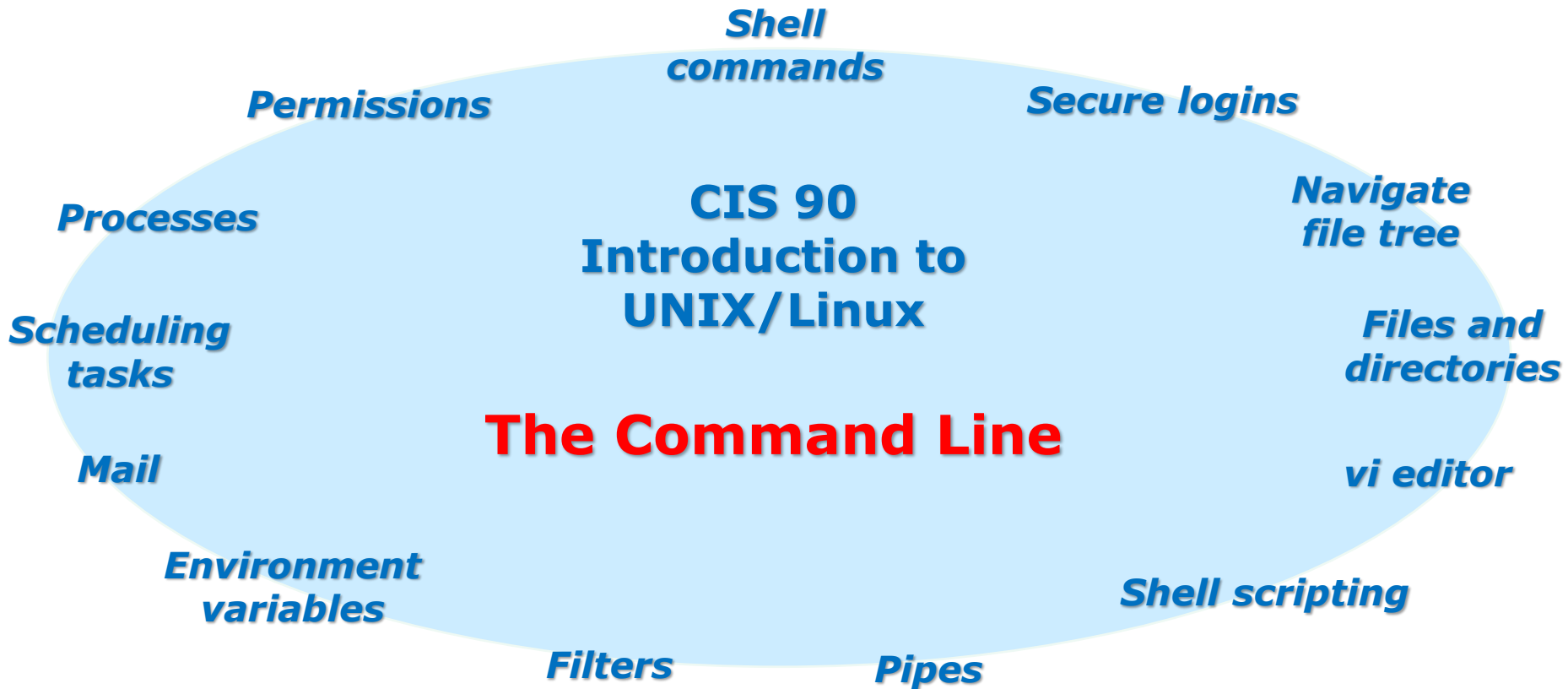**Rich's lesson module checklist**   *Last modified: 10/3/2018*

❑ Zoom recording named and published for previous lesson

❑ Slides and lab posted
❑ Print out agenda slide and annotate page numbers

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

❑ https://zoom.us

❑ Putty, slides, Chrome
❑ Enable/Disable attendee sharing
  ^ > Advanced Sharing Options > Only Host
❑ Enable/Disable attended annotations
  Share > More > Disable Attendee Sharing

❑ 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

Shell commands

Permissions

Secure logins

CIS 90 Introduction to UNIX/Linux

Processes

Navigate file tree

Scheduling tasks

Files and directories

The Command Line

Mail

vi editor

Environment variables

Shell scripting

Filters

Pipes

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.

2

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

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.*
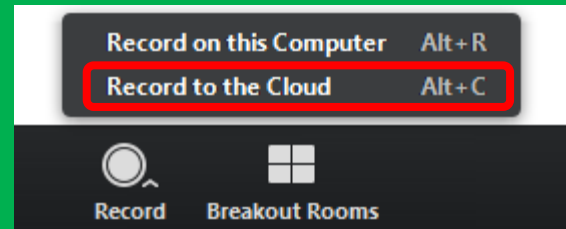

