

Lesson Module Checklist

- Slides
- WB converted fro PowerPoint
- Flash cards
- Properties
- Page numbers
- 1st minute quiz
- Web Calendar summary
- Web book pages
- Commands
- Lab tested
- Supplemental videos uploaded
- Forum created and registration tested
- Opus accounts made (with TBDs for walk-ins) and populated
- CIS 90 VMs created and configured
- Surveys and PW sheet posted
- Rosters printed
- Add codes printed
- Backup slides on flash drive
- Wireless lapel mic + 9v spares
- Key card for door

Student checklist (How to attend from home or in the classroom)

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

Student checklist (How to layout your screen when attending class)

Google

CCC Confer

Downloaded PDF of Lesson Slides

The screenshot displays a virtual classroom environment with several overlapping windows:

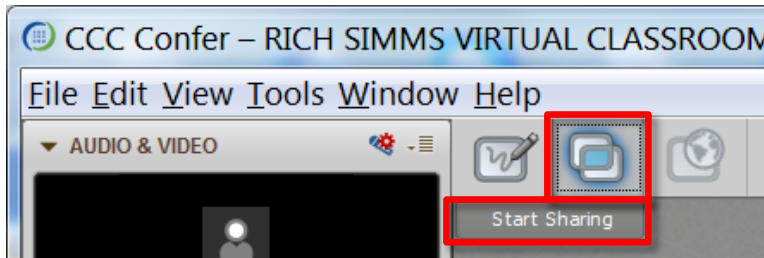
- Blackboard Co. x Google**: A browser window showing the "Rich's Cabrillo College CIS 90 Calendar" page. It includes a sidebar with links like "Login", "Flashcards", "Admin", and "CIS 90 (Spring)". A table lists lessons with columns for "Lesson" and "Date".
- CCC Confer - RICH SIMMS VIRTUAL CLASSROOM**: A video conferencing window showing a live video feed of a participant and a list of participants including "Benji Simms" and "Rich-Simms".
- cis90lesson01.pdf - Adobe Acrobat Pro**: A PDF window showing the "CIS 90 - Lesson 1" slide, titled "The CIS 90 System Playground".
- Google**: A map window showing a location in California, with the text "Class Activity - Where are you now?" overlaid.
- Terminal Window**: A window showing a command prompt with the text "edu's password:" and a timestamp "14:21 2015 from c-71-204-162-14".

CIS 90 website
Calendar page

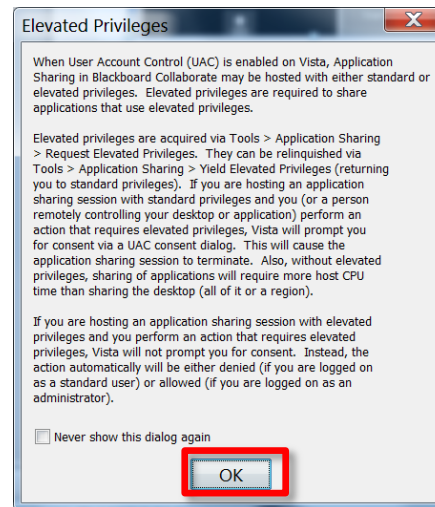
One or more login
sessions to Opus

Student checklist (To share your desktop with the class)

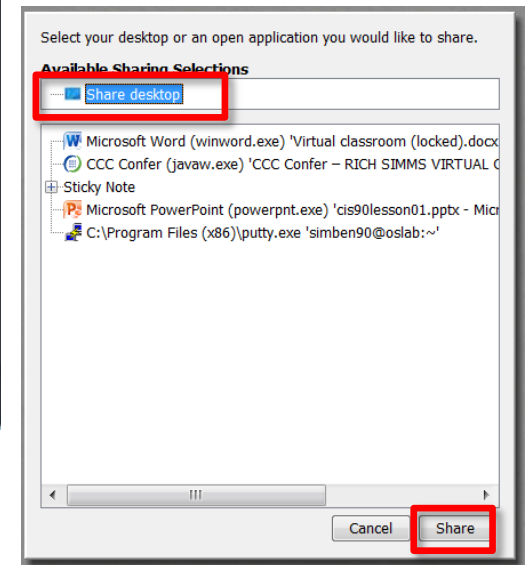
1) Instructor gives you sharing privileges



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



3) Click OK button.



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



Instructor: **Rich Simms**

Dial-in: **888-886-3951**

Passcode: **136690**



Melissa



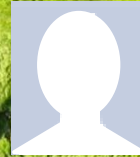
Tim



Emilio



Chris



Eduardo



Clara



Ryan



Ethan



Monte



Cameron



Tanner



Tess



Ahmad



Michael F.



Mario



Rebecca



Diego



John



Efrain



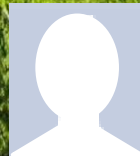
Ivers



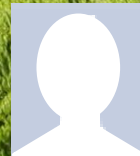
Michael S.



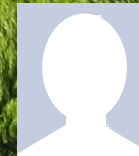
Django



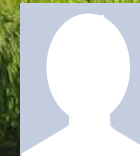
Ian



Abraham



Benjamin



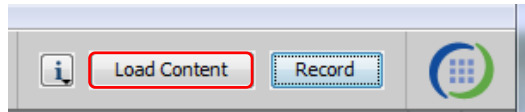
Sean



Rich's CCC Confer checklist - setup

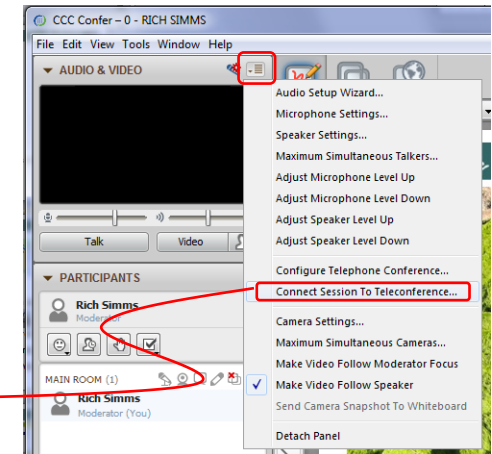
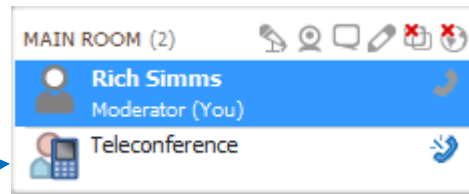


[] Preload White Board

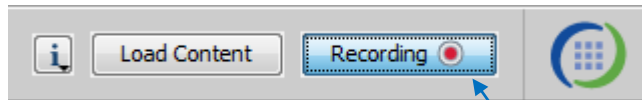


[] Connect session to Teleconference

Session now connected to teleconference



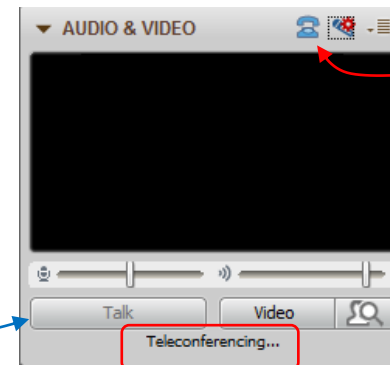
[] Is recording on?



Red dot means recording

[] Use teleconferencing, not mic

Should be greyed out



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

Rich's CCC Confer checklist - app layout



The screenshot displays a Windows desktop environment with the following applications and layout:

- CCC Confer - 0 - RIC...**: A window on the left side of the desktop showing a video conference with Rich Simms.
- foxit for slides**: A Foxit Reader window in the center, displaying a PDF document titled 'cis90lesson07.pdf'.
- chrome**: A Google Chrome window in the top right, displaying a PDF document titled 'simms-teach.com/docs/cis90/cis-90-TEST-1-Fall-12.pdf'.
- vSphere Client**: A vCenter console window in the bottom right, showing the vSphere Client interface.
- putty**: A terminal window in the center, displaying a login prompt for 'simben90@oslab:~'.

Red boxes and arrows highlight the following applications:

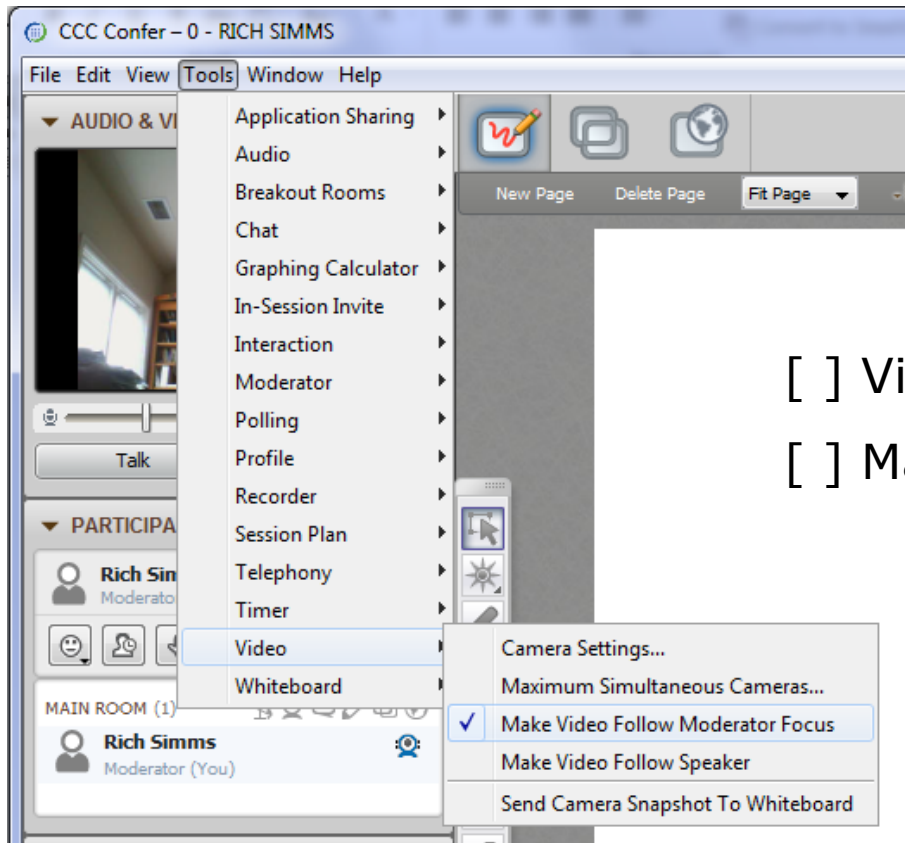
- foxit for slides**: Points to the Foxit Reader window.
- chrome**: Points to the Google Chrome window.
- vSphere Client**: Points to the vCenter console window.
- putty**: Points to the terminal window.

[] layout and share apps





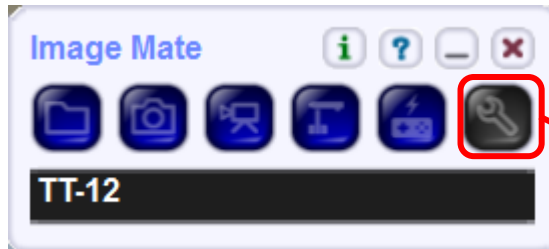
Rich's CCC Confer checklist - video



[] Video (webcam)

[] Make Video Follow Moderator Focus

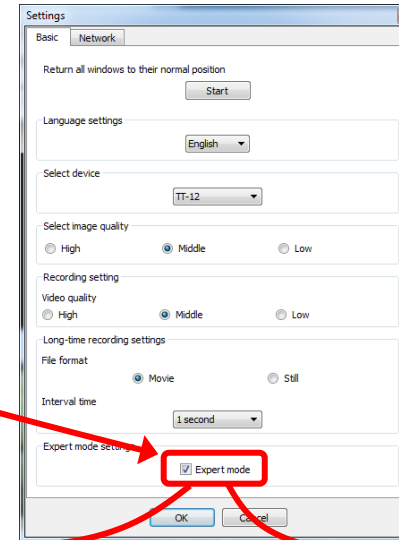
Rich's CCC Confer checklist - Elmo



Elmo rotated down to view side table



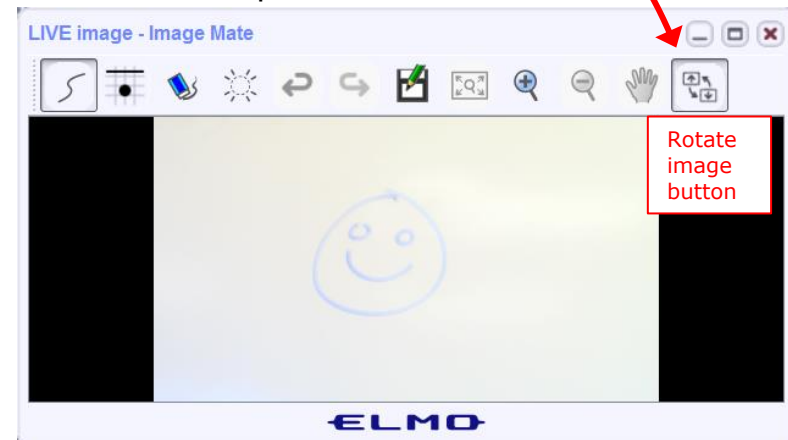
Run and share the Image Mate program just as you would any other app with CCC Confer



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

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

Elmo rotated up to view white board



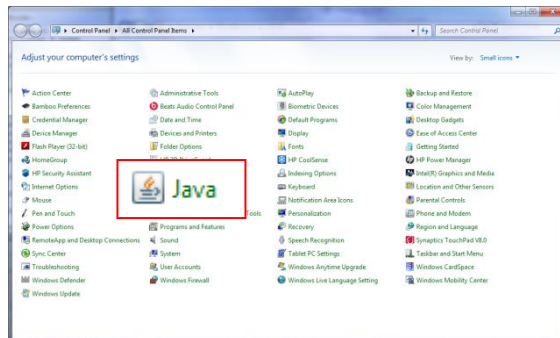
Rich's CCC Confer checklist - universal fix



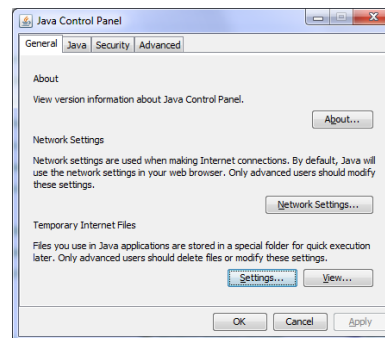
Universal Fix for CCC Confer:

- 1) Shrink (500 MB) and delete Java cache
- 2) Uninstall and reinstall latest Java runtime
- 3) <http://www.cccconfer.org/support/technicalSupport.aspx>

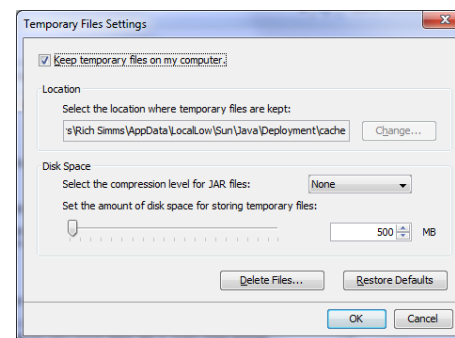
Control Panel (small icons)



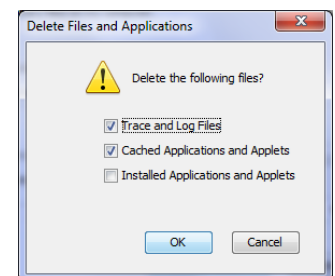
General Tab > Settings...



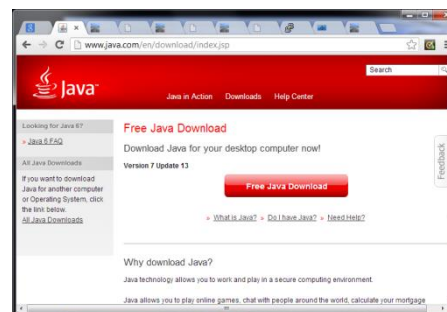
500MB cache size



Delete these



Google Java download





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

Introductions and Credits



Jim Griffin

- Created this Linux course
- Created Opus and the CIS VLab
- Jim's site: <http://cabrillo.edu/~jgriffin/>



Rich Simms

- HP Alumnus
- Started teaching this course in 2008 when Jim went on sabbatical
- Rich's site: <http://simms-teach.com>

And thanks to:

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

Class and Linux Overview

Objectives

- Understand how this course works
- Learn how to login via ssh
- Learn first UNIX/Linux commands

Agenda

- Introductions
- How this class works
- Lab resources
- What is a computer
- Software overview
- UNIX/Linux Overview
- First Commands
- Housekeeping
- SSH (secure shell)
- Navigating systems
- Lab 1
- Wrap up

Attending class

CIS 90 is available online

- Wednesdays - 9:00AM to 12:05PM
 - Section 88446 meets in room 828 on the Aptos Main Campus
 - Section 88445 meets simultaneously online in [this virtual classroom](#)

How to attend class each week:

Option 1: **Online (synchronous)** - from anywhere connect online to the "live" virtual classroom using CCC Confer.

Option 2: **Traditional** - drive to campus, find parking, walk to the 800 building and take a seat in the classroom.

Option 3: **Online archives (asynchronous)** - watch the archived class recording online using CCC Confer at a time that works for you.

*It doesn't matter which section you enrolled in. You can use **any** method of attending for **any** of the classes.*

Option 1: **Online (synchronous)** - from anywhere connect online to the "live" virtual classroom using CCC Confer.

Rich's Cabrillo College CIS Classes
CIS 90 Calendar

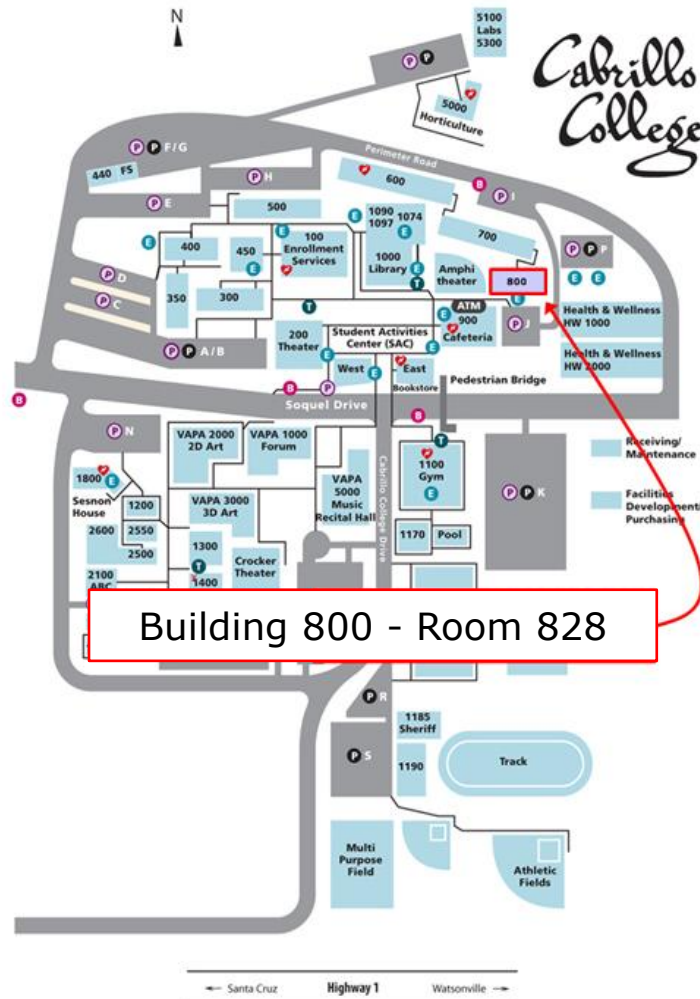
CIS 90 (Fall 2014) Calendar

Course Home | **Calendar**

Lesson	Date	Topics	Chapter	Due
1	9/2	Class and Time		
		- Understand - High-level of systems and - Overview of - Using SSH - Using tar		
		Prerequisites		
		- Presentation - Login Grade		
		Supplemental		
		Provo #14		
		Assignment		
		- Student Survey - Lab 1		
		Enter virtual classroom		
		Class archives		
		Quiz 1		
		Comments		

1. Browse to **http://simms-teach.com**
2. Click the **CIS 90** link
3. Click the **Calendar** link
4. Click the **Enter virtual classroom** link

Option 2: **Traditional** - drive to campus, find parking, walk to the 800 building and take a seat in the classroom.



Enjoy the ocean view from the classroom windows!

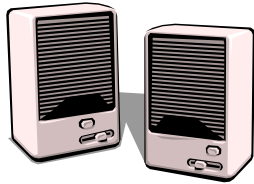
[illegible]

1. Browse to **<http://simms-teach.com>**
2. Click the **CIS 90** link
3. Click the **Calendar** link
4. Click the **Class archives** link

CCC Confer



- Listen using your computer's speakers/headset or with your phone using the dial-in number



- Ask questions using the chat window or just speak if dialed in with your phone (or Skype)

Dialing in by phone (or Skype) is best because you can ask and answer questions by speaking rather than use the chat window

CCC Confer - Is your computer ready?

<http://www.cccconfer.org/support/supportReadiness.aspx>



Browse to the link above anytime before the first class. The first time setup for CCC Confer can take several minutes!

CCC Confer - Java may be downloaded
the first time you use CCC Confer



*CCC Confer uses Java which requires a download
and installation of the Java Runtime Environment
from java.com (Oracle)*

CCC Confer - Attending class online

The screenshot displays the CCC Confer web interface for a session titled "CIS Linux Classes". The interface includes a top menu bar with "File", "Edit", "View", "Tools", "Window", and "Help". Below the menu is a toolbar with icons for drawing, erasing, and other interactive tools. The main content area shows a grid of participant avatars, with the instructor's name "Rich Simms" and contact information "Dial-in: 888-450-4821" displayed at the top. A sidebar on the left contains several sections: "AUDIO & VIDEO" with a video player and controls; "PARTICIPANTS" listing "Benji" and "Rich Simms (Moderator)"; and "CHAT" showing a log of messages. Two red boxes highlight specific areas: one around the "PARTICIPANTS" section and another around the "CHAT" section. A blue callout box points to the "PARTICIPANTS" section, and another blue callout box points to the "CHAT" section.

CCC Confer - 0 - RICH SIMMS

File Edit View Tools Window Help

AUDIO & VIDEO

Rich Simms

Talk Video

PARTICIPANTS

Benji

MAIN ROOM (2)

Rich Simms
Moderator

Benji
(You)

CHAT

- You joined the Main Room. (2:23 PM) -

- Rich Simms joined the Main Room. (2:24 PM) -

Cabrillo College
est. 1959

CIS Linux Classes

Instructor: Rich Simms
Dial-in: 888-450-4821

Show your state of mind, let others know you stepped away, raise your hand, and indicate responses using these controls

Ask and answer questions using the chat area

CCC Confer - Attending class online

When dialed in by phone you can use:

- *0 Contact the operator for assistance.
- *6 Mute/unmute your individual line with a private announcement.

This only applies if you dialed in using a phone

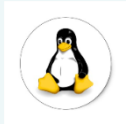
Instructor Note:

Switch to preloaded whiteboard

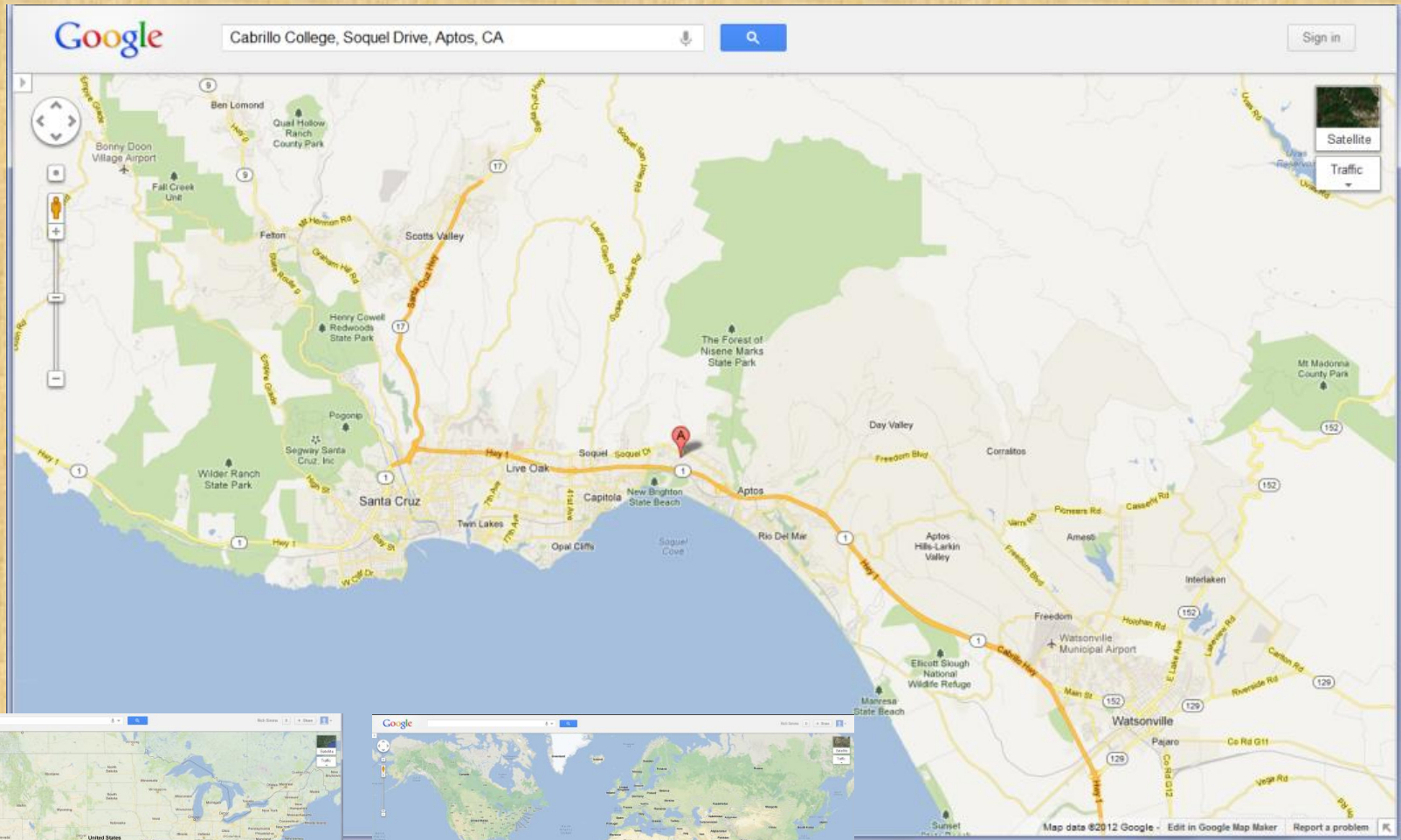


Class Activity

What kind of computer did you use to join CCC Confer?

			Other

Class Activity – Where are you now?



Roll Call

If you are attending class by watching the recordings in the archives contact the instructor at: risimms@cabrillo.edu to provide roll call attendance.

Login Credentials

Username and passwords

The Login Credentials slides are not shown in these lesson slides. To locate a copy of them:

1) See the Welcome email sent by the instructor to registered and wait-listed students.

2) Or login into Blackboard and look at the Welcome announcement.

Instructor Note:

*Turn Recording On
Switch back to shared slides*

How this class works

CIS 90 Spring 2015

Class meets in room **828** and **online** every **Wednesday morning**:

- 15 lessons: **9:00-12:05 PM**, from **Jan 28th** to **May 12th**
- Final exam: **7:00-9:50AM**, on Monday **May 18th**, in room **828**

January							February							March						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3	1	2	3	4	5	6	7	1	2	3	4	5	6	7
4	5	6	7	8	9	10	8	9	10	11	12	13	14	8	9	10	11	12	13	14
11	12	13	14	15	16	17	15	16	17	18	19	20	21	15	16	17	18	19	20	21
18	19	20	21	22	23	24	22	23	24	25	26	27	28	22	23	24	25	26	27	28
25	26	27	28	29	30	31								29	30	31				

April							May							June							
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	
			1	2	3	4						1	2			1	2	3	4	5	6
5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13	
12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20	
19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27	
26	27	28	29	30			24	25	26	27	28	29	30	28	29	30					
							31														

STARTING CLASS TIME/DAY(S)

EXAM HOUR

EXAM DATE

6:30 am and 8:55 am, MW/Daily

Classes starting between:

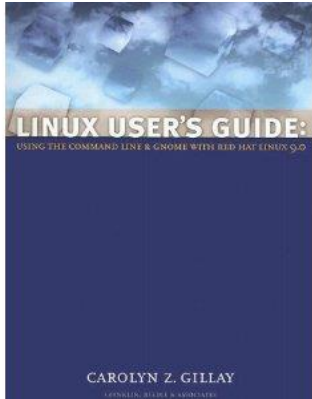
7:00 am-9:50 am

Wednesday, May 20

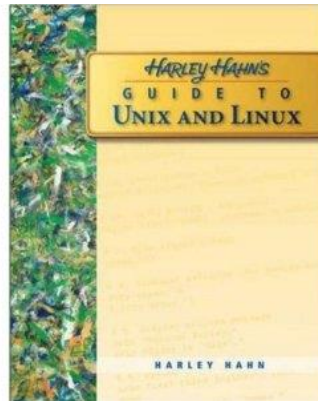
9:00 am and 10:15 am, MW/Daily

7:00 am-9:50 am

Monday, May 18



These textbooks are optional but nice to have if you want to dig deeper into the material provided by the lesson slides.



I really like the very first sentence in Harley Hahn's book:

"This book will change your life."

Optional Textbooks:

Linux User's Guide: Using the Command Line and GNOME with Red Hat Linux 9.0
by Carolyn Z. Gillay
Franklin Beedle & Associates ISBN: 1887902988

Harley Hahn's Guide to Unix and Linux
by Harley Hahn
McGraw-Hill ISBN: 0073133612

The typical week

<http://simms-teach.com>



Use the

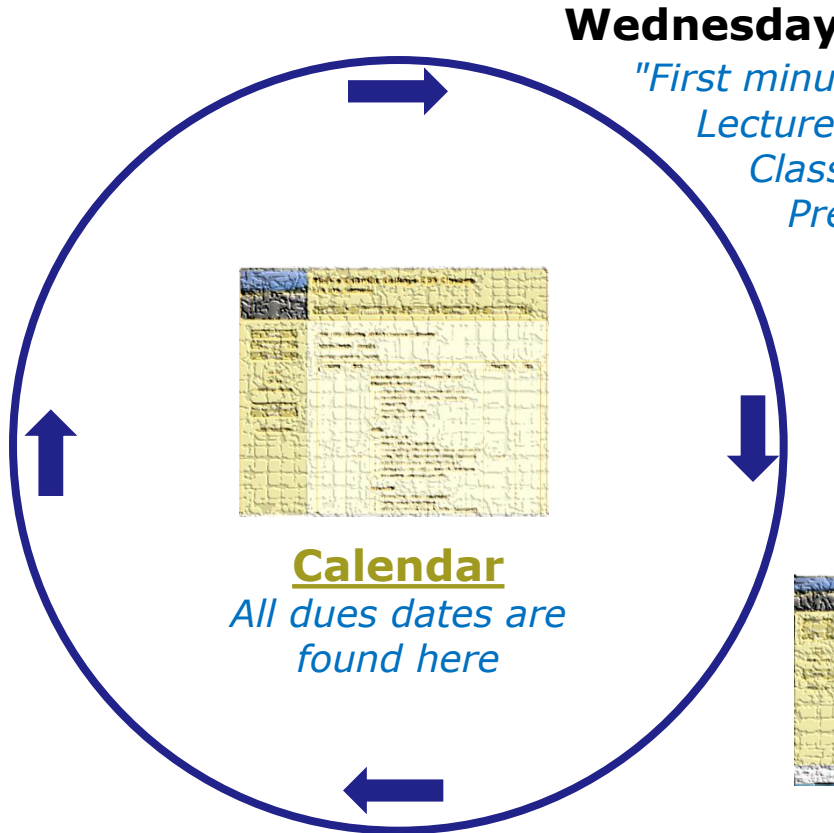
Forum

to collaborate
with classmates
at any time



Work on labs or practice tests
during the week.

All assignments and due dates
are on the **Calendar** page



Wednesday

"First minute" quiz

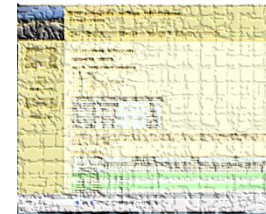
Lecture on new lesson material

Class activities

*Previous week lab assignments
due 11:59PM (Opus time)*



Thursday
is grading day



Check the **Grades**
page to see grades
on labs, quizzes
and tests



Peek at the **Extra Credit**
page if you need more
points

Contacting the instructor

- Use the forum for the fastest response on technical or class related questions.
- Use email for personal matters only. If it's NOT personal I will most likely ask you to post your question on the forum and will answer it there instead so other students may benefit from the answer.
- Weekly office hours:
<http://babyface.cabrillo.edu/salsa/listing.jsp?staffId=1426>
- Avoid leaving a message on voice mail. Checked rarely so don't expect a fast response!



