Lesson Module Status

- Slides – draft
- Properties -
- Flash cards - na
- First minute quiz - na
- Web calendar summary -
- Web book pages -
- Commands –
- Howtos –

- Lab – tested
- Surveys and PW sheet posted –
- Youtube Videos uploaded –

- VM (Classroom PC) –
- VMs (VLab) -

- Rosters printed -
- Headset charged –

- Backup slides, Confer links, handouts on flash drive -

[ ] Has the phone bridge been added?
[ ] Is recording on?
[ ] Does the phone bridge have the mike?
[ ] Share Powerpoint, Chrome, Putties, VLab

CIS 90 - Lesson 1

Instructor: **Rich Simms**
Dial-in: **888-450-4821**
Passcode: **761867**

TBD TBD TBD TBD

TBD TBD TBD TBD TBD TBD TBD TBD TBD TBD

TBD TBD TBD TBD TBD TBD TBD TBD TBD TBD

TBD TBD TBD TBD TBD TBD TBD TBD TBD TBD

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

Student Learner Outcomes

Upon successful completion of this course students will be able to:

Navigate and manage the UNIX/Linux file system

Automate and schedule tasks

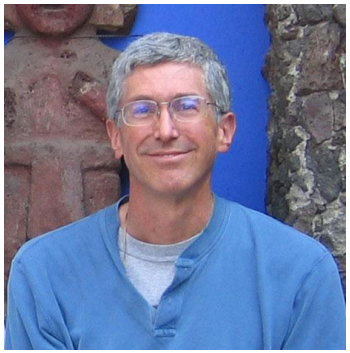
Customize the shell environment

.

Introductions

Course history and credits

Jim Griffin
- Jim created this Linux course
- Jim's site: http://cabrillo.edu/~jgriffin/



Rich Simms
- Worked at HP for 27+ years
- Started teaching this course in 2008 when Jim went on sabbatical
- Added some teaching best practices he liked when he took classes at Cabrillo (e.g. John Govsky's online help forum, first minute quizzes, no late work policy)

Class and Linux Overview

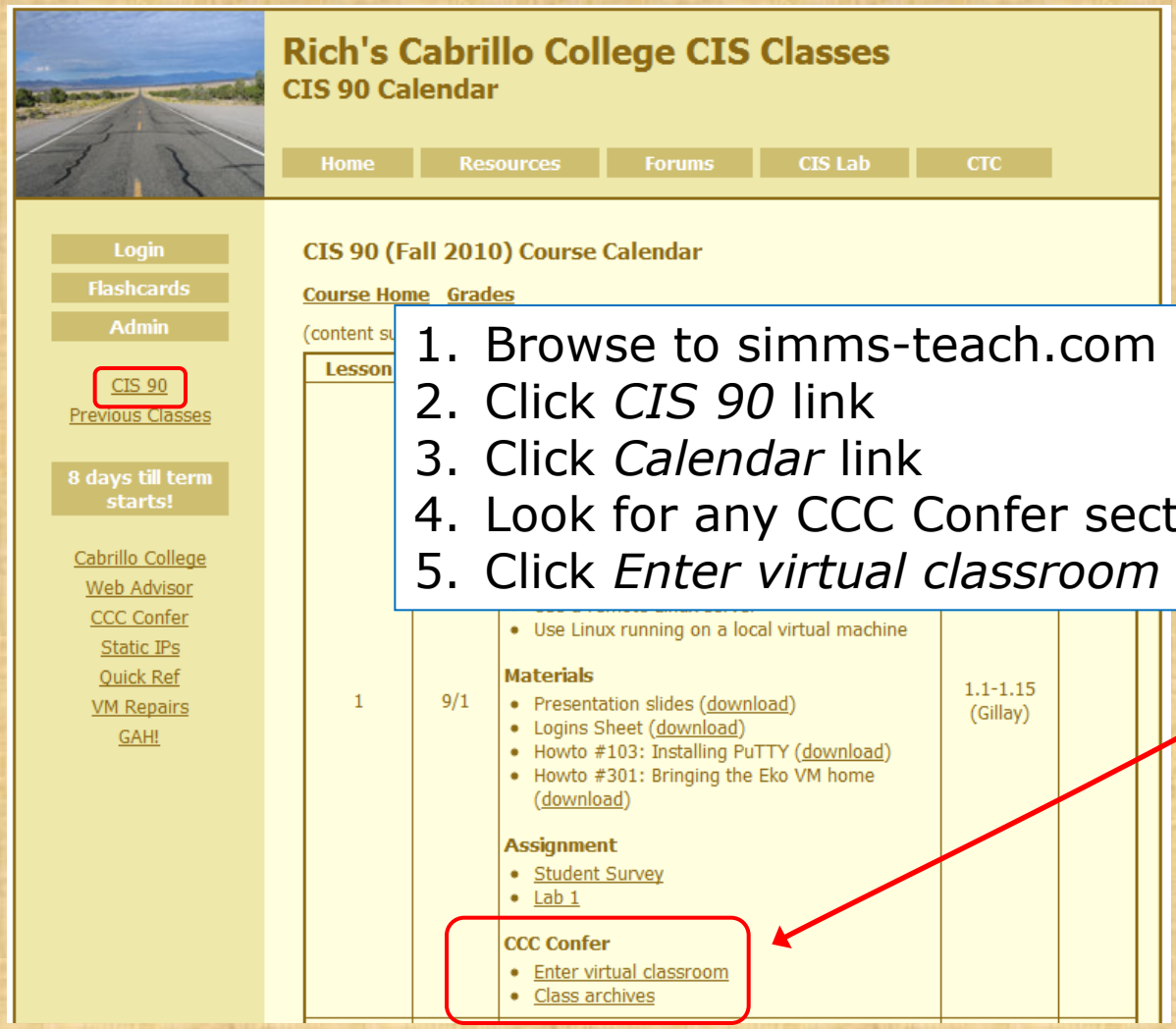
Objectives	Agenda
• Virtual classroom • Course logistics • Introduce UNIX/Linux • Forum registration • Login to Opus using SSH • Login to VLab VMs • Learn first commands	• Introductions • How this class works • Using Opus and VLab • Housekeeping • UNIX/Linux Market • Computers • Virtual Machines • UNIX/Linux Architecture • First Commands • Navigating Terminals • Lab 1 • Wrap up

Virtual Classroom with CCC Confer

- Enables remote students to attend class
- CCC = California Community Colleges
- Web conferencing tool + phone bridge (conference call)
- Listen using your computer's speakers (and ask ?'s using a chat window) or dial-in to the phone bridge (and ask ?'s by speaking)
- Each class is recorded and archived for viewing later
- Local students in the classroom can also use it for viewing slides, using the chat window, polls, and online emoticons.

Class Activity

Enter the online virtual classroom

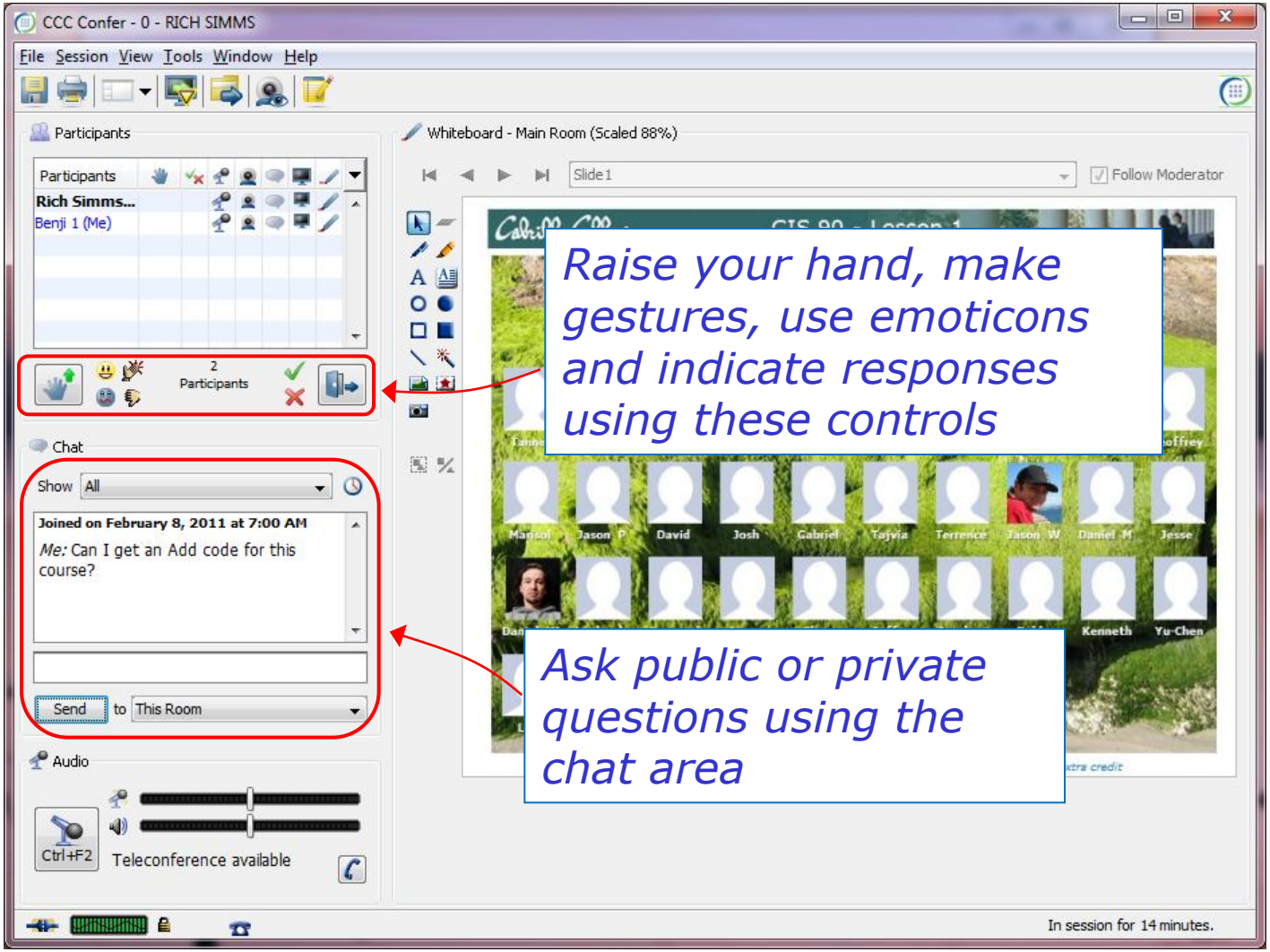


1. Browse to simms-teach.com
2. Click *CIS 90* link
3. Click *Calendar* link
4. Look for any CCC Confer section
5. Click *Enter virtual classroom* link

CCC Confer - Attending class online

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

CCC Confer - Attending class online



CCC Confer - Attending class online

STUDENT CONFERENCE FEATURES

*0 Contact the operator for assistance.

*6 Mute/unmute your individual line with a private announcement.

This only works if you dial-in using your telephone

How this class works

February 2012

S	M	T	W	T	F	S
29	30	31	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	1	2	3

March 2012

S	M	T	W	T	F	S
26	27	28	29	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

April 2012

S	M	T	W	T	F	S
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	1	2	3	4	5

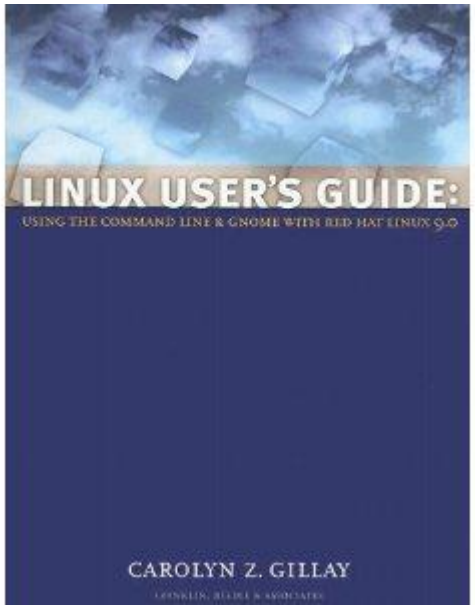
May 2012

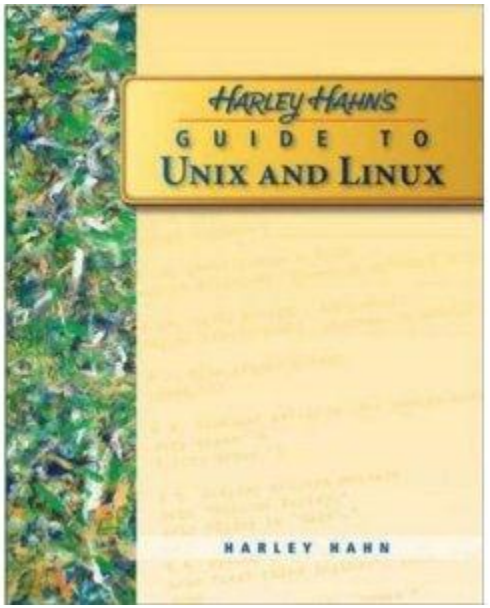
S	M	T	W	T	F	S
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2

CIS 90
Spring 2012

Class meets online every Wednesday afternoon:

- 1:15-4:20PM, from Feb 8th to May 30th
- No class Apr 11th (spring break)
- 15 lessons (class meetings) total
- Final exam (Test #3) at 1-3:50PM, on May 30th





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

Course outline and syllabus

Two important course policies to remember

In order to start classes on time, stay on the tight schedule, keep my own sanity, and to avoid log jams at the end of the term:

1) **No makeup's for missed quizzes**
2) **Late work (Labs assignments) will not be accepted**

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.

The typical week

http://simms-teach.com

Use Forum to ask and answer questions

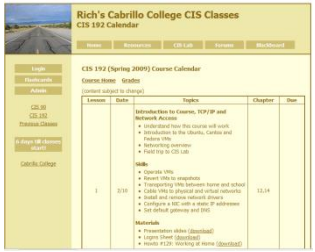
Wednesday

"First minute" quiz

Lecture on new lesson material

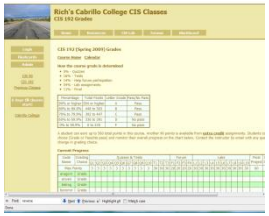
Class activities

Lab assignments due 11:59PM

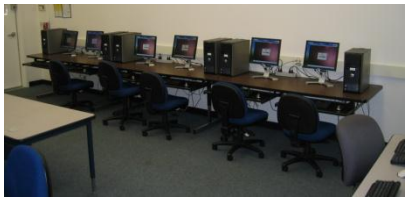


Calendar Page

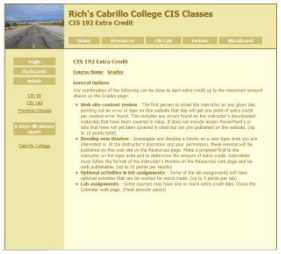
Thursday
is grading day



Check progress on the Grades Page



Work Lab Assignments in the CIS Lab or VLab



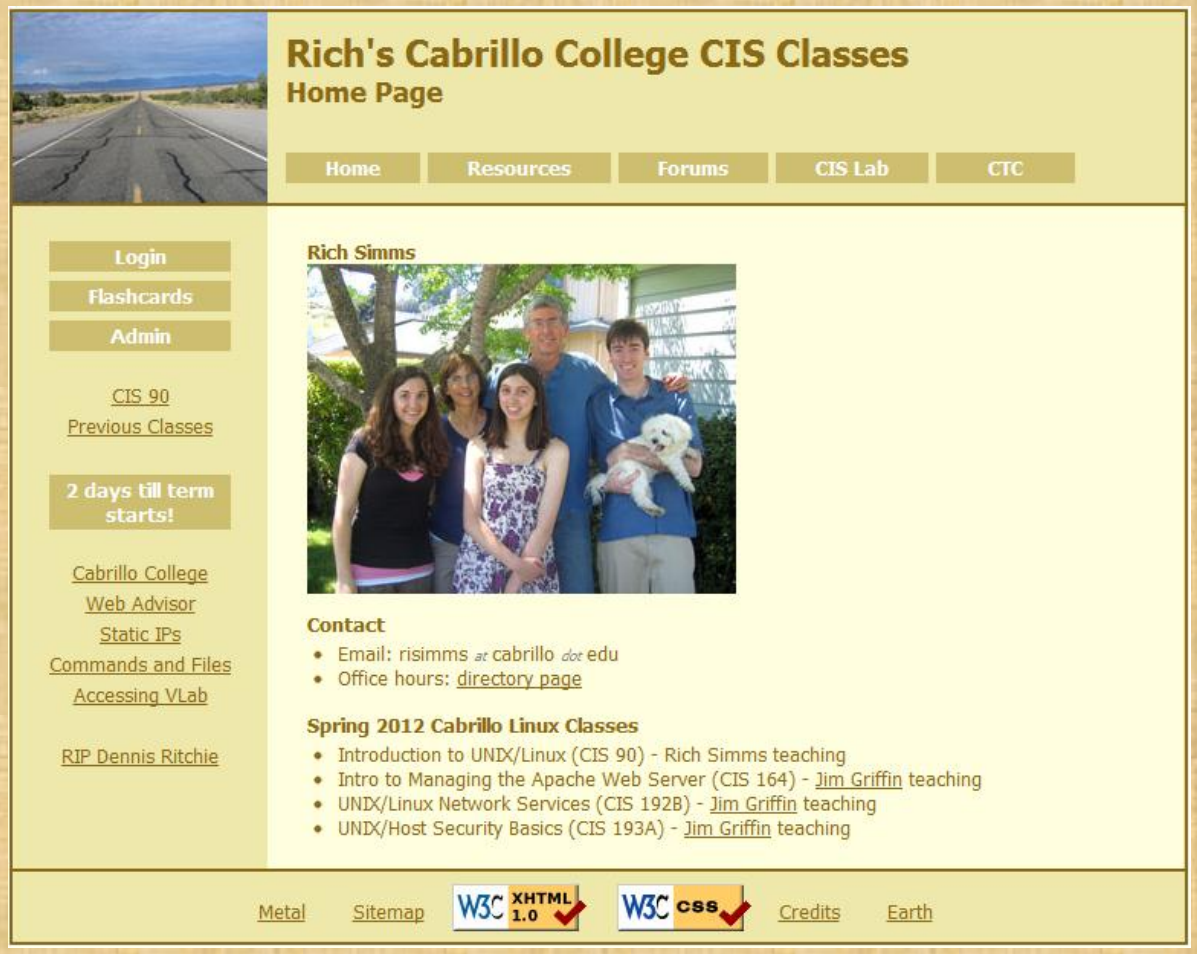
Check Extra Credit Page if you need some more points