☐ *CIS 90 website Calendar page*

☐ *One or more login sessions to Opus-II*

5

Start

Record on this Computer   Alt+R
Record to the Cloud   Alt+C

Record   Breakout Rooms

Start Recording
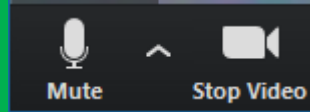
Audio Check

Start Recording

Audio & video Check

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

Mikey   Jona   Joseph   Tara Marie   Fredi   Carina   Isaac   Matthew
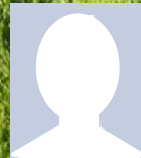
Erik   Tony   Branden   Dominic   Ryan L.   Alejandra   Blair   Zari
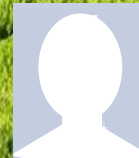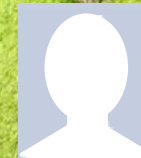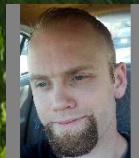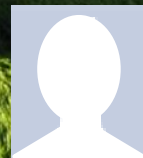
Victor   Danny   Gabriel   Janelly   Austin   Aaron   Ryan M.
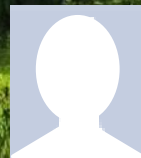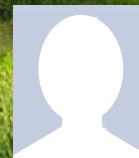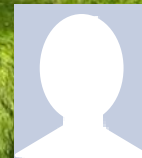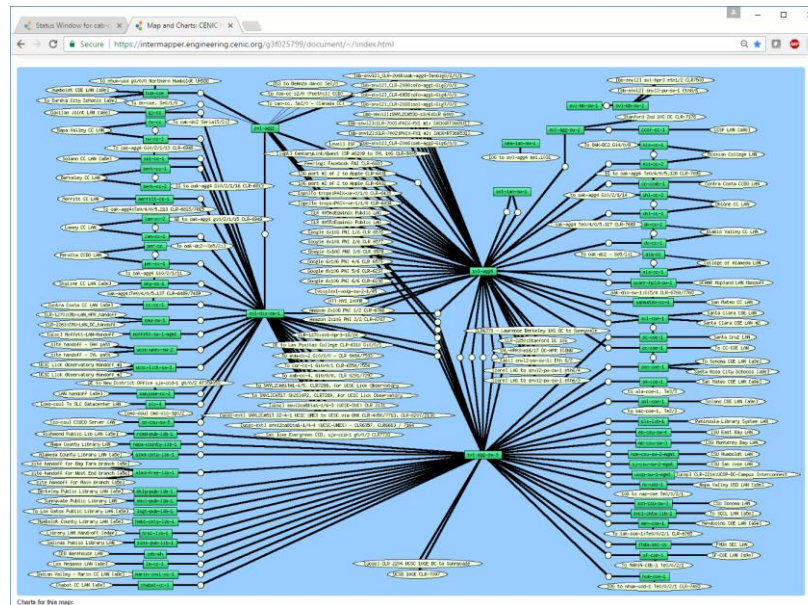
Email me (risimms@cabrillo.edu) a relatively current photo of your face for 3 points extra credit

Network Check

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	• 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

13

Class Activity


```
      _
    ('v')
   \/-=-\/
   (\_=_/)
    ~~ ~~
Welcome to Opus II
Serving Cabrillo College
```
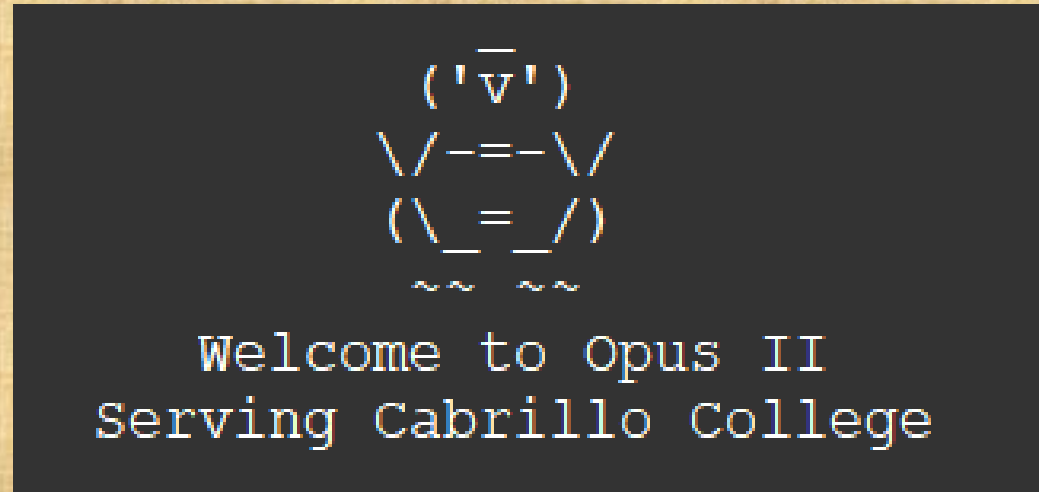
If you haven't already, log into Opus-II

Class Activity

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

If you haven't already, download the lesson slides

15

Class Activity

ConferZoom
- Enter virtual classroom
- Class archives

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

If you haven't already, join ConferZoom classroom

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Denise Moss

Apprenticeships, On-the-Job Training, Student Work, Internships and more

Computer Information Systems (CIS)

Gerlinde Brady, Dean of Career Technical Education

Matt Weis, Internship & Work Experience Instructor

Terri Oropeza, Computer Information Systems Instructor

Denise Moss, Apprenticeship Job Developer

Google, Apple and 13 other companies that no longer require employees to have a college degree

