkFile*

*The s option for a symbolic link*

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

*Creating a symbolic link to the Apache configuration file*

```
/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`

*Which files have the same inode numbers?  
Put your answer in the chat window.*

# Assignment



## Lab 5



**Lab 5: Organizing Files**

The goal of this lab is to become proficient with system commands for copying, moving, renaming, creating and removing files within your home directory.

**Course:**

**Authors:** <http://opus.cabrillo.edu/forum/viewforum.php?f=46>

Check this forum for any lab updates. Read about this lab. The forum is also the place to go if you get stuck. Post a question or send us a message if you have feedback about this lab.

**Procedure**

Log on to the OpenLab server as that you have a command link shell at your disposal. Be sure you are in your home directory by using the `pwd` command. We are going to reorganize the files in that home directory. This will involve making new subdirectories and moving files around. The questions asked during this procedure are for your challenge only. You will be graded on correctly performing this procedure. At the end of this lab you will submit your own report by entering the command:

```
submit
```

**Part A - Making Directories**

1. Display a listing of the files in your home directory using the `ls -l` command.
2. The `mkdir` makes some new directories using the `mkdir` command:
  - o `mkdir` is the directory creation utility for creating one or more using the following command:  
`mkdir <dir>`
  - o After the new directory's contents using the `ls -l` option of the `ls` command. Do you see the two hidden files that were created with the directory?
  - o You can make more than one new directory at a time by supplying two arguments to the `mkdir` command. Make two new directories, one called `dir1` and the other called `dir2`.
  - o Verify that they were made in your home directory.

In this lab you will reorganize your home directory.

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

*Contact me if you clobber your home directory by accident.*



# 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:

**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

## Real 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.

1. opus-ii.cis.cabrillo.edu (port 2220).
2. sun-hwa-vii.cis.cabrillo.edu (port 22)
3. son-of-opus.simms-teach.com (port 2220)
4. 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

- [ ] Kick off and lock out users on **primary 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/cis90/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]
```

- [ ] Schedule **primary real** test system

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

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

- [ ] Schedule **secondary real** test system

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

```
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.*