Contacting the instructor

- Use the forum for the fastest response on technical or class related questions.
- Use email for personal matters.
- Weekly office hours before class (Wednesdays 12:10-1:00) in room 2501
- Also available in the CIS Lab for help with lab assignments or class material. See schedule at: http://webhawks.org/~cislab

- Avoid leaving a message on voice mail. Checked rarely so don't expect a fast response.

http://simms-teach.com/

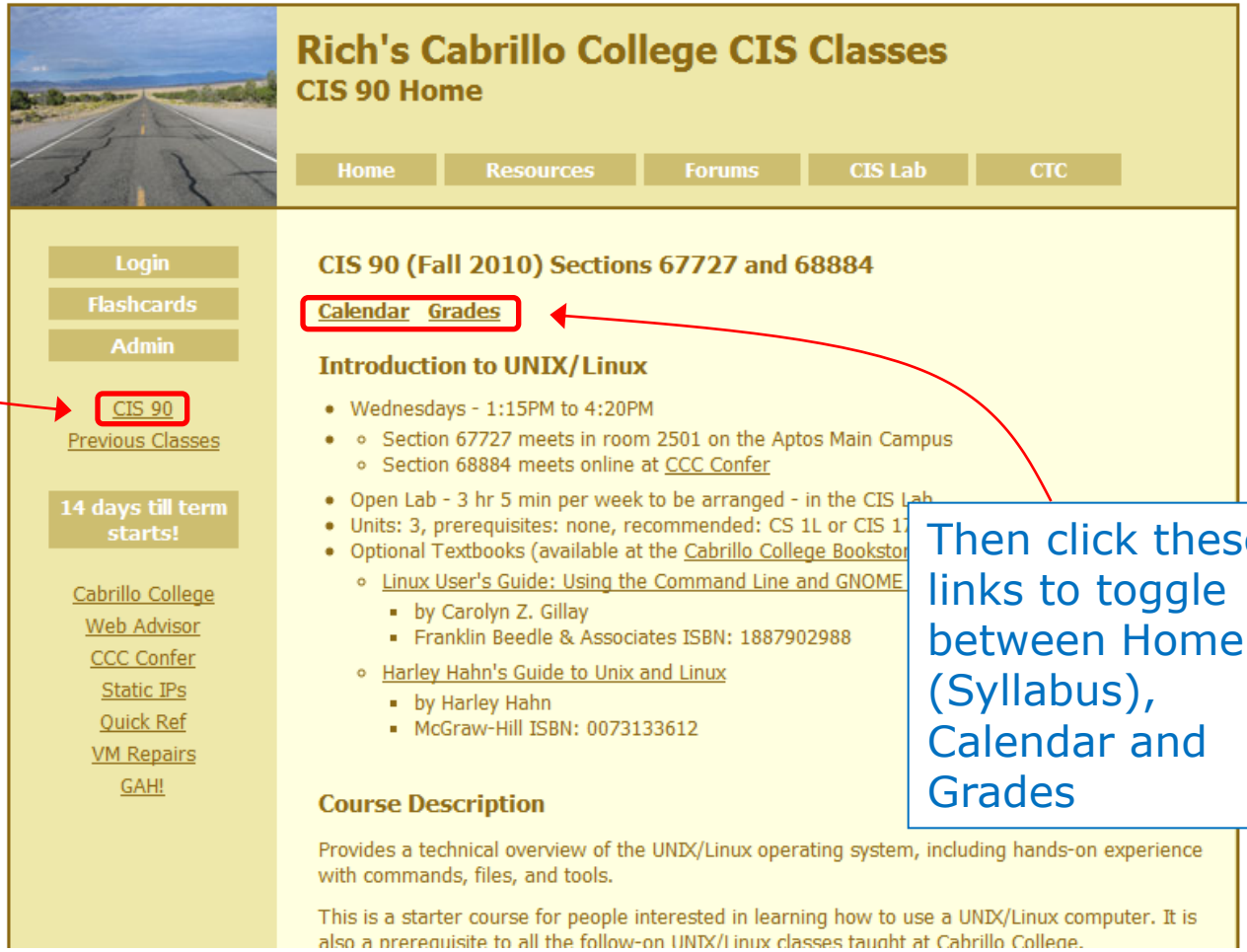


Browse to simms-teach.com so you can follow along the next section

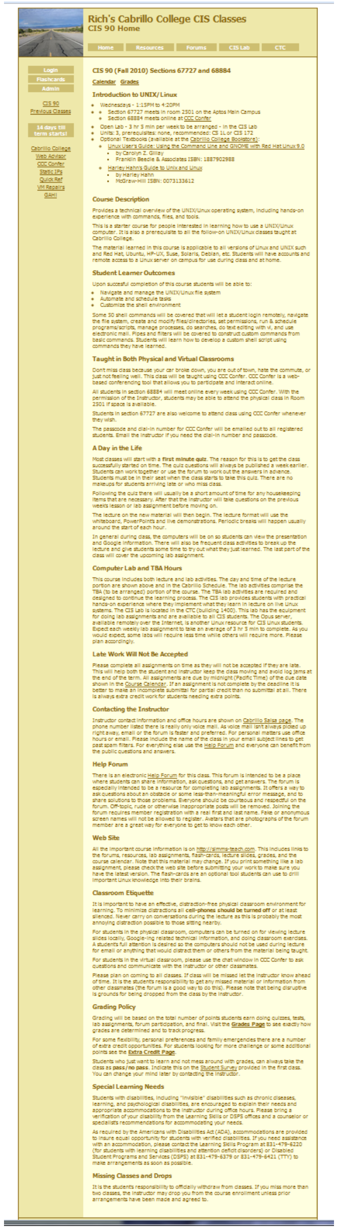
Class Exercise (class website)

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

First click on ***CIS 90*** *on left panel to see syllabus*



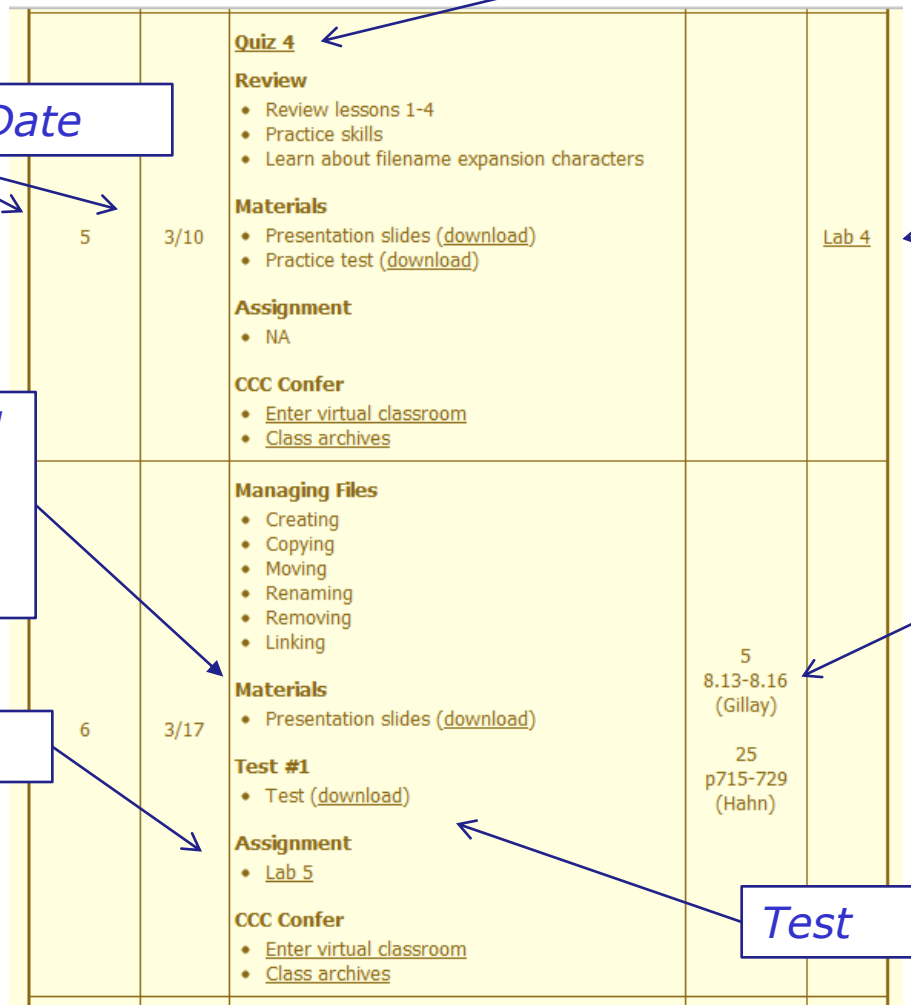
Then click these links to toggle between Home (Syllabus), Calendar and Grades



Course Syllabus
(on the CIS 90 home page)

It is a good idea to read through the syllabus carefully to avoid any surprises and get a good idea how this course works.

Course Calendar



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)	

Course Grading

Rich's Cabrillo College CIS Classes

CIS 90 Grades

Home | Resources | Forums | CIS Lab | CTC

Login | Flashcards | Admin

CIS 90
Previous Classes

16 days till term starts!

Cabrillo College

CIS 90 (Spring 2012) Grades

Course Home Calendar

Points can be earned from the following activities:

- 5% - Quizzes
- 16% - Tests
- 14% - Help forum participation
- 54% - Lab assignments
- 11% - Final project

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 the instructor will include both graded and non-graded areas of performance. Non-graded performance areas may include teamwork, helping others, quality, planning & organization skills, communication, documentation, motivation, and the desire to go above and beyond 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	
amroth	Grade																															

Monitor this page to track your progress in the course.

Your grade is based solely on the number of points you earn.

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 code name

Don't forget to post - with respect to earning points consider the forum as "low hanging fruit"

More on Grading

Points can be earned from the following activities:

- 5% - Quizzes
- 16% - Tests
- 14% - Help forum participation
- 54% - Lab assignments
- 11% - Final

Quizzes: 10 x 3 = 30 points
Tests: 3 x 30 = 90 points
Forum: 4 x 20 = 80 points
Labs: 10 x 30 = 300 points
Project: 1 x 60 = 60 points

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.

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90% or higher	504 or higher	A	Pass
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The student can decide the grade they want and how they want to earn it

Grading observations on previous classes

Code Name	Grading Choice	Quizzes & Tests													Forum				Labs										Final 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	
aragorn	Grade	3	3	3	3	3	3	3	3	3	3	28	27	25	20	20	20	16	28	30	30	24	30	29	29	30	30	30	57		533	A
eomer	Grade	2	3	3	3	3	3	2		3	3	33	26		20	20	20	20	28	27	28	30	29	28	28	29	30	28	90	45	584	A
balrog	P/NP											26			12	0	0		28												66	NP
nazgul	Grade		2			3			3	3	1	24	19		20	8	20	20	28	24	30	24	28	30	29	30	30	30	9		415	C
sauron	Grade		3	3	3		0	1		3	3	28	22	18	20	0	20	20	30	28	30	28			29	30	30	27	90	35	501	B

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

- **Aragorn** got an A by doing solid work across the board and never did any extra credit
- **Eomer** skipped the final yet still got an A by doing some extra credit
- **Balrog** probably should have just dropped the course
- **Sauron** kicked himself later for not doing any posts during the second quarter of the course to turn that B to an A

More on Grading

Lab Assignments (10 labs, 30 points each)

- Will be 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.

More on Grading

"First Minute" quizzes (10 quizzes, 3 points each)

As an incentive to start class on time, 3 points are awarded for correctly answering 3 questions, in the correct order, at the very beginning of class.

- The quiz questions are shown on CCC Confer at **1:15PM** sharp.
- The quiz questions are given out in advance and students can use the forum to collaborate on answers prior to class.
- 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.
- Quizzes are closed book/notes. Students may not give or ask others for assistance while taking a quiz.
- To take the quiz, students email the answers to the instructor.
- There are **no makeup's** for these quizzes and they **must be turned in within the first few minutes of class**.

More on Grading

Tests (3 tests, 30 points each)

- Test 1 and Test 2 will be distributed by during the last half of the class.
- Test 3 is the final exam.
- Tests are usually comprised of fill-in-the-blank type questions. Often you will have to use the Opus Linux server to check the answer.
- Tests are open notes, open book, and open computer.
- Tests are designed to take about 1.5 hours and be turned in at the end of class. To minimize "clock stress" you may continue to work on the test after class is over and turn it no later than 11:59PM.
- Students may not give or ask others for assistance while taking a test.

See the archived courses for an idea of what these tests are like

More on Grading

Forum Posts (4 quarters, up to 20 points per quarter)

- The end of each term quarter is shown on the course calendar.
- Each post in the forum for this class is worth 4 points, up to 20 points maximum per quarter.
- The posts for the quarter will be due at **11:59PM** (Forum 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 forum for **this class** will be counted.

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

More on Grading

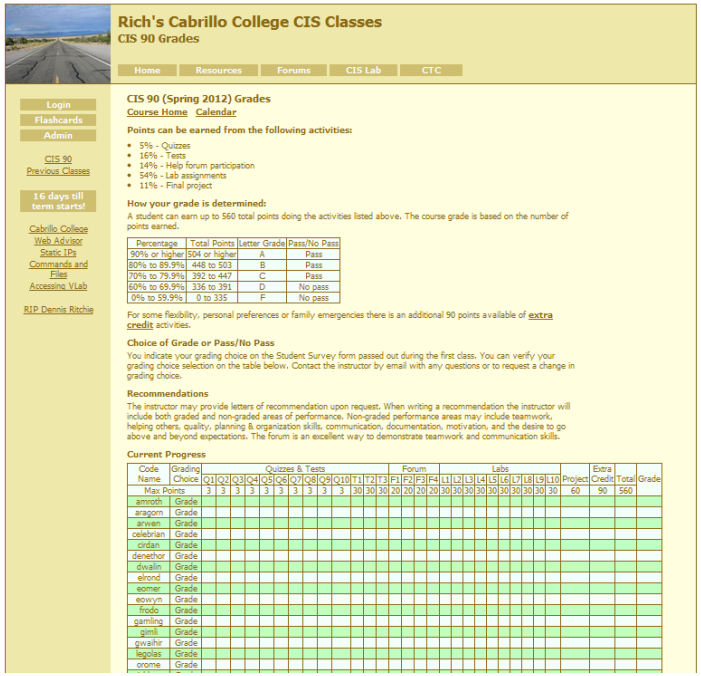
Extra credit (up to 90 points)

- 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 crash and burn on a test … don't worry!
- You just don't like making forum posts … don't worry!
- There is a cap on extra credit points so plan carefully!

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

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 assignments.



Rich's Cabrillo College CIS Classes
CIS 90 Grades

Home | Resources | Forums | CIS Lab | CTC

Login | Flashcards | Admin

CIS 90 Previous Classes

16 days till term starts!