Courtney Connley | @classicalycourt | 10:01 AM ET Thu, 16 Aug 2018

19

Why IBM wants to hire employees who don't have a 4-year college degree

Ruth Umoh | @ruthumohnews | 10:16 AM ET Tue, 7 Nov 2017
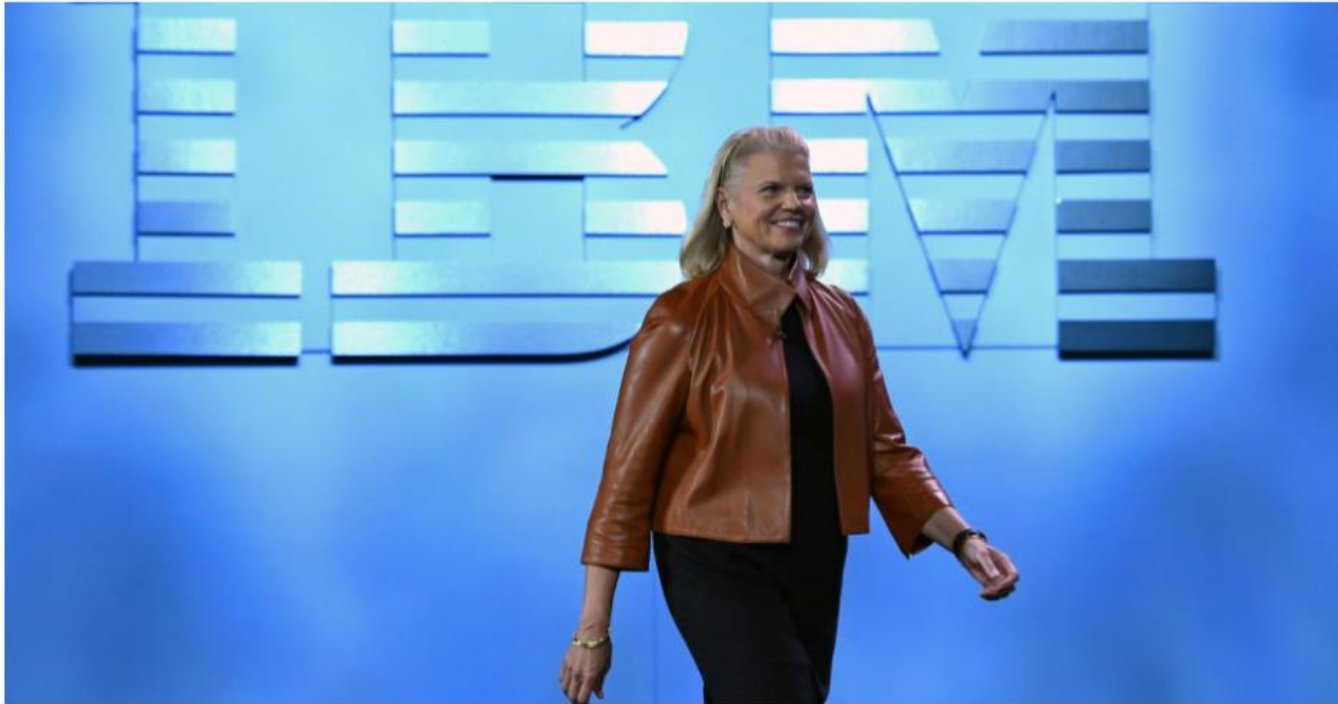
Getty Images

IBM Chairman, President and CEO Ginni Rometty arrives for her keynote address at CES 2016 January 6, 2016 in Las Vegas.

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Work Experience = Internships, Apprenticeships, Student Work, Volunteer….

Developing IT employment, internship, and apprenticeship opportunities

Examples of opportunities:

- ○ Short-Term Contract
- ○ Part-time/Full Time Employment
- ○ Paid/Unpaid Internships
- ○ Volunteer
- ○ Department of Labor Registered Apprenticeship

Computer Support Specialist

Service Desk/Help Desk and Desktop Support

Provide help and advice to computer users and organizations

Devise ways to add new functionality to existing computer systems

Oversee installation/configuration of new systems to customize for the organization

Computer Network and Systems Administrator

Research emerging technologies for potential increases in organizational efficiency and effectiveness