Class Exercise (Syllabus)

Please browse to: **<http://simms-teach.com>**

Click on **CIS 90**
on left panel

The screenshot shows a web browser window displaying the website simms-teach.com/moodle.php. The page title is "Rich's Cabrillo College CIS Classes CIS 90 Home". The left sidebar contains a navigation menu with links: "Home", "Courses", "Calendar", "CIS 90", and "Moodle". The "CIS 90" link is highlighted. Below the navigation menu, there are sections for "CIS 90 Previous Classes", "CIS 90 (Fall 2014) Syllabus", and "CIS 90 (Fall 2014) Syllabus". The "CIS 90 (Fall 2014) Syllabus" section is expanded, showing a "Course Home" link, a "Calendar" link, and a "Syllabus" link. The "Course Home" link is highlighted with a red box. A red arrow points from the "CIS 90" link in the left sidebar to the "Course Home" link in the main content area. The main content area also displays the "Introduction to UNIX/Linux" section, including a list of topics and a "Course Description" section.

Rich's Cabrillo College CIS Classes
CIS 90 Home

Home Courses Calendar CIS 90 Moodle

CIS 90 (Fall 2014) Syllabus

Course Home Calendar

Introduction to UNIX/Linux

- Tuesdays - 1:00PM to 4:05PM
- Section 84743 meets in room 828 on the Aptos Main Campus
- Section 86576 meets simultaneously online in [this virtual classroom](#)
- Unit 3, prerequisites: none, recommended: CIS 11 or CIS 172
- Optional Textbooks, available:
 - [Harley Hahn's Guide to](#)
 - by Harley Hahn
 - McGraw-Hill ISBN-13
 - [Linux User's Guide: User](#)
 - by Carolyn Z. Gray
 - Plankin Books ISBN

Course Description

Provides a technical overview of the UNIX/Linux operating system, including hands-on experience with commands, files, and tools. Topics include basic UNIX/Linux commands, files and directories, text editing, electronic mail, pipes and filters, X Windows, shell environments and scripting. Required for students wishing to pursue the UNIX/Linux track leading to industry certification.

Then click on
Course Home
to see the Syllabus

Class Exercise (Calendar)

Please browse to: <http://simms-teach.com>

Click on **CIS 90**
on left panel

Rich's Cabrillo College CIS Classes
CIS 90 Calendar

Course Home Grades **Calendar**

Lesson	Date	Topics	Chapters	Due
		Class and Linux Overview - Understand how this course will work - High-level overview of computers, operating systems and virtual machines - Overview of UNIX/Linux market and architecture - Using SSH - Using tar		
1	9/2	Materials - Prasen Babu - Login: Cisc90 Supplements - Review # 1.4 Assignment - Student Su - Lab 1		
		CCC Center - Enter virtual classroom - Class archives		
		Quiz 1		
		Commands - Understand how the UNIX login operation works - Meet John the Ripper and learn how vulnerable a poor password is - Understand hows command execution and		

Then click on **Calendar** to see dates for every class meeting, quiz, and test. The **"Due"** column indicates what assignments are due on those dates by 11:59PM (Opus time).

Course Calendar

First minute quiz

Lesson # and Date

What is due by 11:59PM (Opus time) that date

Lesson slides, feel free to download during class for local viewing

Links to virtual classroom and archived recordings

Lab assignment

References to material in the textbook

CCC Confer links to join class online or review archives

Test

5	3/10	Quiz 4 Review - Review lessons 1-4 - Practice skills - Learn about filename expansion characters Materials - Presentation slides (download) - Practice test (download) Assignment - NA CCC Confer Enter virtual classroom Class archives	Lab 4
6	3/17	Managing Files - Creating - Copying - Moving - Renaming - Removing - Linking Materials - Presentation slides (download) Test #1 - Test (download) Assignment Lab 5 CCC Confer Enter virtual classroom Class archives	5 8.13-8.16 (Gillay) 25 p715-729 (Hahn)

Class Exercise (Grades)

Please browse to: **<http://simms-teach.com>**

Click on **CIS 90**
on left panel

[illegible]

Course Grading

Monitor this page to track your progress in the course.

Rich's Cabrillo College CIS Classes CIS 90 Grades

Course Home | Calendar | Points can be earned from the following activities:

CIS 90 (Spring 2014) Grades

Course Home | Calendar

Points can be earned from the following activities:

- First minute quizzes - 30 points (5%)
- Tests - 90 points (16%)
- Forum posts - 80 points (14%)
- Lab assignments - 300 points (54%)
- Project - 60 points (11%)

How your grade is determined:

A student can earn up to 560 total points doing the activities listed above. The course grade is based on the number of points earned.

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

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

Choice of Grade or Pass/No Pass

You indicate your grading choice on the Student Survey form passed out during the first class. You can verify your grading choice selection on the table below. Contact the instructor by email with any questions or to request a change in grading choice.

Recommendations

The instructor may provide letters of recommendation upon request. When writing a recommendation, both graded and non-graded areas of performance. Non-graded performance areas may include team quality, planning & organization skills, communication, documentation, motivation, and the degree to which expectations. The forum is an excellent way to demonstrate teamwork and communication skills.

Current Progress

Code Name	Grading Choice	Quizzes & Tests										Forum				Labs										Project	Extra Credit	Total	Grade			
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	T1	T2	T3	F1	F2	F3	F4	L1	L2	L3	L4	L5	L6	L7					L8	L9	L10
Max Points		3	3	3	3	3	3	3	3	3	3	30	30	30	20	20	20	20	30	30	30	30	30	30	30	30	30	30	60	90	560	
adaldnda	grade																															

Your grade is based solely on the number of points you earn. It offers flexibility and gives you control.

Use extra credit to earn additional points

Your default grading choice will be a letter grade. This can be changed to Pass/No Pass by emailing a request to the instructor.

Each student is assigned a secret LOR code name

Don't forget to post! Racking up points the forum is "low hanging fruit"

More on Grading

[Course Home](#) [Calendar](#)

Points can be earned from the following activities:

- First minute quizzes - 30 points (5%)
- Tests - 90 points (16%)
- Forum posts - 80 points (14%)
- Lab assignments - 300 points (54%)
- Project - 60 points (11%)

How your grade is determined:

A student can earn up to 560 total points doing the activities listed above. The course grade is based on the number of points earned.

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

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

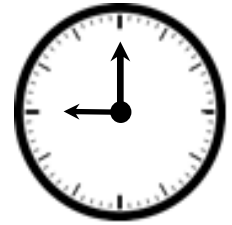
You control your grade. The more points you earn the higher your grade will be.

Grading - Lab Assignments

- 10 labs, 30 points each
- Due at **11:59PM** (Opus time) on the date shown on the course Calendar.
- **Late work is not accepted.** There is no credit for any work turned in after the deadline. If you don't complete a lab assignment, please turn in what you have, by the due date, for partial credit.
- Students may work together and collaborate on labs but they must submit their own work to get credit.
- Lab resources, instructors, and assistants are available in the CIS lab. In addition the Linux Opus server and the CIS VLab may be accessed from anywhere over the Internet.

*A lab assignment due at 11:59PM will get **no credit** if turned in **one minute late** at 12:00AM which is midnight the next day!*

Grading - First Minute Quizzes



- 10 quizzes, 3 points each
- The quiz questions are shown on CCC Confer at **9:00AM** sharp. Answers are emailed to the instructor. The **order of the questions** will not be known until the quiz is given! Emailed answers that are **not in order will be marked as incorrect.**
- The quiz questions are given out in advance and students can use the forum to collaborate on answers prior to class.
- Quizzes are open book/notes. Students may not give or ask others for assistance while taking a quiz.
- There are **no makeup's** for these quizzes and they **must be taken and turned in within the first few minutes of class.**
- Students that attend by watching the archives can do some extra credit work instead. In the past working students have joined the class briefly at the start just to take the quiz and then return to work.

An incentive to start class on time

Grading - Tests



- 3 tests, 30 points each
- Tests are timed.
- A practice test will be made available a week before the actual test.
- Test 1 and 2 will be held during the last hour of class on the days shown on the Calendar.
- Working students have the option to take test 1 and test 2 later in the day but they must be completed no later than 11:59PM on the day of the test.
- Test 3 is the final exam and is mandatory. The time of the test is shown on the Calendar.
- Tests are open notes, open book, and open computer.
- **Students may not give or ask others for assistance while taking a test.**
- Tests may be taken remotely online.

Timed tests are more difficult due to the time pressure! They do help me understand what you have learned so I can adjust the course as needed.

If you get anxious, freeze up, or your mind just doesn't work on timed tests then come see me. I'll be happy to work with you on how to successfully take them.

Grading - Forum Posts

- 4 points per post, up to 20 points maximum per "posting quarter".
- The end date for each posting quarter is shown on the course calendar.
- The posts for the quarter will be due at **11:59PM** (Opus time) on the date shown on the course Calendar.
- Extra posts in one quarter do not carry over to the next quarter.
- Only posts in the CIS 90 class forum will be counted.

As far as earning points, forum posts are "low hanging fruit" !!

Grading - Extra Credit

- Up to 90 points
- You need to attend to a family emergency and can't turn in a lab assignment on time ... don't worry!
- Your schedule/commute doesn't allow you to take any of the "first minute" quizzes don't worry!
- You get anxious, panic and forget everything you know on a test ... don't worry!
- You just don't like making forum posts ... don't worry!

There are ample extra credit opportunities which provide you with the flexibility to get the grade you want.

There is a cap on extra credit points so plan carefully!

Making the fine print large (and red)

Please remember:

- 1) **No makeup's** for missed quizzes
- 2) Quiz answers in the **wrong order** or not emailed **in the first few minutes will not be accepted**
- 3) **Late work will not be accepted.** For example, a lab assignment due at 11:59PM will get no credit if turned in **one minute late** at 12:00AM (midnight) the next day

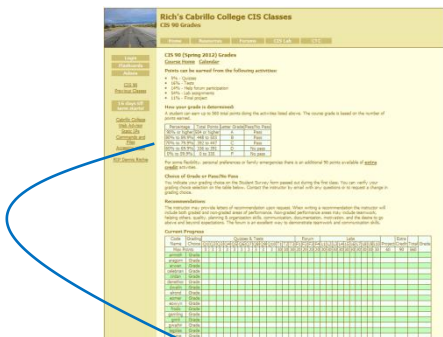
Tip: if you have not completed a lab assignment, **please turn in what you have done for partial credit.**

Don't panic though -- there are ample extra credit opportunities for students wanting or needing any extra points.

Final word on Grading

- You control your grade for this course!
- Use the **Grades** web page to plan for the grade you wish to receive and track your progress.
- Use the **Calendar** web page to see due dates for ALL lab assignments, extra credit labs and forum posts. See when EVERY quiz and test is scheduled.

Grades



Rich's Cabrillo College CIS Classes
CIS 90 Grades

CIS 90 (Spring 2012) Grades
Grades can be earned from the following activities:

- Lab
- Quiz
- Test
- Final project

How your grade is determined
A student can earn up to 503 total points during the semester based on the number of assignments completed.

Grades
The grade is determined by the number of points earned. The grade is based on the number of points earned.

Points of Grade or Percentage
The grade is determined by the number of points earned. The grade is based on the number of points earned.

Recommendations
The grade is determined by the number of points earned. The grade is based on the number of points earned.

Current Progress

Activity	Points	Grade
Lab	100	A
Quiz	100	A
Test	100	A
Final project	100	A
Extra credit	100	A
Forum posts	100	A
Lab	100	A
Quiz	100	A
Test	100	A
Final project	100	A
Extra credit	100	A
Forum posts	100	A
Lab	100	A
Quiz	100	A
Test	100	A
Final project	100	A
Extra credit	100	A
Forum posts	100	A

Calendar



Rich's Cabrillo College CIS Classes
CIS 90 Calendar

CIS 90 (Spring 2012) Calendar
Calendar Dates

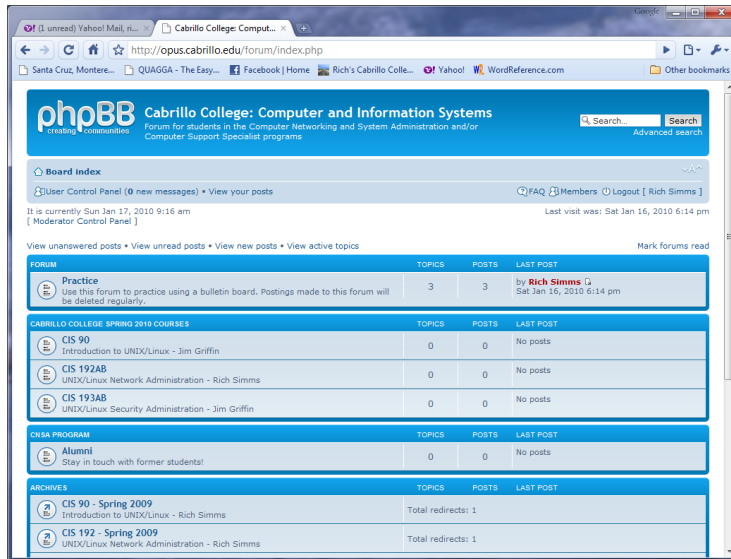
Lesson	Date	Topic	Chapter	Book
1	1/15	Introduction to CIS 90	1	1
2	1/22	Introduction to CIS 90	1	1
3	1/29	Introduction to CIS 90	1	1
4	2/5	Introduction to CIS 90	1	1
5	2/12	Introduction to CIS 90	1	1
6	2/19	Introduction to CIS 90	1	1
7	2/26	Introduction to CIS 90	1	1
8	3/5	Introduction to CIS 90	1	1
9	3/12	Introduction to CIS 90	1	1
10	3/19	Introduction to CIS 90	1	1
11	3/26	Introduction to CIS 90	1	1
12	4/2	Introduction to CIS 90	1	1
13	4/9	Introduction to CIS 90	1	1
14	4/16	Introduction to CIS 90	1	1
15	4/23	Introduction to CIS 90	1	1
16	4/30	Introduction to CIS 90	1	1
17	5/7	Introduction to CIS 90	1	1
18	5/14	Introduction to CIS 90	1	1
19	5/21	Introduction to CIS 90	1	1
20	5/28	Introduction to CIS 90	1	1
21	6/4	Introduction to CIS 90	1	1
22	6/11	Introduction to CIS 90	1	1
23	6/18	Introduction to CIS 90	1	1
24	6/25	Introduction to CIS 90	1	1
25	7/2	Introduction to CIS 90	1	1
26	7/9	Introduction to CIS 90	1	1
27	7/16	Introduction to CIS 90	1	1
28	7/23	Introduction to CIS 90	1	1
29	7/30	Introduction to CIS 90	1	1
30	8/6	Introduction to CIS 90	1	1
31	8/13	Introduction to CIS 90	1	1
32	8/20	Introduction to CIS 90	1	1
33	8/27	Introduction to CIS 90	1	1
34	9/3	Introduction to CIS 90	1	1
35	9/10	Introduction to CIS 90	1	1
36	9/17	Introduction to CIS 90	1	1
37	9/24	Introduction to CIS 90	1	1
38	10/1	Introduction to CIS 90	1	1
39	10/8	Introduction to CIS 90	1	1
40	10/15	Introduction to CIS 90	1	1
41	10/22	Introduction to CIS 90	1	1
42	10/29	Introduction to CIS 90	1	1
43	11/5	Introduction to CIS 90	1	1
44	11/12	Introduction to CIS 90	1	1
45	11/19	Introduction to CIS 90	1	1
46	11/26	Introduction to CIS 90	1	1
47	12/3	Introduction to CIS 90	1	1
48	12/10	Introduction to CIS 90	1	1
49	12/17	Introduction to CIS 90	1	1
50	12/24	Introduction to CIS 90	1	1
51	12/31	Introduction to CIS 90	1	1

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 course the instructor will count the number of points you have earned and use this table on the Grades web page to determine your grade.

Help Forum

Online Help Forum



- Post questions and answers
- Get clarifications on assignments
- Collaborate with classmates on assignments, quizzes and practice tests.
- Share UNIX/Linux information and ideas
- Post class notes for classmates who miss class
- **Please don't post passwords!**



As an incentive to use the forum - students can earn 4 points per CIS 90 forum post (capped at 20 points for each posting period)

Class Forum

Textbook

POSTREPLY ↩

Search this topic...

Search

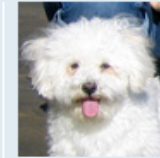
3 posts • Page 1 of 1

Textbook

by Benji Simms on Thu May 15, 2008 2:57 pm

What is the textbook for this course? I want to get it ahead of time and start reading through it.

- Usernames cannot be anonymous and must be:
 - Your **real first and last name separated by a space** e.g. Rich Simms
 - During activation if your username matches a name on the roster, but is not your full first and last name **it will be modified** to be so.
 - During activation if your username does not match a name on roster **it gets deleted**.
- Uploading an avatar is optional. Identifying photos are preferred so students can get to know each other.



Benji Simms

Posts: 5

Joined: Thu May 15, 2008 2:40 pm

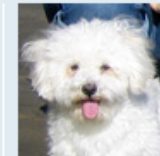


Rich Simms

Site Admin

Posts: 340

Joined: Thu May 15, 2008 1:44 pm



Benji Simms

Posts: 5

Joined: Thu May 15, 2008 2:40 pm

Class Activity Forum Registration

Click the Forums link on
<http://simms-teach.com>

Rich's Cabrillo College CIS Classes
Home Page

Home Resources **Forums** CIS Lab CTC

: Computer and Information Systems
Computer Networking and System Administration and/or
list programs

Search... Search
Advanced search

FAQ **Register** Login

It is currently Sun Jan 17, 2010 9:43 am

To Register:

1. Browse to the forum
2. Click on  Register
3. Review and agree to terms
4. Your **Username** must:
 - be your **first and last name separated by a space**
 - e.g. Benji Simms
 - match a name on the class roster

Note: If you have already registered for a previous CIS course you don't need to do it again.

Note: All registrations are manually approved by the instructor. If your username is incomplete or does not match a name of the class roster it will be modified or deleted.

Class Forum

Optional, but handy is to subscribe to a forum.

After logging in:

1. Go to the class forum.
2. Click the "Subscribe forum" box at the lower left. When subscribed you get email notifications when new posts are made.
3. To unsubscribe, click it again.

 Board index ☒ Subscribe forum

*Unsubscribed
looks like this*

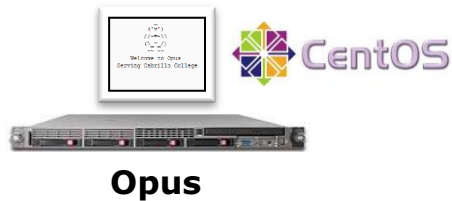
 Board index ☐ Unsubscribe forum

*Subscribed
looks like this*

Lab Resources

The CIS 90 System Playground

Configured for
Command Line Only

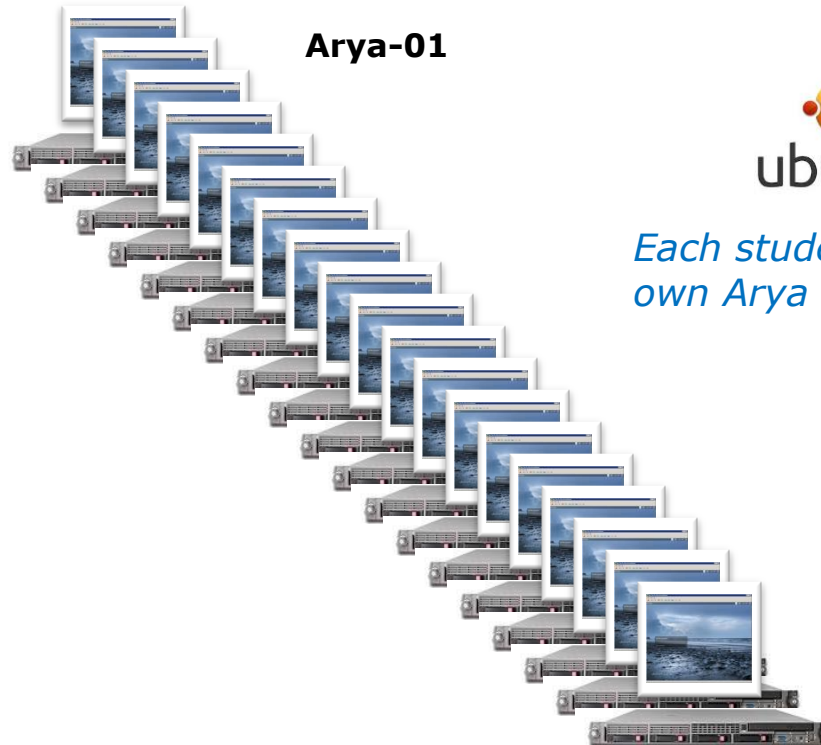


Sun-Hwa-XX servers for tests

Other UNIX/Linux servers



Configured for
Graphics and Command Line



*Each student gets their
own Arya VM for the term*

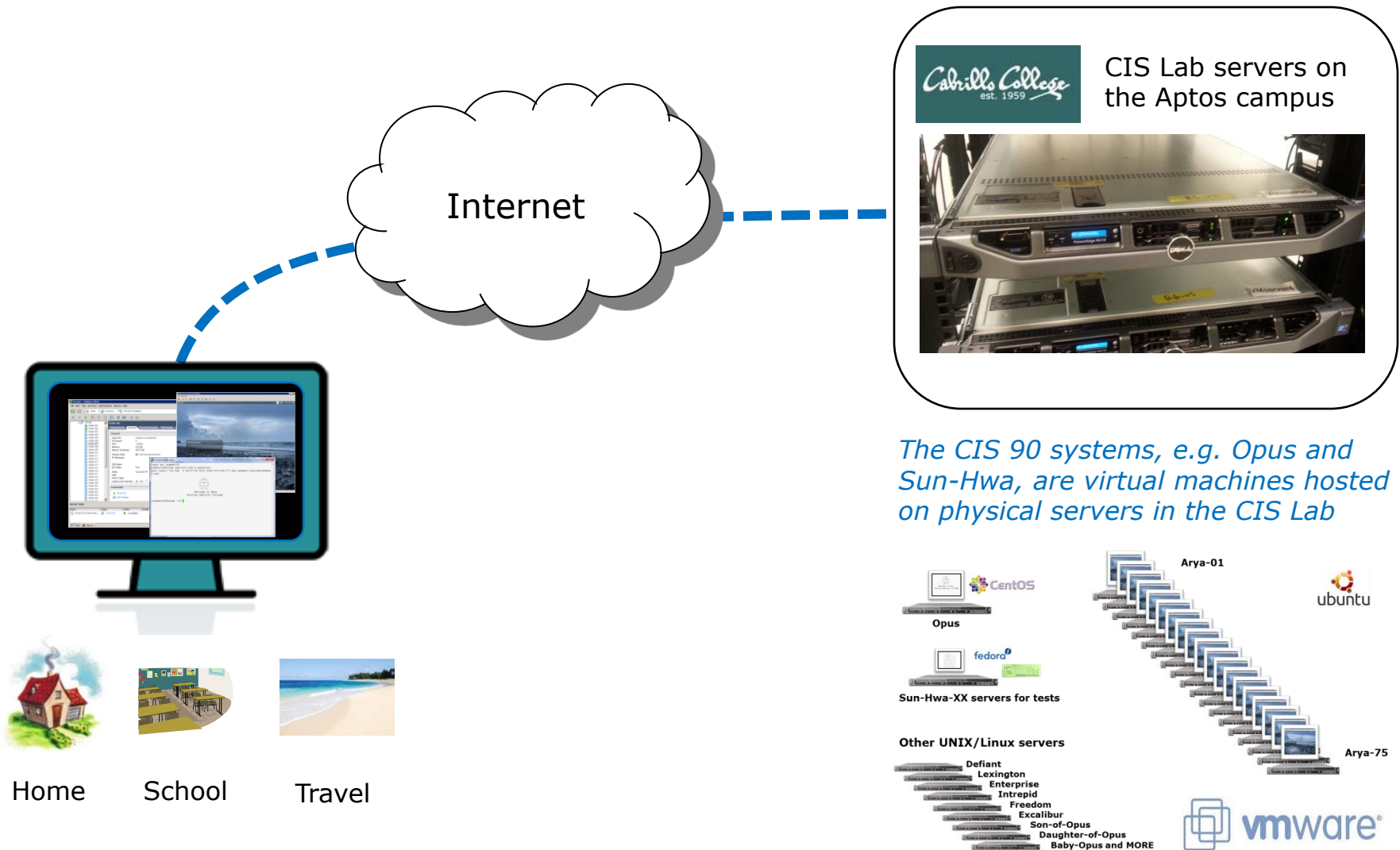
*All the systems are virtual machines
(VMs) running on the CIS Lab servers.
They are available from on or off-campus*

The CIS 90 System Playground



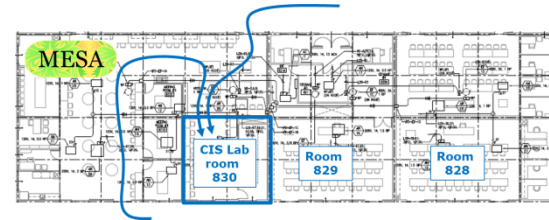
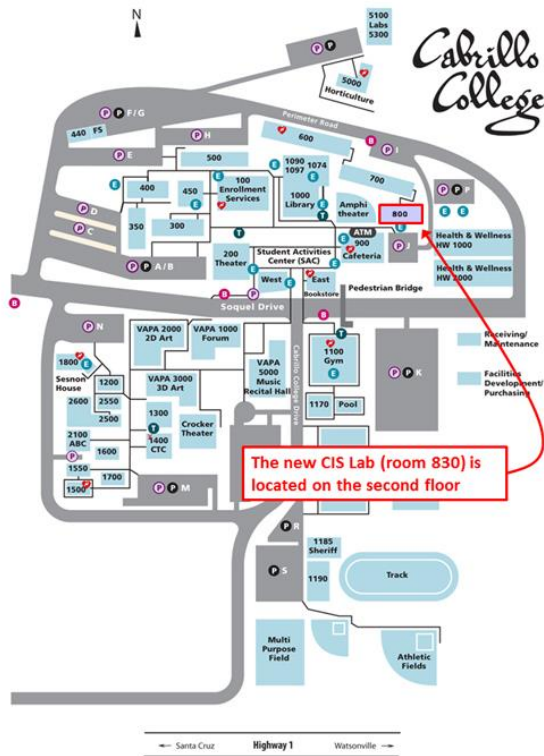
My micro lab on my desk at home

Option 1: Work on assignments online from anywhere



Option 2: Work on assignments in the CIS Lab

Building 800 - Room 830 (in MESA)



Rich's Cabrillo College CIS Classes CIS 90 Grades

Home

Resources

Forums

CIS Lab

Blackboard

Instructors, lab assistants and equipment are available CIS students.

Great place to collaborate with classmates and a place for study groups to meet.

Use this link to see the schedule and location

What is a computer

What is a computer?



smart
phone



tablet



Raspberry Pi



desktop



mobile
"laptop"



blade
server



"heavy iron"
server



Virtual
Machine



supercomputer



"pizza box" 1U
rack server



Banana Pi



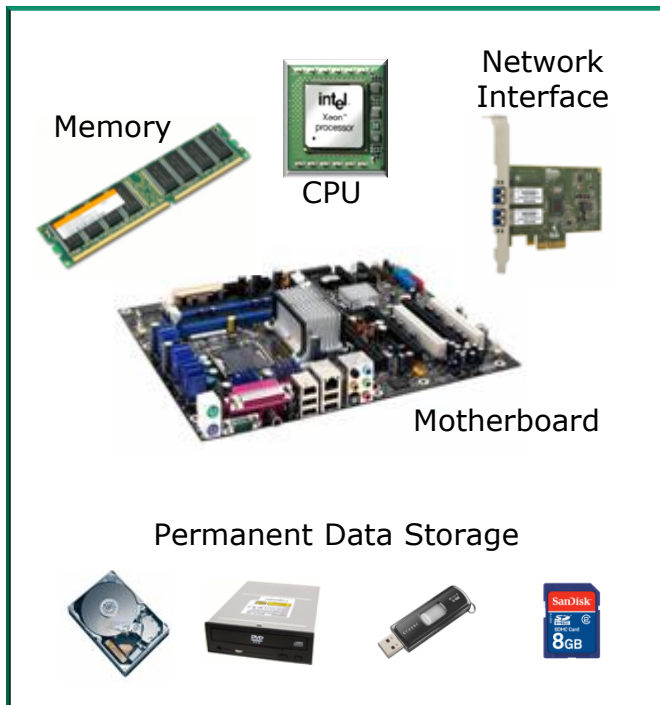
BeagleBone Black

Computers come in a wide variety of form factors

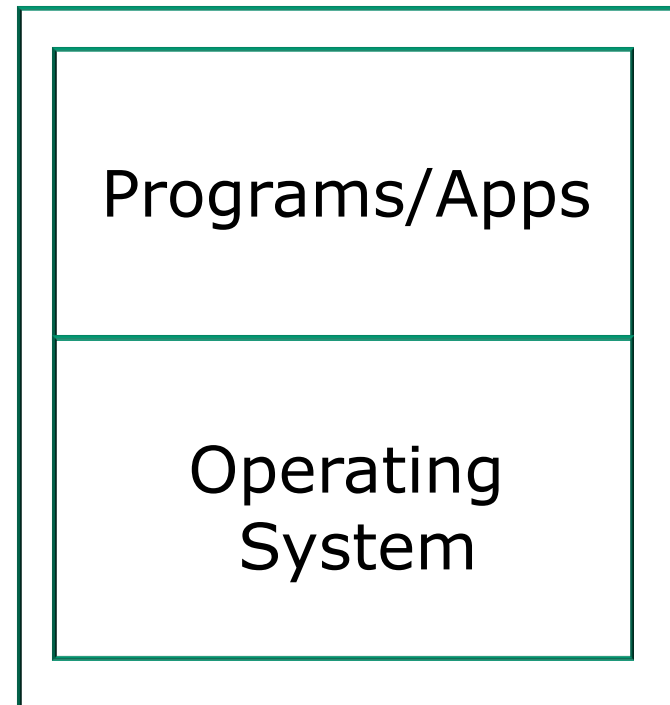
What is a computer?



Hardware



Software



At a high level all computers have the same basic hardware and software components

Software

Software

Users



Programs/Apps

- Interface to users via graphics (GUI) or command line (CLI)
- Some programs come with the OS
- Additional programs can be purchased or downloaded
- Programs use the OS for all access hardware resources

Examples: office apps, utilities, network services, games, email, web browsers, graphics, media players, databases, command line shells, CAD/CAM, contact management, accounting, enterprise applications, custom software, etc.

Operating System (OS)

- Shares hardware resources
- Loads and executes programs
- Manages processes (running programs)
- Manages memory
- Manages the file system
- Provides input/output services
- Monitors the system
- Network stack services

Examples: Windows, Linux, Unix

Hardware



Software Licensing

Public Domain (paid for by the taxpayer)

- Source code is available
- No license, no copyright, maybe modified and redistributed
- Examples: USGS mapping software, NASA aerodynamics software

Open Source

- See: <http://opensource.org>
- Source code is available
- Community of developers doing online collaboration
- Pragmatic redistribution licenses
- Examples: Apache, Firefox, Android, OpenOffice, OpenBSD, LibreOffice

Free Software Foundation

- See: <https://www.fsf.org>
- Source code is available
- GNU ("GNU is not UNIX") General Public License, COPyleft
- Examples: GNU/Linux, gimp, emacs, nano, gcc, zebra, Files

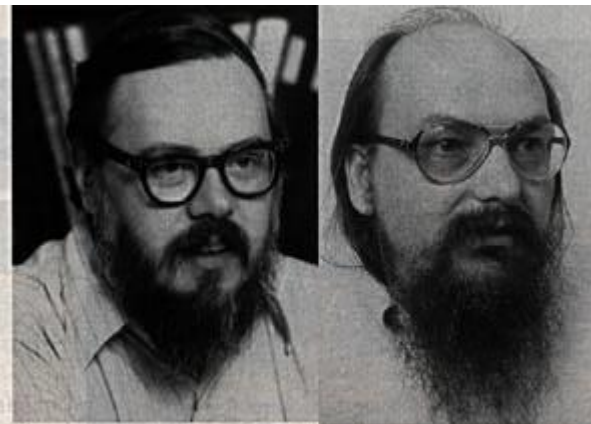
Proprietary (closed source)

- Source code is not available
- Considered intellectual property
- Must be licensed to use
- Examples: Adobe Photoshop, Microsoft Windows, Mac OS X, AT&T UNIX System V, Cisco IOS

Why Study Unix/Linux?