Cabrillo College Web Advisor | Static IPs | Commands and Files | Accessing VLab

RIP Dennis Ritchie

CIS 90 (Spring 2012) Grades

Course Home Calendar

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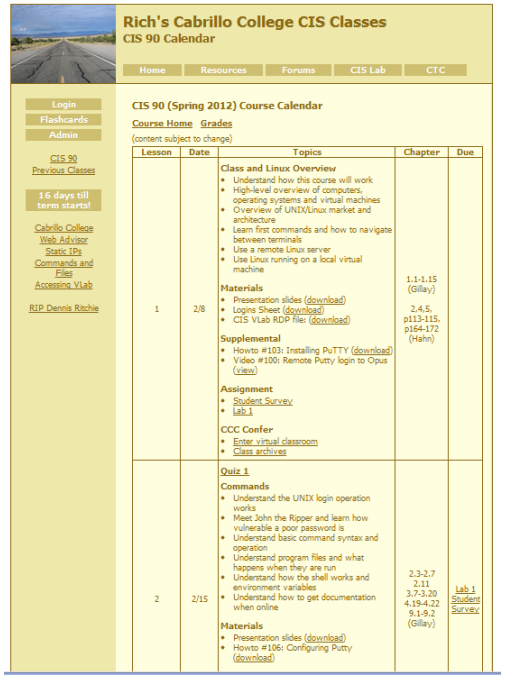
amroth	Grade																													
aragorn	Grade																													
arwen	Grade																													
celebrian	Grade																													
cirdan	Grade																													
denethor	Grade																													
dwalin	Grade																													
elrond	Grade																													
eomer	Grade																													
eowyn	Grade																													
frodo	Grade																													
gamling	Grade																													
gimli	Grade																													
gwaihir	Grade																													
legolas	Grade																													
orome	Grade																													



Rich's Cabrillo College CIS Classes
CIS 90 Calendar

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CIS 90 Previous Classes

16 days till term starts!

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RIP Dennis Ritchie

CIS 90 (Spring 2012) Course Calendar

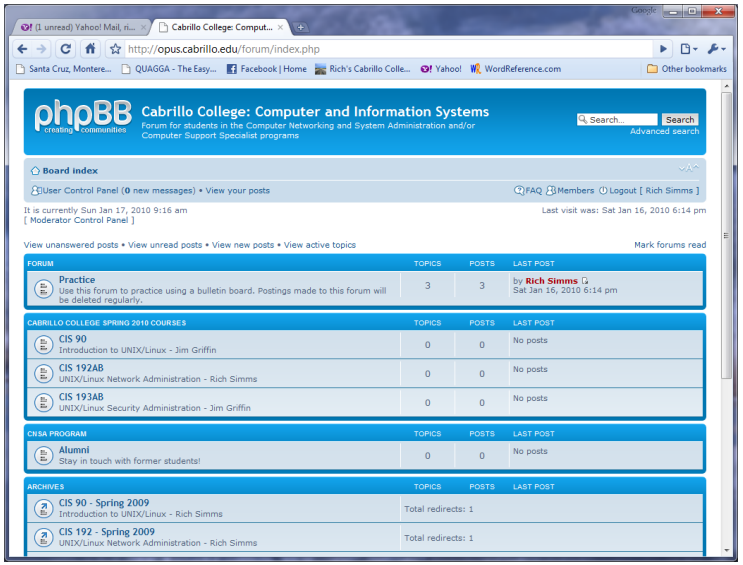
Course Home Grades

(content subject to change)

Lesson	Date	Topics	Chapter	Due
1	2/8	**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 • Learn first commands and how to navigate between terminals • Use a remote Linux server • Use Linux running on a local virtual machine **Materials** • Presentation slides (download) • Logins Sheet (download) • CIS VLab RDP file: (download) **Supplemental** • Howto #103: Installing PuTTY (download) • Video #100: Remote Putty login to Opus (view) **Assignment** • Student Survey • Lab 1 **CCC Confer** • Enter virtual classroom • Class archives	1.1-1.15 (Gilley) 2.4.5, p113-115, p164-172 (Hahn)	
2	2/15	**Quiz 1** **Commands** • Understand 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 documentation when online **Materials** • Presentation slides (download) • Howto #106: Configuring Putty (download)	2.3-2.7 2.11 3.7-3.20 4.19-4.22 9.1-9.2 (Gilley)	Lab 1 Student Survey

Help Forum

Online Help Forum

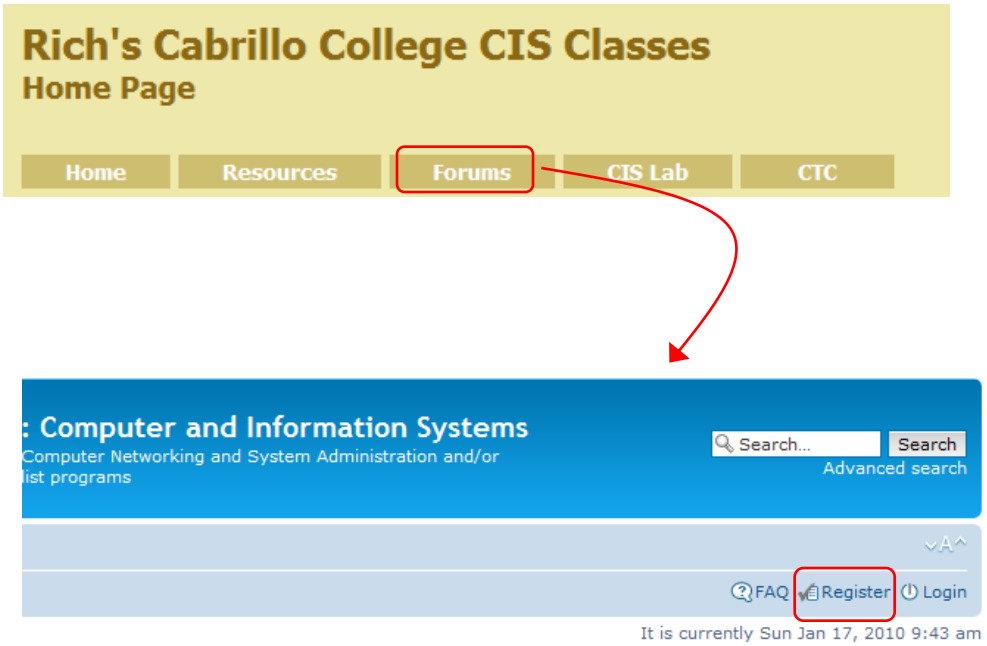


- Post questions and answers
- Collaborate on lab assignments
- Share UNIX/Linux information
- Post class notes for classmates who miss class
- Get clarifications
- Collaborate on quiz questions
- Never post passwords!

As an incentive to use the forum - students can earn 4 points per CIS 90 forum post (capped at 20 points for each ¼ of the course calendar)

Class Activity
Forum Registration

*There is a Forums link on **simms-teach.com***

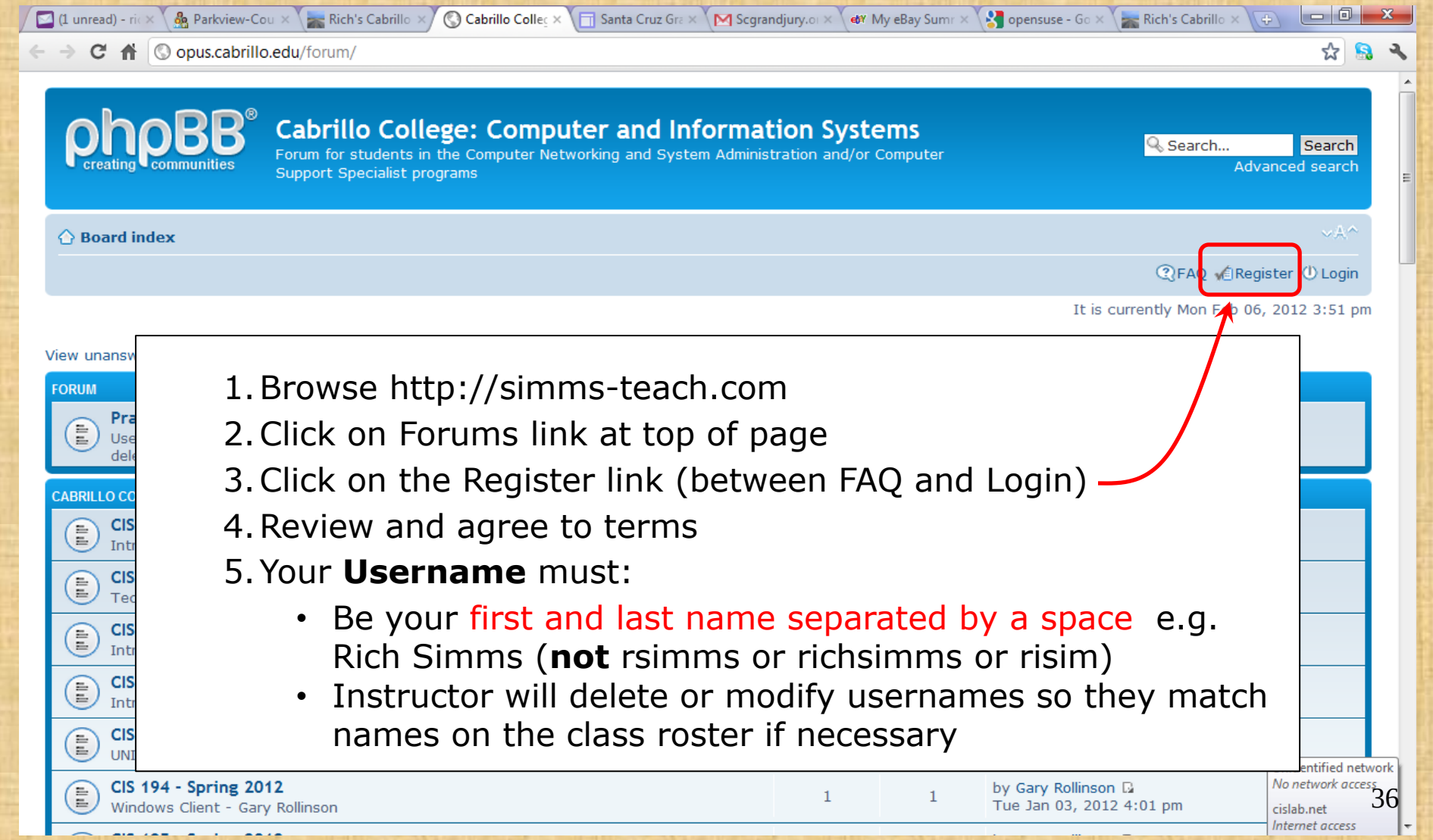


To Register:

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. Rich Simms
   - match a name on the class roster

Note: If you have already registered you don't need to do it again. If your username is incomplete or does not match a name of the class roster it will be modified or deleted by the instructor.

Class Activity



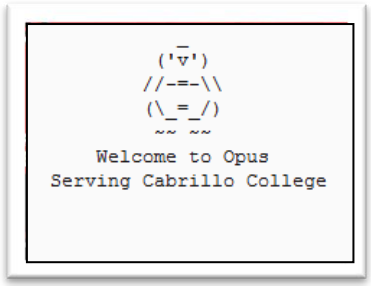
1. Browse http://simms-teach.com
2. Click on Forums link at top of page
3. Click on the Register link (between FAQ and Login)
4. Review and agree to terms
5. Your **Username** must:
   - Be your first and last name separated by a space e.g. Rich Simms (**not** rsimms or richsimms or risim)
   - Instructor will delete or modify usernames so they match names on the class roster if necessary

Lab Assignments

CIS 90 Lab Resources

Building 1300

Red Hat Enterprise Linux



Opus

95% of the work we do in CIS 90 will be on Opus.

The other VMs are available for exploring other Linux distributions.

All systems can be accessed from anywhere over the Internet.

CTC Room 1403

Debian

Kate

CentOS

Not-Opus

Ubuntu

Mr-Eko

OpenSUSE

Fang

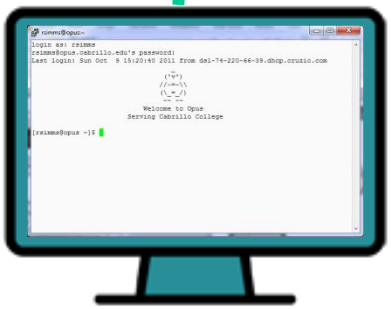
Lab Resources

Remote Access to **Opus**

Building 1300 on Aptos Campus

Red Hat Enterprise Linux Server

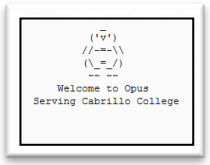
Internet



You can access the Opus server from home or the CTC using SSH (Secure Shell protocol)

Home

CTC



Opus

Lab Resources

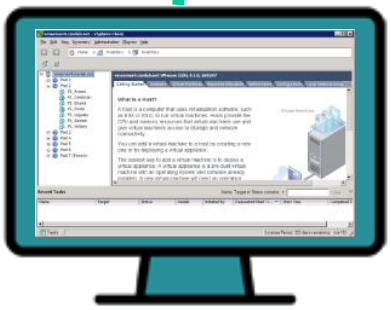
Remote Access to **CIS VLab**

Room 1403 on Aptos Campus

Internet

cislab (Win 2008)

vmserver4 (VMware ESXi)



You can access the course VMs from home or the CTC using RDP (Remote Desktop Protocol)

Home

CTC

MrEko

NotOpus

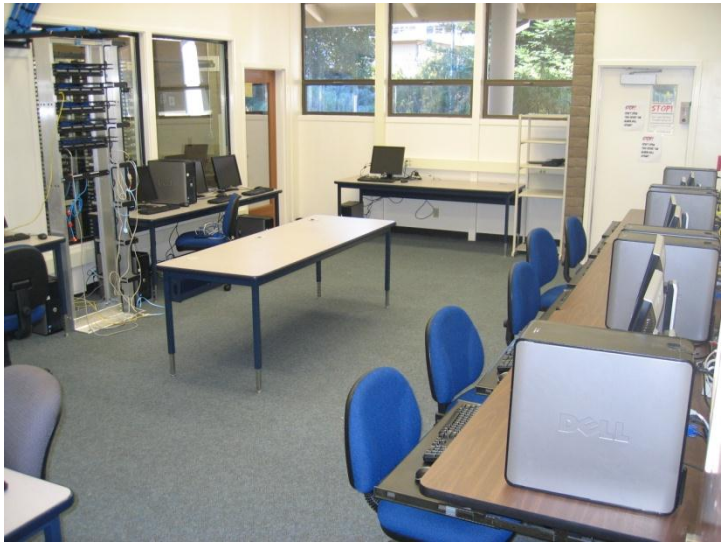
Fang

Kate

Lab Resources – CIS Lab

CIS Lab now in the CTC Building 1400

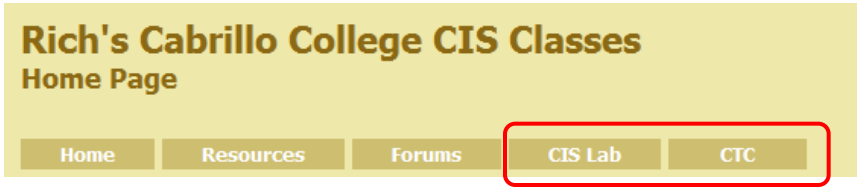
There are ten stations (labeled CIS-Lab-XX) in the CIS Lab for use by CIS students.