Test and evaluate existing network systems

Perform regular maintenance to ensure networks operate correctly

Troubleshoot LANs, WANs, and Internet systems
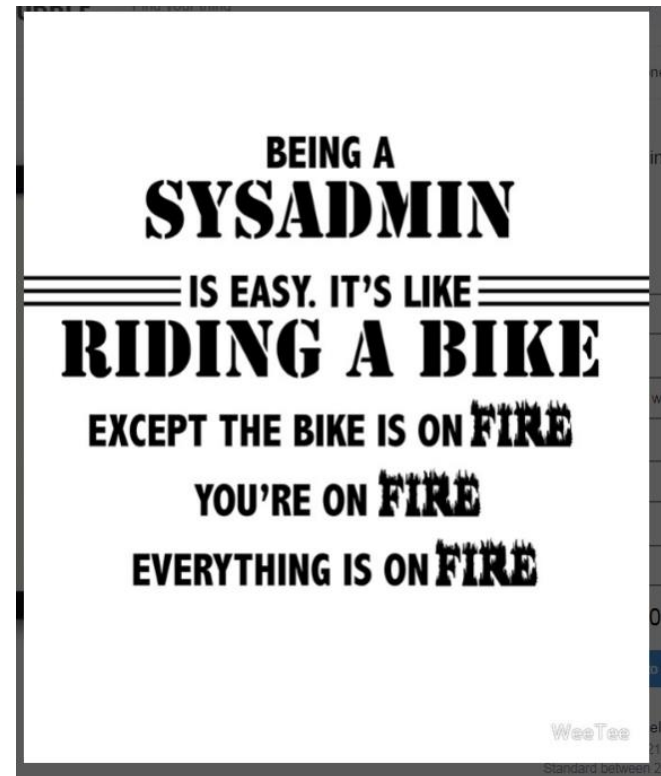
Web Developer / Web Design

Design and create websites

Create and test applications for a website

Write code for websites using HTML, XML, etc

Work with graphics/designers to develop website layout

Integrate graphics, audio, and video into websites

Software Developer

Develop applications for underlying systems that run devices or control networks

Analyze users' needs and design/test/develop software to meet those needs

Ensure programs continue to run normally through software maintenance and testing

Cyber Security

Monitor use of data files and regulate access

Encrypt data transmissions and establish firewalls

Monitor current reports of computer viruses and determine necessary upgrades

FOR THOSE ABOUT TO **CODE**, **WE SALUTE YOU**.

...NOW PICK A PROPER PASSWORD.

Student Preparation and Placement Services

We assist with Preparation and placement:

Technical training - CIS program

Employment Portfolio development

- Resume development
- Interview coaching
- Social Media (LinkedIn)

Pre-screening

Placement

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http://www.santacruztechbeat.com/

Student Placements

Apprenticeship, On-the-Job-Training (OJT), Internship, Student Work

- Cloud Brigade – 2 student apprentices

- Cabrillo College

  - IT Department – 2 Student Workers

  - Computer Technology Center – 2 Student Workers

  - Tutoring and Learning Center – 2 Student Workers

  - Library – 1 Student Workers

  - CyberPatriot/CS4All – 10+ Student Workers

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Great local job website: http://www.santacruztechbeat.com/

Matching in Process….

CABRILLO IT INTERNSHIPS & JOBS			
Company	**Position**	**City**	**Type of Position**
RVS Technology Group	Level 1 Technician	Watsonville	Apprenticeship
TechOnIT	IT Internship (Paid)	Santa Cruz	Internship
PDNC Incorporated	Field Support Technician	Scotts Valley	Direct FT Hire
PDNC Incorporated	Dispatcher	Scotts Valley	Direct FT Hire
truadvantage	Jr. Systems Administrator	San Jose	Part - Time / Internship
truadvantage	Jr. Systems Administrator	San Jose	Direct FT Hire
Network Management Solutions	IT - Technical Support	Santa Cruz	Direct FT Hire
Cruzio	Tech Support / Customer Service	Santa Cruz	Direct FT Hire
Second Harvest	Internship -	Watsonville	Internship
Grey Bears	not defined yet	Santa Cruz	Volunteer and Paid

Opportunities in development…

What's next?

Complete [Student Interest Form](https://goo.gl/forms/0BJfhHDFmZbOhNFh2)
(https://goo.gl/forms/0BJfhHDFmZbOhNFh2)

Email Questions:

Matt Weis maweis@cabrillo.edu

Terri Oropeza terri.oropeza@cabrillo.edu

Denise Moss denise.moss.ed@gmail.com

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.*

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Review your progress in the course

Check the website Grades page

http://simms-teach.com/cis90grades.php
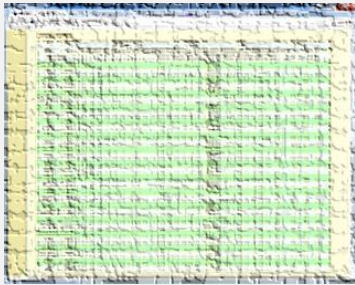
Or check on Opus-II

checkgrades *codename*
(where codename is your LOR codename)
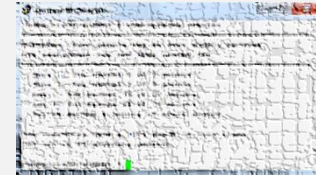
Written by Jesse Warren a past CIS 90 Alumnus

- **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

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

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

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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)

LinkedIn
Computer Science and
Computer Information Systems at Cabrillo College

For 3 points extra credit:
1) Join LinkedIn.com
2) Join this group
3) Send me an email when finished.

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

• **Web site content review** - The first person to email the instructor pointing out an error or typo on this website will get one point of extra credit 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 than has been uploaded but not yet presented in class. (Up to 20 points total)

Lab Assignments -- Pearls of Wisdom
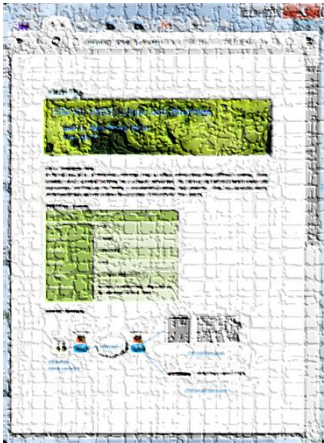
- Don't wait till the last minute to start.