In 1971 Ken Thompson and Dennis Ritchie developed Unix at AT&T's Bell Labs

In 1971 Ken Thompson and Dennis Ritchie developed Unix at AT&T's Bell Labs



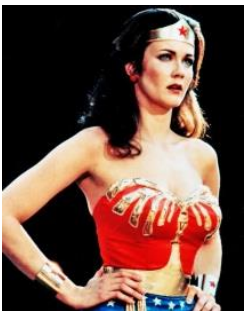
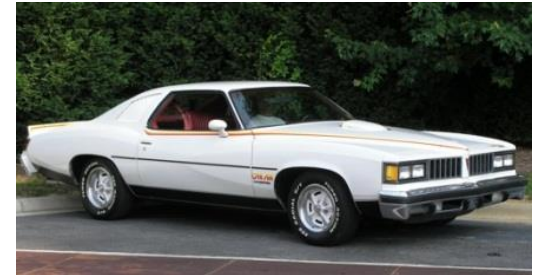
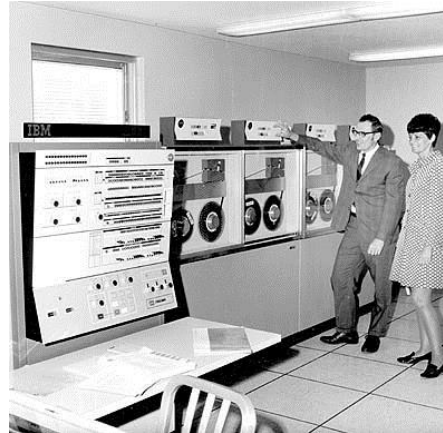
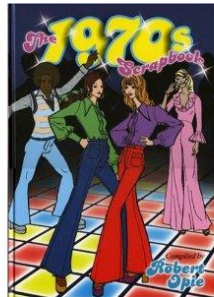
Dennis Ritchie and Kenneth Thompson: they set the style for software development – and for software developers



Bell Laboratories



**Isn't UNIX/Linux an antique
Operating System dating back to the
early 70's that belongs in a museum?**



Heck NO !!

UNIX/Linux is widely used, constantly improved and growing fast!

- Cloud infrastructure
- Embedded in smartphones, tablets and many other appliances.
- Internet services - Web, DNS, DHCP, Net News, Mail, etc.
- Enterprise and mission critical applications - Large databases, Enterprise Resource Management (ERM), Customer Relationship Management (CRM), data warehouse, manufacturing, supply chain management, etc.
- Hollywood - feature animation, visual effects, rendering farms.
- Number-crunching super computers for research.

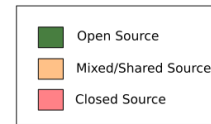


Businesses and organizations that run on Linux



Unix family trees

[illegible]

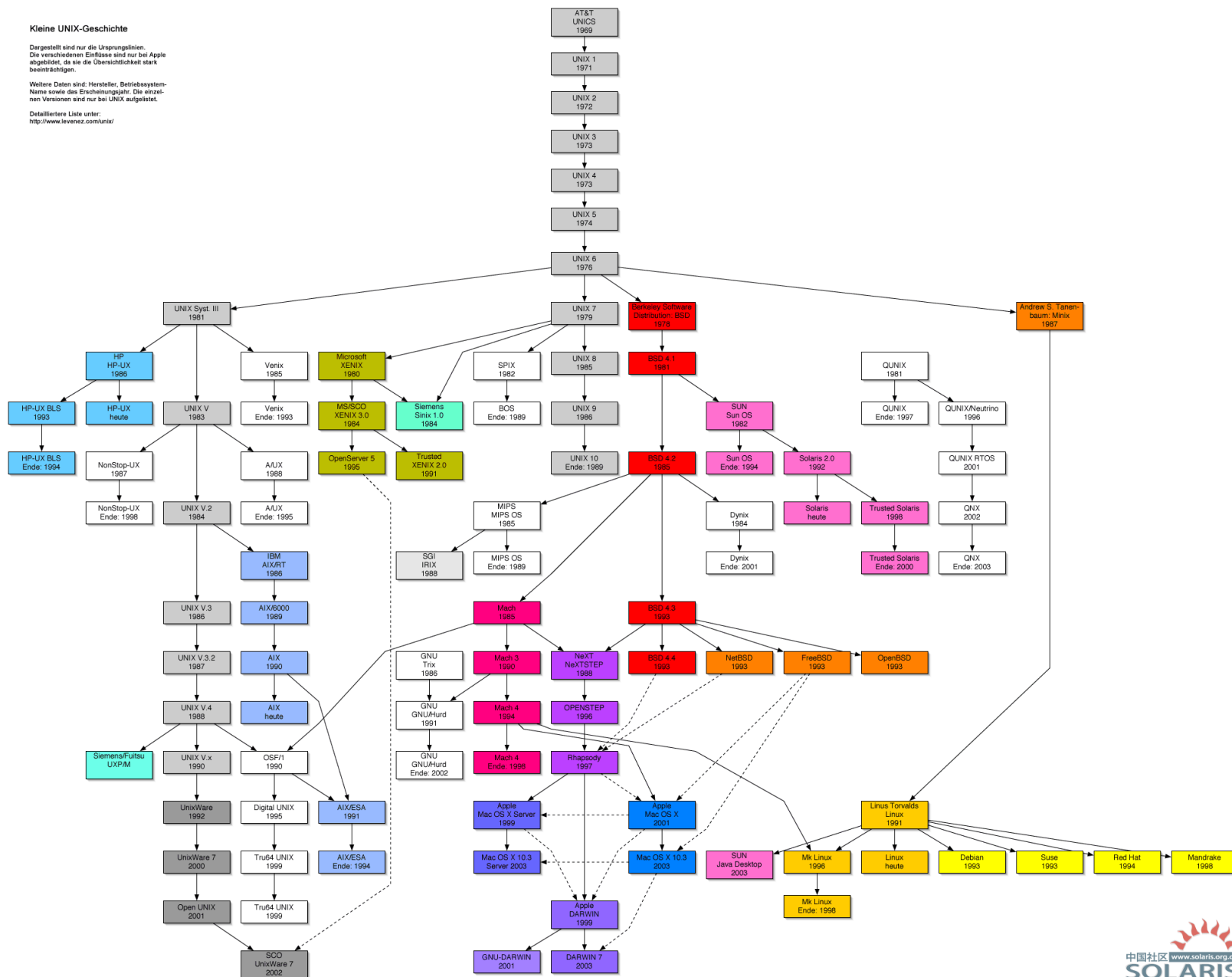


Kleine UNIX-Geschichte

Dargestellt sind nur die Ursprungslinien. Die verschiedenen Einflüsse sind nur bei Apple abgebildet, da sie die Übersichtlichkeit stark beeinträchtigen.

Weitere Daten sind: Hersteller, Betriebssystem-Namen sowie das Erscheinungsjahr. Die einzelnen Versionen sind nur bei UNIX aufgelistet.

Detailliertere Liste unter:
<http://www.levenez.com/unix/>



Unix History

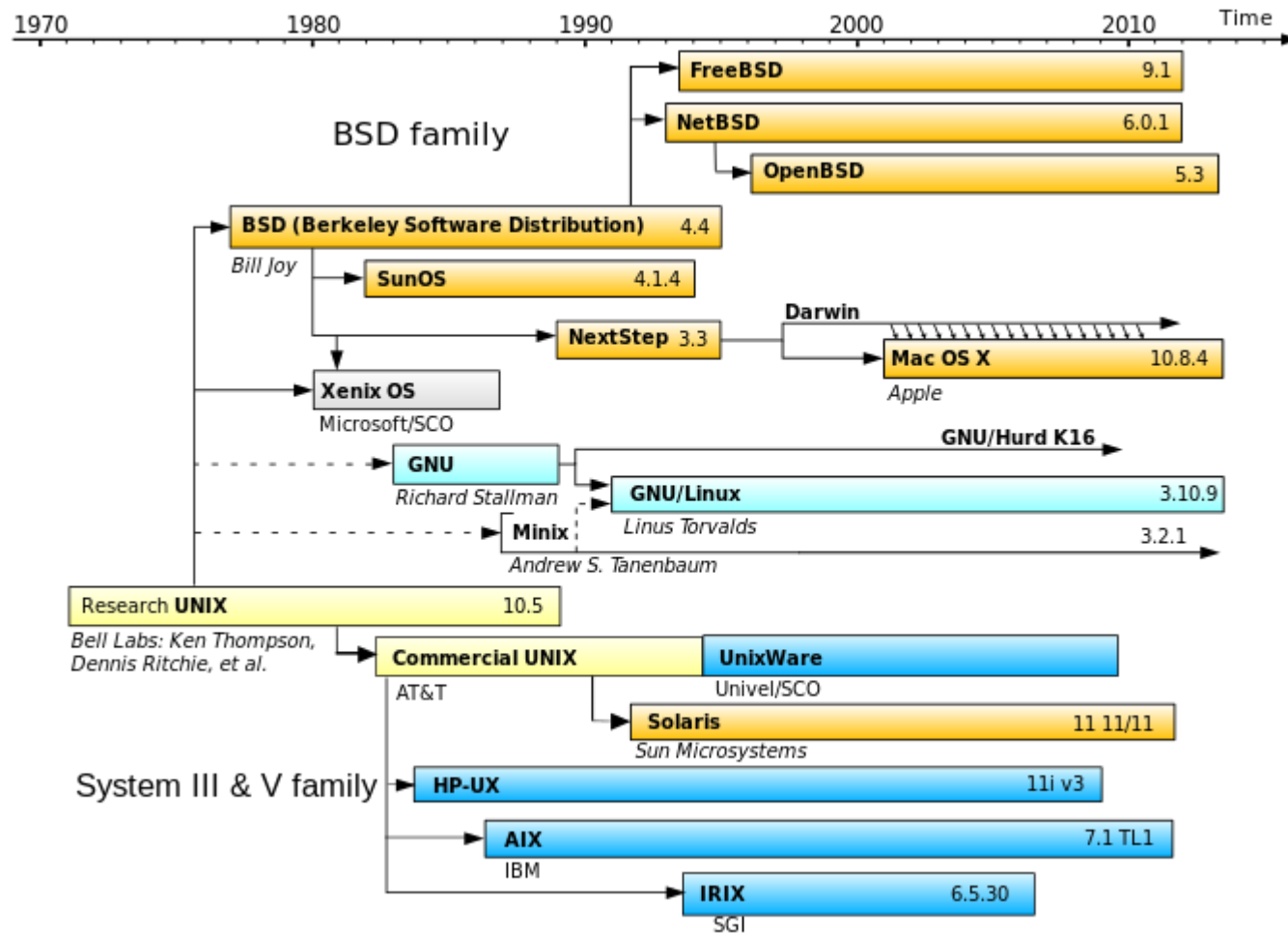
Unix Timeline

Below, you can see the preview of the **Unix History** (move on the white zone to get a bigger image):

This is a simplified diagram of unix history. There are numerous derivative systems not listed in this chart, maybe 10 times more! In the recent past, many electronic companies had their own unix releases. This diagram is only the tip of an iceberg, with a penguin on it ;-).

System	Version	Date
Oracle Solaris	11.1	october 4, 2012
Android	4.1.1 Jelly Bean	july 9, 2012
Android	4.1.2	oct. 9, 2012
Android	4.2	oct. 29, 2012
Android	4.2.1	november 27, 2012
Linux	3.5	july 21, 2012
Linux	3.6	september 30, 2012
Linux	3.7	december 10, 2012

www.levenez.com/unix/redirect_unix_a4_pdf.html

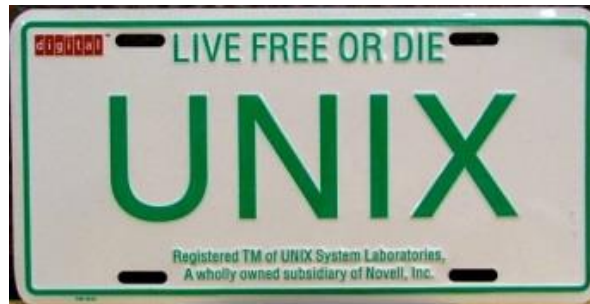


UNIX

Commercial UNIX

The "UNIX" descendants

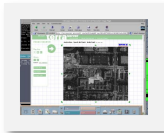
The UNIX trademark is owned and managed by The Open Group on behalf of the industry to signify products that are certified to conform to the Single UNIX Specification.



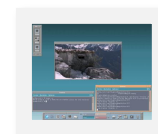
SCO UNIX
PC servers



Sun Solaris
Servers and workstations



IBM AIX
Servers, mainframes and
workstations



HP HP-UX
Servers and workstations



Apple OS X
Mac computers

BSD

Berkeley

Software

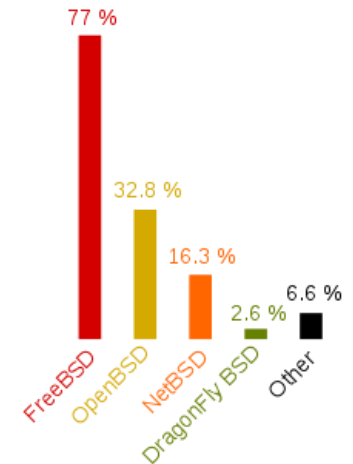
Distribution

BSD Unix and its "UNIX-like" Descendants

UC Berkeley had a source license from AT&T so they could make their own modifications and additions like TCP/IP which enabled Unix for the Internet. BSD Unix was very popular with university and government users.



Because the original BSD Unix was based on ATT's UNIX code it had to be re-written from scratch so it could be distributed freely as open source. These "UNIX-like" descendants are not allowed to use the UNIX trademark.



Source: <http://en.wikipedia.org/wiki/OpenBSD>

Apple iOS



The Apple iOS, internally known as Darwin, like Mac OS X, runs on a Unix-like kernel (Mach kernel + BSD components)

Sources: [http://en.wikipedia.org/wiki/Darwin_\(operating_system\)](http://en.wikipedia.org/wiki/Darwin_(operating_system))
[http://en.wikipedia.org/wiki/IOS_\(Apple\)](http://en.wikipedia.org/wiki/IOS_(Apple))

GNU/Linux

GNU is Not Unix

Various Linux "Distros" (Distributions)

Red Hat Enterprise Linux



CentOS



Fedora



OpenSUSE



Debian



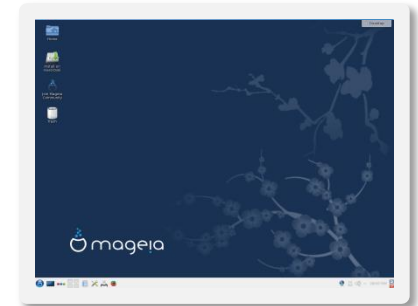
Ubuntu



Mint



Mageia



*Note: A distribution is built by a company or organization. They start with the **Linux kernel** then add a custom mix of open source components. They may then add some of their own unique software to differentiate their distribution.*



Tux, the penguin, is the Linux kernel mascot

iso.linuxquestions.org

15 Most Popular Linux Distro Downloads

15 Most Downloaded Distribution Versions (last 30 Days)	 15 Most Downloaded Distributions (Ever)
1. BackTrack 5 R3 (563598)	1. Fedora
2. CentOS 6.5 (24485)	2. Red Hat Enterprise Linux
3. Linux Mint 17.1 (10509)	3. Mandriva
4. Fedora 20 (7214)	4. Ubuntu
5. Wifislax 4.9 (6778)	5. SUSE
6. Puppy Linux 6.0 "Tahrpup" (4429)	6. CentOS
7. CentOS 7.0-1406 (4029)	7. Damn Small Linux
8. KNOPPIX 7.4.2 (3455)	8. Knoppix
9. linuX-gamers Live 0.9.7 (2675)	9. BackTrack
10. FreeBSD 9.3 (2312)	10. Debian
11. Puppy Linux 4.3.1 (1912)	11. Slackware
12. Ubuntu 12.04.4 (1584)	12. Linux Mint
13. Damn Small Linux 4.4.10 (1207)	13. PCLinuxOS
14. Xubuntu 14.04.1 (1052)	14. Puppy Linux
15. Zorin OS 6 "Lite" (968)	15. MEPIS

Jan 21, 2015

There are hundreds of Linux distributions. The one thing they have in common is they all use the Linux kernel.



Katana Robotic Arm

Embedded Linux (just a few)



Asus RT-AC66U
wireless router



Tivo



Yamaha Disklavier
Mark IV

```

$ ./android_vmlinux 3 cat /proc/version
Linux version 3.0.31-204565 (oe.infra@SEP-120) (gcc version
4.7 (GCC) ) #1 SMP PREEMPT Mon Nov 11 21:11:31 HST 2013
oe.infra@vmlinux 3
    
```



Android



Some TomTom
GPS models



Garmin
Nuvi 5000



Buffalo
NAS storage



Virgin America
Personal
Entertainment



MikroTik Routers



Sony TVs



Android Tablets



Raspberry Pi

Televisions

The Open-Source Car

Summary: Toyota is joining the Linux Foundation.



By Steven J. Vaughan-Nichols for Linux and Open Source |
July 5, 2011 -- 10:13 GMT (03:13 PDT)

Follow @sjvn

Besides a V6 as your engine, your car is very likely to soon be running Linux under the hood. The Linux Foundation will be announcing today that Toyota is joining the Foundation.

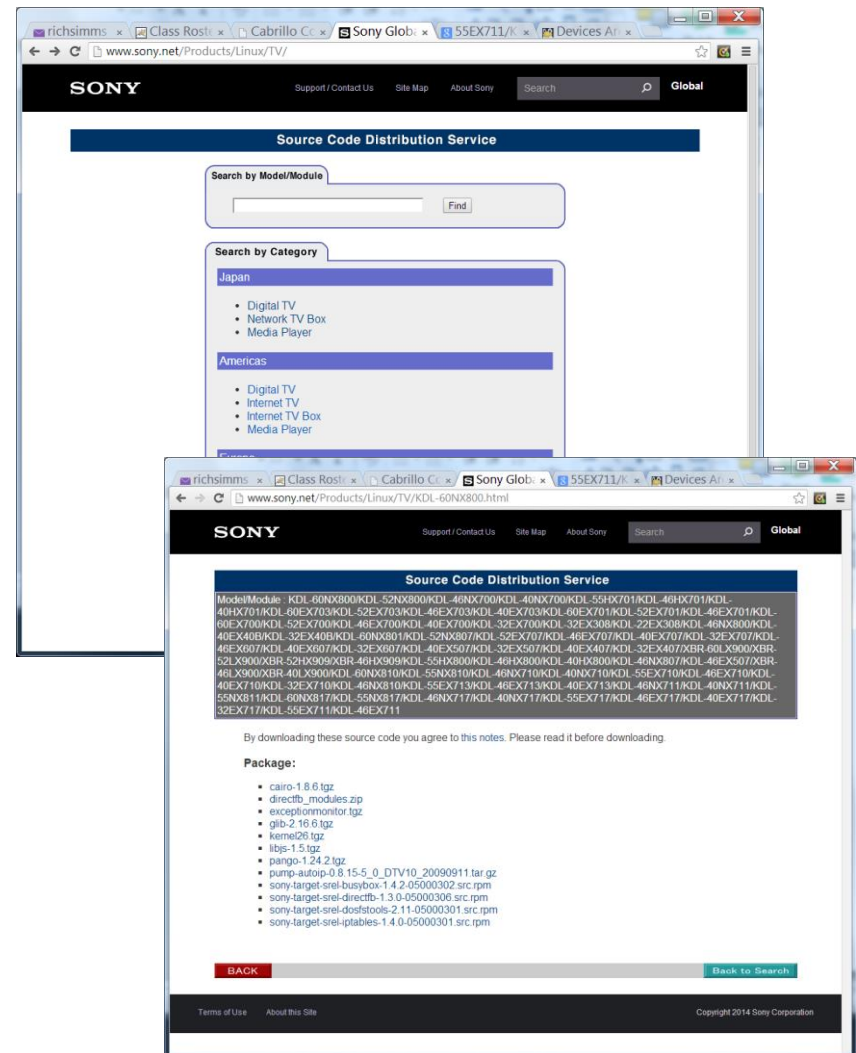


Some of you may be wondering, "What the heck is a car company doing joining the Linux Foundation?" The answer is easy. As the Foundation puts it, "A major shift is underway in the automotive industry. Car-makers are using new technologies to deliver on consumer expectations for the same connectivity in their cars as they've come to expect in their homes and offices. From dashboard computing to In-Vehicle-Infotainment (IVI), automobiles are becoming the latest wireless devices - on wheels."

And, what's one of the most popular systems for dashboard computing, heads-up driving displays and IVI? It's Linux, of course.

< snipped >

<http://www.zdnet.com/blog/open-source/the-open-source-car/9193>



<http://www.sony.net/Products/Linux/common/search.html>

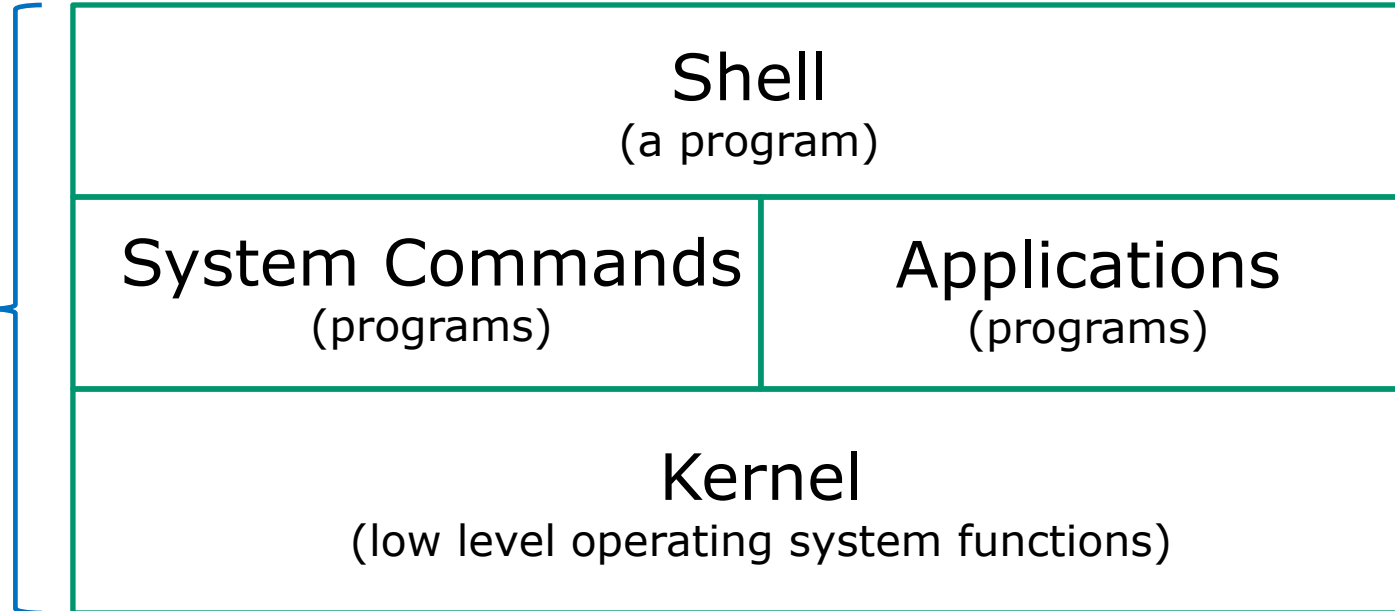
Unix/Linux Architecture simplified

UNIX/Linux Architecture Simplified View

Users



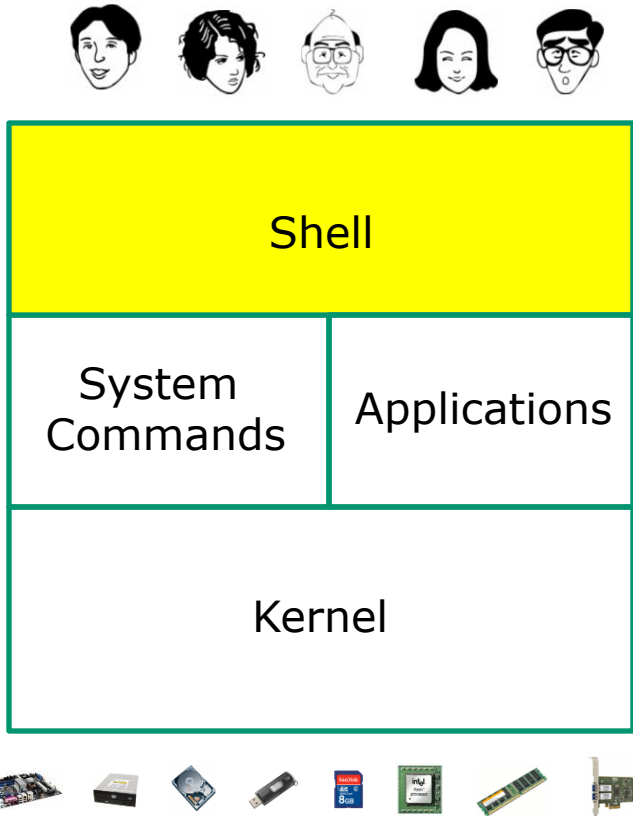
Software



Hardware

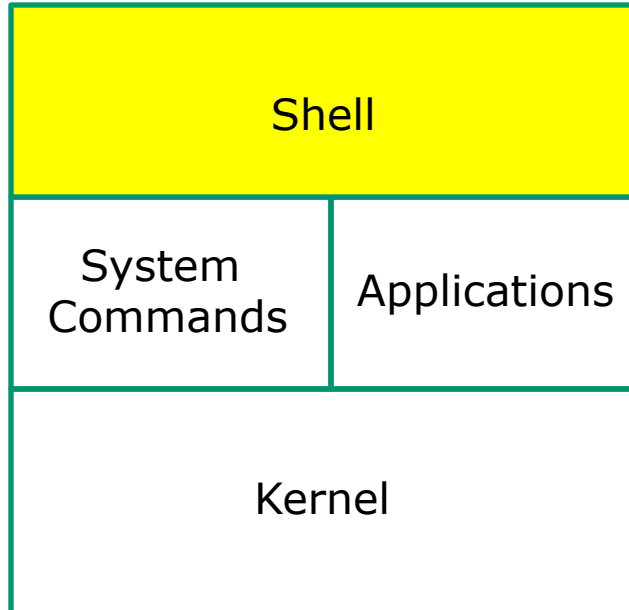


The Shell (Command Line)



- Allows users to interact with the computer
- Called a "shell" because it hides the underlying operating system.
- Prompts user for a command, parses the command, then locates the command (a program or script) and runs it.
- Many shell programs are available: sh (Bourne shell), bash (Bourne Again shell), csh (C shell), ksh (Korn shell).
- The shell is a user interface and a programming language (scripts).
- GNOME and KDE desktops could be called graphical shells.

The Shell

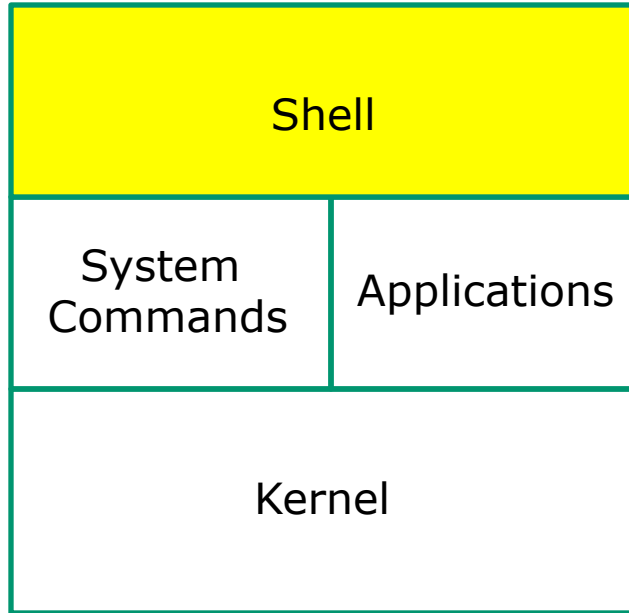


```
rsimms@opus:~$ hostname
opus.cabrillo.edu
rsimms@opus ~]$
```

```
rsimms@opus:~$ for i in Larry Moe Curly
> do
>   echo "Hello $i"
>   sleep 1
> done
Hello Larry
Hello Moe
Hello Curly
rsimms@opus ~]$
```

The shell is a user interface and a programming language

Various types of user interfaces



Shell Command Line Interface (CLI)

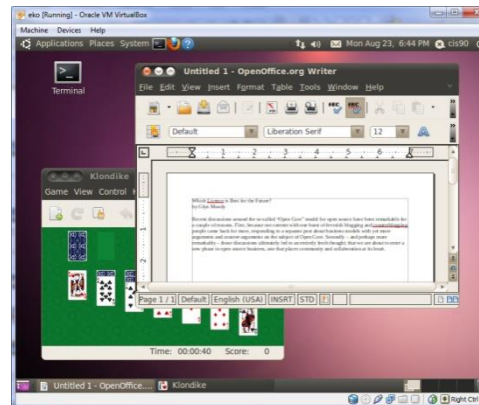
```
[root@frida root]# iptables -L -t nat
Chain PREROUTING (policy ACCEPT)
target     prot opt source                destination

Chain POSTROUTING (policy ACCEPT)
target     prot opt source                destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source                destination
[root@frida root]#
```

bash

Graphic shells or desktops (GUI)

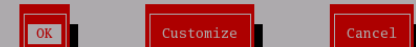


gnome

Text User Interface (TUI)

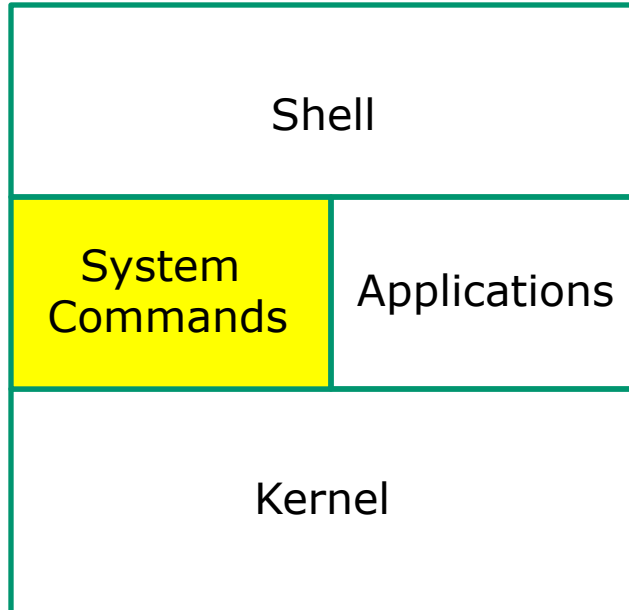
A firewall protects against unauthorized network intrusions. High security blocks all incoming accesses. Medium blocks access to system services (such as telnet or printing), but allows other connections. No firewall allows all connections and is not recommended.

Security Level: ☒ High ☐ Medium ☐ No firewall



Lokkit Utility (uses curses library)

System Commands

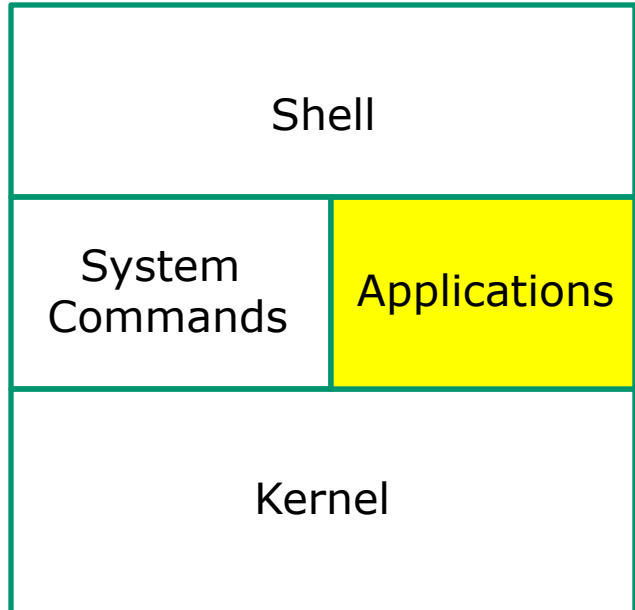


- 100's of system commands and utilities.
- We will learn how to use the following commands in this lesson:

- cal
- clear
- date
- exit
- hostname
- id
- ps
- ssh
- tty
- uname

UNIX/Linux Architecture

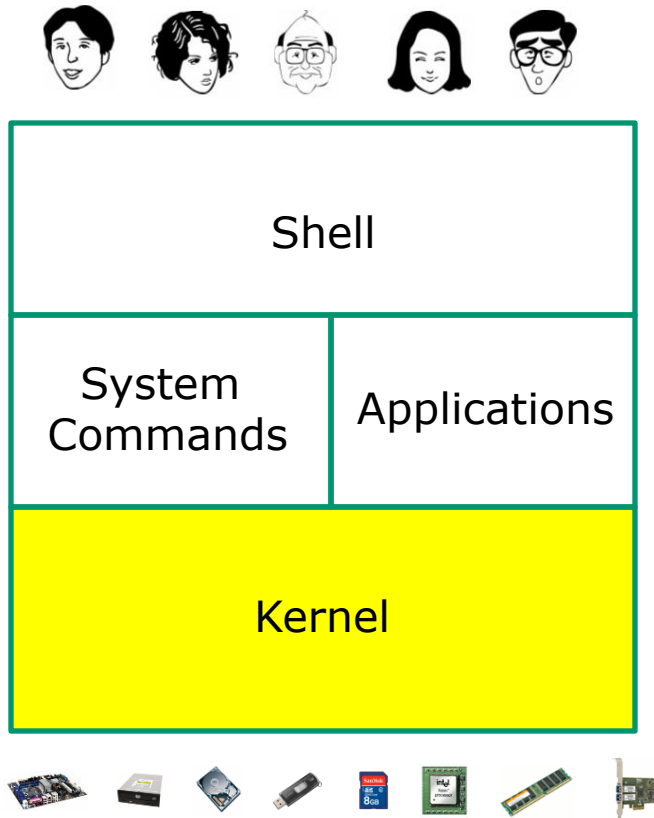
Applications



- Could be included in the distribution or optionally installed.
- Could be an add-on program developed by an ISV (Independent Software Vendor) or Open Source organization.
- Could be an in-house developed custom application.
- Examples are **Apache** (web server), **GIMP** (GNU image manipulation program), **OpenOffice** (word processing, spreadsheets, presentations), **Oracle** (commercial database), ... etc.