Each station has:

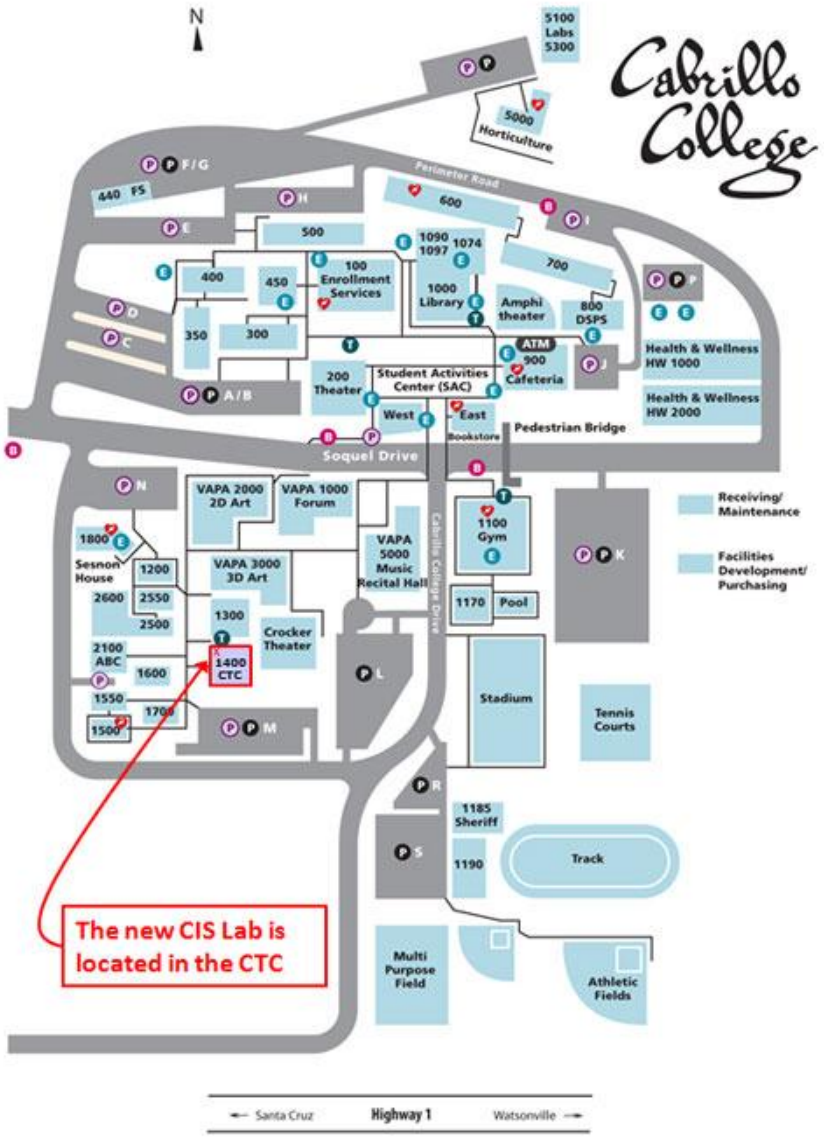
- Putty (for Opus access)
- RDP access to VLab VMs

Instructors and Lab Assistants are available (see schedule) to help students with lab assignments

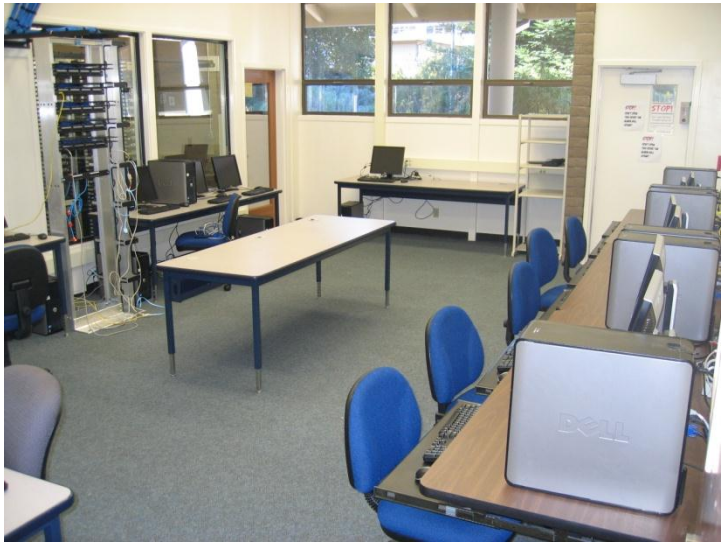


Use these links to get the schedule and hours of operation

Lab Resources – CIS Lab



The CIS Lab is inside the CTC (Building 1400)

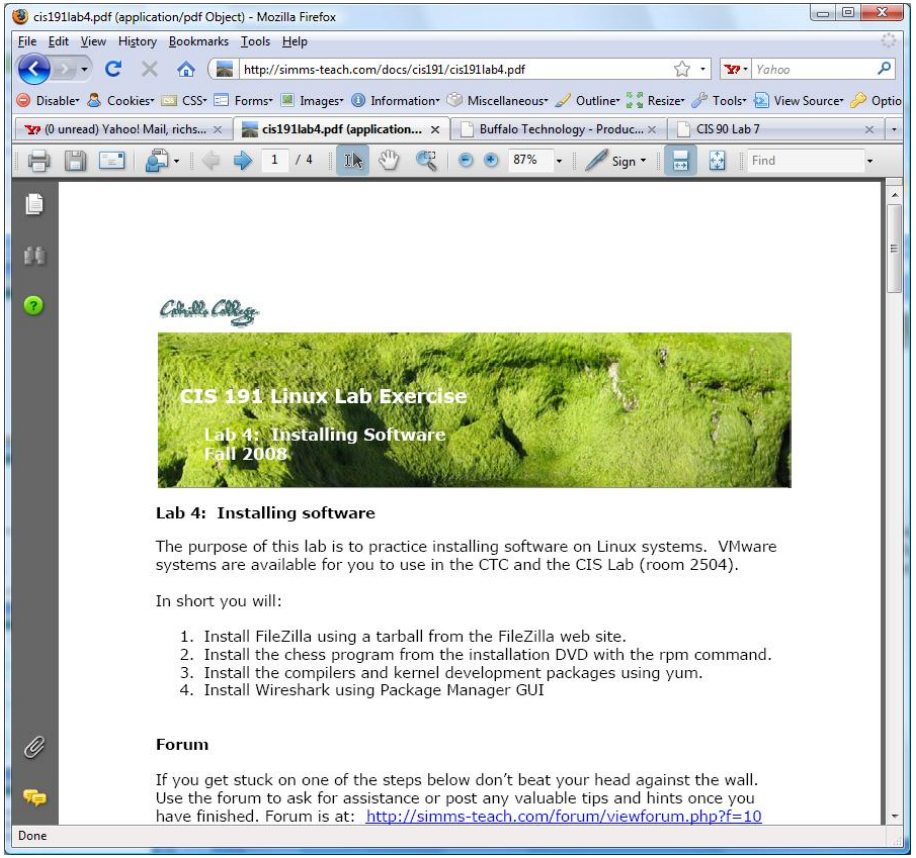


http://simms-teach.com/cis90calendar.php

1	2/8	• Presentation slides (download) • Logins Sheet (download) • CIS VLab RDP file: (download) **Supplemental** • Howto #103: Installing PuTTY (download) • Video #100: Remote Putty login to Opus (view) **Assignment** • Student Survey • Lab 1 **CCC Confer** • Enter virtual classroom • Class archives	2,4,5, p113-115, p164-172 (Hahn)	
2	2/15	**Quiz 1** **Commands** • Understand 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 documentation when online **Materials**	2.3-2.7 2.11 3.7-3.20 4.19-4.22 9.1-9.2 (Gillay)	Lab 1 Student Survey

Note: The first lab assignment and student survey is due by 11:59PM one week from today!

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.
- Use Google when trouble-shooting
- **Late work is not accepted** so submit what you have for partial credit.

Login Credentials

Usernames and passwords

Passwords

Turn OFF the recording

Logins and Passwords for CIS 90

Class Computer:

Username: _____

Password: _____

CIS-Lab-XX PC's (in the CIS Lab)

Username: _____

Password: _____

Help Forum (http://opus.cabrillo.edu/forum)

Username: _____

Password: _____

Opus (opus.cabrillo.edu)

Username: _____

Password: _____

VLab (cislab.cabrillo.edu)

Username: _____

Password: _____

VLab VMs (Kate, Mr-Eko, Not-Opus)

Username: _____ Password: _____

Username: _____ Password: _____

This Logins sheet can be downloaded from the website.

See Lesson 1 materials on the Calendar page.

Contact the instructor at risimms@cabrillo.edu for your credentials if you miss this presentation.

Logins and Passwords for CIS 90

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Username: _____

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Username: _____

Password: _____



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Username: _____ Password: _____

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Contact the instructor at risimms@cabrillo.edu for your credentials if you miss this presentation.

Passwords

Turn recording back ON

Using Opus

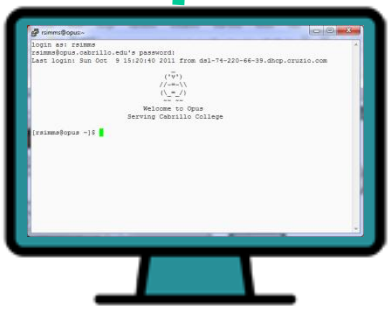
Lab Resources

Remote Access to **Opus**

Building 1300 on Aptos Campus

Red Hat Enterprise Linux Server

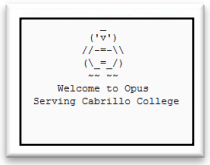
Internet



You can access the Opus server from home or the CTC using SSH (Secure Shell protocol)

Home

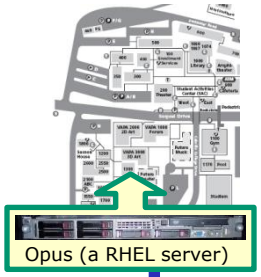
CTC



Opus

Why we use SSH instead of Telnet

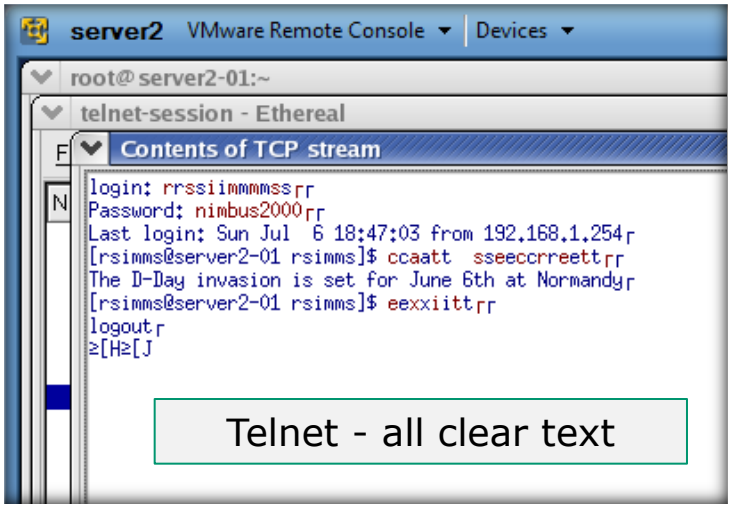
Remote computer



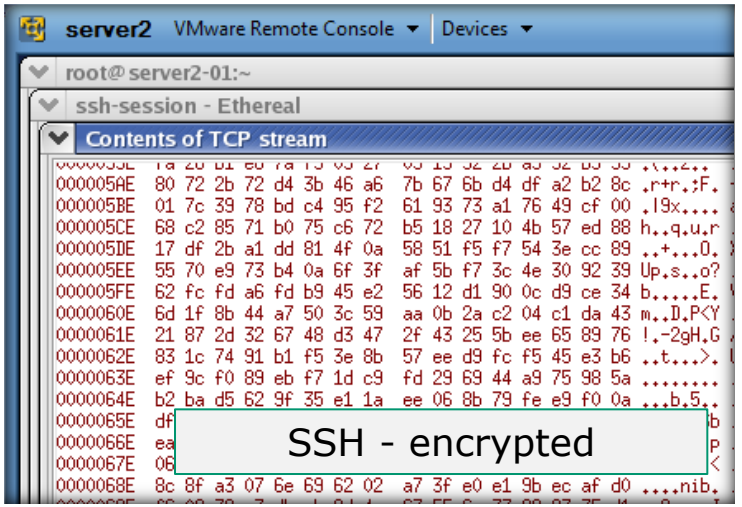
Picture credit:
http://www.cs.umd.edu/faq/ssh.html

SSH is a network protocol that enables secure connections between computers

Sniffer view of a Telnet session



Sniffer view of a SSH session



Local computer

With telnet, everything is transferred in clear text over the network

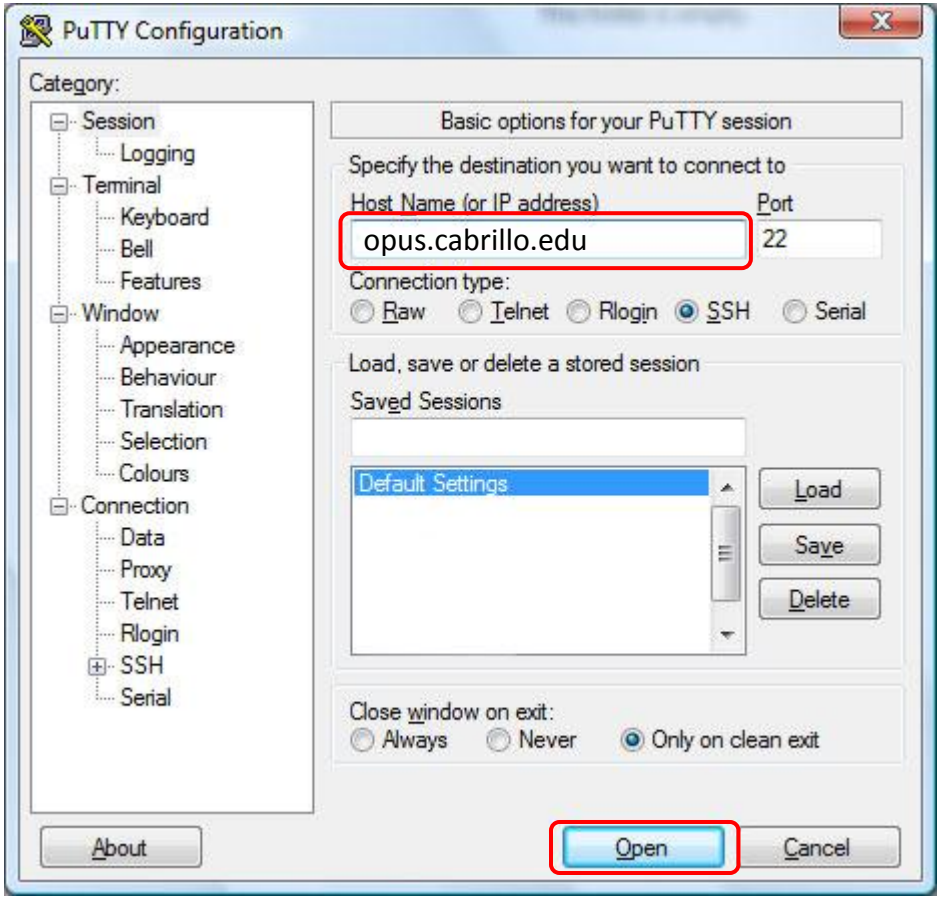
With ssh, it is encrypted. This is how we will access all remote systems in CIS 90.

Accessing UNIX/Linux systems over the network

- Linux and Mac have SSH built in
- Windows does not include SSH
- Putty is a free download for adding SSH to Windows
- We will be using Putty this term on the Windows classroom systems to access Opus
- You can also install Putty on Windows at home to access Opus

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

Using Opus from Windows PC

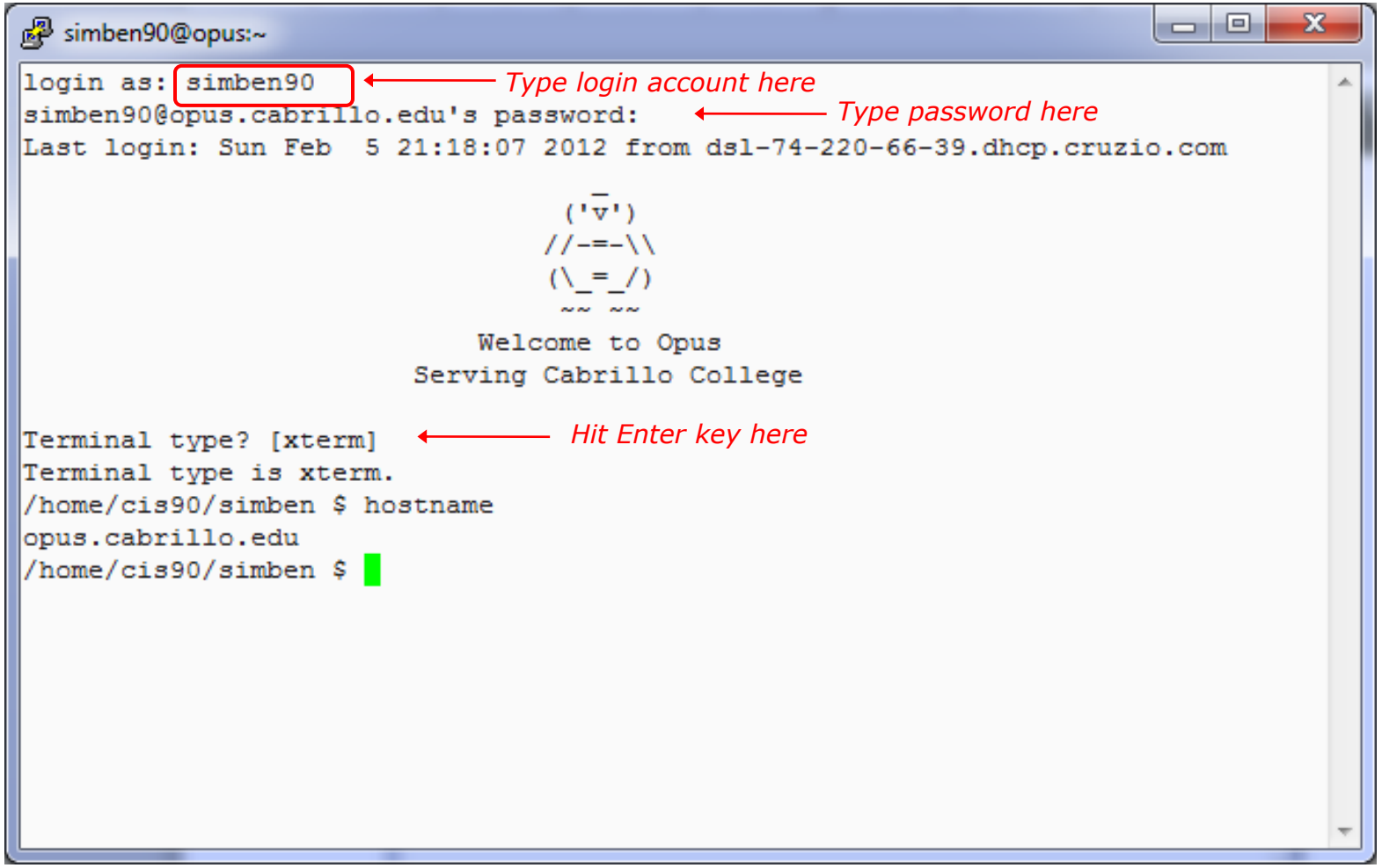


Students with Windows PC's will use PuTTY to connect to opus.cabrillo.edu

For more information:
http://simms-teach.com/howtos/133-win-opus-access.pdf
http://www.youtube.com/watch?v=Wnu734GKMQI