- 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.

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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 STEM center tutor/assistant.

- 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 3:30-5:00 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!

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CTC - Building 1400
On lower campus
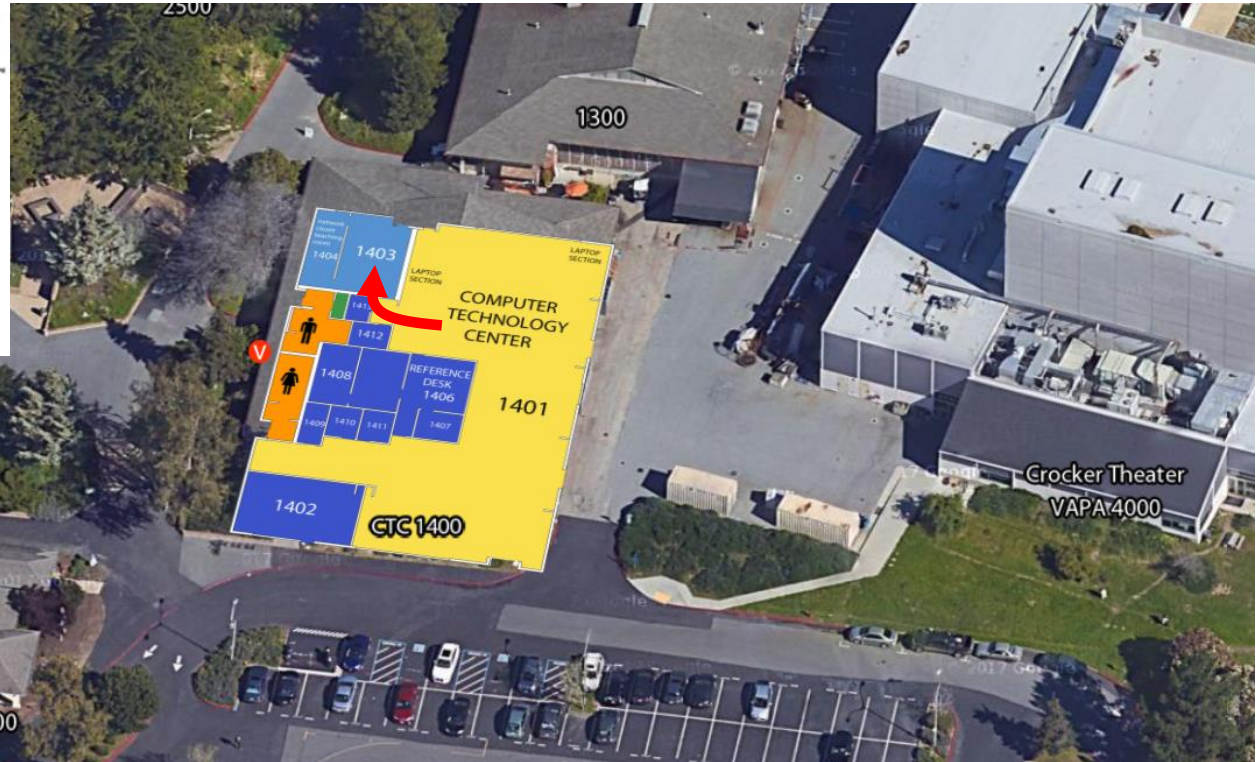
I will be in the CTC (room 1403) every Tuesday afternoon from 3:30-5.

Help Available in the CIS Lab (inside STEM Center)

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

The CIS Lab

Inside the STEM Center

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

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Fall '18 Announcement

Rich Simms
Site Admin

CIS tutoring schedule

Sat Sep 29, 2018 8:42 am

We have an experienced CIS tutor, Kevin Cameron, who is now working in the STEM center. His hours are Monday, Tuesday, and Wednesday from 1:30 to 4:30. He is a CIS 90 alumnus and very happy to help you with any CIS 90 questions.

In an effort to expand tutoring coverage we would like to solicit weekly schedule times that would be best for students. Please reply to this post or email me with a list of days and times you would like to have a tutor available. Also indicate if your would prefer working with a tutor in the STEM Center or the CTC.

Thanks!

- Rich

Recent forum post if you missed it

41

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

44

Roll Call

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

risimms@cabrillo.edu

Resume/Stop Recording

Resume Recording

Audio Check

47

No labs due today

Test 1 will become available at **3:00 PM** today

- Open book, open notes, open computer.

- You must work alone and not help or receive help from others.

- Online <u>timed</u> 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

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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.

Note Taker Wanted

Up to $100 reward

Please contact me if you would be interested in letting me publish your notes on the CIS 90 website.

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Linux Computer Home Loans

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

Email me if you are interested in getting a Linux PC home loan. Based on the number of requests I'll determine how long they can be checked out for.

52

CIS Fundraising "Bake Sale"

Donate by answering seven questions on an online CTE survey!