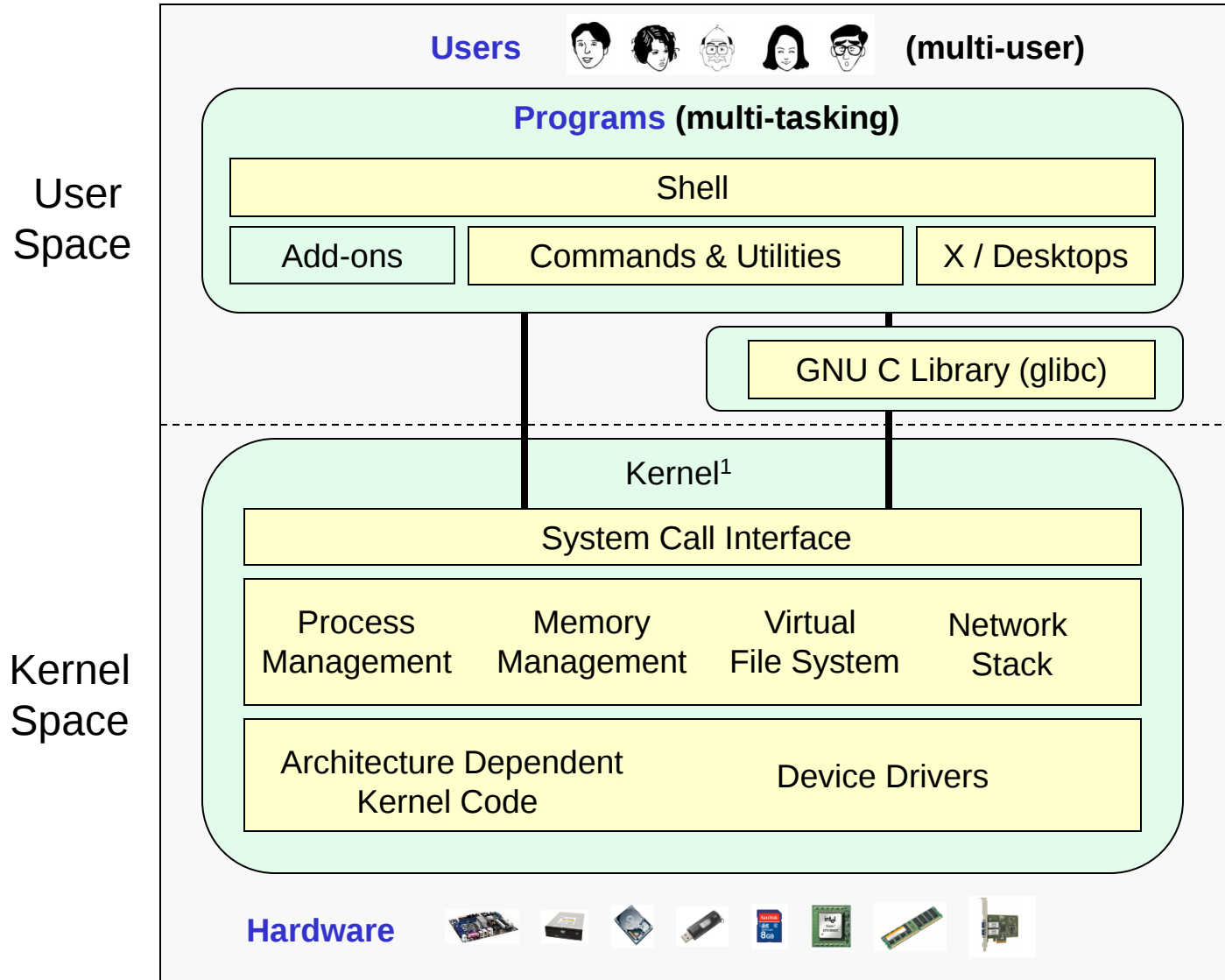
The Kernel



- Lowest level, inner-most core of the operating system.
 - Process management - what programs are called when they are loaded and running.
 - Memory management - handles all the reads and writes to memory (RAM and virtual memory).
 - File System - handle all the reads and writes to files on drives.
 - Network stack - provides the communication layers to exchange packets with other computers.



GNU/Linux Operating System Architecture



Richard Stallman started the GNU project in 1983 to create a free UNIX-like OS. He Founded the Free Software Foundation in 1985. In 1989 he wrote the first version of the GNU General Public License



Linus Torvalds, as a student, initially conceived and assembled the Linux kernel in 1991. The kernel was later re-licensed under the GNU General Public License in 1992.

¹See "Anatomy of the Linux kernel" by M. Tim Jones at <http://www-128.ibm.com/developerworks/linux/library/l-linux-kernel/>

UNIX/Linux Design “Observations”

- Multi-tasking and multi-user capabilities
- Unlike Windows, the GUI does not run in the kernel (adds stability)
- Unlike Windows, multiple graphical desktops available
- Linux kernel is “monolithic”, not a modular “microkernel”
- Dynamic - can load and unload modules on the fly
- Programs restricted to the privileges of the user running them (more secure)
- Scalable - scales up to handle the largest enterprise and mission-critical applications
- Portable - runs on a variety of hardware platforms
- Reliable and robust
- Powerful, **but NOT friendly** !!

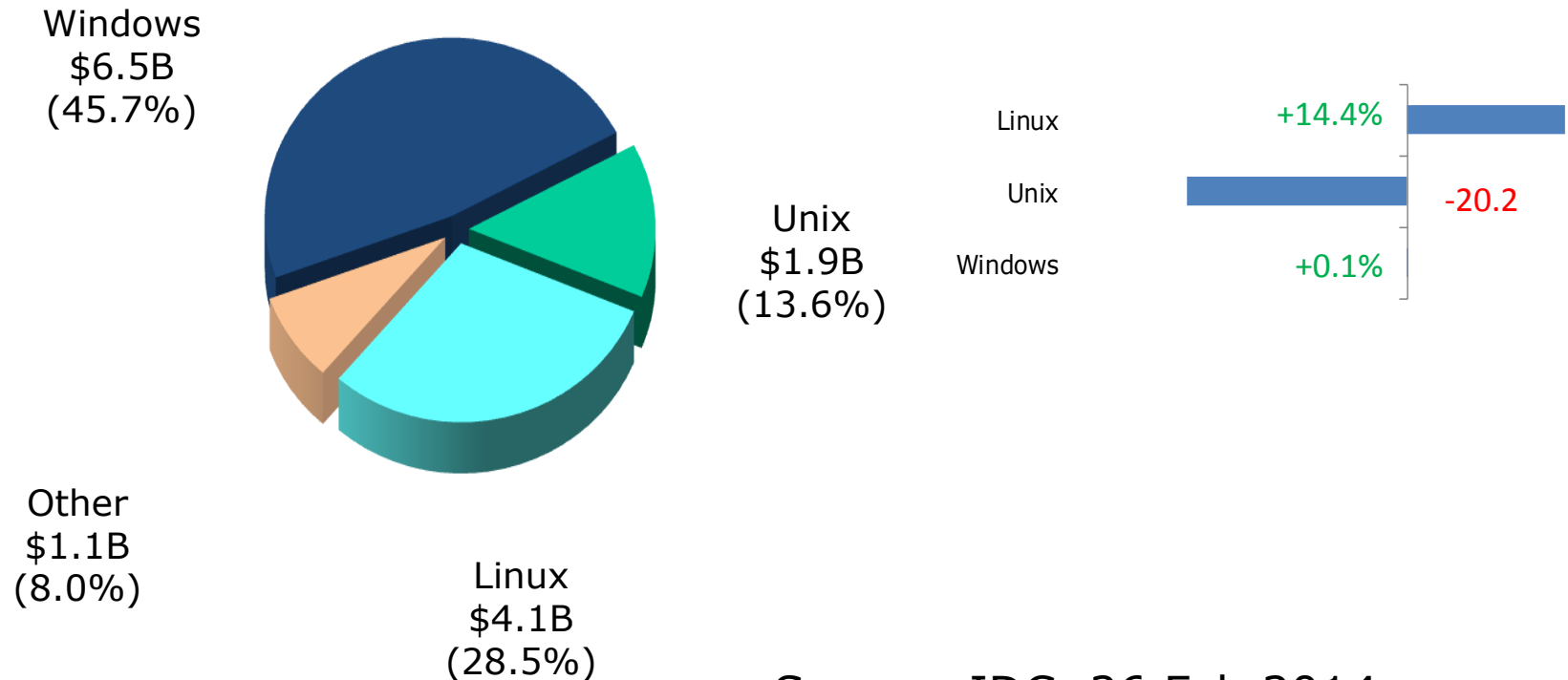
Market Share



Worldwide Server Market

\$14.2 Billion Server Revenue Q4 2013

Year over Year Change



Source: IDC, 26 Feb 2014

Website hits by browser OS

Jul 2010¹

Operating Systems		
1	Windows XP	48.17%
2	Windows 7	17.02%
3	Windows Vista	16.60%
4	Mac OS X	4.84%
5	Linux	1.45%
6	Windows 2003	1.02%
7	iPhone OSX	0.56%
8	Windows 2000	0.31%
9	WAP	0.12%
10	Android	0.08%

6.9%

Jan 2013¹

Operating Systems		
1	Windows 7	44.13%
2	Windows XP	23.70%
3	iOS	8.79%
4	Apple OS X	8.52%
5	Windows Vista	5.48%
6	Android	3.75%
7	Windows 8	2.28%
8	Linux	1.74%
9	BlackBerry	0.61%
10	SymbianOS	0.23%

22.8%

Dec 2014³

Operating Systems		
1	Windows 7	40.54%
2	Android 4	11.47%
3	Windows XP	9.04%
4	Windows 8.1	8.14%
5	iOS 8	6.51%
6	Mac OS X	6.20%
7	iOS 7	4.11%
8	Windows 8	2.85%
9	Linux	2.46%
10	Windows Vista	2.10%

30.7%

1-This report was generated 07/31/2010 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 38,996 websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below.

3-This report was generated 01/31/2013 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 63,187 websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below.

3- This report was generated 12/31/2014 based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes 80,565 websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below.



Smartphones, Tablets and PCs



Worldwide Device Shipments by Operating System in Mature Markets (Thousands of Units)

Operating System	2013	2014	2015
Android	266,701	313,529	337,791
IOS/Mac OS	157,273	167,787	182,564
Windows	138,312	141,977	149,128
Others	100,633	48,130	29,352
Total	662,920	671,424	698,835

Shipments include mobile phones, ultramobiles (including tablets) and PCs

Source: Gartner (October 2014)

Worldwide Device Shipments by Operating System in Emerging Markets (Thousands of Units)

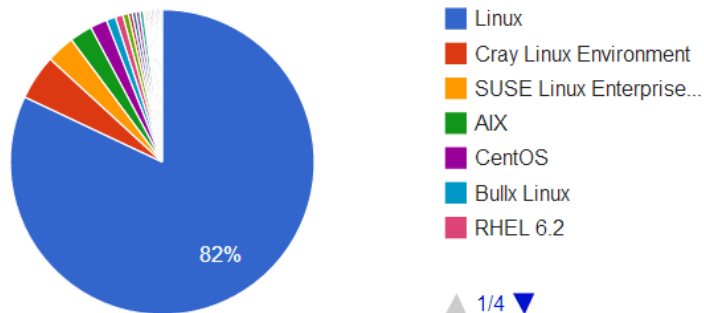
Operating System	2013	2014	2015
Android	632,517	928,135	1,117,860
Windows	187,474	194,091	221,804
IOS/Mac OS	78,928	95,304	112,647
Others	772,562	520,605	383,914
Total	1,671,480	1,738,135	1,836,225

Shipments include mobile phones, ultramobiles (including tablets) and PCs

Source: Gartner (October 2014)

Operating System Share (by system)

June 2014



Linux dominates the Supercomputer market

Operating System	Count	System Share (%)	Rmax (GFlops)	Rpeak (GFlops)	Cores
Linux	410	82	170,858,490	254,569,525	14,829,593
Cray Linux Environment	24	4.8	39,060,748	55,313,420	1,855,432
SUSE Linux Enterprise Server 11	15	3	10,856,287	15,078,367	520,704
AIX	12	2.4	4,443,567	5,288,805	176,288
CentOS	9	1.8	2,438,215	3,276,319	172,296
Bullx Linux	5	1	1,565,126	1,878,599	69,668
RHEL 6.2	4	0.8	1,738,900	2,132,582	102,528
bullx SuperComputer Suite A.E.2.1	3	0.6	2,942,070	3,583,180	165,888
SLES10 + SGI ProPack 5	2	0.4	398,000	439,910	38,400
Redhat Enterprise Linux 6.5	2	0.4	611,669	628,800	28,000
Redhat Enterprise Linux 6.4	2	0.4	720,702	1,223,280	56,026
Redhat Enterprise Linux 6	2	0.4	2,433,470	3,032,783	295,656
Redhat Linux	1	0.2	196,234	262,560	8,412
RHEL 6.1	1	0.2	230,600	340,915	37,056
bullx SCS	1	0.2	255,078	274,176	12,240
SUSE Linux	1	0.2	274,800	308,283	26,304
Kylin Linux	1	0.2	33,862,700	54,902,400	3,120,000
Windows Azure	1	0.2	151,300	167,731	8,064
CNL	1	0.2	165,600	201,216	20,960
Windows HPC 2008	1	0.2	180,600	233,472	30,720
Scientific Linux	1	0.2	188,725	199,680	9,600
CNK/SLES 9	1	0.2	190,900	222,822	65,536



Tianhe-2
supercomputer
in China



Cray XK7
Titan at Oak
Ridge National
Lab



Sequoia, IBM
BlueGene/Q
at Lawrence
Livermore
Lab



Fujitsu K
computer in
Japan



Mira, IBM
BlueGene/Q
at Argonne
Lab

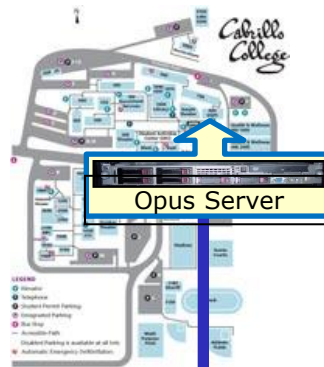
Source: <http://www.top500.org/statistics/list/>



SSH (secure shell)

Getting the car keys

Remote Server



Problem: We need a secure (encrypted) way to login and enter commands to a remote server over the network.



Solution: SSH is a network protocol that enables secure connections between computers

Picture credit: <http://www.cs.umd.edu/faq/ssh.html>

Old way: **telnet**
Sniffer view of a Telnet session

```

server2 VMware Remote Console | Devices
root@ server2-01:~
telnet-session - Ethereal
Contents of TCP stream
login: rrsiiimmmssrr
Password: nimbus2000rr
Last login: Sun Jul 6 18:47:03 from 192.168.1.254r
[rsimms@server2-01 rsimms]$ ccaatt sseeccrreettrr
The D-Day invasion is set for June 6th at Normandyr
[rsimms@server2-01 rsimms]$ eexxiittrr
logoutr
z[H]z[J
    
```

Telnet uses clear text

With telnet, everything is transferred in clear text over the network (not good!)

New way: **ssh**
Sniffer view of a SSH session

```

server2 VMware Remote Console | Devices
root@ server2-01:~
ssh-session - Ethereal
Contents of TCP stream
0000035E 1a 20 b1 b0 fa f3 03 2f 03 13 32 20 a3 32 b3 33 ...2..
000005AE 80 72 2b 72 d4 3b 46 a6 7b 67 6b d4 df a2 b2 8c ,r+r.;F.
000005BE 01 7c 39 78 bd c4 95 f2 61 93 73 a1 76 49 cf 00 ,l9x...
000005CE 68 c2 85 71 b0 75 c6 72 b5 18 27 10 4b 57 ed 88 h.,q.u.r
000005DE 17 df 2b a1 dd 81 4f 0a 58 51 f5 f7 54 3e cc 89 ..+...0.
000005EE 55 70 e9 73 b4 0a 6f 3f af 5b f7 3c 4e 30 92 39 Up,s..o?
000005FE 62 fc fd a6 fd b9 45 e2 56 12 d1 90 0c d9 ce 34 b.....E.
0000060E 6d 1f 8b 44 a7 50 3c 59 aa 0b 2a c2 04 c1 da 43 m..D.P<Y
0000061E 21 87 2d 32 67 48 d3 47 2f 43 25 5b ee 65 89 76 l.-2gH.G
0000062E 83 1c 74 91 b1 f5 3e 8b 57 ee d9 fc f5 45 e3 b6 ..t...>.
0000063E ef 9c f0 89 eb f7 1d c9 fd 29 69 44 a9 75 98 5a .....
0000064E b2 ba d5 62 9f 35 e1 1a ee 06 8b 79 fe e9 f0 0a ...b.5.
0000065E df ..
0000066E ea ..
0000067E 06 ..
0000068E 8c 8f a3 07 6e 69 62 02 a7 3f e0 e1 9b ec af d0 ....nib.
    
```

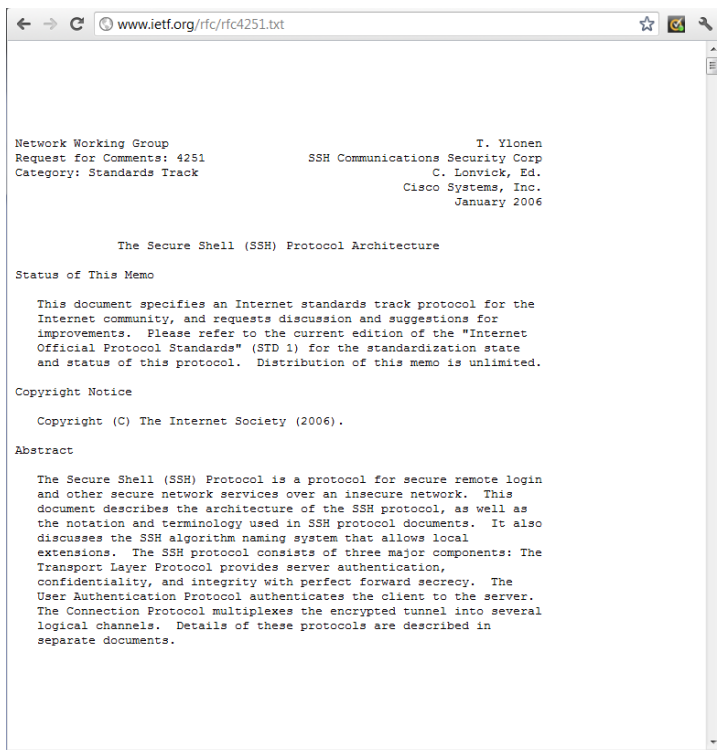
SSH is encrypted

With ssh, everything is encrypted. This is how we will access all UNIX/Linux systems in CIS 90.



Local computer at home or on campus

SSH (secure shell) is a standards based protocol. We will use it for remotely logging into and running commands on UNIX/Linux systems.



- See RFCs 4250 to 4254 at www.ietf.org for the gory details
- “RFC” = Request for Comment
- “IETF” = Internet Engineering Task Force

SSH apps may need to be installed

- ✓ Linux and Mac already have SSH built in (i.e. the **ssh** command)
- ❑ Android smartphones and tablets can use SSH apps such as the free **ConnectBot** or **Juice** apps
- ❑ Apple iPhones and iPads can use ssh apps such as the **iSSH** app
- ❑ Windows users can download and install the **Putty** program



Putty is written and maintained primarily by Simon Tatham.
<http://www.chiark.greenend.org.uk/~sgtatham/>
Thank you Simon!

Class Activity – Install SSH software if necessary

Operating System	 Students in the classroom	 Students at home
 Windows	 Find and run the Putty program	 - Google “putty download” - Download the <u>putty.exe</u> binary to your desktop - Run the downloaded putty.exe program http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html
  Linux or Mac		Search for and run the terminal app

Logging Into Opus via SSH

Get into the car

SSH connection to a UNIX/Linux Server

To connect and login to a remote system you must know:

- The **hostname or IP Address** of the remote server (hostnames must be *fully qualified domain names* when going over the Internet)
- The **port** number the SSH service is listening on (the default is port 22)
- Your login credentials (**username** and **password**) on the remote server

How people get into another home

<http://modernwarpoetry.com/wp-content/uploads/2014/09/Vertical-Siding-Brick-wall-white-house-with-a-big-house.jpg>

1) You need an address to find someone's home

2) Some doors are locked and some are open.
You can only enter if the door is open.



3) Homer owner: Who the heck are you?

4) Visitor: My name is Rich and I live next door in the small shack

How ssh lets you log into a remote server

1) You need an IP address or hostname to find a server on the Internet



2) Some ports are locked and some are open. You can only connect if the port is open.



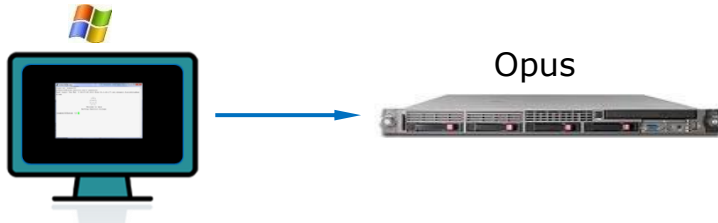
<http://product-images.www8-hp.com/digmedialib/prodimg/lowres/c03120597.png>

3) Server: Enter username & password

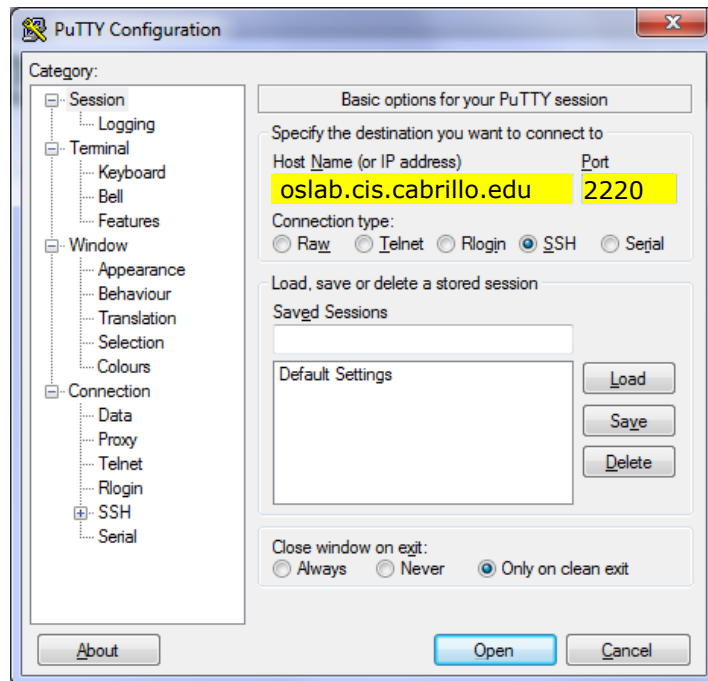
4) Visiting user: rsimms & <secret>

SSH connection to a UNIX/Linux Server - from Windows

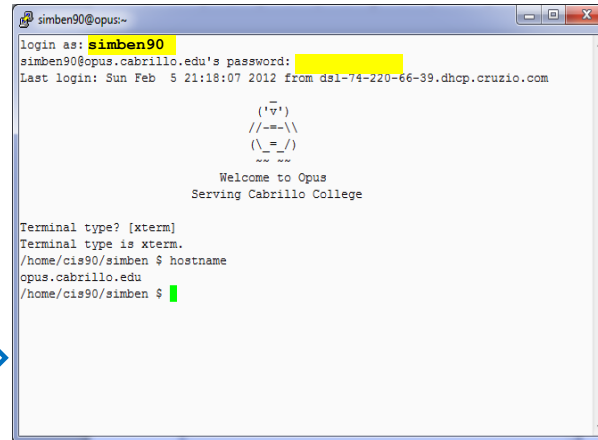
(specify hostname, username, password and port)



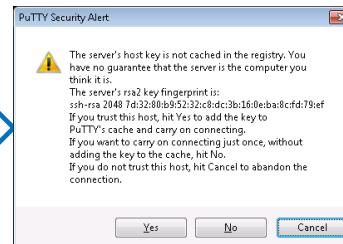
On Windows run Putty



Click Open



The password is not echoed (printed) as you type it



The first time a connection is made to a server this warning is displayed.

Click Yes

SSH connection to a UNIX/Linux Server - from Linux/Mac

(specify hostname, username, password and port)



Opus



On a Mac or Linux terminal type:

ssh -p 2220 username@oslab.cis.cabrillo.edu

The authenticity of host '[oslab.cis.cabrillo.edu]:2220
([2607:f380:80f:f425::230]:2220)' can't be established.
RSA key fingerprint is 7d:32:80:b9:52:32:c8:dc:3b:16:0e:ba:8c:fd:79:ef.
Are you sure you want to continue connecting (yes/no)? **yes**

```

Activities  Terminal  Thu 12:10  Rich Simms

simben90@oslab:~
File Edit View Search Terminal Help
[rsimms@batman ~]$ ssh -p 2220 simben90@oslab.cabrillo.edu
simben90@oslab.cabrillo.edu's password:
Last login: Tue Jan 29 16:07:08 2013 from 50-0-68-177.dsl.dynamic.fusionbroadband.com

      ( 'v' )
    //  -  -  \
   (  _  _  )
   ~~~~

Welcome to Opus
Serving Cabrillo College

Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $
    
```

*Enter yes if you get
this authenticity
warning*

SSH login to a UNIX/Linux Server

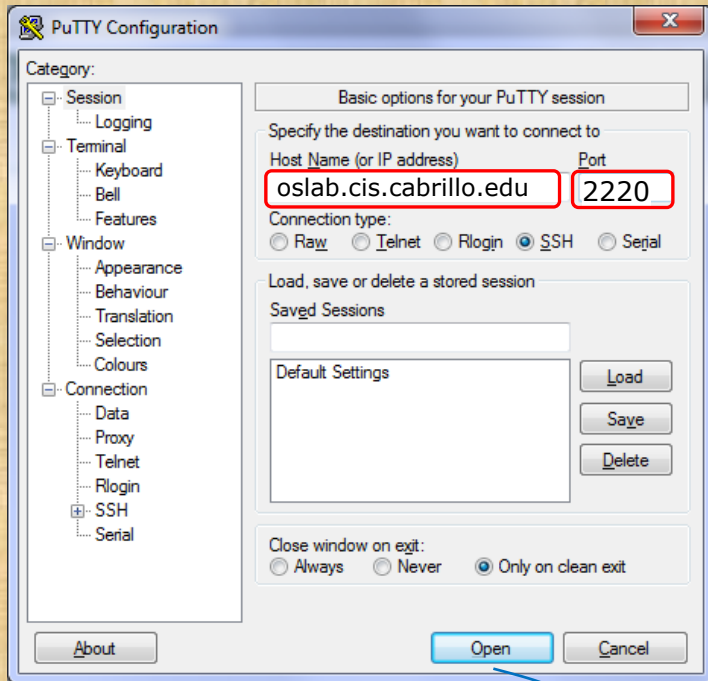
username

password
(not echoed)

```
simben90@opus:~  
login as: simben90  
simben90@opus.cabrillo.edu's password:  
Last login: Sun Feb  5 21:18:07 2012 from dsl-74-220-66-39.dhcp.cruzio.com  
  
      ('v')  
    //--\\  
   (\\_/_/)  
   ~ ~ ~  
Welcome to Opus  
Serving Cabrillo College  
  
Terminal type? [xterm] Hit Enter key here to accept default terminal type  
Terminal type is xterm.  
/home/cis90/simben $ hostname  
opus.cabrillo.edu  
/home/cis90/simben $ Use exit command to end session
```

Note: If you specified the username in Putty or on the ssh command you will not be prompted for the username again.

1) On Windows run Putty:

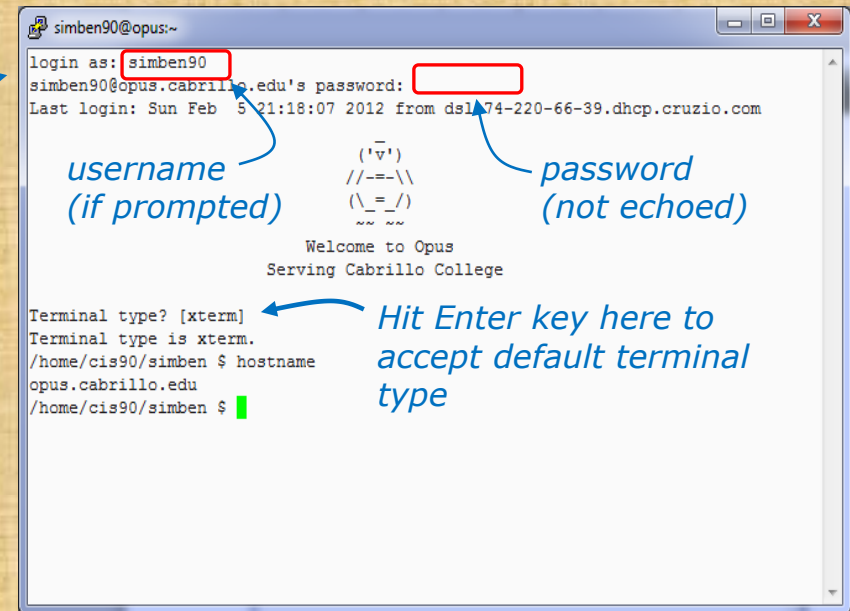


*Respond "yes" to
authenticity warning if
it appears*

Class Activity

Log into Opus using SSH
(specify hostname, username, password, and port)

2) Enter your credentials (not Benji's)



1) On a Mac or Linux terminal type:

ssh -p 2220 username@oslab.cis.cabrillo.edu

Additional Resources

- How to open the terminal window on a mac
https://www.youtube.com/watch?v=zw7Nd67_aFw
- Howto #143: Logging into Opus
<http://simms-teach.com/howtos/143-opus-access.pdf>



Lesson 1

Commands

First driving lesson

First commands for your toolbox



cal
date
clear

- show calendar
- show current time and date
- clear the terminal screen

hostname
ps
uname

- show the host name of the computer being accessed
- show processes, including the name of the shell being run
- show the kernel name

cat /etc/issue
cat /etc/*-release

- usually shows distro (distribution) name
- usually shows distro (distribution) name

who
who am i
tty
id

- shows current login sessions
- identifies which login session you are using
- shows your terminal device
- show user info including username/UID and group/GID

history

- show previous commands

ssh
exit

- Connect and login to remote system
- terminate your shell and log off

Terminal type

```
login as: simben90  
simben90@oslab.cabrillo.edu's password:  
Last login: Sun Aug 26 08:54:09 41-3-21-105.dsl.fusion.com
```

```
      _  
    ('v')  
  //-==-\ \  
  (\_=_/)  
   ~ ~ ~ ~
```

```
      Welcome to Opus  
    Serving Cabrillo College
```

```
Terminal type? [xterm] ← Hit Enter key here to accept  
Terminal type is xterm. default terminal type  
/home/cis90/simben $
```

The terminal type in this case is "xterm". The terminal type is different than the terminal device (more on this later)

Shell Prompt

login as: **simben90**

simben90@oslab.cabrillo.edu's password:

Last login: Sun Aug 26 08:54:09 41-3-21-105.dsl.fusion.com

```
( '_v' )  
//--=\ \  
( \_=_/ )  
~~  ~~
```

Welcome to Opus
Serving Cabrillo College

Terminal type? [xterm]

Terminal type is xterm.