Using Opus

The Opus RHEL Server



Example showing Benji Simms logging into Opus

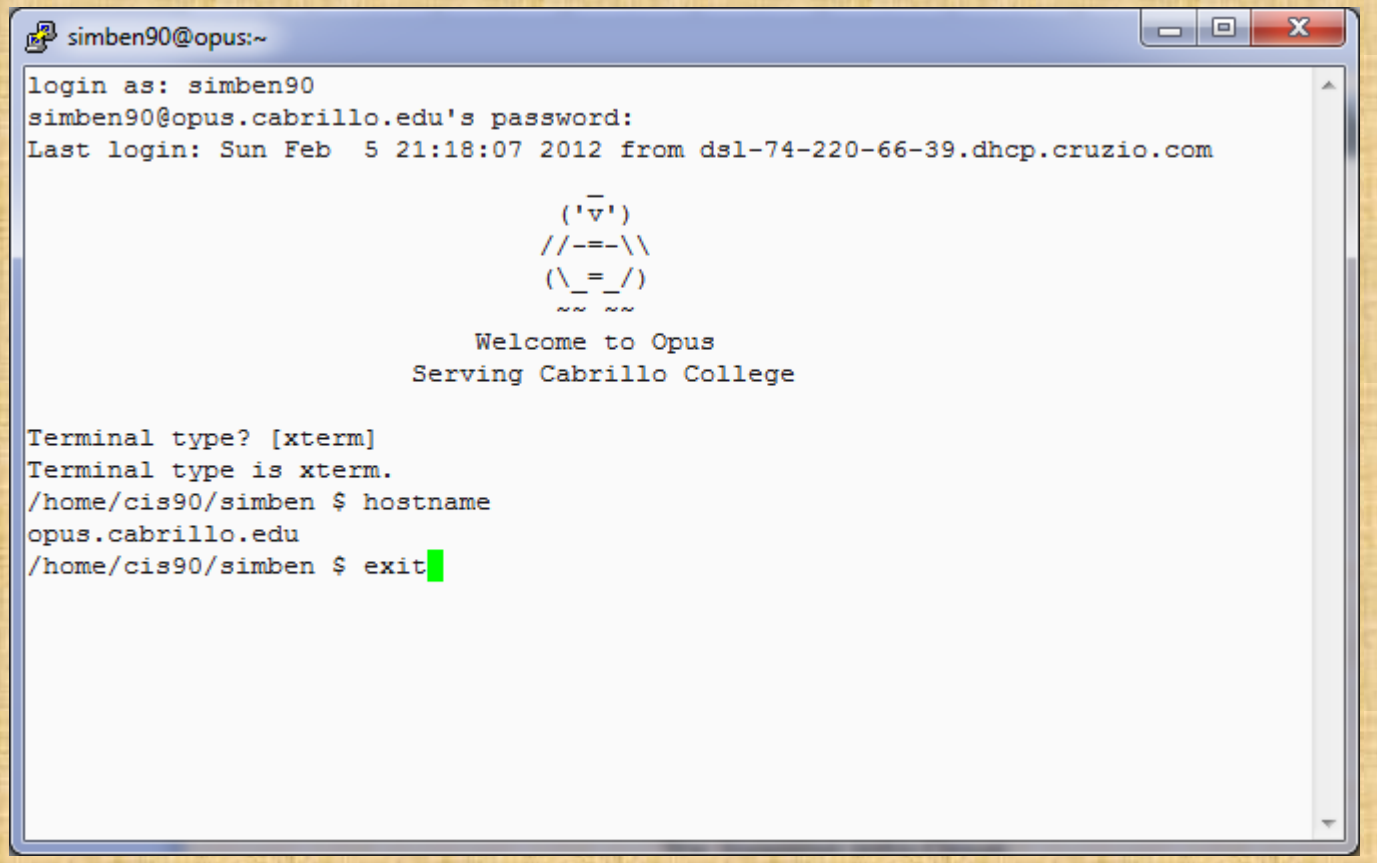
Using Opus from Mac or Linux

ssh *username*@**opus.cabrillo.edu**

Students with Macs or Linux computers will use the ssh command from a terminal.

For more information:
http://simms-teach.com/howtos/students/opus-and-macs-sreckovic.pdf

Class Activity



Try logging into Opus with your own credentials

- Use **hostname** command
- Use **exit** command

Using VLab

Lab Resources

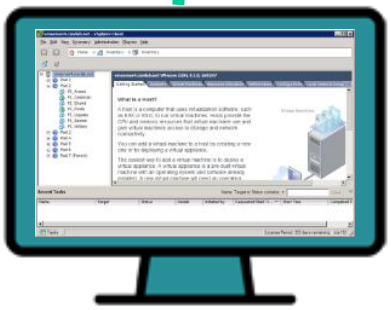
Remote Access to **CIS VLab**

Room 1403 on Aptos Campus

Internet

cislab (Win 2008)

vmserver4 (VMware ESXi)



You can access the course VMs from home or the CTC using RDP (Remote Desktop Protocol)

Home

CTC

MrEko

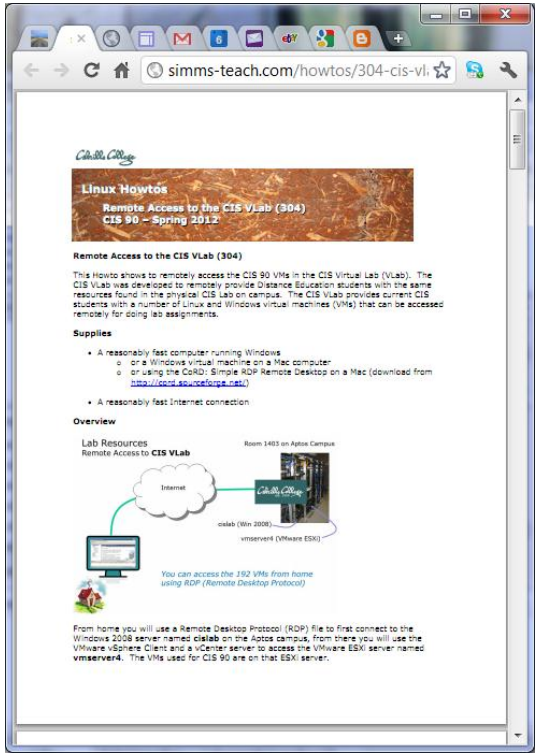
NotOpus

Fang

Kate

VLab Howto

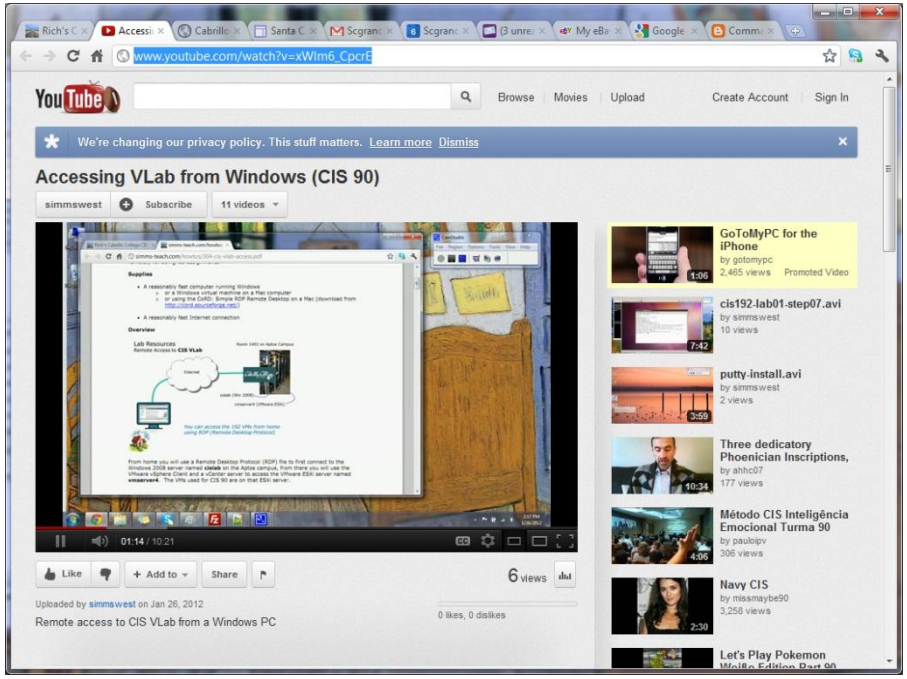
Howto #304: Accessing VLab
http://simms-teach.com/howtos/304-cis-vlab-access.pdf



Documents how to access CIS VLab

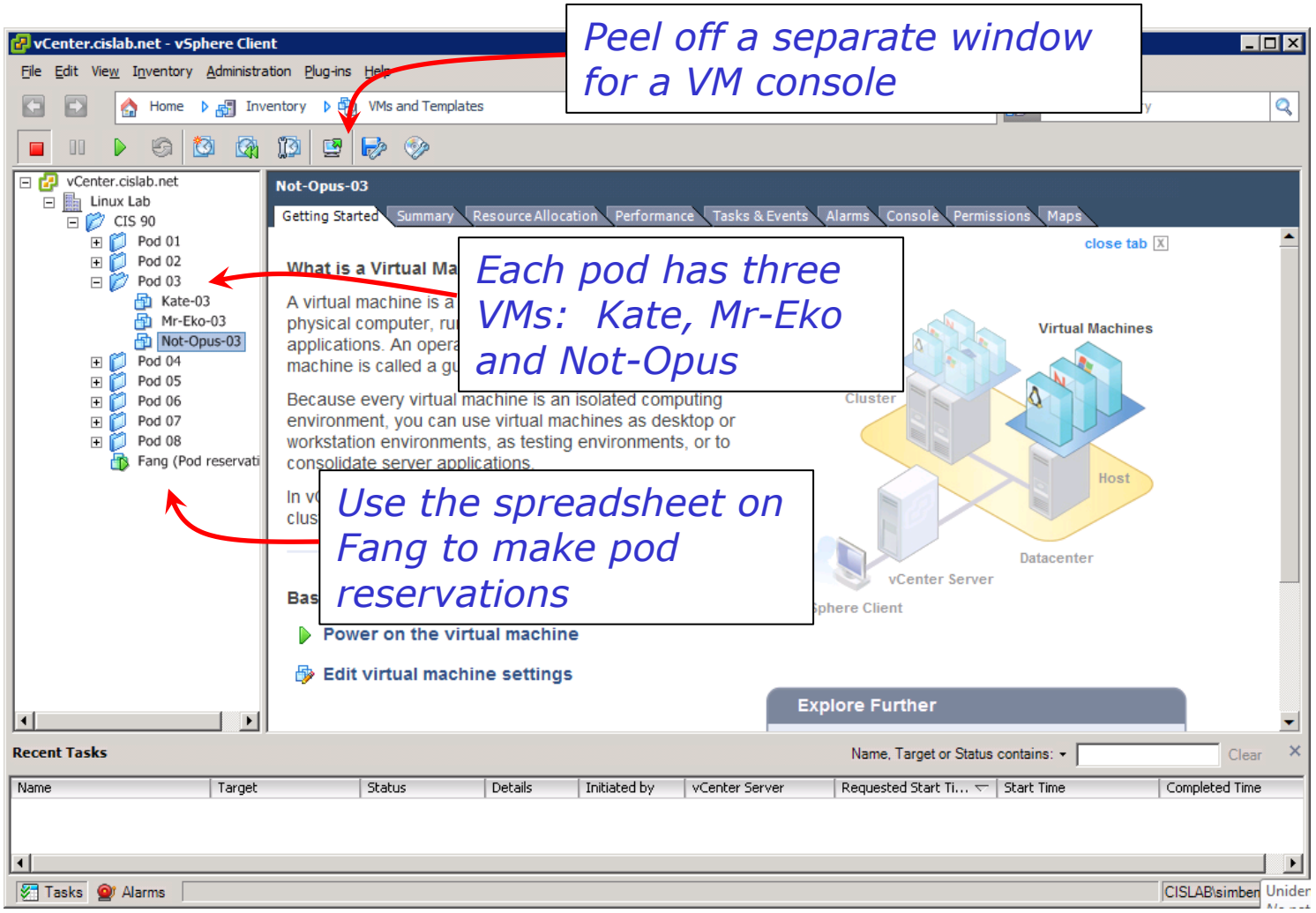
VLab Video

Accessing VLab from Windows (video)
http://www.youtube.com/watch?v=xWlm6_CpcrE



Shows how to access CIS VLab

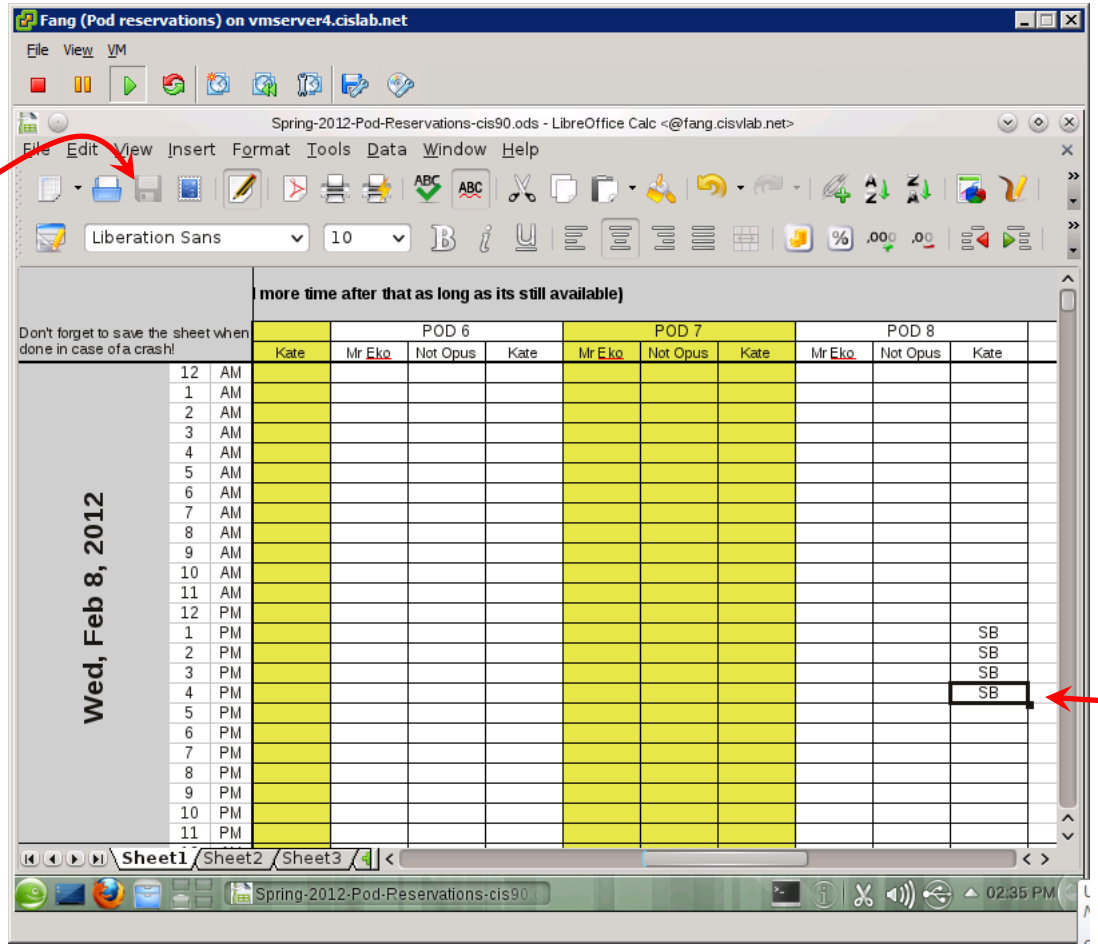
CIS VLab



VMware vSphere Client

The Fang VM (openSUSE)