Perkins/VTEA Survey

https://opus-ii.cis.cabrillo.edu/forum/viewtopic.php?f=7&t=559

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!***

Even if you took the survey in another CIS class!

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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.

Master Boot Record (MBR)

Partition Boot Sector

Data

Partition Boot Sector

Data

Partition Boot Sector

Data

Partition Boot Sector

Unused Boot Sector

Data

Unused Boot Sector

Data

ext3 file system

Superblock

Inode Table

Data Blocks

57

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

58

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

bigfile 19470
bin 9628
letter 9662

ext*X* file system

Superblock

Inode Table

Data Blocks

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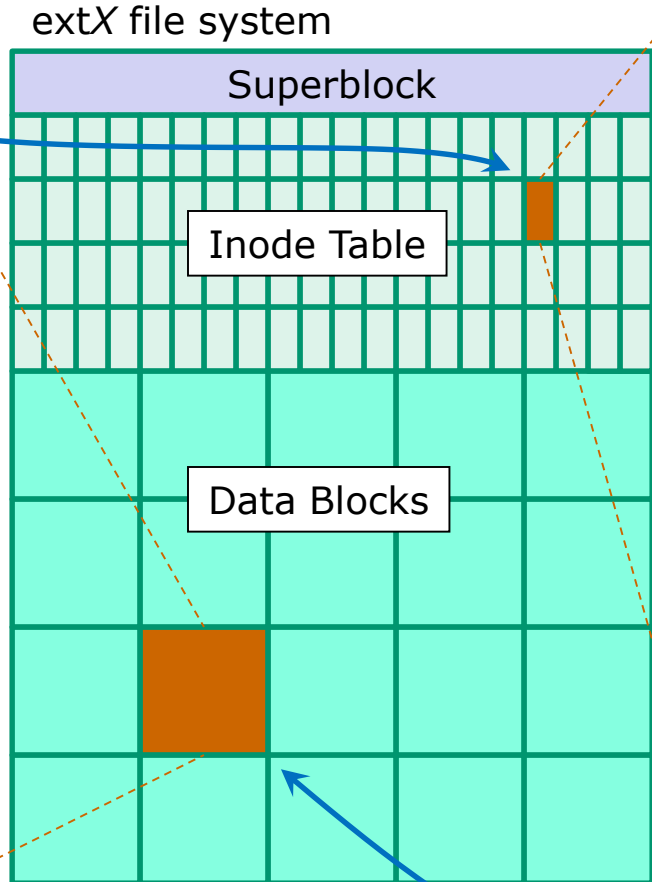
inode	
9662	inode number
-	Type
rw-r--r--	Permissions
1	Number of links
simben90	User
cis90	Group
1044	Size
2001-07-20	Modification time
2012-09-17	Access Time
2012-08-01	Change time
Pointer(s) to data blocks	Pointer(s) to data blocks

/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

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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
├── READNAME
├── 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

64

Managing the UNIX/Linux File System
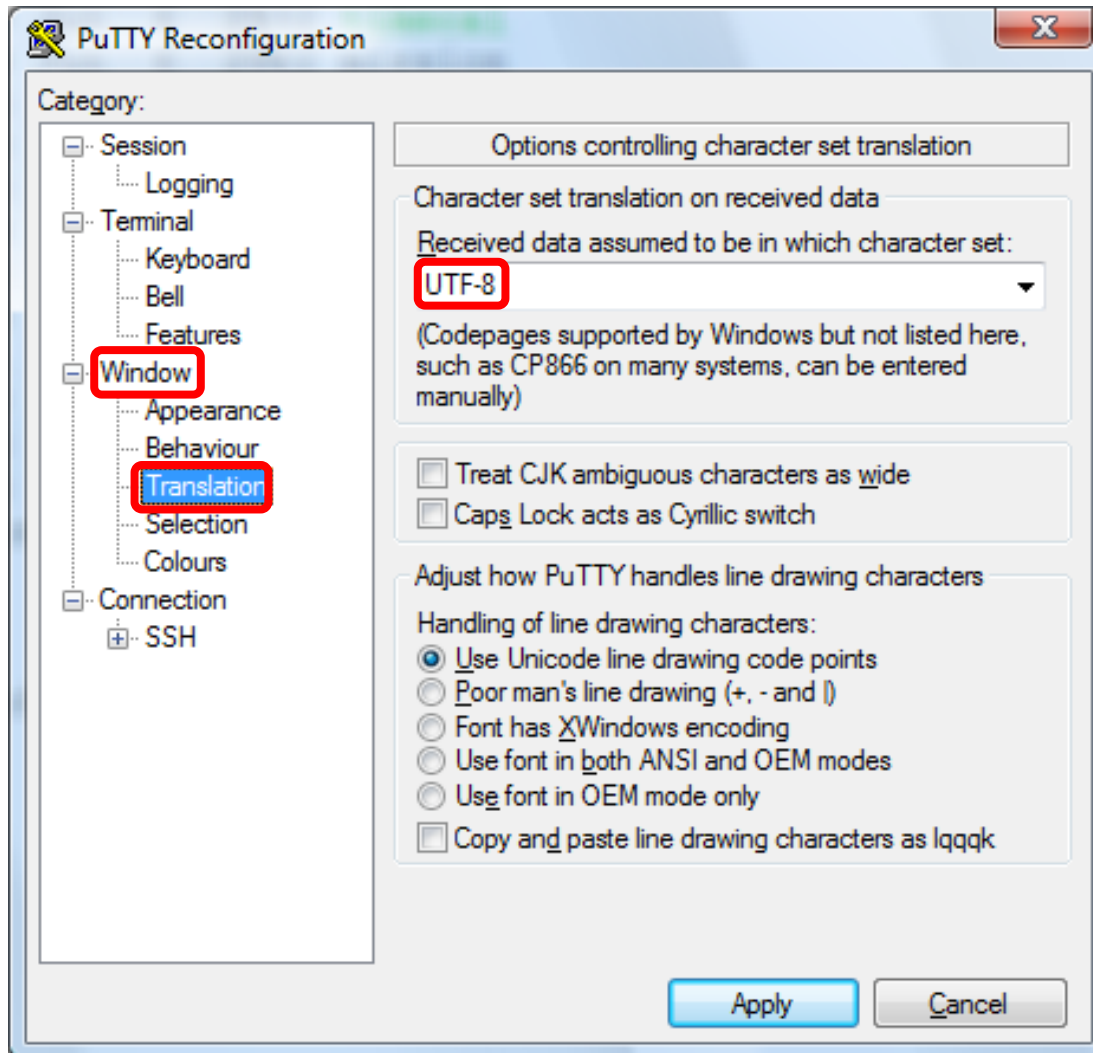
Putty may need to be configured for UTF-8 so the tree command can use the line drawing symbols.