```
/home/cis90/simben $  
/home/cis90/simben $
```

*Hit Enter key here to accept
default terminal type*

*Shell prompt - used by the shell to prompt the
user to enter a command. The shell will display
this prompt every time you hit the Enter key.*

Question: What is your exact prompt string on this system?

Answer: /home/cis90/simben \$

cal command

prompt *command*

```
/home/cis90/simben $ cal  
August 2012  
Su Mo Tu We Th Fr Sa  
    1  2  3  4  
  5  6  7  8  9 10 11  
12 13 14 15 16 17 18  
19 20 21 22 23 24 25  
26 27 28 29 30 31
```

*The **cal** command outputs the calendar for the current month.*

cal command continued

prompt *command* *arguments*

```
/home/cis90/simben $ cal 12 2012
December 2012
Su Mo Tu We Th Fr Sa
      1
 2   3   4   5   6   7   8
 9  10  11  12  13  14  15
16  17  18  19  20  21  22
23  24  25  26  27  28  29
30  31
```

*Adding the month and year arguments to the **cal** command lets you specify a specific month and year*

Question: What day of the week (e.g Su Mo, Tu ...) was December 25, 2012?

Answer: Tu

date command

prompt
/home/cis90/simben \$ *command* **date**
Tue Aug 26 08:11:31 PDT 2014

*The **date** command outputs the current date and time.*

Day-of-the-week Month Day-of-the-month Hours:Minutes:Seconds Time-Zone Year

Question: What time is it on this system? (use HH:MM format and don't dawdle!)

Answer: 08:11

Command Line Interface (CLI) terminology

*This portion is the shell **prompt***

```
/home/cis90/simben $ cal 12 2012
```

```
December 2012
Su Mo Tu We Th Fr Sa
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
```

*This is the **command**
which includes two
arguments 12 and 2012*

```
/home/cis90/simben $ cal 12 2012
```

```
December 2012
Su Mo Tu We Th Fr Sa
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
```

*These are **arguments** for
the command to process*

*This is the **output** of
the command*

```
/home/cis90/simben $ cal 12 2012
```

```
December 2012
Su Mo Tu We Th Fr Sa
                1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
```

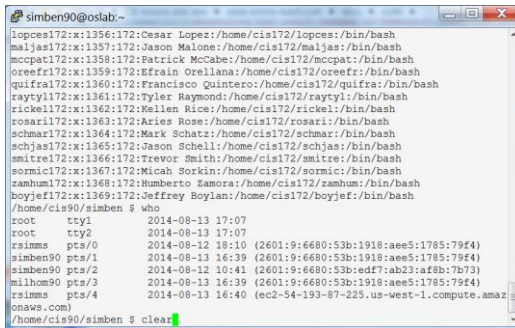
clear command

prompt *command*

```
/home/cis90/simben $ clear
```

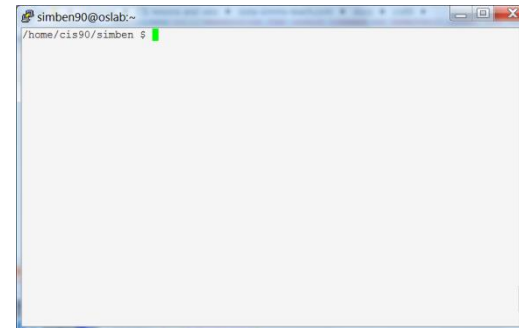
The clear command will clear the screen.

(On scrollable terminals you are still able to scroll back to see previous commands entered)



```
simben90@oslab:~$
lopces172:x:1356:172:Cesar Lopez:/home/cis172/lopces:/bin/bash
maljas172:x:1357:172:Jason Malone:/home/cis172/maljas:/bin/bash
mccpat172:x:1358:172:Patrick McCabe:/home/cis172/mccpat:/bin/bash
oreefr172:x:1359:172:Efrain Orellana:/home/cis172/oreefr:/bin/bash
quifra172:x:1360:172:Francisco Quintero:/home/cis172/quifra:/bin/bash
raytyl172:x:1361:172:Tyler Raymond:/home/cis172/raytyl:/bin/bash
rickel172:x:1362:172:Kellen Rice:/home/cis172/rickel:/bin/bash
rosari172:x:1363:172:Aries Rose:/home/cis172/rosari:/bin/bash
schmar172:x:1364:172:Mark Schatz:/home/cis172/schmar:/bin/bash
schjas172:x:1365:172:Jason Schell:/home/cis172/schjas:/bin/bash
smitre172:x:1366:172:Trevor Smith:/home/cis172/smitre:/bin/bash
sormic172:x:1367:172:Micah Sorkin:/home/cis172/sormic:/bin/bash
zamhum172:x:1368:172:Humberto Samora:/home/cis172/zamhum:/bin/bash
boyjef172:x:1369:172:Jeffrey Boylan:/home/cis172/boyjef:/bin/bash
/home/cis90/simben $ who
root      tty1      2014-08-13 17:07
root      tty2      2014-08-13 17:07
rsims     pts/0     2014-08-12 18:10 (2601:9:6680:53b:1918:aee5:1785:79f4)
simben90  pts/1     2014-08-13 16:39 (2601:9:6680:53b:1918:aee5:1785:79f4)
simben90  pts/2     2014-08-12 10:41 (2601:9:6680:53b:edf7:ab23:af8b:7b73)
milhom90  pts/3     2014-08-13 16:39 (2601:9:6680:53b:1918:aee5:1785:79f4)
rsims     pts/4     2014-08-13 16:40 (ec2-54-193-87-225.us-west-1.compute.amaz
onaws.com)
/home/cis90/simben $ clear
```

before



```
simben90@oslab:~$
/home/cis90/simben $
```

after

Question: What happens when you use the clear command?
Answer: The terminal window is cleared (scrolled up and out of sight)

hostname command

prompt *command*

```
/home/cis90/simben $ hostname  
oslab.cishawks.net
```

The **hostname** command outputs the hostname of the system you are interacting with.

Question: What is the hostname of this system?

Answer: oslab.cishawks.net

ps command

The **ps** command outputs the processes (programs loaded into memory and running) belonging to your username.

prompt *command*

```
/home/cis90/simben $ ps
```

PID	TTY	TIME	CMD
21629	pts/0	00:00:00	bash
21674	pts/0	00:00:00	ps

name of the shell being run

name of the ps command running that produces this output

There are a number of different shells such as **bash** (Bourne Again shell), **sh** (original Bourne shell), **ksh** (Korn shell), **dash** (Debian Almquist shell), **tcsh** (TENEX C Shell) and **csh** (C shell).

Question: What is the name of the shell running on this system?
Answer: bash

uname command

```
/home/cis90/simben $ uname  
Linux
```

*The **uname** command outputs the name of the kernel being used.*

Question: What is the name of the kernel running on this system?
Answer: Linux

cat command (to show the name of the distribution)

```
/home/cis90/simben $ cat /etc/issue
```

```
CentOS release 6.2 (Final)  
Kernel \r on \l
```

Name of distro

Version of distro

*These two **cat** commands will usually (but not always) output something that contains the name of the distribution being used.*

```
/home/cis90/simben $ cat /etc/*-release
```

```
CentOS release 6.2 (Final)  
CentOS release 6.2 (Final)  
CentOS release 6.2 (Final)
```

Question: Which distro has been installed on this system?
(single word answer only please)

Answer: CentOS

cat command (to show the name of the distribution)

```
simben90@doc:~$ cat /etc/issue
Ubuntu 13.04 \n \l
```

Name of distro

Version of distro

*These two **cat** commands will usually (but not always) output something that contains the name of the distribution being used.*

```
simben90@doc:~$ cat /etc/*-release
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=13.04
DISTRIB_CODENAME=raring
DISTRIB_DESCRIPTION="Ubuntu 13.04"
NAME="Ubuntu"
VERSION="13.04, Raring Ringtail"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 13.04"
VERSION_ID="13.04"
HOME_URL="http://www.ubuntu.com/"
SUPPORT_URL="http://help.ubuntu.com/"
BUG_REPORT_URL="http://bugs.launchpad.net/ubuntu/"
```

**Question: Which distro has been installed on this system?
(single word answer only please)**

Answer: Ubuntu

who command

/home/cis90/simben \$ **who**

root	tty1	2014-08-13 17:07	
root	tty2	2014-08-13 17:07	
rsimms	pts/0	2014-08-12 18:10	(2601:9:6680:53b:1918:aee5:1785:79f4)
simben90	pts/1	2014-08-13 16:39	(2601:9:6680:53b:1918:aee5:1785:79f4)
simben90	pts/2	2014-08-12 10:41	(2601:9:6680:53b:edf7:ab23:af8b:7b73)
milhom90	pts/3	2014-08-13 16:39	(2601:9:6680:53b:1918:aee5:1785:79f4)
rsimms	pts/4	2014-08-13 16:40	(ec2-54-193-87-225.us-west-1.compute.amazonaws.com)

username

*terminal
device
used for
login
session*

*date and time
of login*

*where user logged in from (remote hostname
or IP address) . If empty the user logged on
locally rather than over the network.*

Show information about current login sessions

who command

```

/home/cis90/simben $ who
local { root      tty1      2014-08-13 17:07
      root      tty2      2014-08-13 17:07
remote { rsimms     pts/0      2014-08-12 18:10 (2601:9:6680:53b:1918:aee5:1785:79f4)
      simben90 pts/1      2014-08-13 16:39 (2601:9:6680:53b:1918:aee5:1785:79f4)
      simben90 pts/2      2014-08-12 10:41 (2601:9:6680:53b:edf7:ab23:af8b:7b73)
      milhom90 pts/3      2014-08-13 16:39 (2601:9:6680:53b:1918:aee5:1785:79f4)
      rsimms     pts/4      2014-08-13 16:40 (ec2-54-193-87-225.us-west-1.compute.amazonaws.com)

```

Users in the same room as the system can login locally. Everyone else must login remotely over the network. The IP address or hostname in the last column indicates a remote login session.

who command

```
/home/cis90/simben $ who
root      tty1          2014-08-13 17:07
root      tty2          2014-08-13 17:07
rsimms    pts/0           2014-08-12 18:10 (2601:9:6680:53b:1918:aee5:1785:79f4)
simben90  pts/1           2014-08-13 16:39 (2601:9:6680:53b:1918:aee5:1785:79f4)
simben90  pts/2           2014-08-12 10:41 (2601:9:6680:53b:edf7:ab23:af8b:7b73)
milhom90  pts/3           2014-08-13 16:39 (2601:9:6680:53b:1918:aee5:1785:79f4)
rsimms    pts/4           2014-08-13 16:40 (ec2-54-193-87-225.us-west-1.compute.amazonaws.com)
```

Question: How many login sessions (including yours) are there on this system?

Answer: 7

Question: Regarding the users logged in REMOTELY (over the network rather than local). Who has been logged in the longest?

Answer: simben90

Question: Where did that REMOTE user (the one logged in longest) login from?

Answer: 2601:9:6680:53b:edf7:ab23:af8b:7b73 (this is an IPv6 address)

who am i command

*The **who am i** command lists just the session you are using*

```
/home/cis90/simben $ who am i
simben90 pts/1      2014-08-13 16:39  (2601:9:6680:53b:1918:aee5:1785:79f4)
```

<i>username</i>	<i>terminal device used for login session</i>	<i>date and time of login</i>	<i>where user logged in from (remote hostname or IP address) . If empty the user logged on locally rather than over the network.</i>
-----------------	---	-----------------------------------	--

This is a good way to distinguish which session you are currently interacting with when you have logged in more than once on the same system.

tty command

```
/home/cis90/simben $ tty  
/dev/pts/0
```

*The **tty** command shows the terminal device being used for the login session.*

Every login session uses a unique terminal device.

The terminal device is different than the terminal type you accepted during login.

Question: **Which terminal device are you using to connect to this system?**
Answer: **/dev/pts/0**

tty command

```
/home/cis90/simben $ who am i
simben90 pts/1          2014-08-13 16:39 (2601:9:6680:53b:1918:aee5:1785:79f4)
/home/cis90/simben $
/home/cis90/simben $
/home/cis90/simben $ tty
/dev/pts/1
```

*The terminal device is abbreviated in **who** output. The **tty** command on the other hand shows the entire terminal device.*

Question: Run the `who am i` and `tty` commands.

What portion of the output from these commands is identical?

Answer: pts/1

id command

*The **id** command outputs information about the user*

```
/home/cis90/simben $ id  
uid=1201(simben90) gid=190(cis90) groups=190(cis90),100(users)  
context=unconfined_u:unconfined_r:unconfined_t:s0-s0:c0.c1023
```

Question: What is your uid (user ID) number on oslab?

Answer: 1201

Question: What is your username on oslab?

Answer: simben90

Question: What is your gid (group ID) number on oslab?

Answer: 190

history command

```
/home/cis90/simben $ history
```

<snipped>

```
54 cal
55 cal 12 2012
56 date
57 clear
58 hostname
59 ps
60 uname
61 cat /etc/issue
62 cat /etc/*-release
63 who
64 who am i
65 tty
66 id
67 id milhome90
68 id milhom90
69 id rsimms
70 history
```

*The **history** command shows all previously entered commands.*

The list can span multiple login sessions.

Question: What happens when you use the history command?
Answer: Shows previously entered commands

ssh command (to securely log into a remote UNIX/Linux system)

Basic command syntax:

Optional. Specifies the port on the remote system. The default is port 22.

If a username is specified the "@" is used to separate the username from the hostname.

ssh -p nnnn username@hostname

Optional. Specifies the account username on the remote system. The default is the username on the local system.

Required. This can be the hostname or IP address of the remote system. If a hostname is used for a server on the Internet it must be the entire fully qualified domain name (FQDN).

Example **ssh** command Logging into a Pxx-Arwen system from Opus

username → *short hostname*

```
/home/cis90/simben $ ssh cis90@arya-03
```

The authenticity of host 'arya-03 (172.20.90.3)' can't be established.
RSA key fingerprint is 8b:a0:ef:d2:52:e4:f3:a3:c2:41:b5:93:89:c3:1d:58.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'arya-03,172.20.90.3' (RSA) to the list of known hosts.

password is typed but not echoed →
cis90@arya-03's password:
Welcome to Linux Mint 15 Olivia (GNU/Linux 3.8.0-26-generic x86_64)

Welcome to Linux Mint
* Documentation: <http://www.linuxmint.com>
Last login: Mon Jan 27 17:13:33 2014 from opus.cis.cabrillo.edu
cis90@arya-03:~ > **exit**
logout
Connection to arya-03 closed.
/home/cis90/simben \$

Note how the prompt changes (highlighted above) when on a different system

Example **ssh** command Logging into son-of-opus from Opus

non-standard ssh port → *username* → *FQDN hostname*

```
/home/cis90/simben $ ssh -p 2220 simben90@son-of-opus.simms-teach.com
simben90@son-of-opus.simms-teach.com's password: ← password is typed
Last login: Mon Jan 27 18:14:32 2014 from oslab.cis.cabrillo.edu

      _
     ('v')
    //==-\
   (\ _ _ /)
    ~ ~ ~

Welcome to Son of Opus
Serving Cabrillo College
```

```
[simben90@son-of-opus ~]$ exit
logout
Connection to son-of-opus.simms-teach.com closed.
/home/cis90/simben $
```

Note how the prompt changes (highlighted above) when on different systems

exit command

```
/home/cis90/simben $ exit
```

*The **exit** command logs out and ends the session.*



Housekeeping

Add Codes

- Available after class
- You can stop by before you leave or email me
- Please use them online the same day you get them!

Planning on taking more Linux courses?

Be sure to add CIS 81 to your plans so you can take CIS 192

CIS 90 Introduction to UNIX/Linux



Provides a technical overview of the UNIX/Linux operating system, including hands-on experience with commands, files, and tools. Prerequisite: CIS 72. Transfer Credit: CSU.

CIS 81 Networking Fundamentals and Theory (Cisco CCNA 1)

Presents networking protocols, standards, concepts, and terminology including Ethernet, ARP, ICMP, IP addressing, subnetting, switches, hubs, routers, TCP, UDP, OSI Model and other standards and protocols. Hybrid Requisite: Completion of or concurrent enrollment in CIS 72. Recommended Preparation: Eligibility for MATH 154. Transfer Credit: CSU.

CIS 98 UNIX/Linux Shell Programming

Presents an introduction to shell programming in a UNIX/Linux environment, and is designed for system administrators or technical users with little or no programming background. Prerequisite: CIS 90. Transfer Credit: Transfers to CSU.

CIS 191AB UNIX/Linux Installation, Configuration and Administration



Introduces skills required to administer UNIX/Linux systems. Prerequisite: CIS 90 or equivalent.

CIS 192AB UNIX/Linux Network Administration



Teaches the building of network infrastructures, and the installation, configuration, and protection services on Linux TCP/IP networks. Prerequisites: **CIS 81** and CIS 90 or equivalent skills. Recommended Preparation: CIS 191AB.

CIS 193AB UNIX/Linux Security Administration



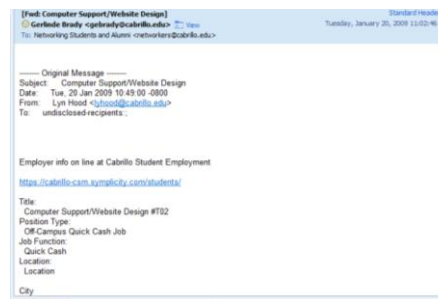
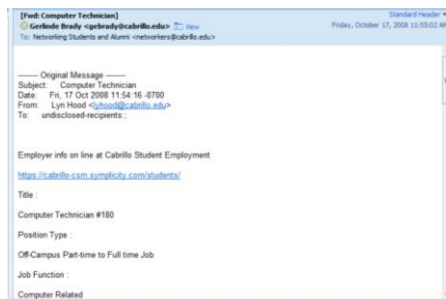
Teaches how to perform the tasks and examine the strategies of UNIX/Linux host, files, and network security management. Prerequisite: CIS 192AB. Recommended Preparation: CIS 175.

Cabrillo Networking Program Mailing list

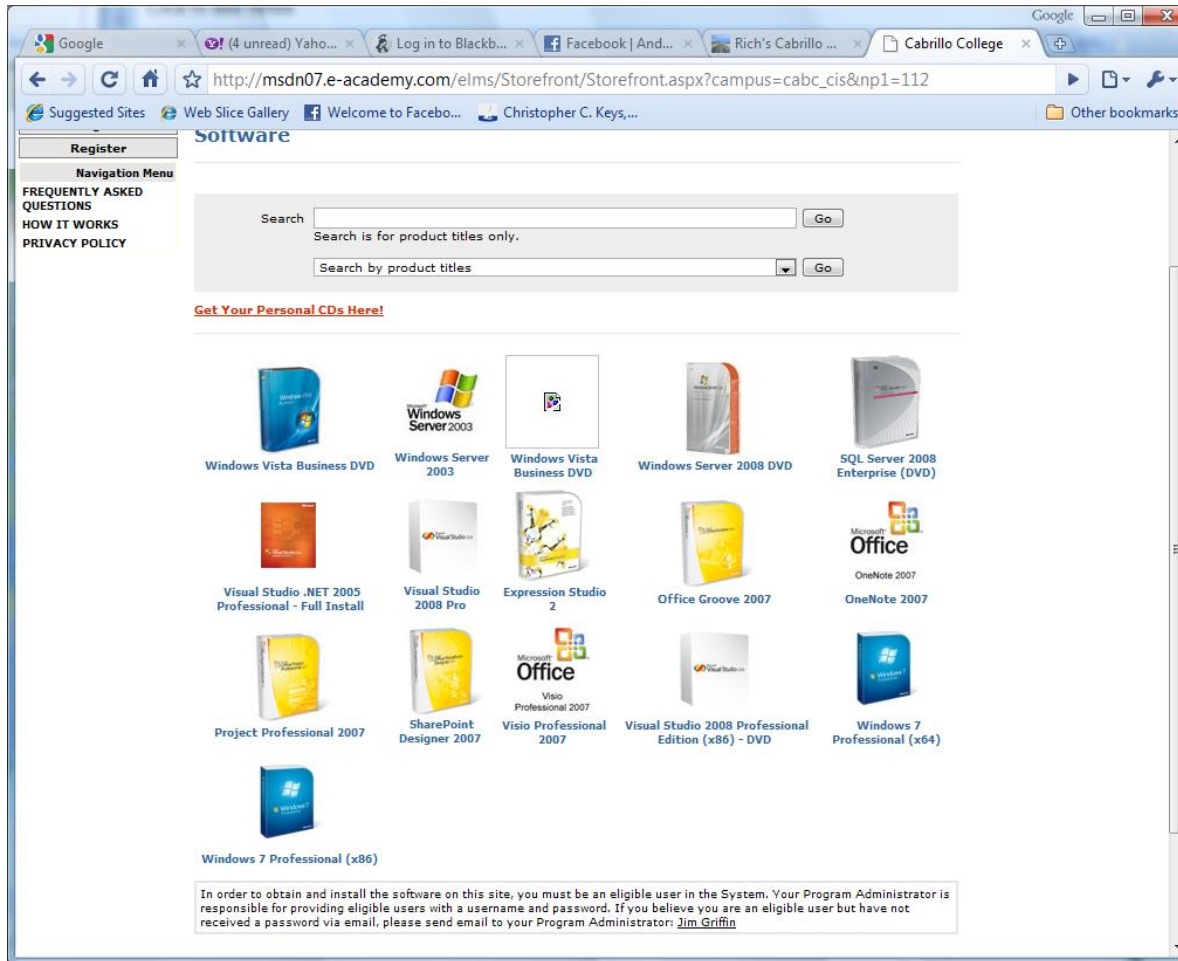
Subscribe by sending an email (no subject or body) to:

networkers-subscribe@cabrillo.edu

- Program information
- Certification information
- Career and job information
- Short-term classes, events, lectures, tours, etc.
- Surveys
- Networking info and links



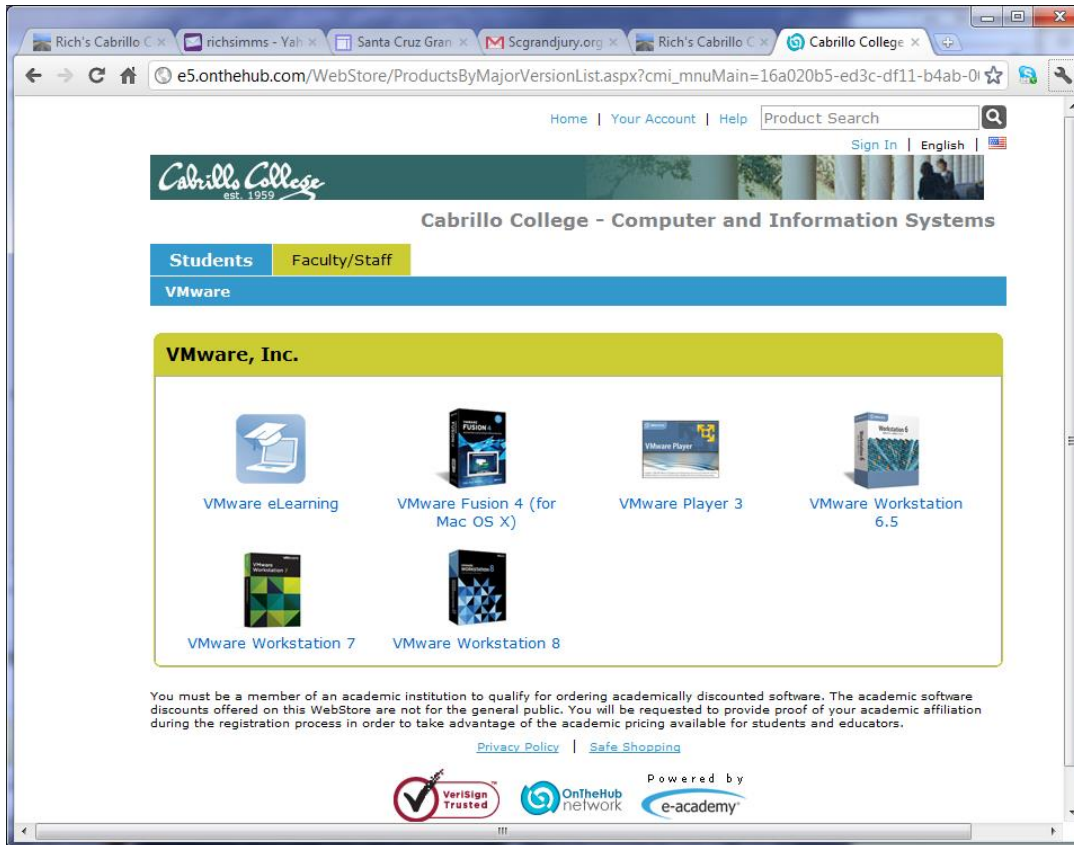
MSDN Academic Alliance



- Microsoft software for students registered in a CIS or CS class at Cabrillo
- Available after registration is final (two weeks after first class)

To get to this page, go to **<http://simms-teach.com/resources>** and click on the appropriate link in the Tools and Software section

VMware e-academy



- VMware software for students registered in a CIS or CS class at Cabrillo
- Available after registration is final (two weeks after first class)

To get to this page, go to **<http://simms-teach.com/resources>** and click on the appropriate link in the Tools and Software section

Help Available in the CIS Lab

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



Rich's Cabrillo College CIS Classes CIS 90 Grades

Home

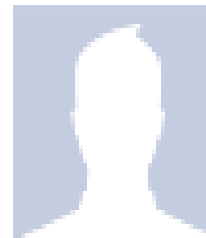
Resources

Forums

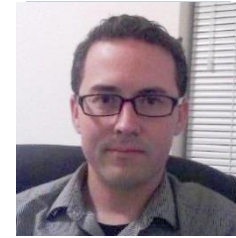
CIS Lab

Blackboard

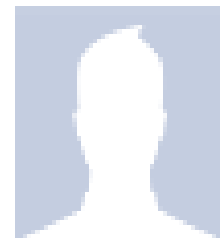
CIS 90 Student Lab Assistants:



Tess



Geoff

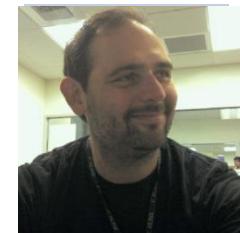


Nick

Linux Instructors



Rich Simms



Mike Matera

Look for Tess, Leandro, Nick, Rich or Mike on the schedule found [here](#)

CIS 90 Tutoring Available

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

TUTORIALS

ANNOUNCEMENTS & DEADLINES

- New subjects for Spring 2014:
- American Sign Language
- Computer Applications/Business Technology (CABT)
- Computer and Information Systems (CIS)
- History 17A

Welcome to the Tutorials Center!

We offer FREE peer tutoring to Cabrillo students who are enrolled in the course/s for which they need help.

- Tutoring is by appointment. The days and times of tutoring sessions are established by the office.
- Sessions are weekly and for the duration of the semester.
- Tutoring sessions are scheduled in small groups. Sessions last 1-2 hours depending on the class. Occasionally, sessions may be one to one but that is not guaranteed.
- Come directly to the TC office to schedule (second floor of library).

The following classes are being tutored for Spring 2014:

- Accounting 1A, 1B, 6, 54A, 151A, 159, 163
- American Sign Language (ASL) 1, 2
- Biology 4, 5, 6
- Computer Applications/Business Technology (CABT) 31, 38, 41, 101, 157, 160
- Computer and Information Systems (CIS) 81, 90, 172**
- Chemistry 1A, 1B, 2, 30A, 30B, 32

CONTACT INFORMATION

Tutorials Center

Location Room 1080A - Learning Resource Center

Phone 831.479.6470

Email tutorialcenter@cabrillo.edu

Coordinator Lori Chavez

Phone 831.479.6126

Email lochavez@cabrillo.edu

Hours Monday - Thursday: 9am - 5pm
Friday: 9am - 1pm

MAP, DIRECTIONS, & PARKING

DEPARTMENT STAFF & FACULTY DIRECTORY



Matt Smithey

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

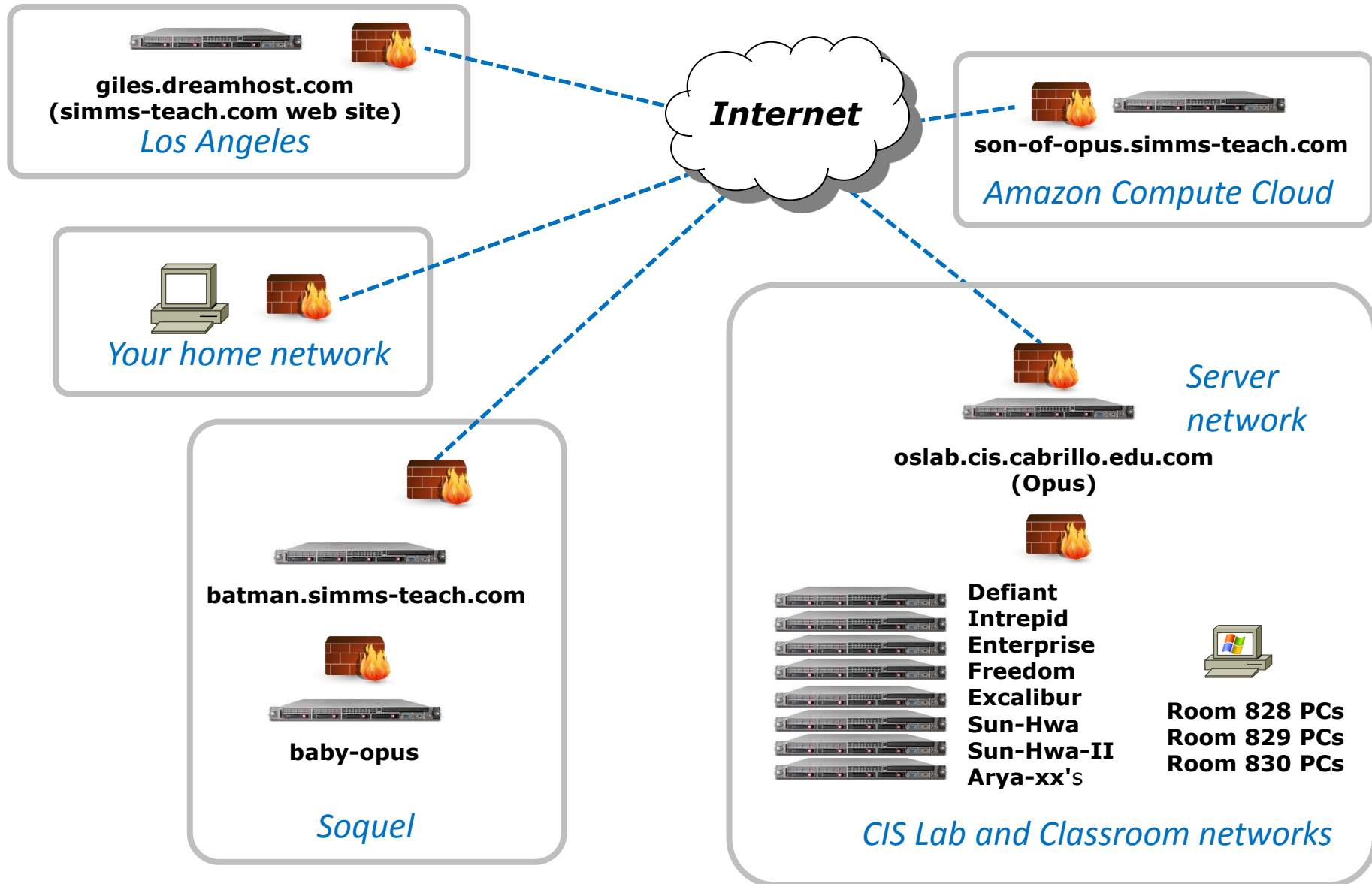
The tutoring will take place at the STEM center and they will log in and log out on a computer you have designated (I will figure out exactly what that means).

Don't wait too long to sign up! Tutoring hours are limited!

Additional Resources

- My office hours for additional hands-on help, feedback and development planning.
- Cabrillo CS/CIS LinkedIn group for students and alumni
<http://www.linkedin.com/groups/Computer-Science-Computer-Information-Systems-6689142>
- Society of Women Engineers (SWE) Facebook page
<https://www.facebook.com/SWEorg>
- Syssters Listserv
<http://anitaborg.org/get-involved/syssters/>

CIS 90 systems Roadmap

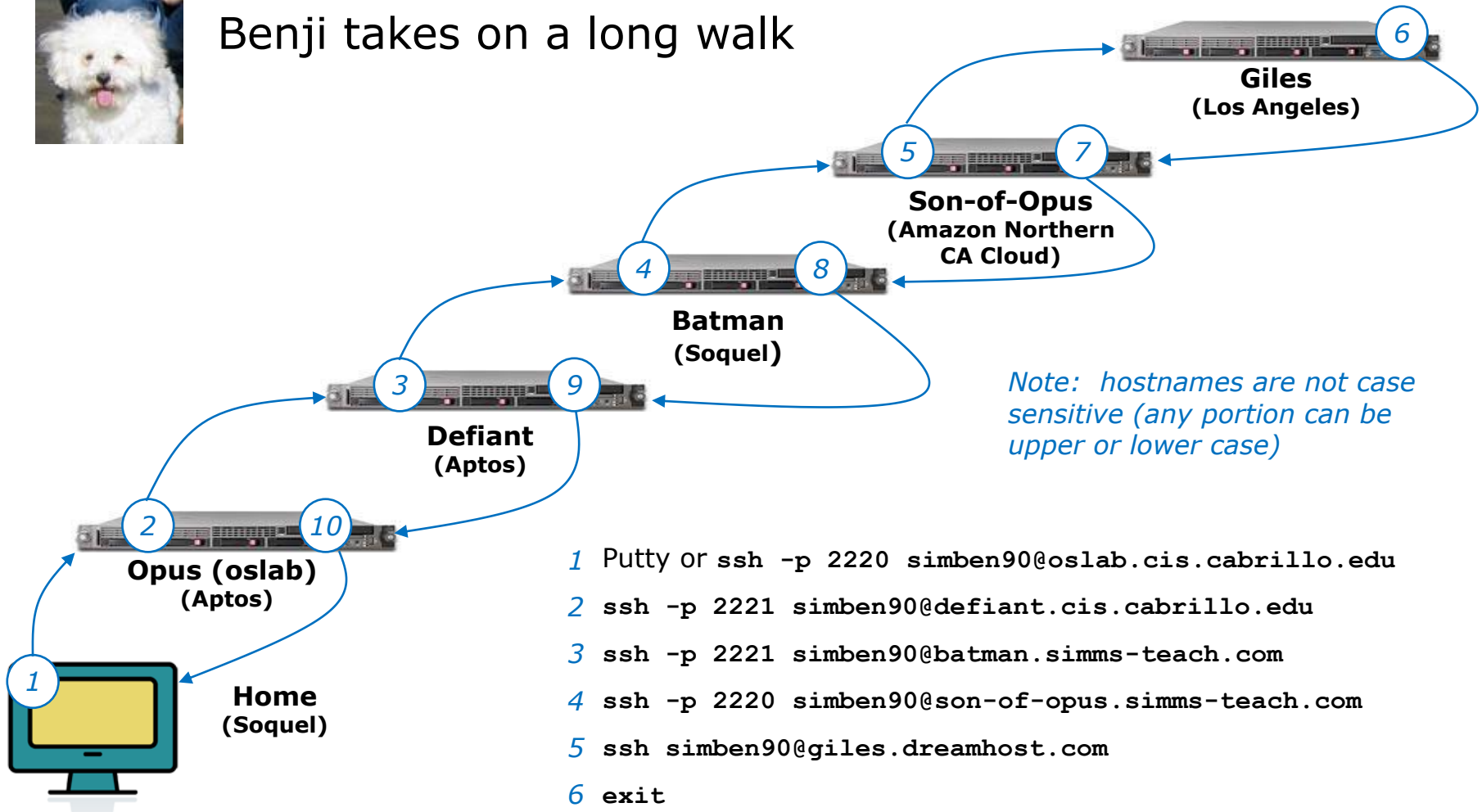


Navigating the Internet using SSH

Second driving lesson



Benji takes on a long walk

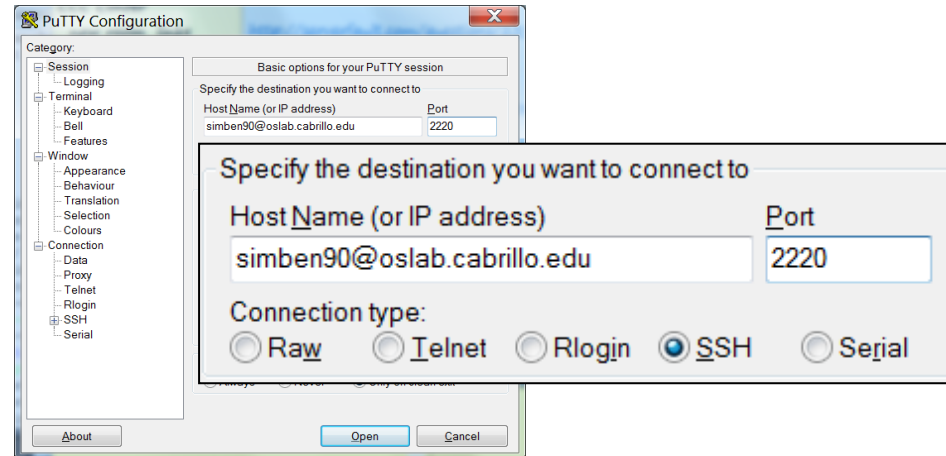
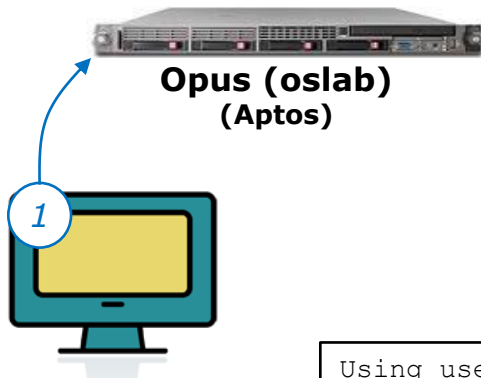