It's a good idea to save the spreadsheet after you make your changes

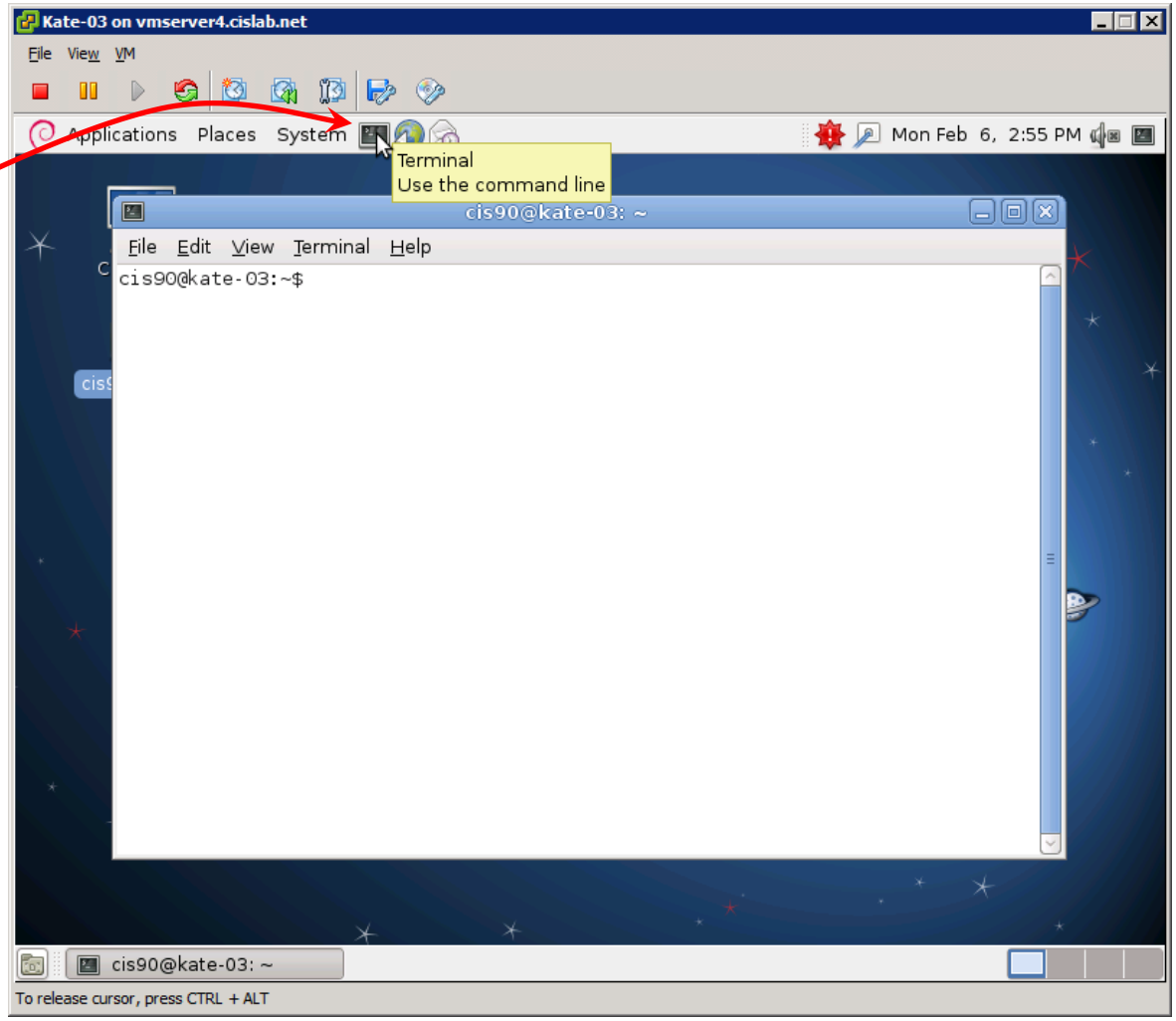


Type your initials into the spreadsheet cells to indicate the date, time and VMs you wish to reserve.

Don't shut down this VM or close the spreadsheet.

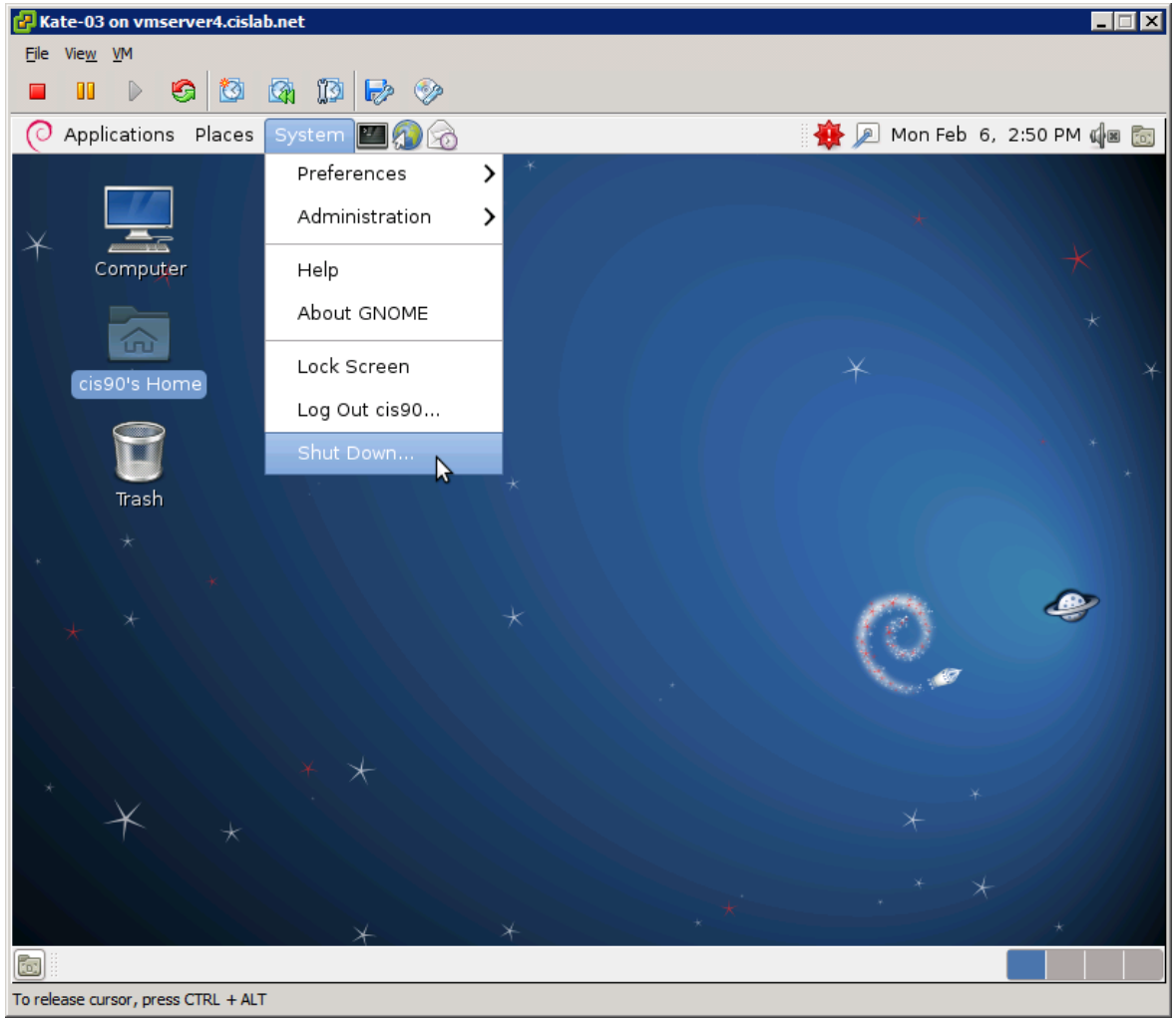
The Kate VM (Debian)

Terminal icon



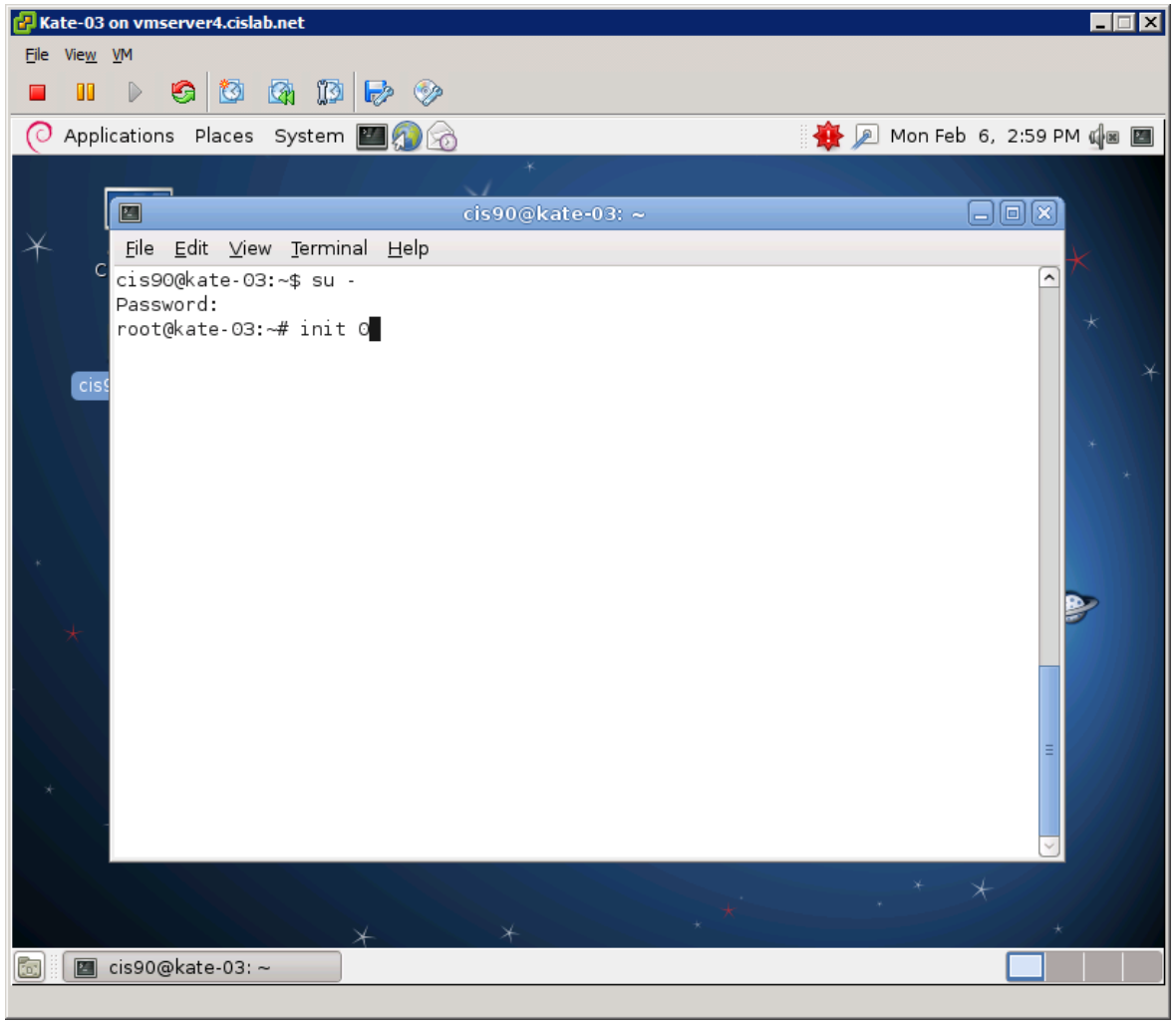
Click the Terminal icon on the panel to run a graphical terminal

The Kate VM (Debian)



To shutdown: System > Shut Down...

The Kate VM (Debian)

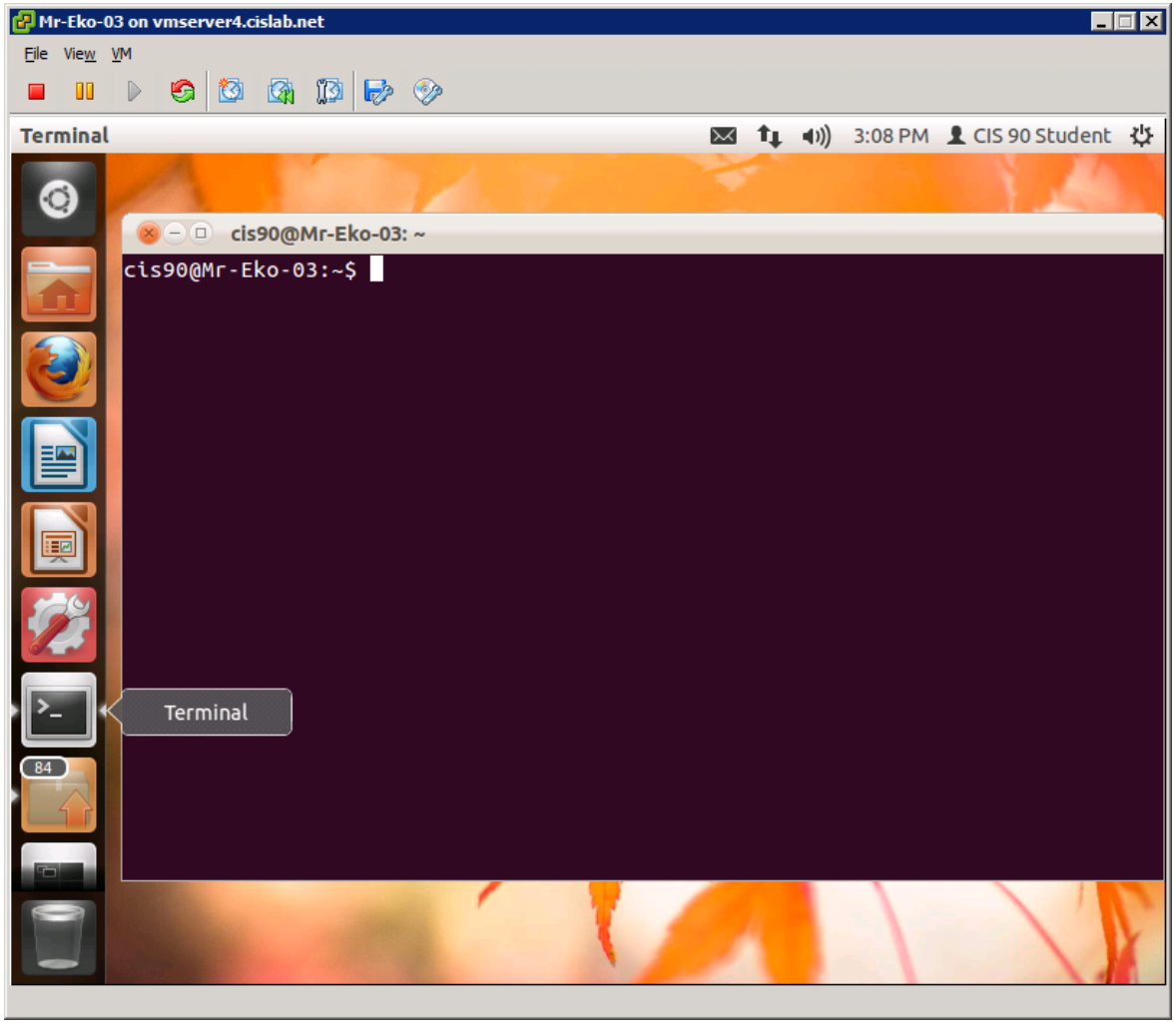


Use **su -** command to become root user

Another way to shutdown: Become root user, then issue **init 0** command

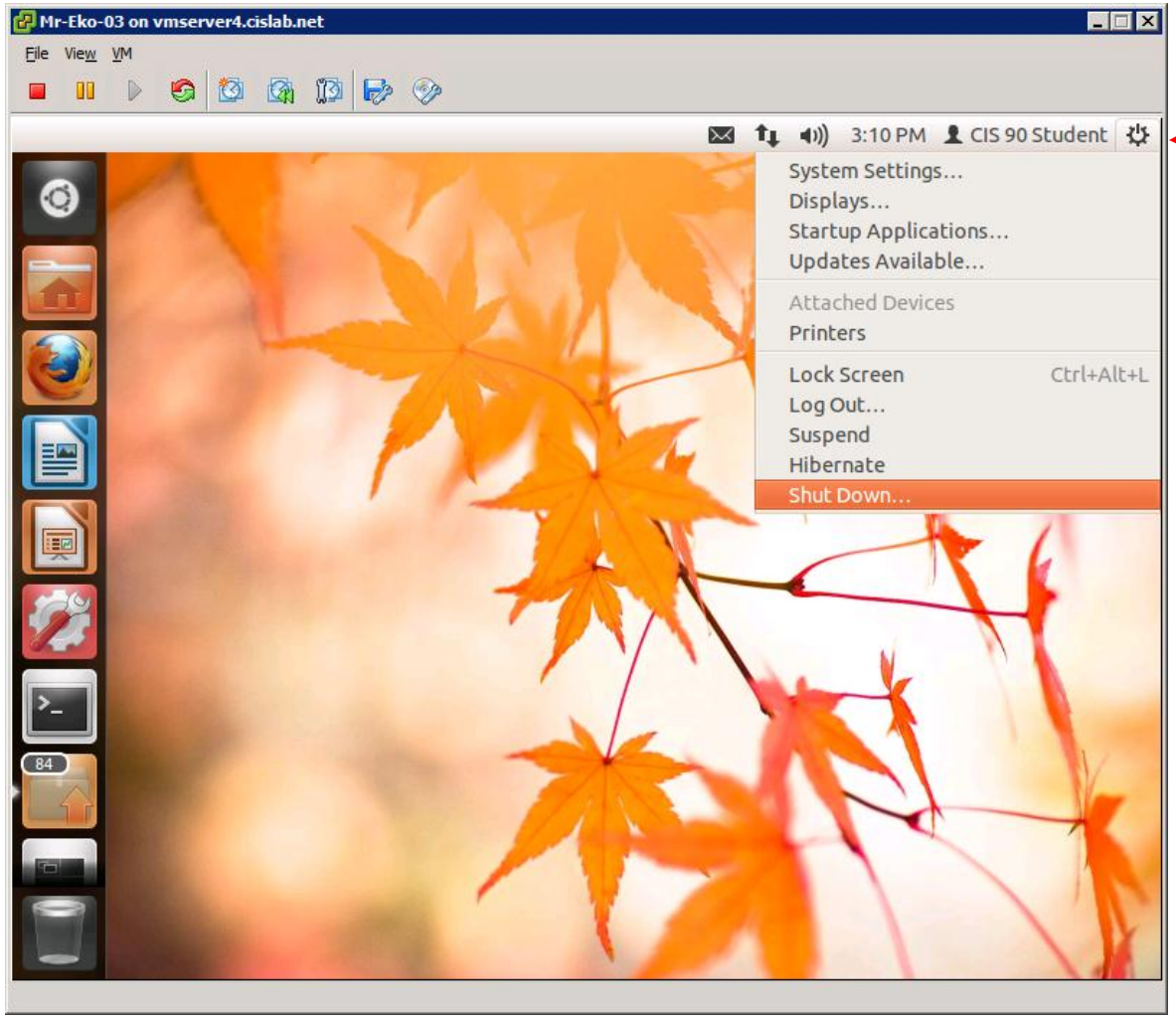
The Mr-Eko VM (Ubuntu)