65

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/Dickenson/ Poems/Angelou/
    ```

- Make a tree diagram of your home directory:

    ```
    tree
    ```

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

Managing Regular Files

Lesson 6 commands managing regular files

touch - create an empty regular file
mv - rename a file
rm - remove a file permanently
> - 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

Example 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)

72

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*

mv Rome Remus
ls -li R*

rm -i Remus    (when prompted Enter n for no)
ls -li R*

rm Remus
ls -li R*
```

Write "Rome done" in chat window when finished

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*
```

Write "places done" in chat window when finished

75

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
```

Touch the file you picked then do another long listing:

```
/home/cis90/simben $ touch Rome
/home/cis90/simben $ ls -l Rome
-rw-rw-r--. 1 simben90 cis90 0 Oct  1 18:53 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

78

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 "naaaaaaaaaaa" > Goat
   echo "honk honk honk" > Goose
   ```

2. Show the data contents of your animal files:

   ```
   cat G*
   head -n1 G*
   ```

Write "animals done" in chat window when finished

81

Activity

1) Do a long listing of your animal files:

```
ls -l G*
```

Write the name and size of your largest 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.

82

Activity

1) Do a long listing of your animal files:

```
ls -l G*
```

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

2) **<u>Empty</u>** 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 updated name and size of your smallest file in the chat window.

Activity

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

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

   Write "places restored" in chat window when finished

84

Managing Directories

Lesson 6 commands managing directories

mkdir - create a new directory
mv - rename a directory
rmdir - permanently remove an empty directory
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



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

*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 6 bytes

91

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 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 . *
   ```

Why is deep larger than animals or places but smaller than stuff?
Put your answer in the chat window.

94

Moving Files

Moving Files
The **mv** command

Command syntax:

mv *oldfilename newfilename*

mv *file targetdirectory*

Note all arguments are either relative or absolute pathnames

mv *file targetdirectory**/**targetfile*

mv *file1 file2 targetdirectory/*

options:
    -i = warn before overwriting
    -v = verify files moved

Activity

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

```
cd
ls G*
```

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

```
mv G* stuff/animals/
ls stuff/animals/
tree stuff
```

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

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
  ```

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

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/*

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

100

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

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

101

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

linking files

Linking files
The **ln** command

Command syntax:

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

ln [*options*] *filename linkname*

options:

s = symbolic link (like Windows shortcut)

With UNIX there are hard and soft (symbolic) links

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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

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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.

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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

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Linking Files
Symbolic "Soft" Links

Creating a "soft" (symbolic) link

ln -s *pathname 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.

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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

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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!

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

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

[ ] 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/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.

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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.

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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.

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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.

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

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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

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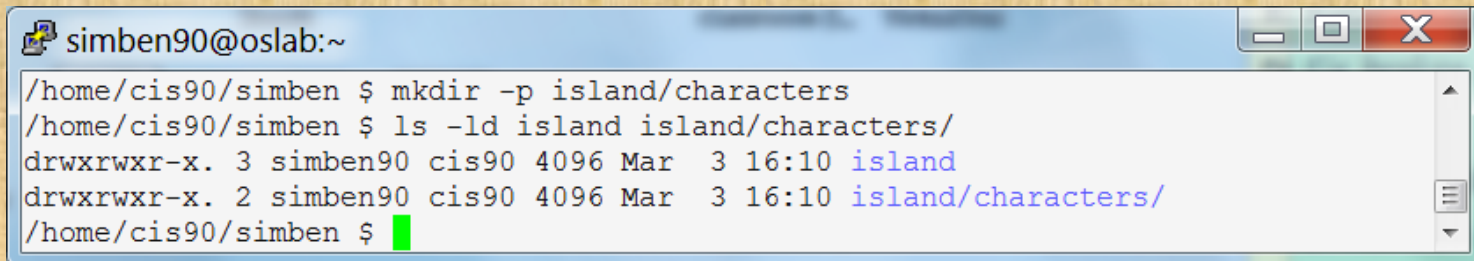
*Need to use the **p** option to create new parent directories as needed*

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/