```

1 Putty or ssh -p 2220 simben90@oslab.cis.cabrillo.edu
2 ssh -p 2221 simben90@defiant.cis.cabrillo.edu
3 ssh -p 2221 simben90@batman.simms-teach.com
4 ssh -p 2220 simben90@son-of-opus.simms-teach.com
5 ssh simben90@giles.dreamhost.com
6 exit
7 exit
8 exit
9 exit
10 exit
    
```



Benji takes on a long walk



```
Using username "simben90".
simben90@oslab.cabrillo.edu's password:
Last login: Mon Aug 18 09:09:14 2014 from 2601:9:6680:53b:93f:8df2:6592:a958
```

```
( 'v' )
\ / - - \ /
( \ _ _ / )
~ ~ ~ ~
```

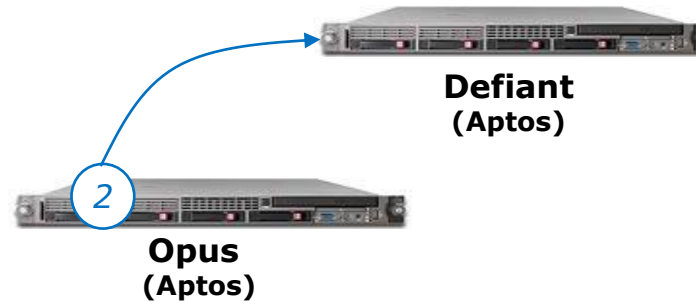
Welcome to Opus
Serving Cabrillo College

```
Terminal type? [xterm]
Terminal type is xterm.
/home/cis90/simben $ hostname
oslab.cis.cabrillo.edu
/home/cis90/simben $
```

*Note: usernames and
passwords are case sensitive*

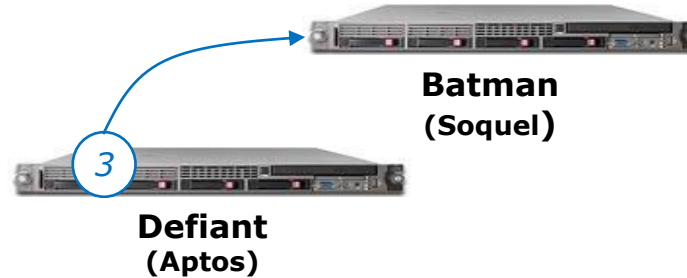


Benji takes on a long walk

[illegible]



Benji takes on a long walk



```
[defiant] $ ssh -p 2221 simben90@batman.simms-teach.com
The authenticity of host '[batman.simms-teach.com]:2221 ([2601:9:6680:53b:20c:29ff:fe0d:9285]:2221)'
can't be established.
RSA key fingerprint is b4:20:f4:dc:d1:ab:5b:8a:bb:44:61:bf:1c:c8:97:6e.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '[batman.simms-teach.com]:2221,[2601:9:6680:53b:20c:29ff:fe0d:9285]:2221'
(RSA) to the list of known hosts.
simben90@batman.simms-teach.com's password:
```

```

      _==/          i      i          \==_
    /xx/          | \__/ |          \xx\
  /xxxx\        |xxxxx|        /xxxx\
|xxxxxx\_      _xxxxxxx_      _/xxxxxx|
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
|XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX|
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
|XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX|
XXXXXX/^/^/^"\XXXXXXXXXXXXXXXXXXXX/^/^/^XXXXXX
|xxx|      \xxx/^^\xxxx/^^\xxx/      |xxx|
  \xx\      \x/      \xxx/      \x/      /xx/
    "\      "      \x/      "      /"

```

```

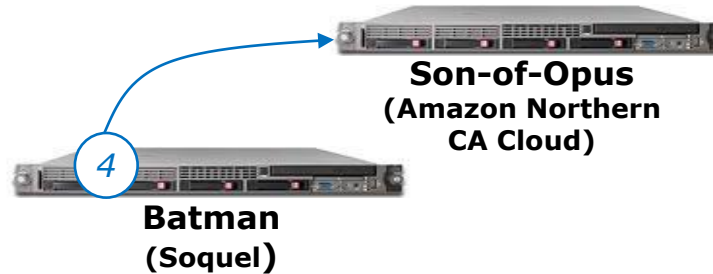
Welcome to Batman
Serving Cabrillo College and Ceiba College Prep

```

```
[simben90@batman ~]$ hostname
batman.simms-teach.com
[simben90@batman ~]$
```



Benji takes on a long walk



```
[simben90@batman ~]$ ssh -p 2220 simben90@son-of-opus.simms-teach.com
The authenticity of host '[son-of-opus.simms-teach.com]:2220 ([54.193.87.225]:2220)' can't
be established.
RSA key fingerprint is 05:02:f7:48:00:e6:af:a9:dd:47:33:c3:82:80:29:4d.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '[son-of-opus.simms-teach.com]:2220,[54.193.87.225]:2220' (RSA)
to the list of known hosts.
simben90@son-of-opus.simms-teach.com's password:
Permission denied, please try again.
simben90@son-of-opus.simms-teach.com's password:
Last login: Mon Aug 18 12:55:04 2014 from 207.62.187.227
```

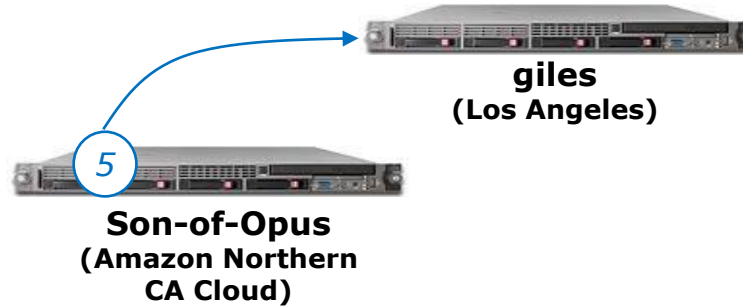
```
  _
 ('v')
//--=\
(\_=_/)
~~ ~~
```

Welcome to Son-of-Opus
Serving Cabrillo College

```
[simben90@son-of-opus ~]$
```



Benji takes on a long walk



```
[simben90@son-of-opus ~]$ ssh simben90@giles.dreamhost.com
The authenticity of host 'giles.dreamhost.com (208.113.153.233)' can't be established.
RSA key fingerprint is d8:3c:65:de:d3:43:ef:aa:76:13:d9:16:85:b9:36:9a.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'giles.dreamhost.com,208.113.153.233' (RSA) to the list of known
hosts.
simben90@giles.dreamhost.com's password:
```

```

  _ _
 / _ \ _ _ | / _ \ _ _ |
 | ( _ | | | _ _ \ _ _ \
 \ _ / | | | \ _ _ | _ _ /
 | _ /

```

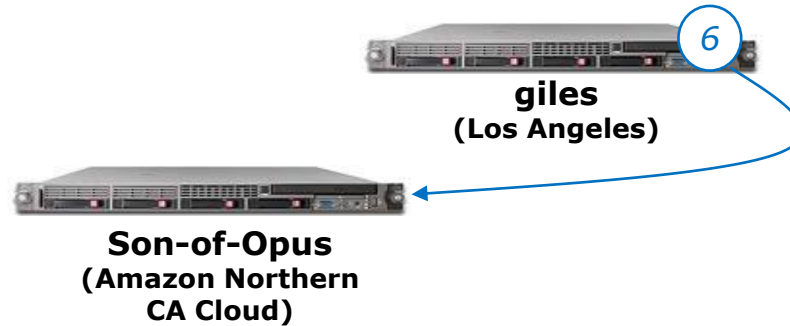
Welcome to giles.dreamhost.com

Any malicious and/or unauthorized activity is strictly forbidden.
All activity may be logged by DreamHost Web Hosting.

```
[giles]$ hostname
giles
```



Benji takes on a long walk



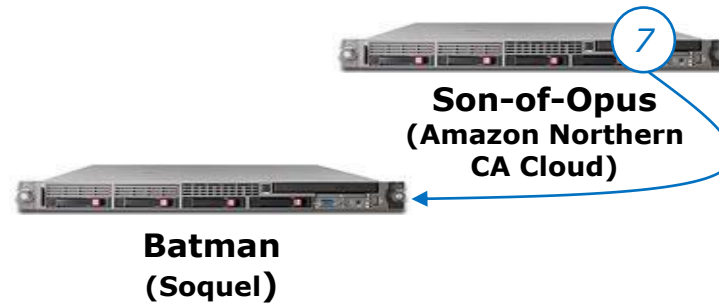
```
[giles]$ exit
logout
Connection to giles.dreamhost.com closed.
[simben90@son-of-opus ~]$ hostname
son-of-opus.simms-teach.com
[simben90@son-of-opus ~]$
```



When you **exit** a server it's like you pop it off the top of a stack and return to the previous server underneath



Benji takes on a long walk



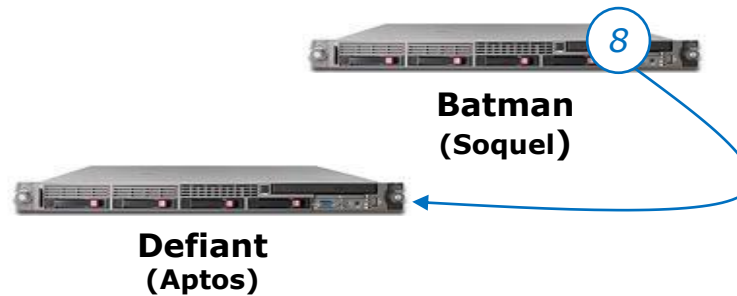
```
[simben90@son-of-opus ~]$ exit
logout
Connection to son-of-opus.simms-teach.com closed.
[simben90@batman ~]$ hostname
batman.simms-teach.com
[simben90@batman ~]$
```



When you **exit** a server it's like you pop it off the top of a stack and return to the previous server underneath



Benji takes on a long walk



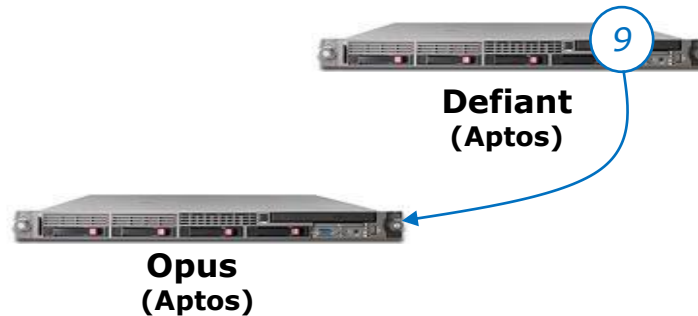
```
[simben90@batman ~]$ exit
logout
Connection to batman.simms-teach.com closed.
[defiant] $ hostname
defiant.cis.cabrillo.edu
[defiant] $
```



When you **exit** a server it's like you pop it off the top of a stack and return to the previous server underneath



Benji takes on a long walk



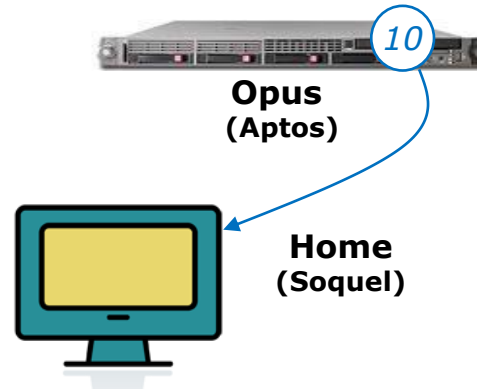
```
[defiant] $ exit
Connection to defiant.cis.cabrillo.edu closed.
/home/cis90/simben $ hostname
oslab.cis.cabrillo.edu
/home/cis90/simben $
```



When you **exit** a server it's like you pop it off the top of a stack and return to the previous server underneath



Benji takes on a long walk



```
/home/cis90/simben $ exit
```

And the Putty terminal program closes



*When you **exit** a server it's like you pop it off the top of a stack and return to the previous server underneath*

Assignment

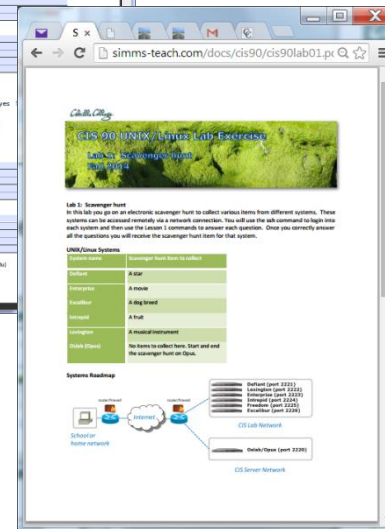
<http://simms-teach.com/cis90calendar.php>

Lesson	Date	Topics	Chapter	Due*
1	1/28	Class and Linux Overview - Understand how this course will work - High-level overview of computers, operating Materials - Presentation slides (download) - Login Credentials Sheet (download) Supplemental - Howto #143: Logging into Opus (download) Assignment Student Survey Lab 1 CCC Confer Enter virtual classroom Class archives	1.1-1.15 (Gillay) 2,4,5, p113-115, p164-172 (Hahn)	
2	2/4	Quiz 1 Commands - Understand how the UNIX login operation works - Meet John the Ripper and learn how vulnerable a poor password is - Understand basic command syntax and operation - Understand program files and what happens when they are run - Understand how the shell works and environment variables - Understand how to get online documentation Materials - Presentation slides (download) - Howto #106: Configuring Putty (download) Assignment Lab 2 CCC Confer Enter virtual classroom Class archives	2.3-2.7 2.11 3.7-3.20 4.19-4.22 9.1-9.2 (Gillay)	Lab 1 Student Survey

Assigned on 1/28

Survey

Lab 1
Scavenger
Hunt



Both due by 11:59PM on Wednesday 2/4

Lab 1 - Scavenger Hunt

Starting on Opus you will log into several systems using ssh. On each system you will collect an item after answering correctly a series of questions.

*Start and
end here*



**oslab.cis.cabrillo.edu
(Opus)**

Get a movie



Enterprise

Get a book



Freedom

Get a fruit



Intrepid

Get a star



Defiant

Get a musical instrument



Lexington

Get a dog



Excalibur

Lab 1 - Tips

Tip - as a shortcut, use **sc** instead of typing the full **scavenge** each time.

Lab 1 - Tips

```
simben90@excalibur:~
#####
#  S C A V E N G E R  H U N T  #
#####

STAT
- Y
- Y
- Y

Nice work ... your answer to Q17 was:  C O R R E C T !!

You are off to a good start Benji!

Since you correctly answered all questions for the excalibur
system here is your dog:

Redbone Coonhound

(Please record the system name and dog in your notes because
you will need them when submitting this lab!)

You are not done yet.  Please continue on to the next system.

INSTRUCTIONS FOR THE NEXT SYSTEM:
With the ssh command login to the next Linux system using:
Username: simben90
Password: <the one assigned to you by the instructor>
Hostname: freedom.cis.cabrillo.edu
Port: 2225
You will be scavenging for books there.

Have fun scavenging!

[simben90@excalibur ~]$
```

To copy text in Putty just select it (left mouse button and drag)

copy

Tip - use two login sessions. Use one to collect scavenger hunt items and the other to record your work using the **submit** script. Submit as many times as you wish. Only the last submittal will be graded.

```
simben90@oslab:~
/home/cis90/simben $ submit
Which lab are you submitting? (1,2,3, ...) 1
Please stretch this window so it is a lot TALLER
Press Enter to continue

=====
Lab 1 Scavenger Hunt
Update the table below with your collected items then submit
=====
```

SYSTEM	ITEM	COLLECTED
defiant	star	<no entry>
lexington	instrument	<no entry>
enterprise	movie	<no entry>
intrepid	fruit	<no entry>
freedom	book	<no entry>
excalibur	dog	Redbone Coonhound