Terminal icon



Click the Terminal icon on the panel to run a graphical terminal

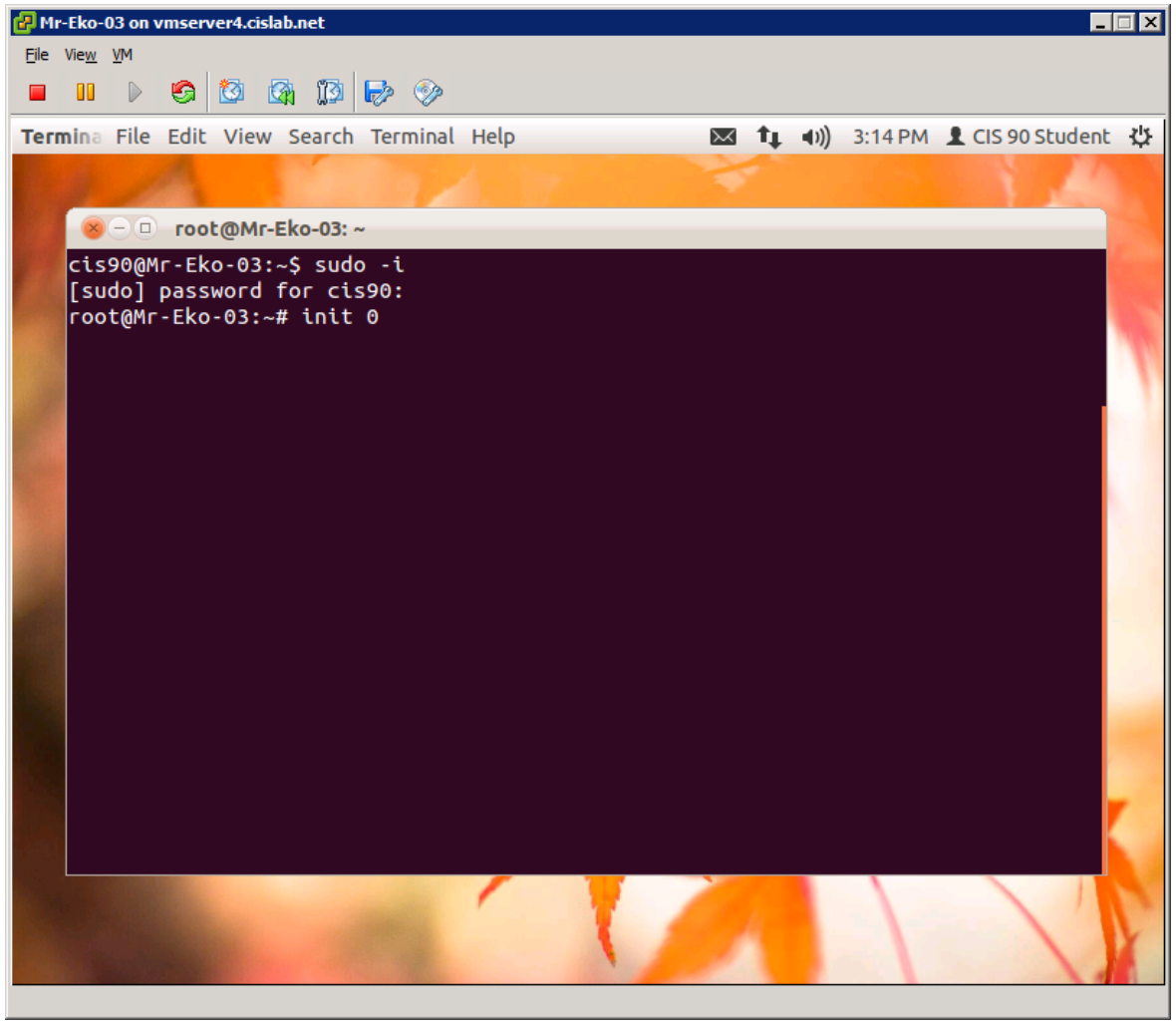
The Mr-Eko VM (Ubuntu)



Power icon

To shutdown: Click Power icon, then Shut Down...

The Mr-Eko VM (Ubuntu)

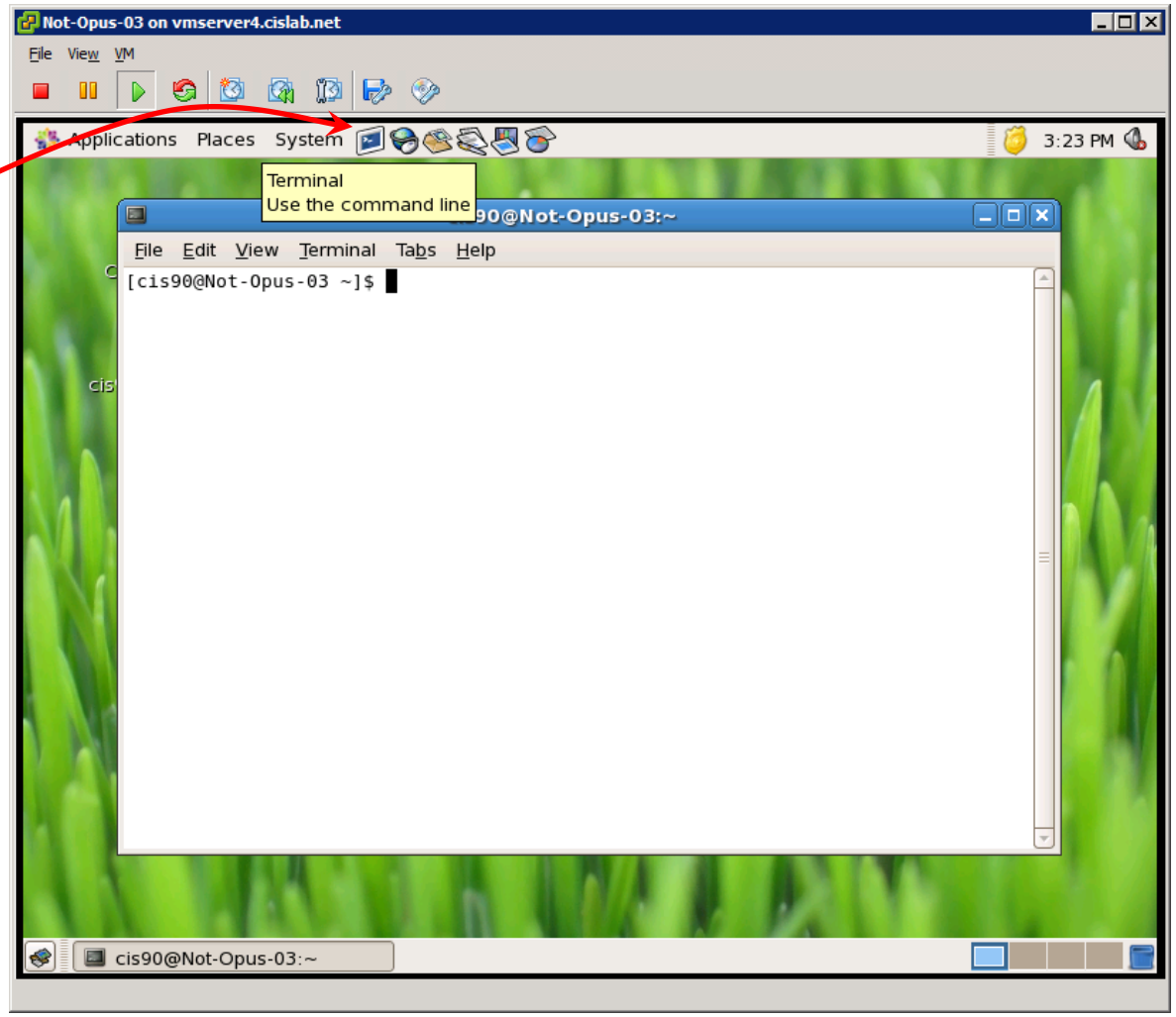


Use **sudo –i** command to become root user

Another way to shutdown: Become root user, then issue **init 0** command

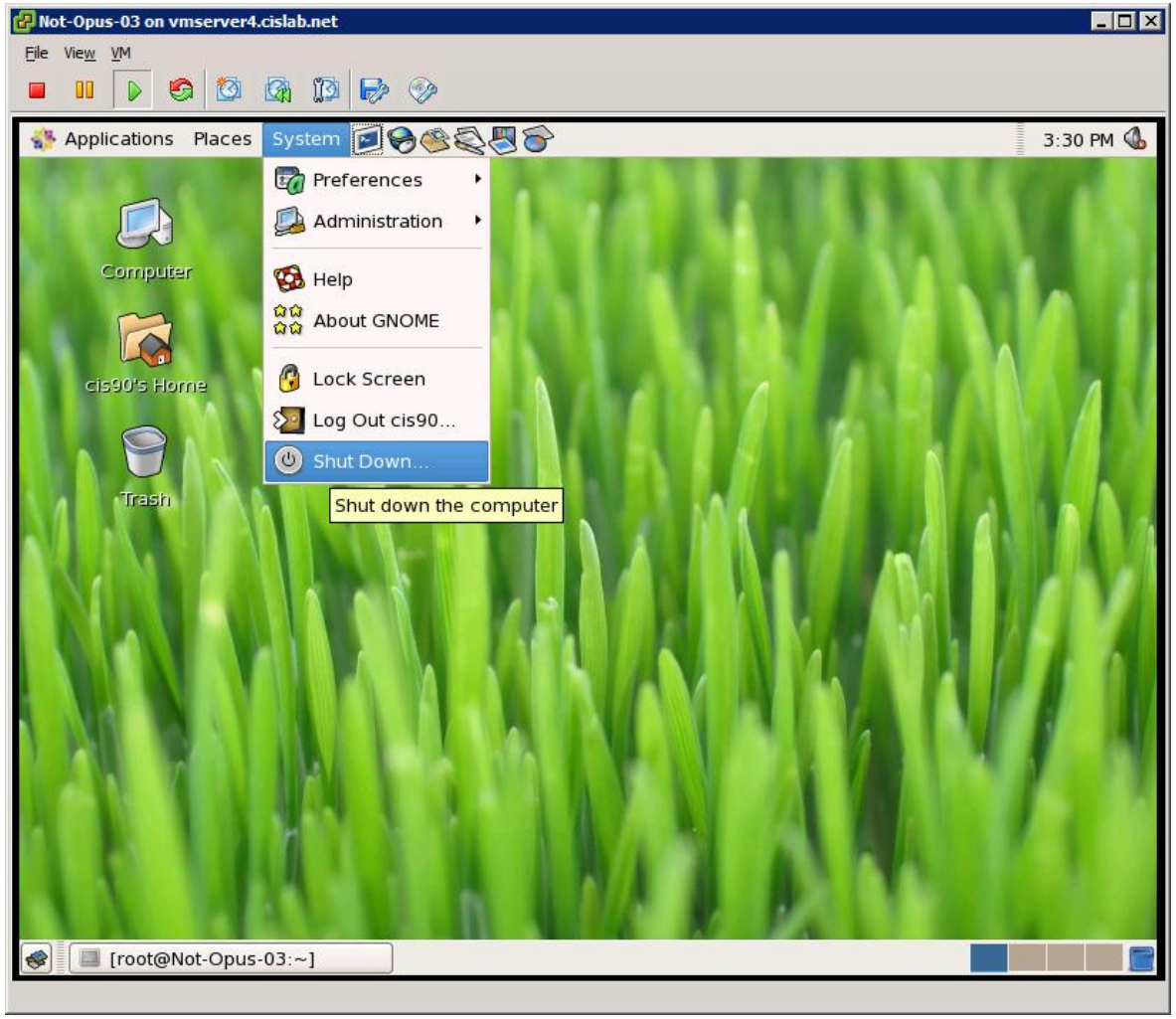
The Not-Opus VM (CentOS)

Terminal icon



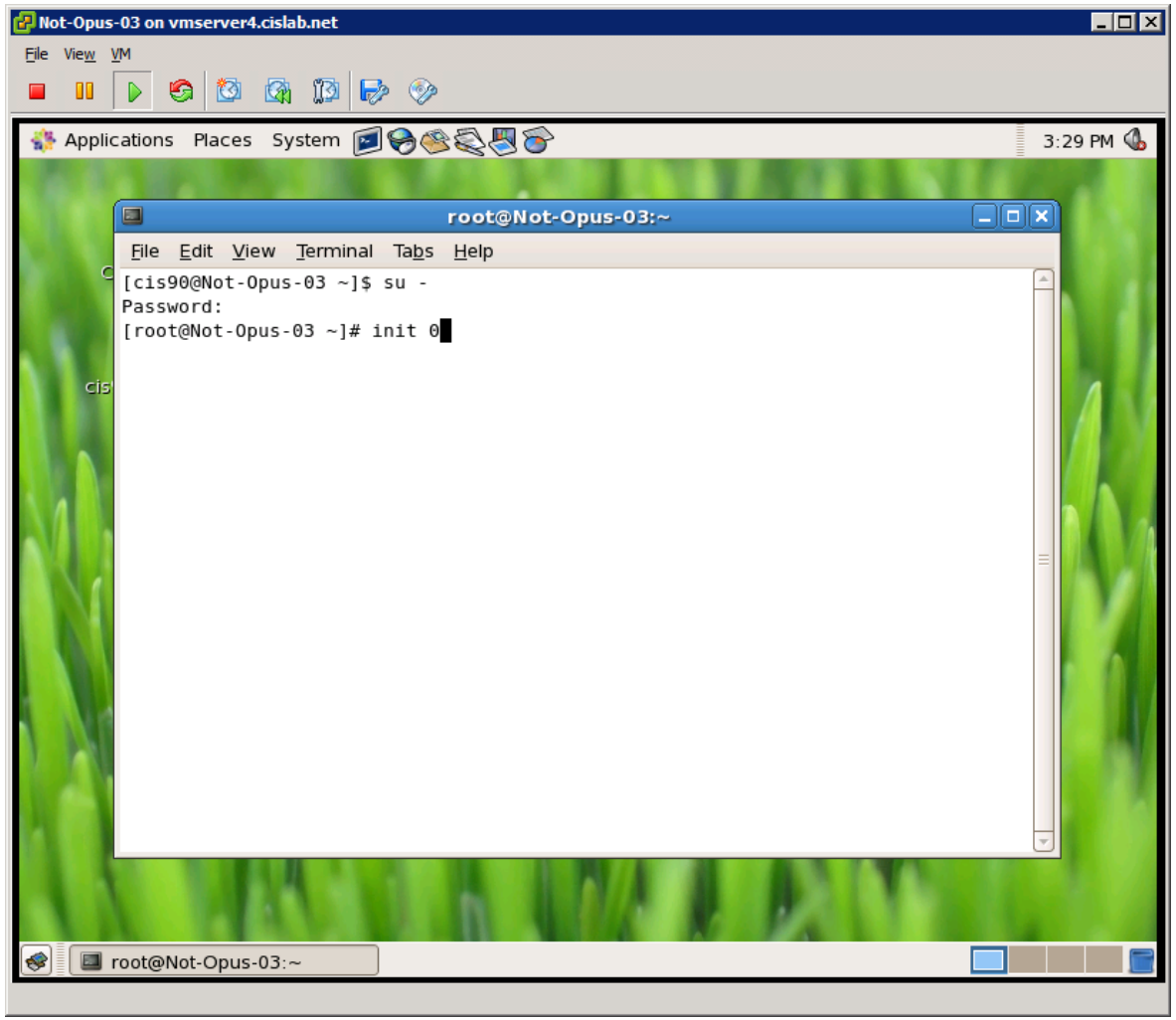
Click the Terminal icon on the panel to run a graphical terminal

The Not-Opus VM (CentOS)



To shutdown: System > Shut Down...