```
simben90@oslab:~
/home/cis90/simben $ mkdir -p island/characters
/home/cis90/simben $ ls -ld island island/characters/
drwxrwxr-x. 3 simben90 cis90 4096 Mar  3 16:10 island
drwxrwxr-x. 2 simben90 cis90 4096 Mar  3 16:10 island/characters/
/home/cis90/simben $
```

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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)

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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   multiple arguments allowed
/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
```

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

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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
```
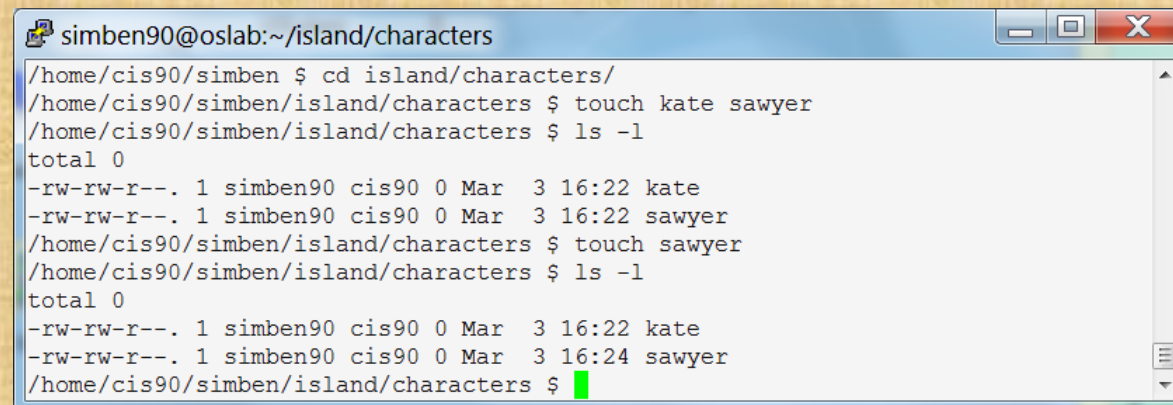
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Activity

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
```

```
simben90@oslab:~/island/characters

/home/cis90/simben $ cd island/characters/
/home/cis90/simben/island/characters $ touch kate sawyer
/home/cis90/simben/island/characters $ ls -l
total 0
-rw-rw-r--. 1 simben90 cis90 0 Mar  3 16:22 kate
-rw-rw-r--. 1 simben90 cis90 0 Mar  3 16:22 sawyer
/home/cis90/simben/island/characters $ touch sawyer
/home/cis90/simben/island/characters $ ls -l
total 0
-rw-rw-r--. 1 simben90 cis90 0 Mar  3 16:22 kate
-rw-rw-r--. 1 simben90 cis90 0 Mar  3 16:24 sawyer
/home/cis90/simben/island/characters $
```

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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*

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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!

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Activity

- In the directory named *characters* create a new file:
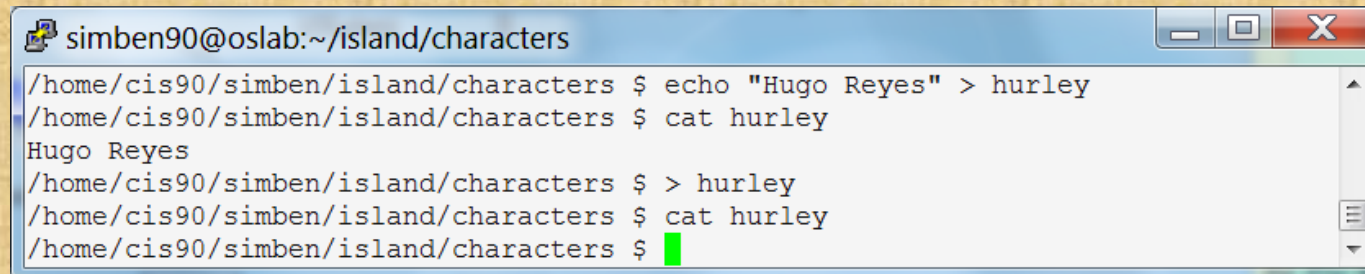
    ```
    echo "Hugo Reyes" > hurley
    ```

- Print the new file with:

    ```
    cat hurley
    ```

- Empty the file *hurley*

    ```
    > hurley
    cat hurley
    ```

simben90@oslab:~/island/characters

```
/home/cis90/simben/island/characters $ echo "Hugo Reyes" > hurley
/home/cis90/simben/island/characters $ cat hurley
Hugo Reyes
/home/cis90/simben/island/characters $ > hurley
/home/cis90/simben/island/characters $ cat hurley
/home/cis90/simben/island/characters $
```

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