```
=====
BONUS QUESTION ANSWERS
Q1) <no entry>
Q2) <no entry>
Q3) <no entry>

SELECTION MENU
1) Set star
2) Set instrument
3) Set movie
4) Set fruit
5) Set book
6) Set dog
7) Answer bonus questions
8) Submit your work for grading
9) Quit without submitting
Enter selection (1-9): 6
Please enter your dog on excalibur: Redbone Coonhound
```

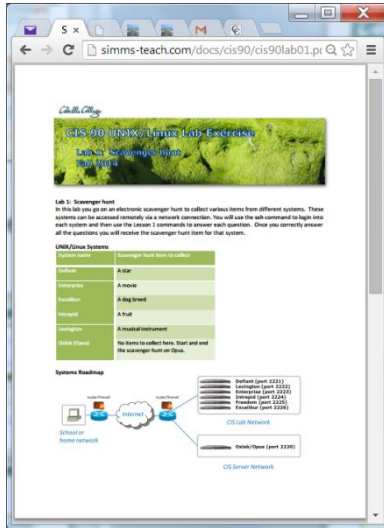
To paste in Putty just use a right mouse click

paste

Lab Assignments

Pearls of Wisdom:

- Don't wait till the last minute to start.
- 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.
- Use Google when trouble-shooting
- 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.
- Plan for things to go wrong and give yourself time to ask questions and get answers.
- **Late work is not accepted** so submit what you have for partial credit.



Wrap up

New shell commands:

cal	- show calendar
cat /etc/issue	- usually shows distro (distribution) name
cat /etc/*-release	- usually shows distro (distribution) name
clear	- clear the terminal screen
date	- show current time and date
exit	- terminate your shell and log off
history	- show previous commands
hostname	- show the name of the computer being accessed
id	- show user and group id information
ps	- show processes (loaded programs) being run
ssh	- secure login to a remote system
uname	- show kernel name
tty	- show terminal device
who	- show everyone logged in
who am i	- identifies which login session you are using

New Files and Directories:

VMware:

Next Class

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

**Lab 1
& Survey**

Quiz questions for next class:

- What part of UNIX/Linux is both a user interface and a programming language?
- What is the lowest level, inner-most component of a UNIX/Linux Operating System called?
- What command shows the other users logged in to the computer?



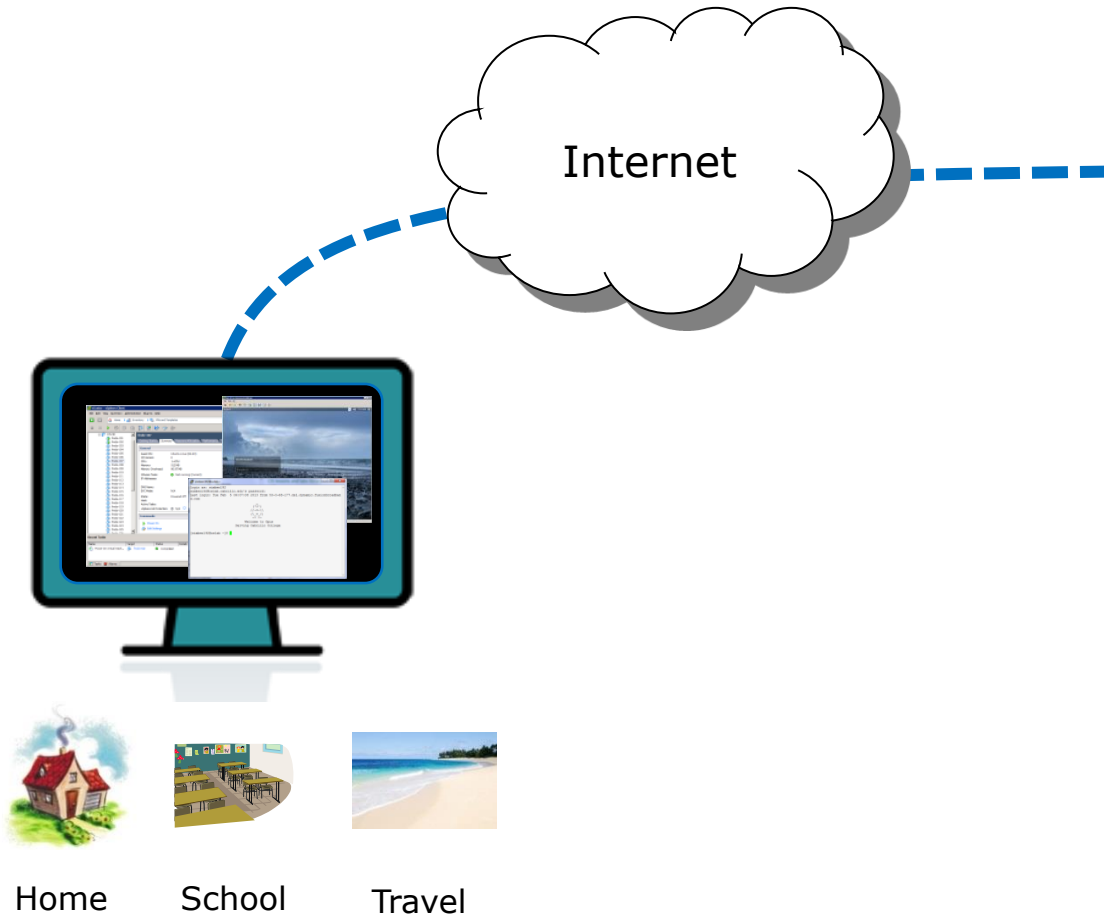
Backup

If we have time

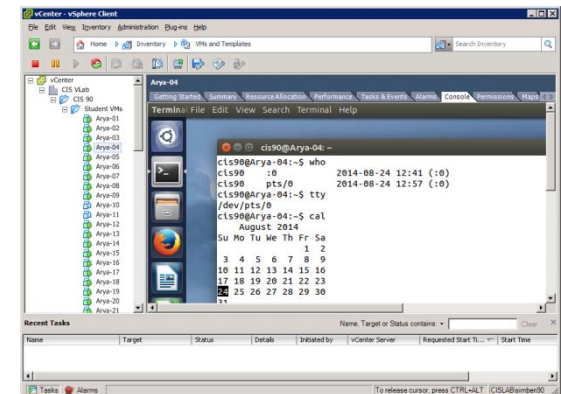
Using CIS VLab (Virtual Lab)

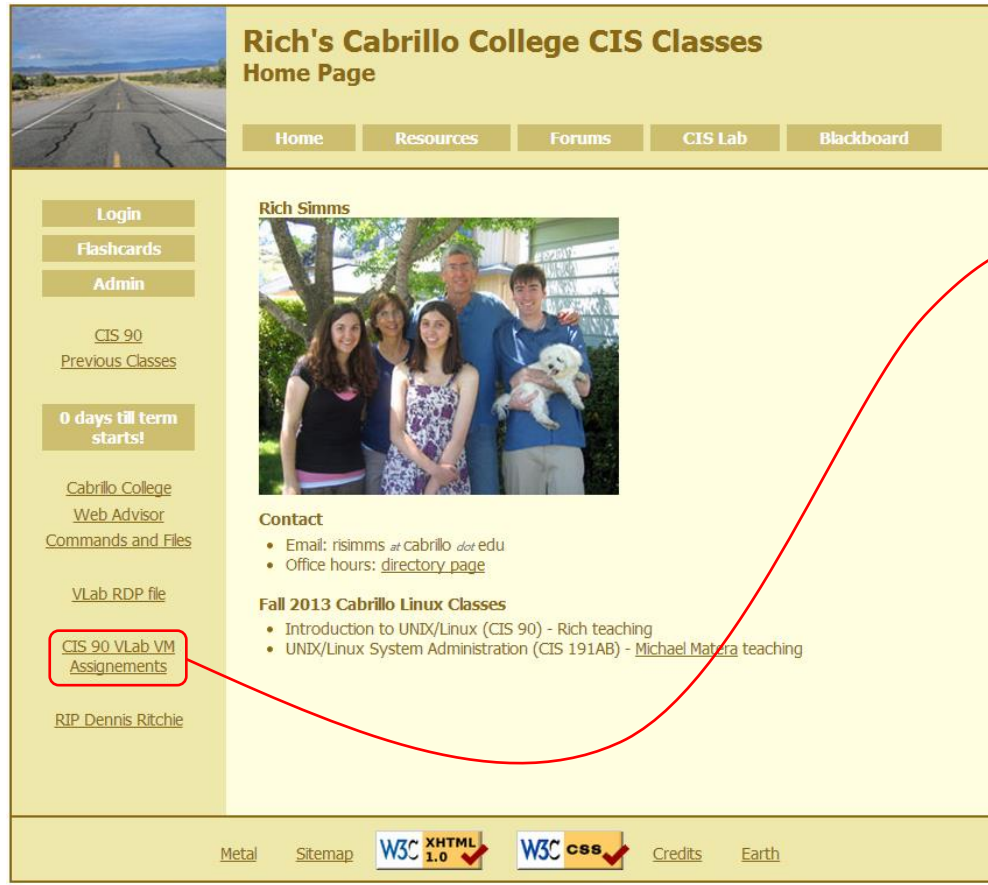
Third driving lesson

Accessing CIS VLab VMs



CIS Lab servers on
the Aptos campus





Rich's Cabrillo College CIS Classes Home Page

Home Resources Forums CIS Lab Blackboard

Login
Flashcards
Admin

CIS 90
Previous Classes

0 days till term starts!

Cabrillo College
Web Advisor
Commands and Files

VLab RDP file

CIS 90 VLab VM Assignments

RIP Dennis Ritchie

Rich Simms



Contact

- Email: risimms at cabrillo dot edu
- Office hours: [directory page](#)

Fall 2013 Cabrillo Linux Classes

- Introduction to UNIX/Linux (CIS 90) - Rich teaching
- UNIX/Linux System Administration (CIS 191AB) - [Michael Matara](#) teaching

Metal Sitemap W3C XHTML 1.0 W3C CSS Credits Earth

CIS 90 VLab VM Assignments

VM	Assignment
Arya-01	Assignment 1
Arya-02	Assignment 2
Arya-03	Assignment 3
Arya-04	Assignment 4
Arya-05	Assignment 5
Arya-06	Assignment 6
Arya-07	Assignment 7
Arya-08	Assignment 8
Arya-09	Assignment 9
Arya-10	Assignment 10
Arya-11	Assignment 11
Arya-12	Assignment 12
Arya-13	Assignment 13
Arya-14	Assignment 14
Arya-15	Assignment 15
Arya-16	Assignment 16
Arya-17	Assignment 17
Arya-18	Assignment 18
Arya-19	Assignment 19
Arya-20	Assignment 20
Arya-21	Assignment 21
Arya-22	Assignment 22
Arya-23	Assignment 23
Arya-24	Assignment 24
Arya-25	Assignment 25
Arya-26	Assignment 26
Arya-27	Assignment 27
Arya-28	Assignment 28
Arya-29	Assignment 29
Arya-30	Assignment 30
Arya-31	Assignment 31
Arya-32	Assignment 32
Arya-33	Assignment 33
Arya-34	Assignment 34
Arya-35	Assignment 35
Arya-36	Assignment 36
Arya-37	Assignment 37
Arya-38	Assignment 38
Arya-39	Assignment 39
Arya-40	Assignment 40
Arya-41	Assignment 41
Arya-42	Assignment 42
Arya-43	Assignment 43
Arya-44	Assignment 44
Arya-45	Assignment 45
Arya-46	Assignment 46
Arya-47	Assignment 47
Arya-48	Assignment 48
Arya-49	Assignment 49
Arya-50	Assignment 50

To see which Arya VM is yours use the link on the class website

Accessing CIS VLab

Rich's Cabrillo College CIS Classes Home Page

Home Resources

Login
Flashcards
Admin

CIS 90
CIS 192
Previous Classes

10 days till term starts!

Cabrillo College
Web Advisor
Commands and Files

Vlab RDP file

CIS 90 VLab VM Assignments
CIS 192 VLab Pod Assignments

RJP Dennis Ritchie

Rich Simms

Contact

- Email: risimms@cabrillo.edu
- Office hours: [directory page](#)

Spring 2013 Cabrillo Linux Classes

- Introduction to UNIX/Linux (CIS 90) - Rich Simms teaching
- UNIX/Linux Network Administration (CIS 192AB) - Rich Simms teaching

Welcome to Opus

opslab.cis.cabrillo.edu

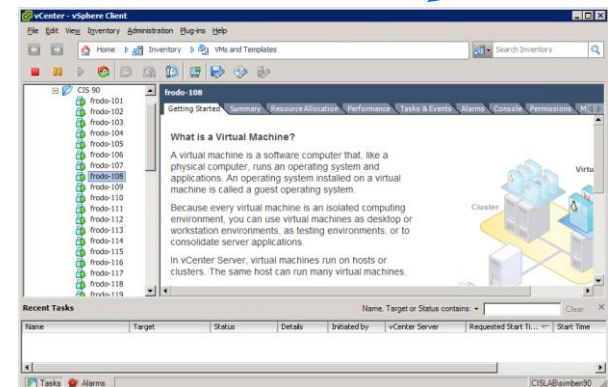
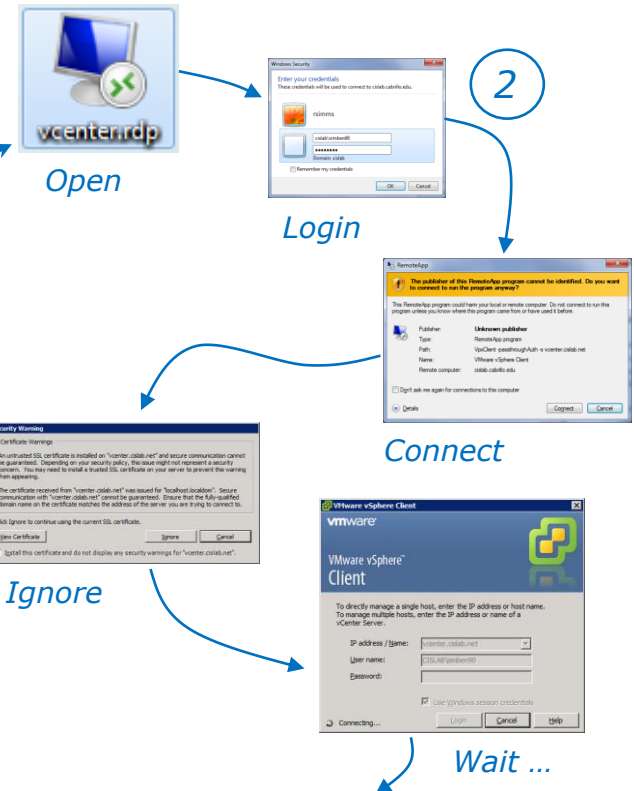
Remote access to the CIS Virtual Lab (VLab)

Download this RDP file: [vcenter.rdp](#)
(Use right-click Save As...)

1) Download the `vcenter.rdp` file to your desktop and then open it to access VLab.

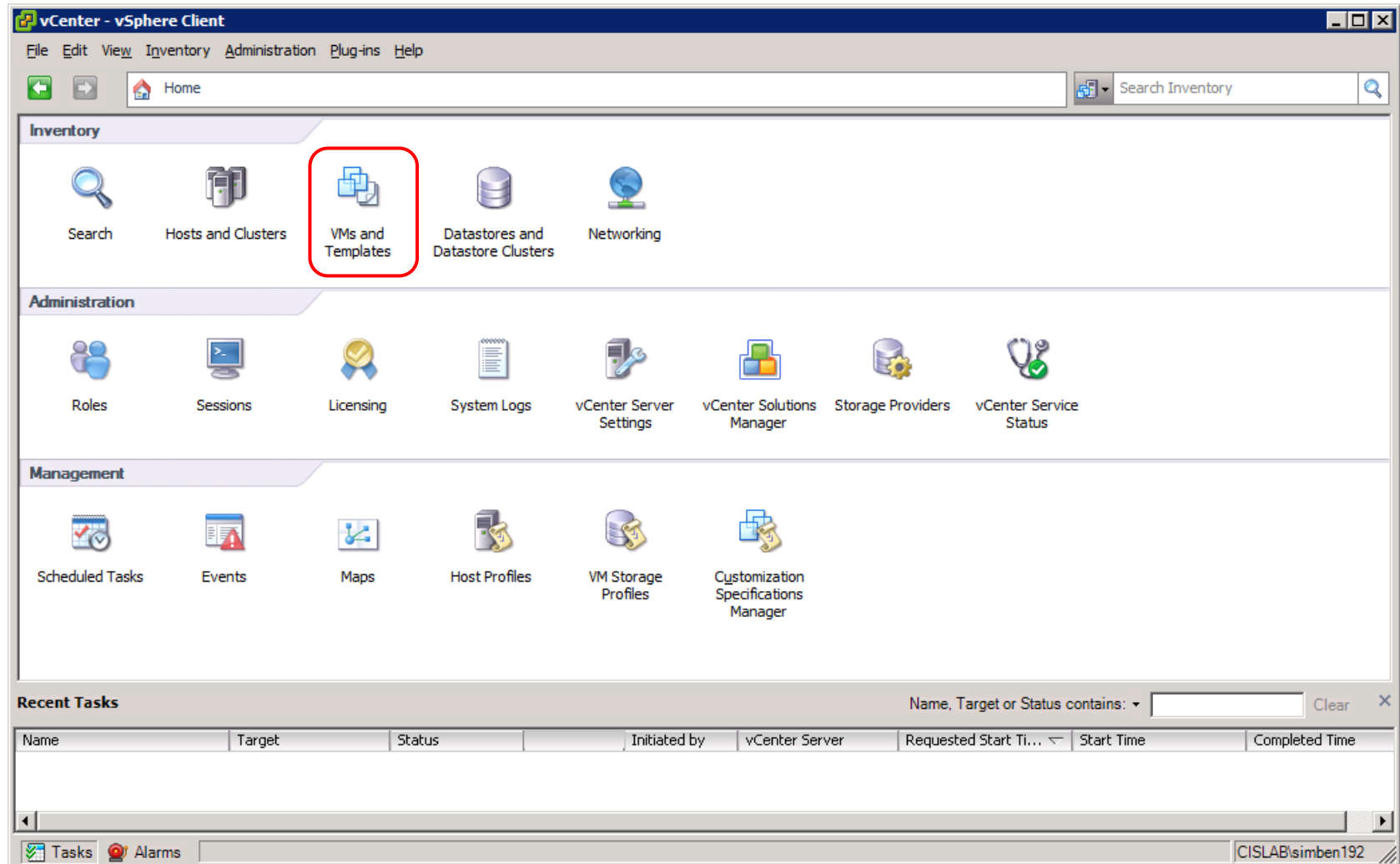
2) Mac users will **need to install** CoRD.

3) When entering your username and password you must preface your username with the "cislab", for example Benji would use: `cislab\simben90`



Locate and select your assigned VM

CIS VLab Home View



Click VMs and Templates to get to your course VMs

Selecting and powering on your VM

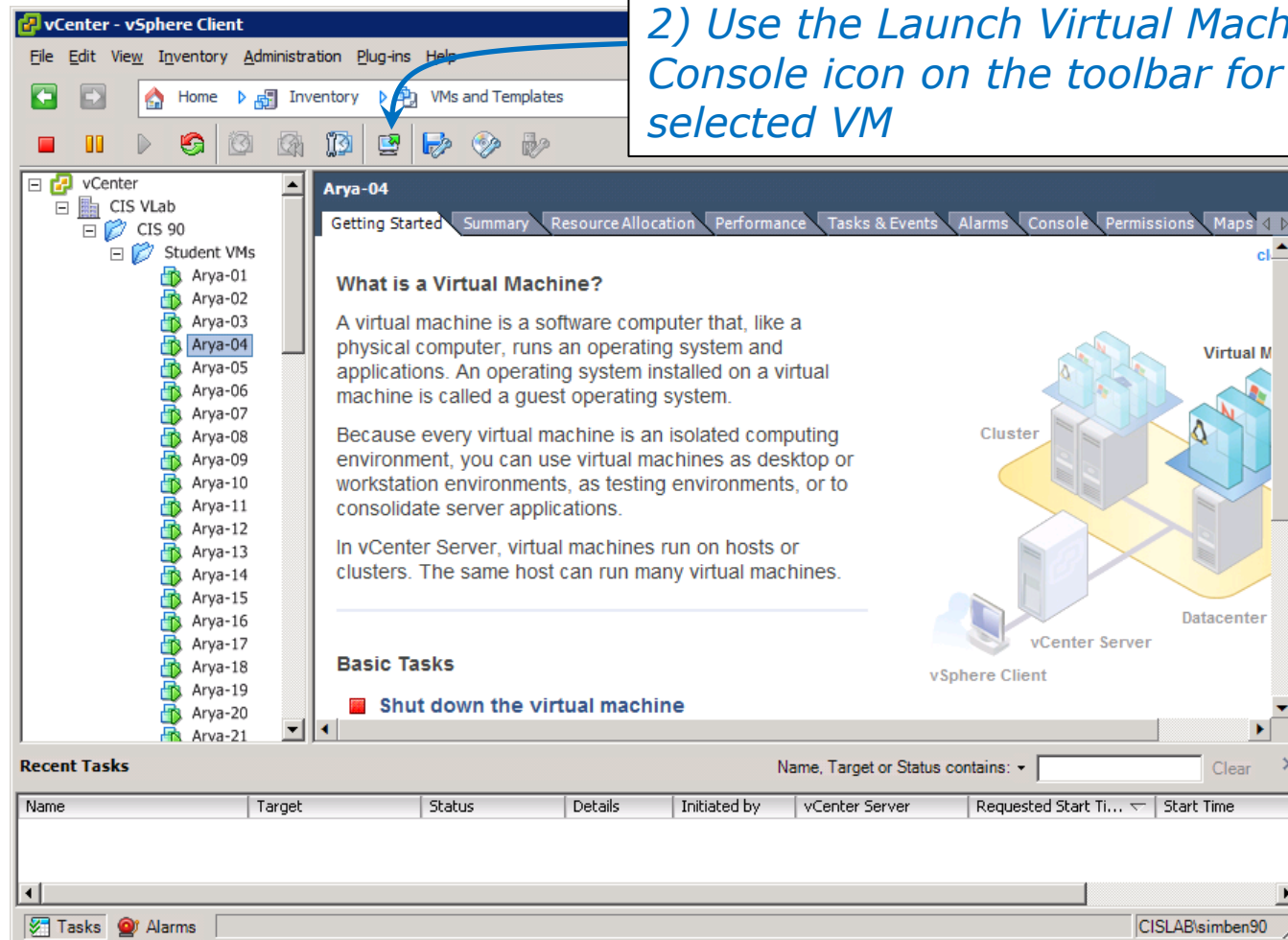
The screenshot shows the vCenter - vSphere Client interface. The left pane displays a tree view of the inventory, including 'vCenter', 'CIS VLab', 'CIS 90', and 'Student VMs'. Under 'Student VMs', a list of VMs is shown, with 'Arya-04' selected. A blue arrow points from the 'Power On' icon in the toolbar to the 'Arya-04' VM in the list. Another blue arrow points from the 'Arya-04' VM to a text box containing the instruction: '1) Find and select your Arya VM'. A second text box contains the instruction: '2) If it is not powered on them then click the Power On icon on the toolbar. This icon will be grayed out if your VM is already running.' The right pane shows the 'Getting Started' page for the selected VM, with a 'Basic Tasks' section containing a 'Shut down the virtual machine' button. The bottom pane shows the 'Recent Tasks' table.

Recent Tasks

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Time	Start Time
Initiate guest OS shutd...	Arya-11	Completed		CISLAB\simb...	vCenter	8/24/2014 12:35:17 ...	8/24/2014 12:35:14
Initiate guest OS shutd...	Arya-10	Completed		CISLAB\simb...	vCenter	8/24/2014 12:35:13 ...	8/24/2014 12:35:14

Note that the Arya-10 and Arya-11 VMs above are not powered on

Launching a graphical console



2) Use the Launch Virtual Machine Console icon on the toolbar for the selected VM

What is a Virtual Machine?

A virtual machine is a software computer that, like a physical computer, runs an operating system and applications. An operating system installed on a virtual machine is called a guest operating system.

Because every virtual machine is an isolated computing environment, you can use virtual machines as desktop or workstation environments, as testing environments, or to consolidate server applications.

In vCenter Server, virtual machines run on hosts or clusters. The same host can run many virtual machines.

Basic Tasks

- Shut down the virtual machine

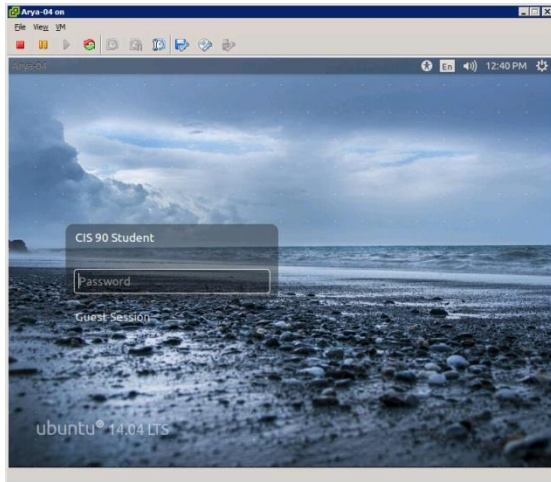
Recent Tasks

Name	Target	Status	Details	Initiated by	vCenter Server	Requested Start Ti...	Start Time

Tasks Alarms

CISLAB\simben90

Log in as
CIS 90 Student

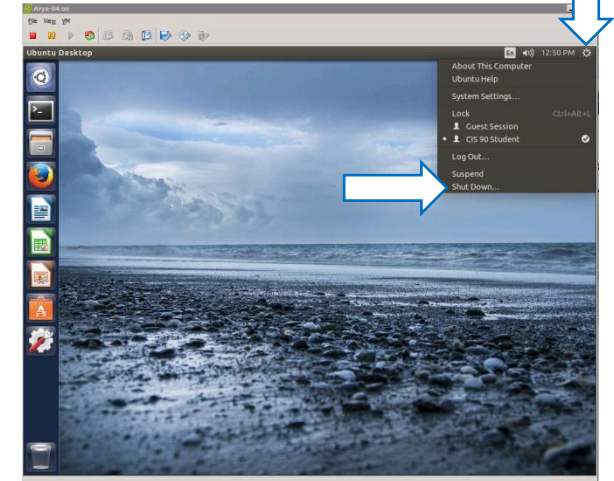


The Arya VM

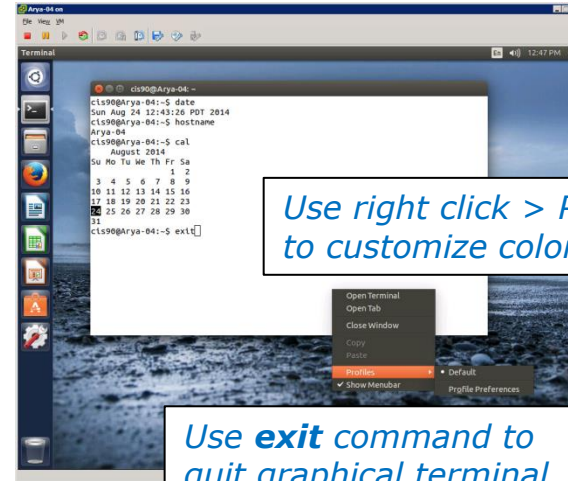
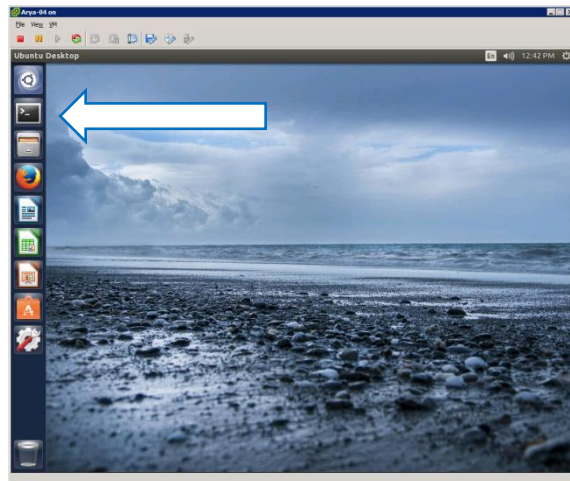


ubuntu

Shutdown using
 **> Shut Down...**



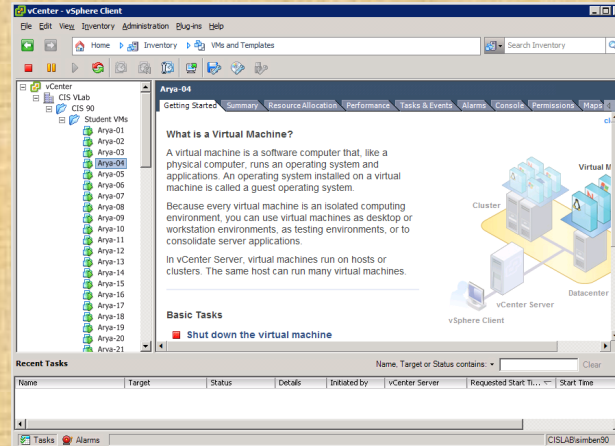
To get a graphical terminal
Terminal icon (under System Settings)



*Use right click > Profiles
to customize colors*

*Use **exit** command to
quit graphical terminal*

Class Activity



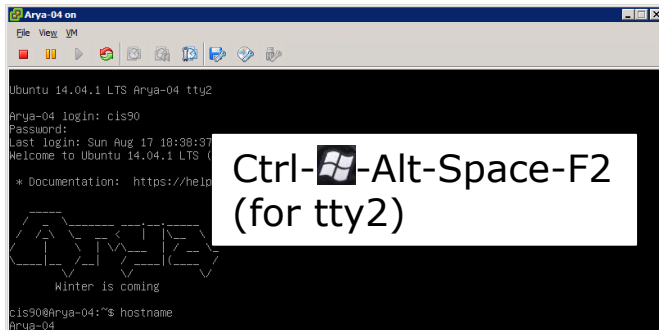
Try logging into CIS VLab with your **own credentials**

- Find your VM
- Power it on (if it's not already)
- Open a separate console for your VM
- Login as CIS 90 Student into the graphical desktop
- Run a terminal on the graphical desktop
- Shut down the VM

Virtual/Console tty Terminals

Virtual Terminals

- 1) While holding down Ctrl--Alt keys, tap Space, then tap Fn key
- 2) or try: **chvt** *n*
- 3) or try: **sudo chvt** *n*
- 4) or try: <alt-key> *n*
(in an Ubuntu virtual terminal)



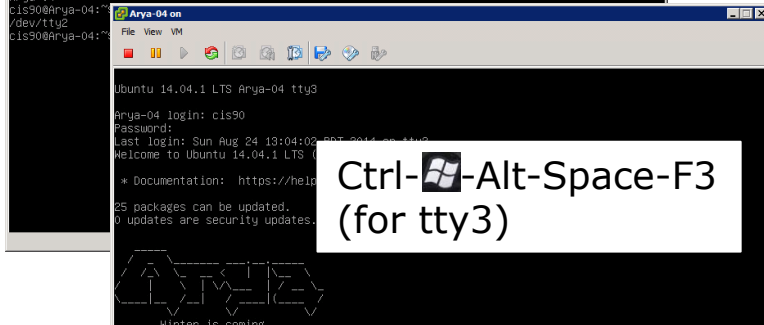
```

Arya-04 on
File View VM
Ubuntu 14.04.1 LTS Arya-04 tty2
Arya-04 login: cis90
Password:
Last login: Sun Aug 17 18:38:57
Welcome to Ubuntu 14.04.1 LTS

 * Documentation: https://help.ubuntu.com/

cjs90@Arya-04:~$ hostname
Arya-04
cjs90@Arya-04:~$ /dev/tty2
cjs90@Arya-04:~$
  
```

Ctrl--Alt-Space-F2
(for tty2)



```

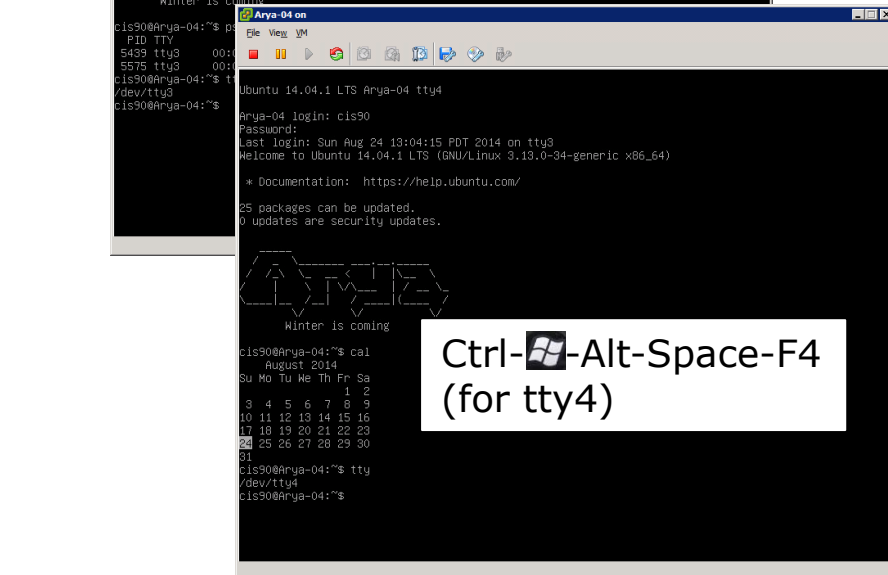
Arya-04 on
File View VM
Ubuntu 14.04.1 LTS Arya-04 tty3
Arya-04 login: cis90
Password:
Last login: Sun Aug 24 13:04:02 PDT 2014 on tty3
Welcome to Ubuntu 14.04.1 LTS

 * Documentation: https://help.ubuntu.com/

25 packages can be updated.
0 updates are security updates.

cjs90@Arya-04:~$ sudo chvt 3
cjs90@Arya-04:~$
  
```

Ctrl--Alt-Space-F3
(for tty3)



```

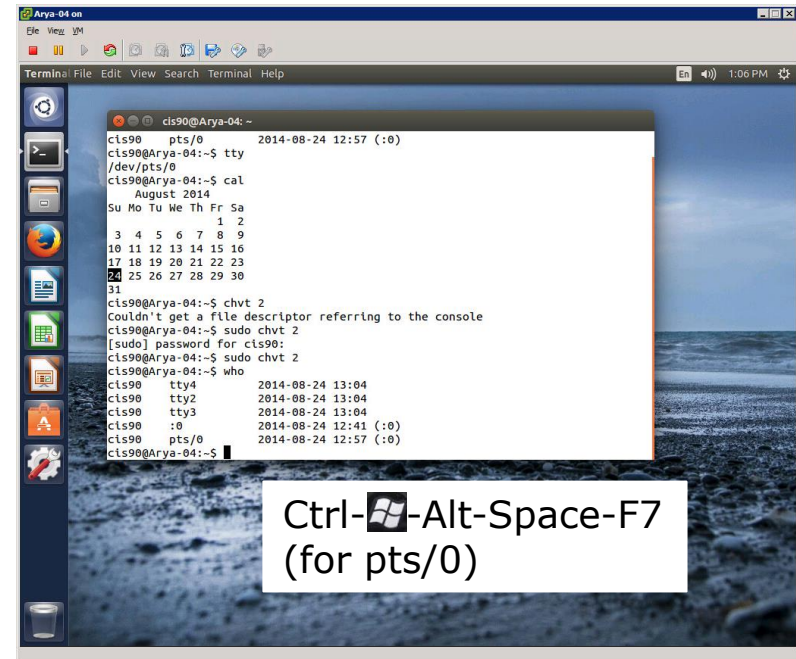
Arya-04 on
File View VM
Ubuntu 14.04.1 LTS Arya-04 tty4
Arya-04 login: cis90
Password:
Last login: Sun Aug 24 13:04:15 PDT 2014 on tty3
Welcome to Ubuntu 14.04.1 LTS (GNU/Linux 3.13.0-34-generic x86_64)

 * Documentation: https://help.ubuntu.com/

25 packages can be updated.
0 updates are security updates.

cjs90@Arya-04:~$ sudo chvt 4
cjs90@Arya-04:~$
  
```

Ctrl--Alt-Space-F4
(for tty4)

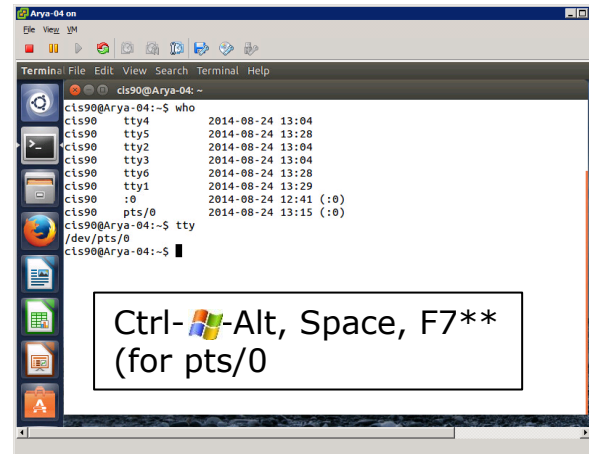
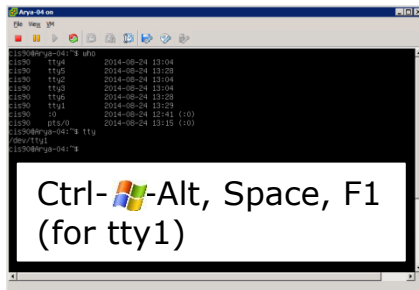


```

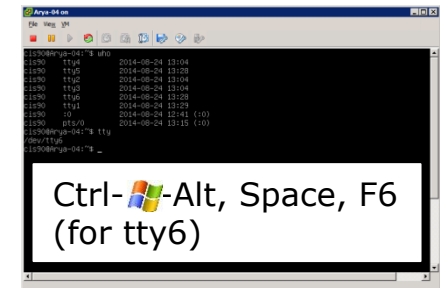
Arya-04 on
File View VM
Terminal File Edit View Search Terminal Help
En 1:06 PM
cis90@Arya-04:~$
cis90 pts/0 2014-08-24 12:57 (:0)
cis90@Arya-04:~$ tty
/dev/pts/0
cis90@Arya-04:~$ cal
August 2014
Su Mo Tu We Th Fr Sa
      1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
cis90@Arya-04:~$ chvt 2
Couldn't get a file descriptor referring to the console
cis90@Arya-04:~$ sudo chvt 2
[sudo] password for cis90:
cis90@Arya-04:~$ sudo chvt 2
cis90@Arya-04:~$ who
cis90    tty4      2014-08-24 13:04
cis90    tty2      2014-08-24 13:04
cis90    tty3      2014-08-24 13:04
cis90    :o        2014-08-24 12:41 (:0)
cis90    pts/0     2014-08-24 12:57 (:0)
cis90@Arya-04:~$
  
```

Ctrl--Alt-Space-F7
(for pts/0)

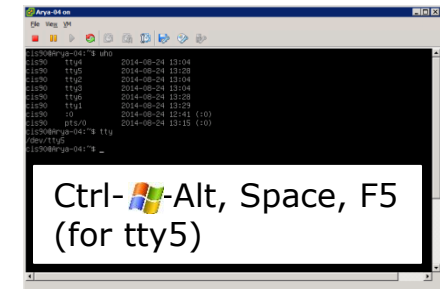
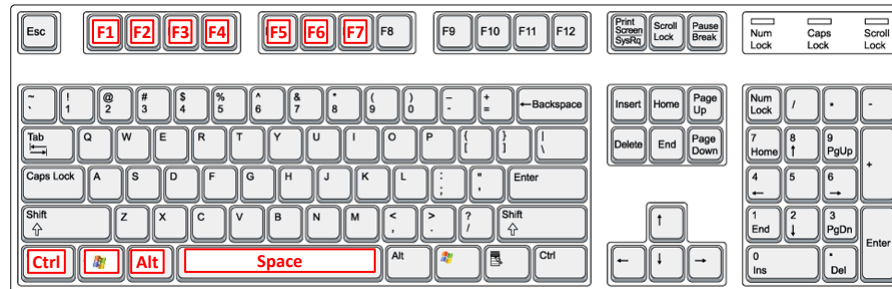
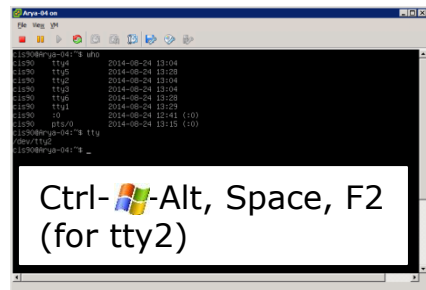
Changing Virtual TTY Terminals using **VMware vSphere**



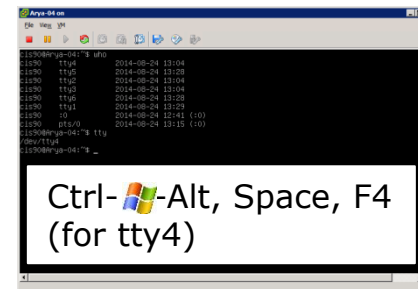
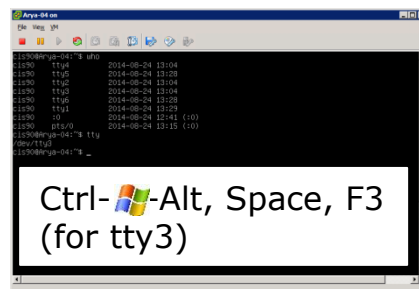
Windows PC Keyboard



While holding down Ctrl-Alt keys, tap Space, then tap Fn key*



*On some PC keyboards it is not necessary to use the  key



Note: This is for vSphere only. The  key and Space bar are not pressed for physical (non-VM) servers

Changing Virtual Terminals on VMware Linux VMs

VMware operations

On PC Keyboard:

While holding down the Ctrl--Alt keys, tap spacebar then tap f1, f2, ... or f7.

Pressing the  on some Windows keyboards may not be necessary

F7 is graphics mode for the Ubuntu VMs.

On Mac keyboard:

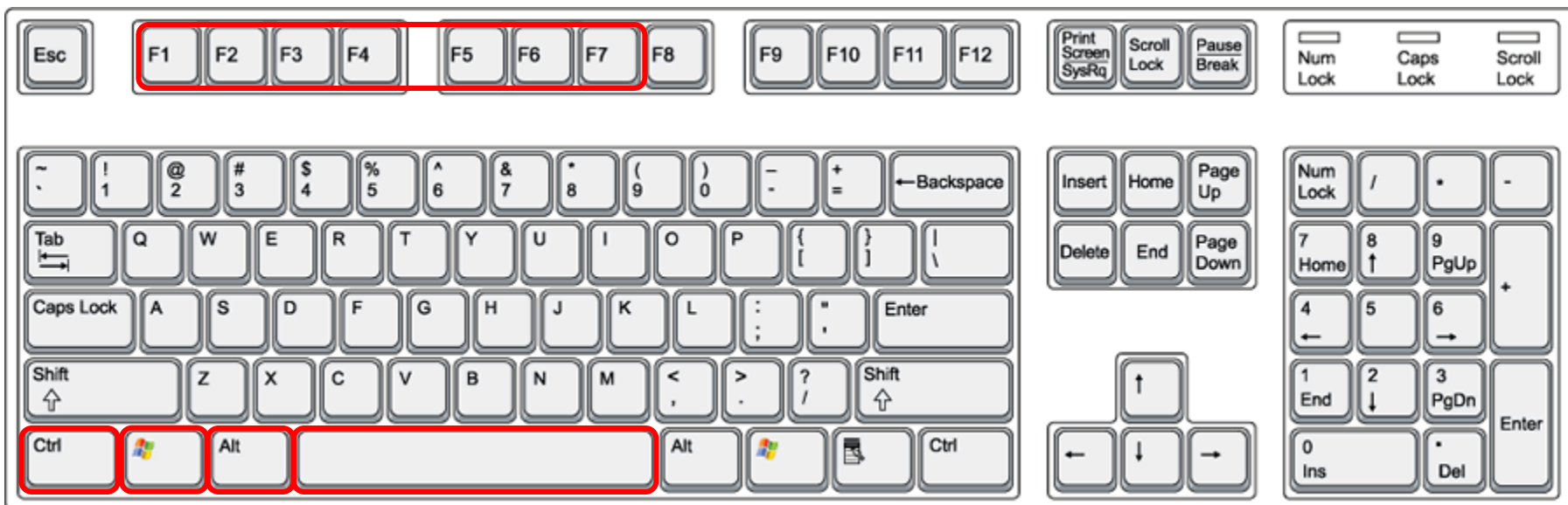
Hold down Control and Option keys, tap the spacebar, hold down fn key (in addition to Control and Option keys) and tap f1, f2, ... or f7.

The Centos VMs do not have a graphics mode components installed (run level 3 only)

Note: the spacebar does not need to be tapped on a physical (non-VM) system. This is only required when changing virtual terminals on VMware VMs.

VMware VM Operations

Changing Virtual Terminals with a PC keyboard



On PC keyboard:

While holding down the **Ctrl**--**Alt** keys,

tap **Spacebar** then tap **F_n** key

(where *n*=1-7 to specify a function key)

VMware VM Operations

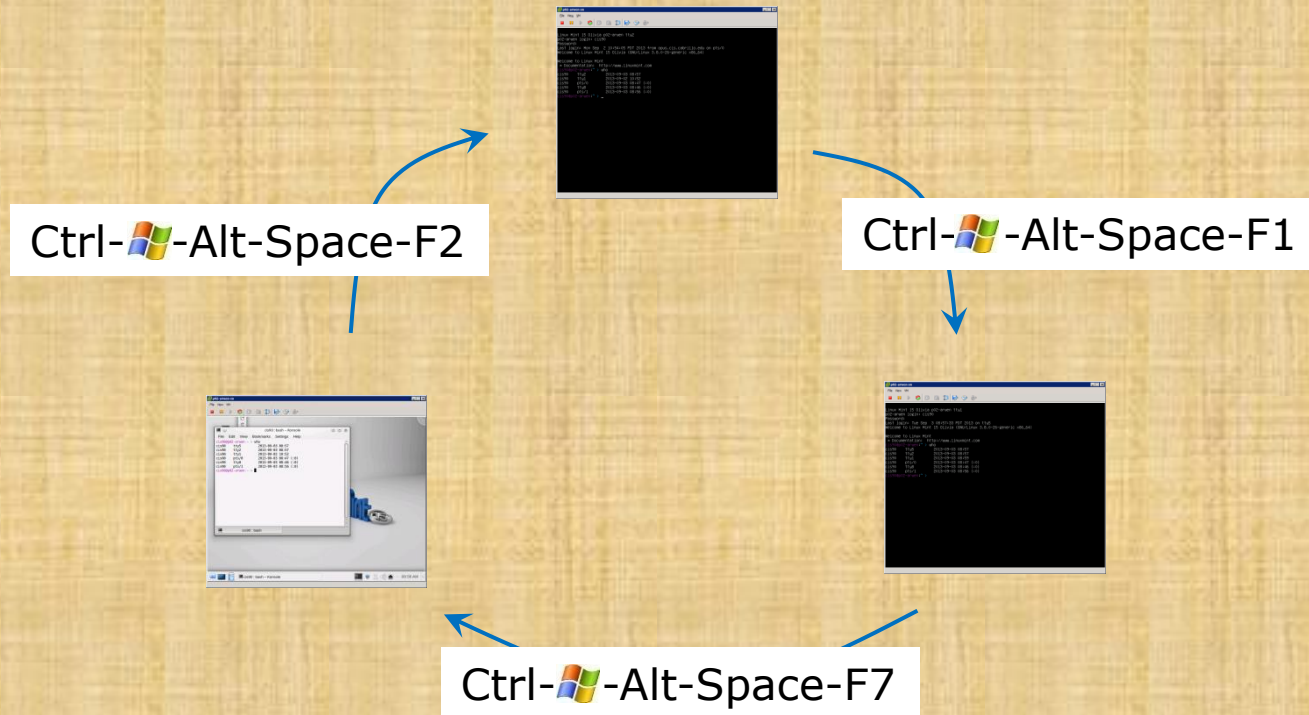
Changing Virtual Terminals with a Mac keyboard



On Mac keyboard:

While holding down the **control-option** keys
tap **Spacebar** then tap **fn-F n** keys
(where $n=1-7$ to specify a function key)

Class Activity

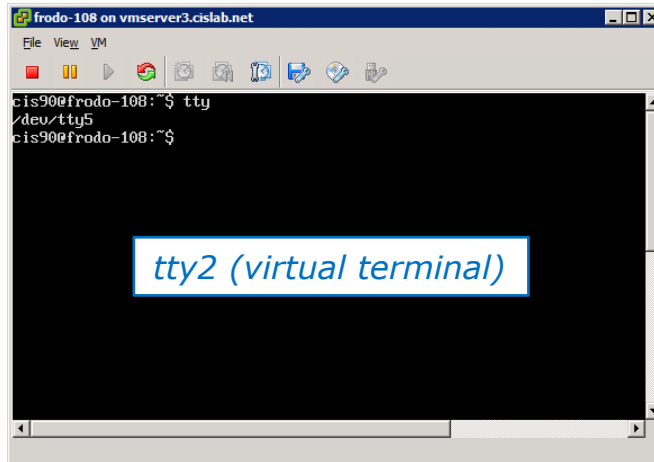


On your VM:

- Try changing between the graphical desktop and the TTYs
- Login as cis90 on tty1 and tty2
- Run a terminal on the graphical desktop
- Use the who command to see how many logins there are

More on who command

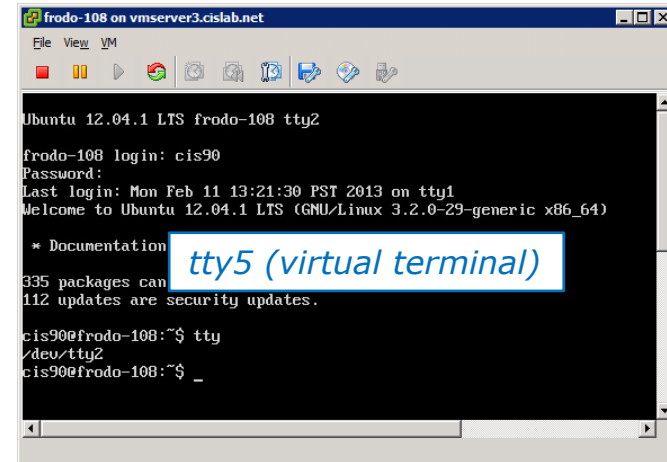
Deciphering **who** command output (Ubuntu 12.04)



```

frodo-108 on vmserver3.cislab.net
File View VM
cis90@frodo-108:~$ tty
/dev/tty5
cis90@frodo-108:~$
    
```

tty2 (virtual terminal)



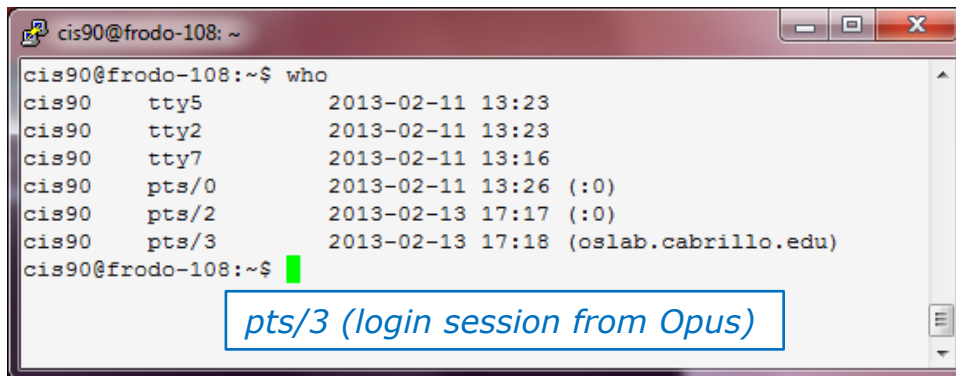
```

frodo-108 on vmserver3.cislab.net
File View VM
Ubuntu 12.04.1 LTS frodo-108 tty2
frodo-108 login: cis90
Password:
Last login: Mon Feb 11 13:21:30 PST 2013 on tty1
Welcome to Ubuntu 12.04.1 LTS (GNU/Linux 3.2.0-29-generic x86_64)

 * Documentation
335 packages can
112 updates are security updates.

cis90@frodo-108:~$ tty
/dev/tty2
cis90@frodo-108:~$ _
    
```

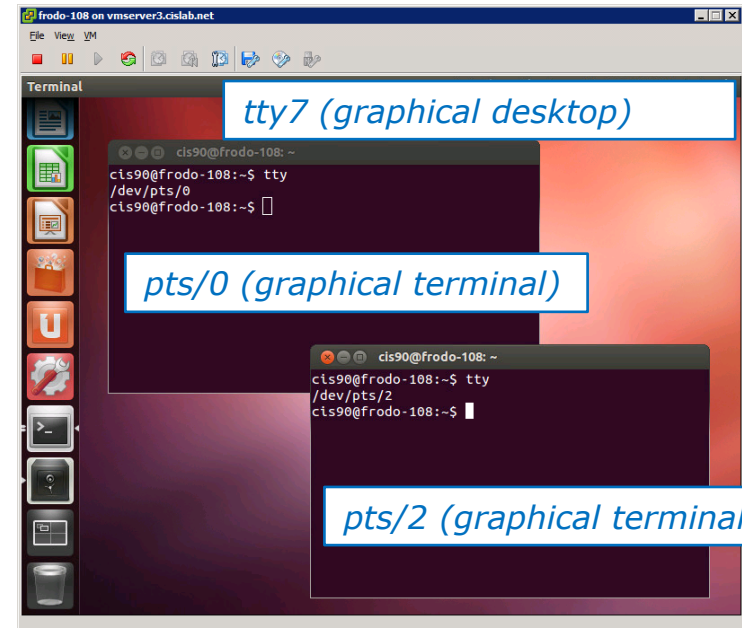
tty5 (virtual terminal)



```

cis90@frodo-108: ~
cis90@frodo-108:~$ who
cis90    tty5      2013-02-11 13:23
cis90    tty2      2013-02-11 13:23
cis90    tty7      2013-02-11 13:16
cis90    pts/0      2013-02-11 13:26 (:0)
cis90    pts/2      2013-02-13 17:17 (:0)
cis90    pts/3      2013-02-13 17:18 (oslab.cabrillo.edu)
cis90@frodo-108:~$
    
```

pts/3 (login session from Opus)



```

frodo-108 on vmserver3.cislab.net
File View VM
Terminal
cis90@frodo-108: ~
cis90@frodo-108:~$ tty
/dev/pts/0
cis90@frodo-108:~$

cis90@frodo-108: ~
cis90@frodo-108:~$ tty
/dev/pts/2
cis90@frodo-108:~$
    
```

tty7 (graphical desktop)

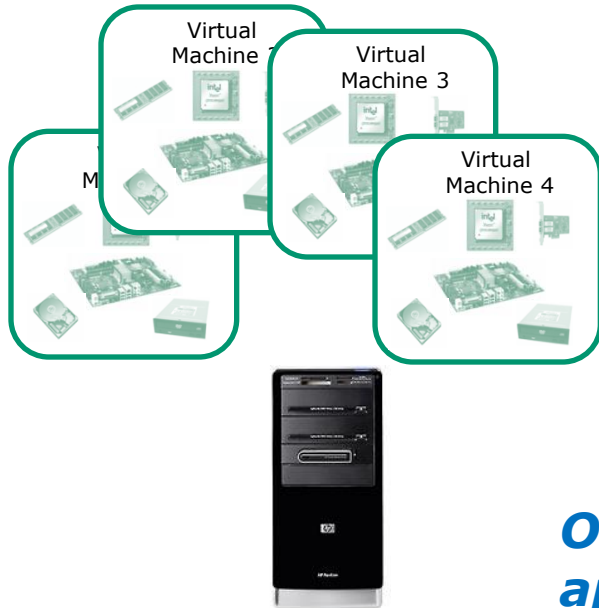
pts/0 (graphical terminal)

pts/2 (graphical terminal)

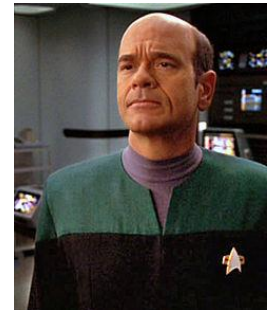
Virtual Machines

What is a virtual machine?

- There are software programs (e.g. VMWare, VirtualBox, MS Virtual Server) that simulate perfectly all the hardware of a real computer.
- These simulated computers are called virtual machines or VMs.



- You load an operating system and applications on virtual machines just like you would any other computer.
- The guest OS and apps don't even know they are not running on a "real" computer.
- Opus used to be a 1U rack mounted server. Now it's a VM on a server in building 1300.

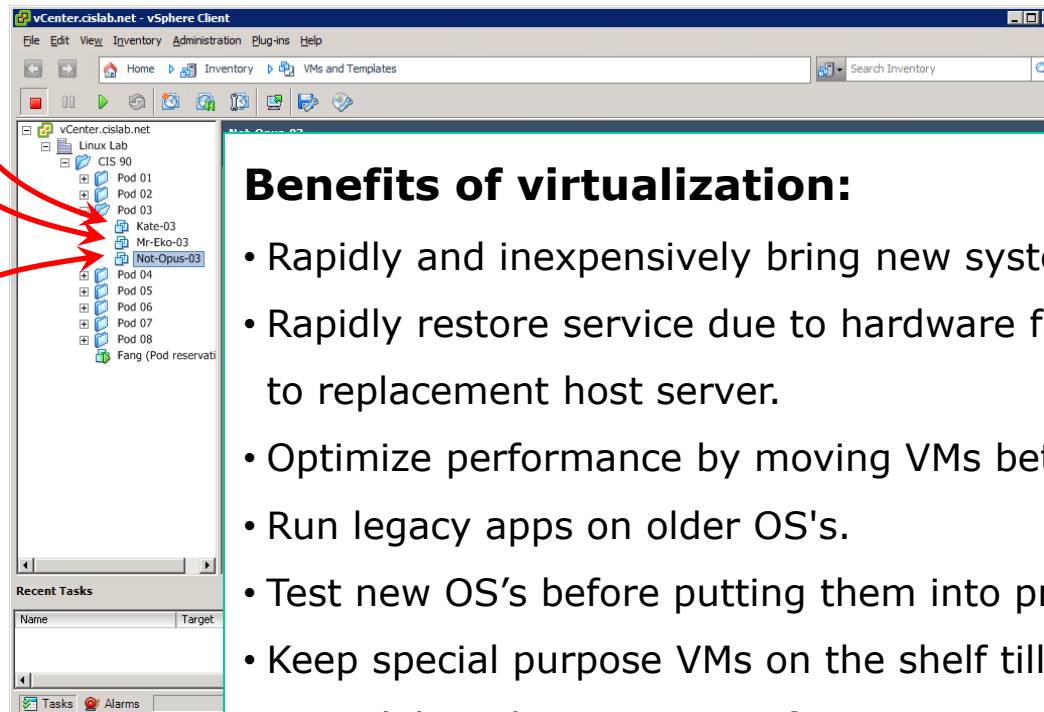
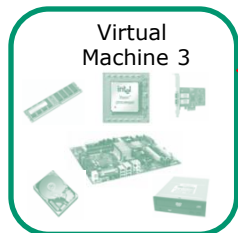
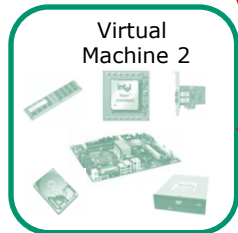
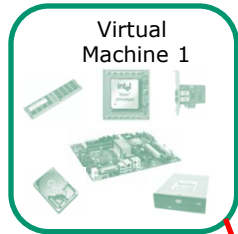


The EMH doctor on Star Trek Voyager was a simulation

Over the network, virtual machines appear just like any other computer.

Virtual Machines

*Multiple computers on one computer
... running at the same time
... sharing the same physical hardware*

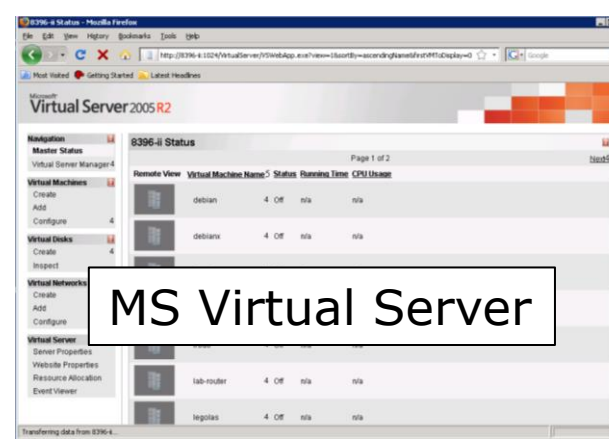
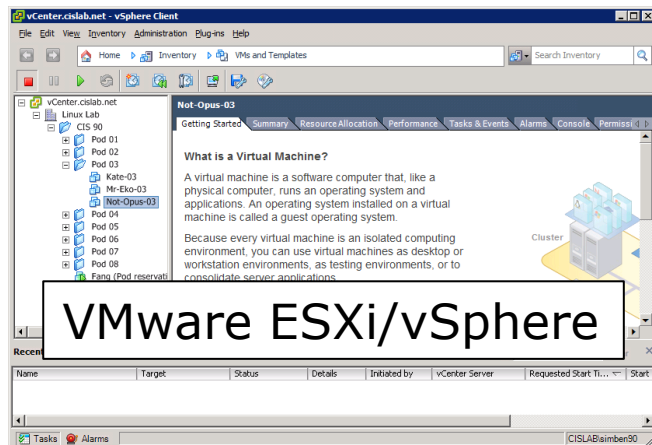
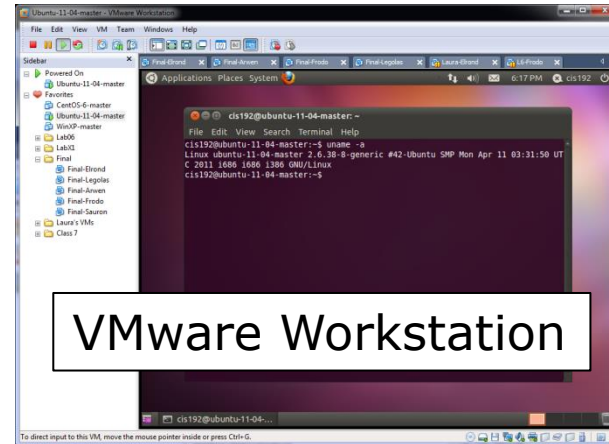
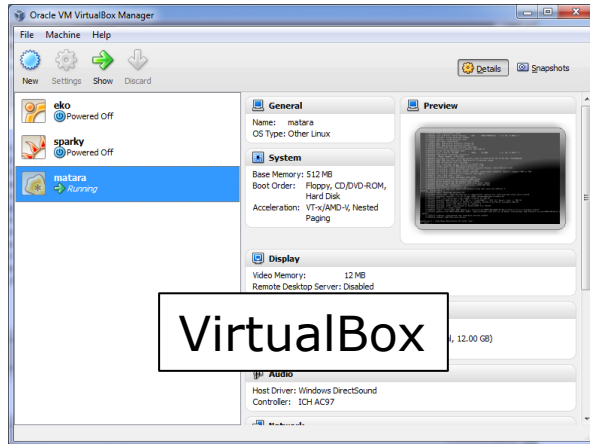


Benefits of virtualization:

- Rapidly and inexpensively bring new systems online.
- Rapidly restore service due to hardware failures by moving VMs to replacement host server.
- Optimize performance by moving VMs between physical hosts.
- Run legacy apps on older OS's.
- Test new OS's before putting them into production.
- Keep special purpose VMs on the shelf till needed.
- Consolidate data center on fewer servers.
- Students can have their own personal computer lab!



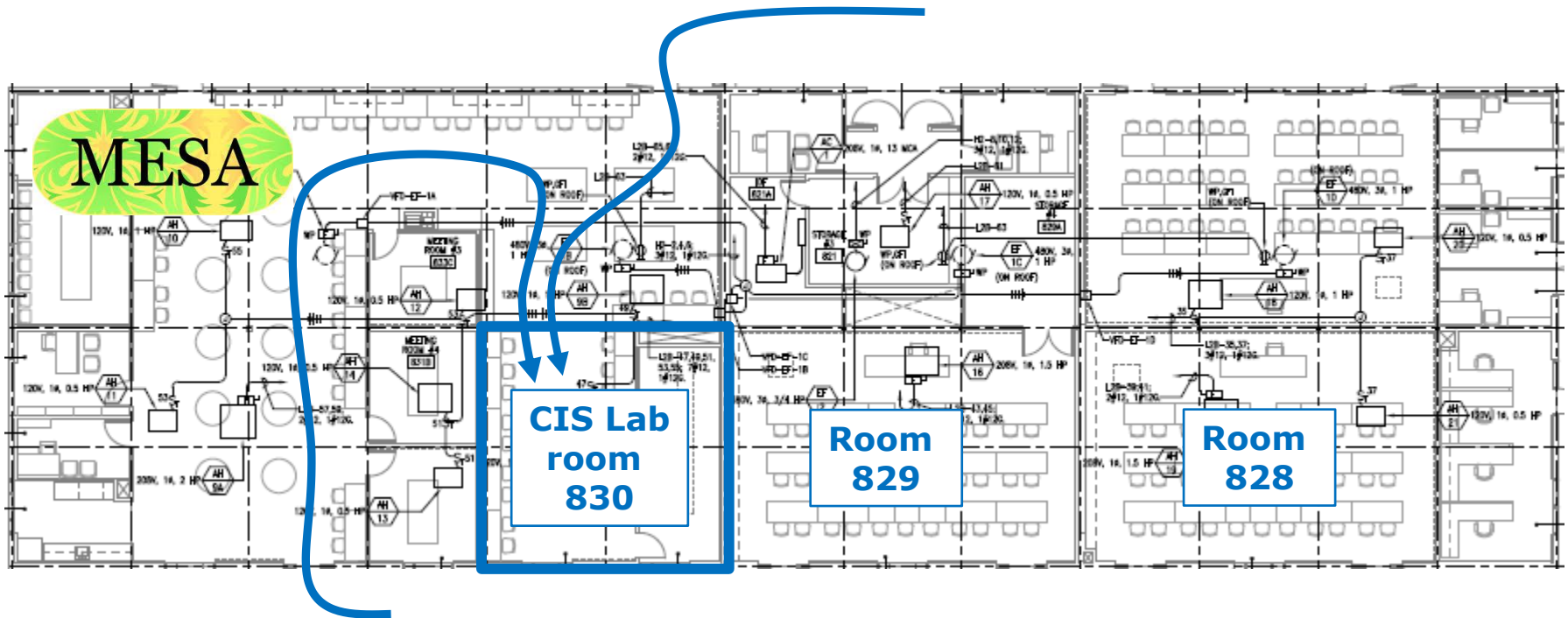
Various Virtualization Products



CIS Lab

The CIS Lab

Building 800 - room 830



The CIS Lab is inside the MESA Center

UNIX/Linux Devices

Apple iPad



```
ipa$ v.2.5.1 - Copyright 2013, Martino Orlandi (www.treehousetec.com)
Type 'help' for a list of available commands
August 25, 2014 at 5:25 PM logged on Mary's iPad

ipa$ date
Monday, August 25, 2014 at 5:25:49 PM Pacific Daylight Time
ipa$ hostname
Mary's iPad
ipa$ uname
Darwin
ipa$ ps
PID  PROCESS NAME      USER      PRIORITY
18   timed              mobile    17
21   mediaremotd        mobile    17
23   fairplayd.A1       mobile    17
25   iaptransportd       mobile    24
28   softwareupdated     mobile    17
29   backboardd          mobile    24
33   SpringBoard         mobile    17
34   routined            mobile    17
35   softwarebehavior     mobile    17
37   aggregated          mobile    17
42   aosnotifyd          mobile    17
45   mediaserverd        mobile    24
54   identityservices    mobile    17
56   imagent             mobile    17
59   BTServer            mobile    24
60   installd            mobile    17
70   lsd                 mobile    17
72   xpcd                mobile    17
73   MobileGestaltHel     mobile    17
74   BlueTool            mobile    24
80   IMDPersistenceAg     mobile    17
83   apsd                mobile    24
85   accountsd           mobile    17
92   dataaccessd         mobile    24
94   itunescloudd         mobile    17
95   itunesstored        mobile    17
96   storebookkeeperd    mobile    17
97   gamed               mobile    24
99   medialibraryd       mobile    17
100  DuetLST             mobile    17
101  tccd                mobile    17
104  kbd                 mobile    17
105  MobileMail          mobile    24
106  softwareupdatesd     mobile    17
107  assetd              mobile    17
108  librariand          mobile    17
111  calaccessd           mobile    17
115  Skype              mobile    17
118  MobileSlideShow     mobile    24
124  geod                mobile    24
125  MobileCal           mobile    17
127  absd                mobile    17
128  ipash               mobile    17
ipa$
```

Asus Router



```
172.30.1.1 - PuTTY
admin@RT-AC66U:/tmp/home/root# uname
Linux
admin@RT-AC66U:/tmp/home/root# date
Mon Aug 25 18:13:02 DST 2014
admin@RT-AC66U:/tmp/home/root# ps
  PID  USER    VSZ  STAT  COMMAND
    1  admin   2360  S     /sbin/init
    2  admin      0  SW<   [kthreadd]
    3  admin      0  SWN   [ksoftirqd/0]
    4  admin      0  SW<   [events/0]
    5  admin      0  SW<   [khelper]
   18  admin      0  SW<   [kblockd/0]
   49  admin      0  SW     [pdflush]
   50  admin      0  SW     [pdflush]
   51  admin      0  SW<   [kswapd0]
   52  admin      0  SW<   [aio/0]
   96  admin      0  SW<   [mtdblockd]
  125  admin      0  SW<   [kmmcd]
  129  admin    608  S     hotplug2 --persistent --no-coldplug
  162  admin   2344  S     console
  166  admin   1552  S     /bin/sh
  168  admin   1540  S     syslogd -m 0 -S -O /tmp/syslog.log -s 256 -l 6
  170  admin   1540  S     /sbin/klogd
  172  admin      0  SW<   [khubd]
  248  admin   2352  S     usbld
  320  admin   2352  S     /sbin/wanduck
  327  admin   1544  R     telnetd
  330  admin   1056  S     /bin/eapd
  335  admin   1492  S     nas
  336  admin   1860  S     /bin/wps_monitor
  337  admin   2352  S     wpsaide
  340  nobody  1100  S     dnsmasq --log-async
  341  admin   4356  S     httpd
  343  admin   1552  S     crond
  344  admin   1028  S     /usr/sbin/infosvr br0
  347  admin   3700  S     watchdog
  348  admin   2352  S     ots
  351  admin   1240  S     rstats
  365  admin   1072  S     lld2d br0
  375  admin   1376  S     /usr/sbin/acsd
  386  admin   2052  S     u2ec
  388  admin   1128  S     lpd
  391  admin   2052  S     u2ec
  395  admin   2052  S     u2ec
  412  admin   1016  S     rdnssd -u admin -i eth0
  413  admin   1084  S     rdnssd -u admin -i eth0
  461  admin   2352  S     ntp
  468  admin    748  S     dhcp6c -T LL eth0
  472  admin    744  S     dhcp6s -c /etc/dhcp6s.conf br0
  474  admin    768  S     radvd -u admin
  476  admin    768  S     radvd -u admin
  477  admin   1556  S     udhcpc -i eth0 -p /var/run/udhcpc0.pid -s /tmp/udhcp
  485  admin    760  S     miniupnpd -f /etc/upnp/config
  486  admin   2352  S     disk_monitor
  884  admin   1308  S     networkmap
 2734  admin   1692  S     -sh
 2794  admin   1544  R     ps
admin@RT-AC66U:/tmp/home/root#
```

Samsung Galaxy smartphone



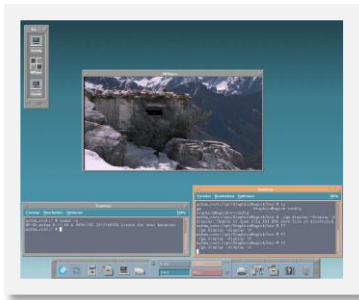
```
172.30.1.1 - PuTTY
u0_a61@d2vmu:/ $ clear
u0_a61@d2vmu:/ $ date
Wed Aug 27 17:52:55 PDT 2014
u0_a61@d2vmu:/ $ echo $SHELL
/system/bin/sh
u0_a61@d2vmu:/ $ id
uid=10061(u0_a61) gid=10061(u0_a61) groups=1015(sdcard_rw),1028(sdcard_r),3003(inet),50061(all_a61) context=u:
r:untrusted_app:s0
u0_a61@d2vmu:/ $ cat /proc/version
Linux version 3.4.0-1368792 (dpi@SWDD5612) (gcc version 4.7 (GCC) ) #1 SMP PREEMPT Wed Apr 30 20:46:12 KST 201
4
u0_a61@d2vmu:/ $ ps
USER      PID     PPID  VSIZE  RSS      WCHAN    PC         NAME
root         1         0    1372   888      ffffffff 00000000 S  /init
root         2         0         0       0      ffffffff 00000000 S  kthreadd
root         3         2         0       0      ffffffff 00000000 S  ksoftirqd/0
root         6         2         0       0      ffffffff 00000000 S  migration/0
root         7         2         0       0      ffffffff 00000000 S  watchdog/0
root        12         2         0       0      ffffffff 00000000 S  khelper
root        13         2         0       0      ffffffff 00000000 S  suspend_sys_syn
root        14         2         0       0      ffffffff 00000000 S  suspend
root        17         2         0       0      ffffffff 00000000 S  irq/203-msmdata
root        18         2         0       0      ffffffff 00000000 S  sync_supers
root        19         2         0       0      ffffffff 00000000 S  bdi-default
root        20         2         0       0      ffffffff 00000000 S  kblockd
root        21         2         0       0      ffffffff 00000000 S  khubd
root        22         2         0       0      ffffffff 00000000 S  l2cap
root        23         2         0       0      ffffffff 00000000 S  a2mp
root        24         2         0       0      ffffffff 00000000 S  cfg80211
root        25         2         0       0      ffffffff 00000000 S  rpciod
root        26         2         0       0      ffffffff 00000000 S  modem_notifier
root        27         2         0       0      ffffffff 00000000 S  smd_channel_clo
root        28         2         0       0      ffffffff 00000000 S  smsm_cb_wq
root        30         2         0       0      ffffffff 00000000 S  qmi
root        31         2         0       0      ffffffff 00000000 S  nmea
root        32         2         0       0      ffffffff 00000000 S  msm_ipc_router
root        33         2         0       0      ffffffff 00000000 S  apr_driver
root        34         2         0       0      ffffffff 00000000 S  khungtaskd
root        35         2         0       0      ffffffff 00000000 S  kswapd0
root        36         2         0       0      ffffffff 00000000 S  fsnotify_mark
root        37         2         0       0      ffffffff 00000000 S  ecryptfs-kthrea
root        38         2         0       0      ffffffff 00000000 S  nfsiod
root        39         2         0       0      ffffffff 00000000 S  cifsiod
root        40         2         0       0      ffffffff 00000000 S  crypto
root        58         2         0       0      ffffffff 00000000 S  mdp_dma_wq
```

VMware ESXi server



```
simben90@excalibur:~
~ # clear
~ # date
Thu Aug 28 00:59:38 UTC 2014
~ # hostname
vmserver3.cis.cabrillo.edu
~ # who
root          char/pty/t0      00:00   Aug 28 00:57:54   excalibur.cis.cabrillo.edu
~ # uname
VMkernel
~ # ps | head
WID  CID  World Name          Command
32769      idle1
32770      idle2
32771      idle3
32772      idle4
32773      idle5
32774      idle6
32775      idle7
32776      idle8
~ # ps | grep sh
32786      tlbflushcount
32787      tlbflushcountryflush
32788      vaSpaceTLBFlush
32873      pshare-est
32901      OCFlush
32903      BCFlush-0
33273 33273 sh                /bin/sh
33315 33315 sh                /bin/sh
33479 33479 sh                /bin/sh
33743 33743 sh                /bin/sh
33780 33780 sh                /bin/sh
33818 33818 sh                /bin/sh
33871 33871 sh                /bin/sh
33911 33911 sh                /bin/sh
33947 33947 sh                /bin/sh
33990 33990 sh                /bin/sh
34064 34064 sh                /bin/sh
34115 34115 sh                /bin/sh
34217 34217 sh                /bin/sh
34260 34260 sh                /bin/sh
34297 34297 sh                /bin/sh
34333 34333 sh                /bin/sh
34539 34539 sh                /bin/sh
34613 34613 sh                /bin/sh
34706 34706 sh                /bin/sh
35049 35049 sh                /bin/sh
4197333 4197333 sshd             sshd
4197376 4197376 sh                -sh
~ #
```

HP-UX



```
cupsim98.cup.hp.com - PuTTY
restrictions as set forth in sub-paragraph (c)(1)(ii) of the Rights in
Technical Data and Computer Software clause in DFARS 252.227-7013.

Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304 U.S.A.

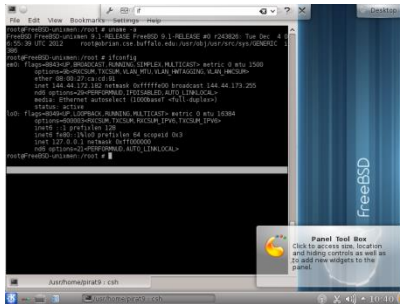
Rights for non-DOD U.S. Government Departments and Agencies are as set
forth in FAR 52.227-19(c)(1,2).
You have mail.

Value of TERM has been set to "xterm".
WARNING: YOU ARE SUPERUSER !!

# ls /
.mozilla          .sw              home            sbin
.mozilla-license  bin             lib             stand
.profile          core            lost+found      tmp
.rnd              dev             net             usr
.ssh              etc             opt             var

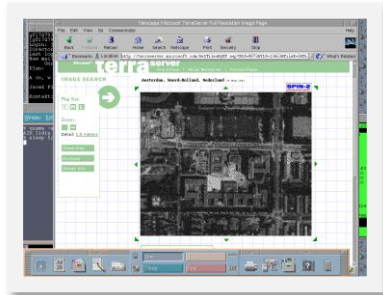
# uname -a
HP-UX cupsim98 B.11.23 U ia64 0564465391 unlimited-user license
#
```

BSD Unix



```
root@FreeBSD-unixmen:/root # uname -a
FreeBSD FreeBSD-unixmen 9.1-RELEASE FreeBSD 9.1-RELEASE #0 r243826: Tue Dec 4 0
6:55:39 UTC 2012      root@obrian.cse.buffalo.edu:/usr/obj/usr/src/sys/GENERIC i
386
root@FreeBSD-unixmen:/root # ifconfig
em0: flags=8843<UP,BROADCAST,RUNNING,SIMPLEX,MULTICAST> metric 0 mtu 1500
      options=9b<RXCSUM, TXCSUM, VLAN_MTU, VLAN_HWTAGGING, VLAN_HWCSUM>
      ether 08:00:27:ca:cd:91
      inet 144.44.172.182 netmask 0xfffffe00 broadcast 144.44.173.255
      nd6 options=29<PERFORMNUD,IFDISABLED,AUTO_LINKLOCAL>
      media: Ethernet autoselect (1000baseT <full-duplex>)
      status: active
lo0: flags=8049<UP,LOOPBACK,RUNNING,MULTICAST> metric 0 mtu 16384
      options=600003<RXCSUM, TXCSUM, RXCSUM_IPV6, TXCSUM_IPV6>
      inet6 ::1 prefixlen 128
      inet6 fe80::1%lo0 prefixlen 64 scopeid 0x3
      inet 127.0.0.1 netmask 0xff000000
      nd6 options=21<PERFORMNUD,AUTO_LINKLOCAL>
root@FreeBSD-unixmen:/root #
```

IBM AIX

A screenshot of a terminal window titled 'dtterm'. The terminal has a menu bar with 'Window', 'Edit', 'Options', and 'Help'. The command prompt is '\$'. The user has entered the command 'uname -a', which returned 'AIX aix 3 5 004518FC4C00'. The user then entered 'cat .screenrc', which displayed the following content:

```
log off
hardstatus alwayslastline "%{-b ck} %?%-w%?%{+b}%n%f %t%{-b} %?%+w%? %=- %l %
D %d/%m/%Y %0c "
hardstatus on
escape ^Tt
```

The terminal status bar at the bottom shows '0 ksh', '1 irssi', '2 VMS', and a question mark, followed by the date and time '? Sat 15/03/2008 00:35'.