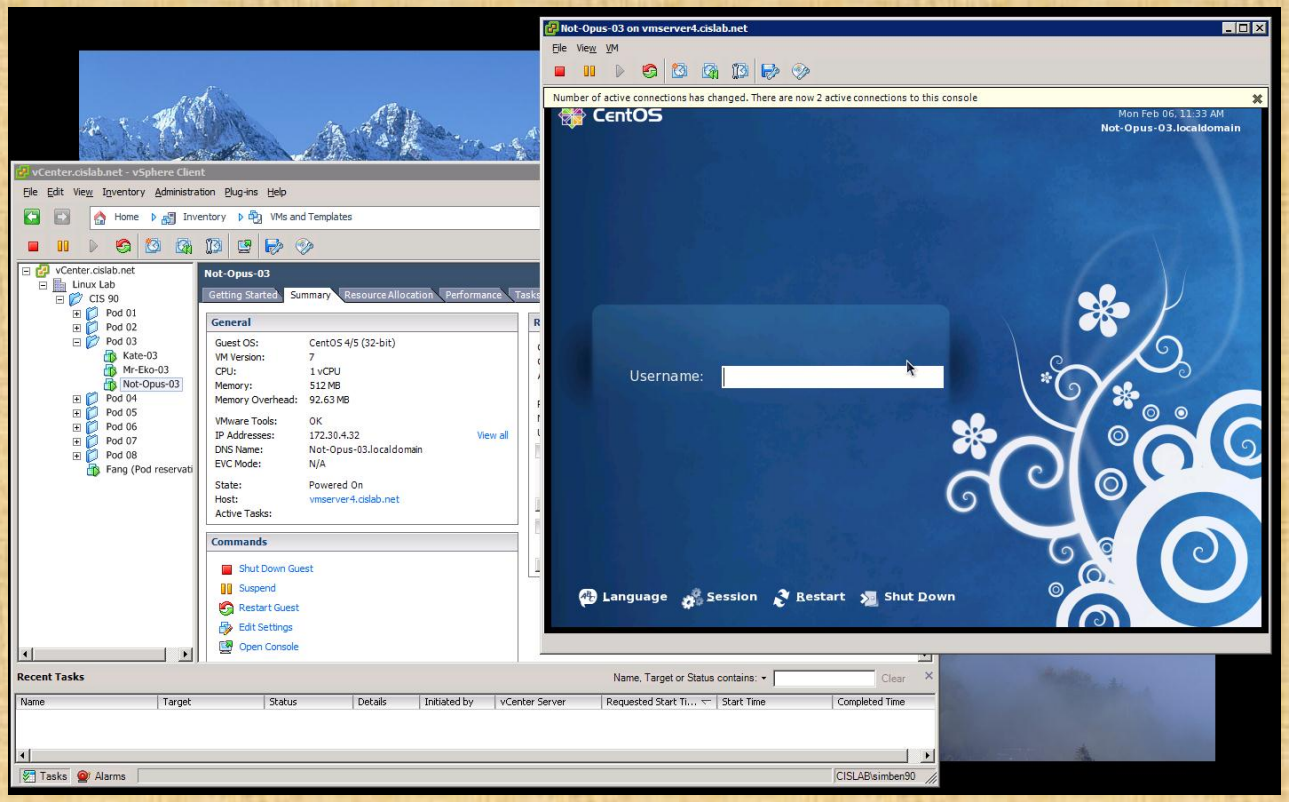
The Not-Opus VM (CentOS)



Use **su -** command to become root user

Another way to shutdown: Become root user, then use **init 0** command

Class Activity



Try logging into CIS VLab with your own credentials

- View Pod reservations on Fang
- View one or more VMs
- Close VMware vSphere when finished

Housekeeping

Can I add this class?

- Maybe!
- The section is completely full and it may not be possible to add everyone.
- The instructor will email add codes to students after the first class meeting.
- The last day for students to add CIS 90 is Feb 18th.
- Enrolled and wait-listed students that don't show up for class will be dropped or lose their space on the wait list unless they have made prior arrangements with the instructor.

Roll Call for both sections

Turn OFF the recording

Roll Call

Roll Call for both sections

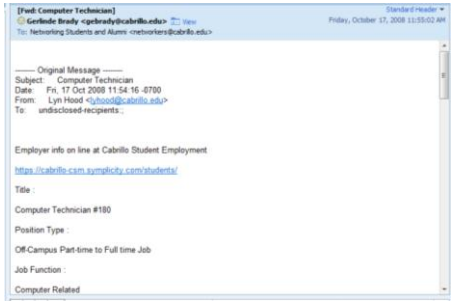
Turn recording back ON

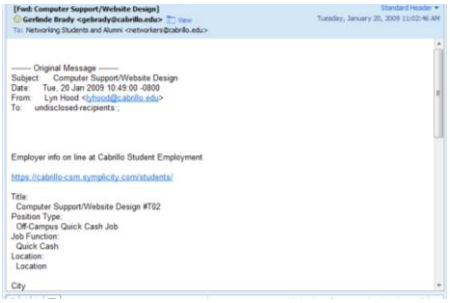
Cabrillo Networking Program Mailing list

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

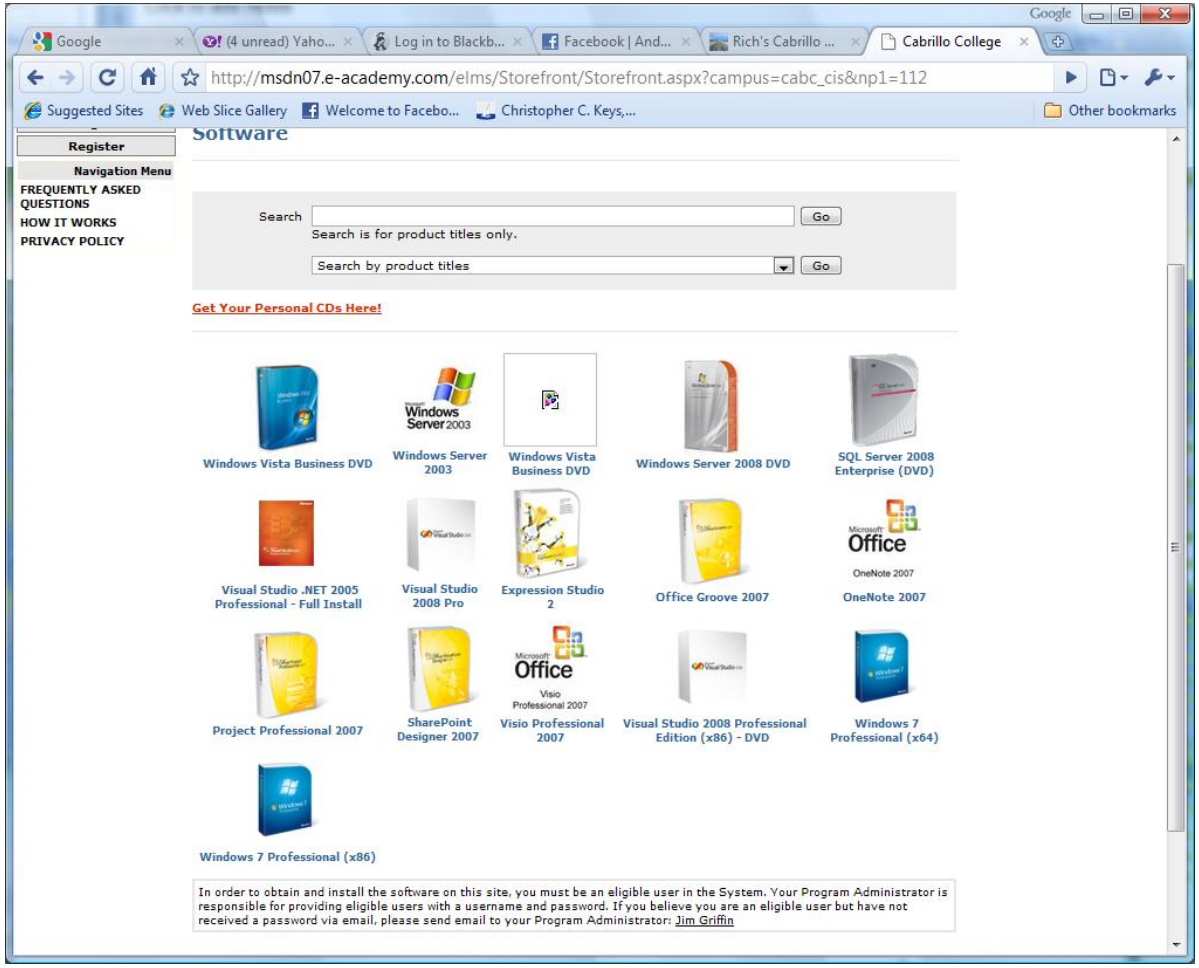
networkers-subscribe@cabrillo.edu

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





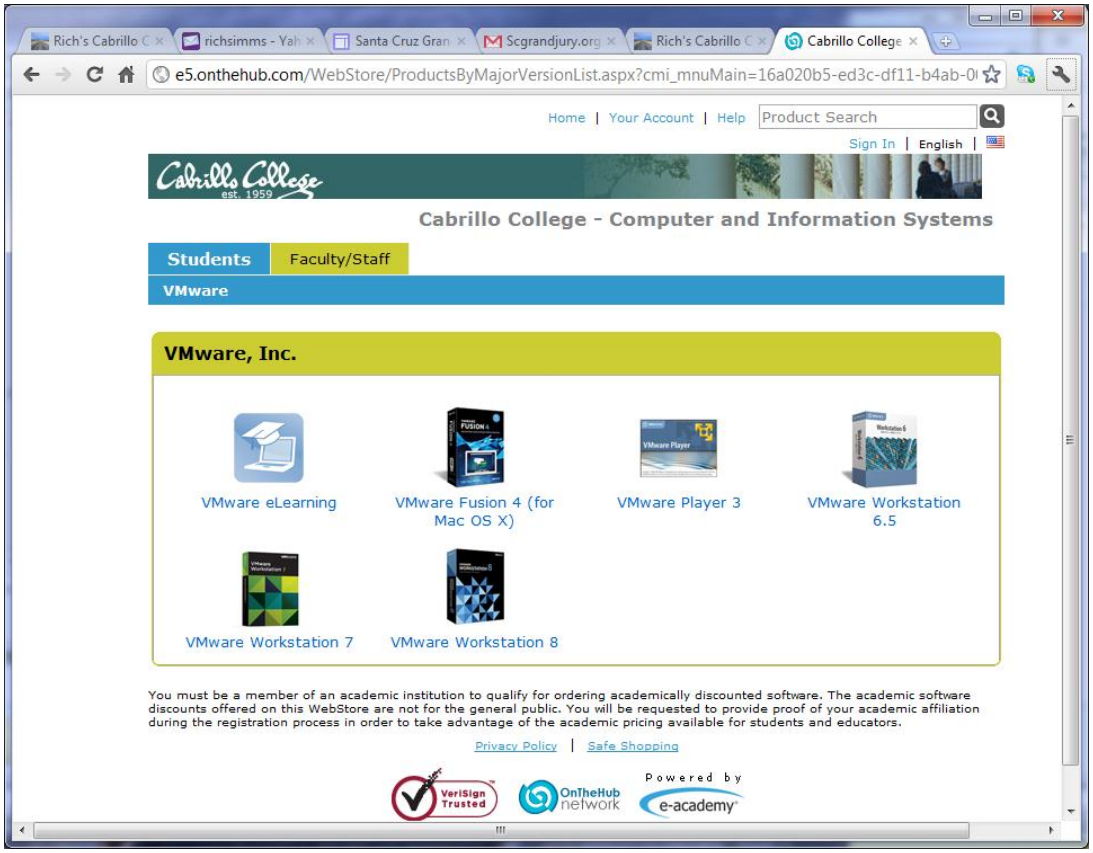
MSDN Academic Alliance



- 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



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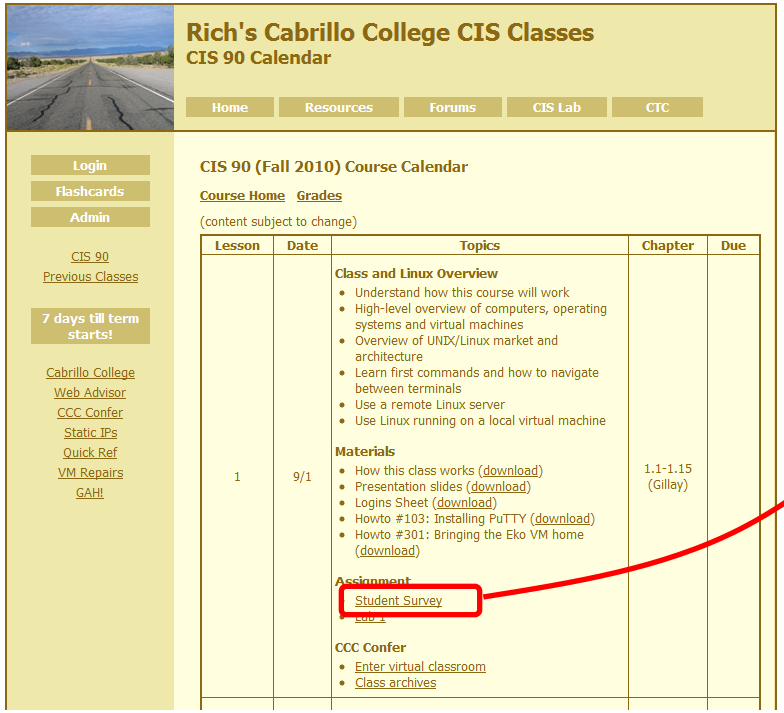
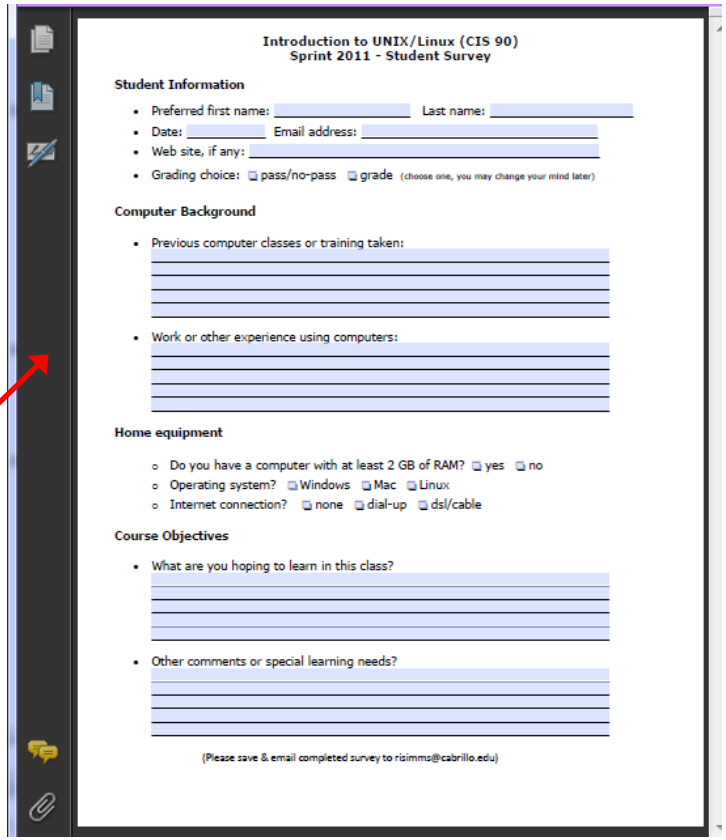
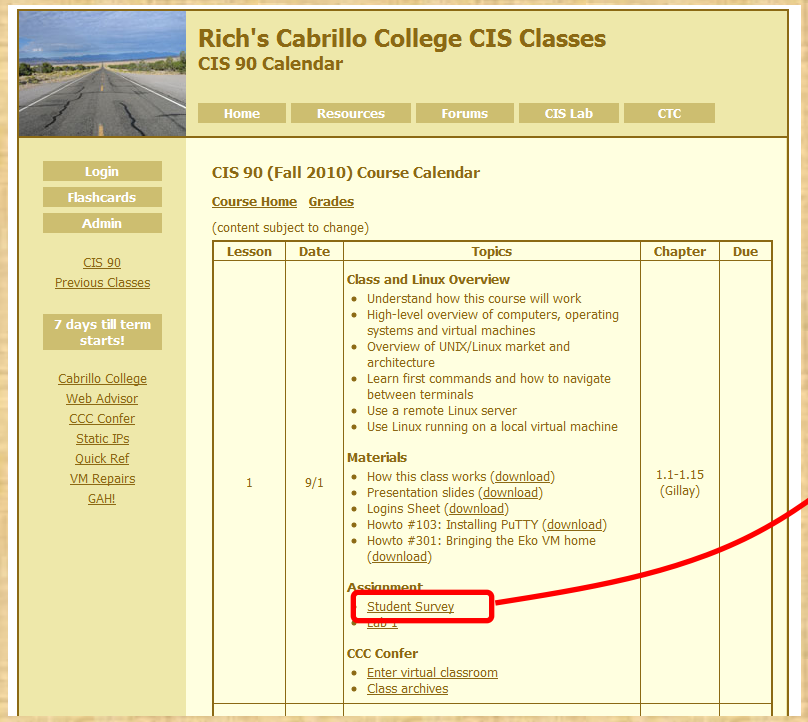
Student Survey

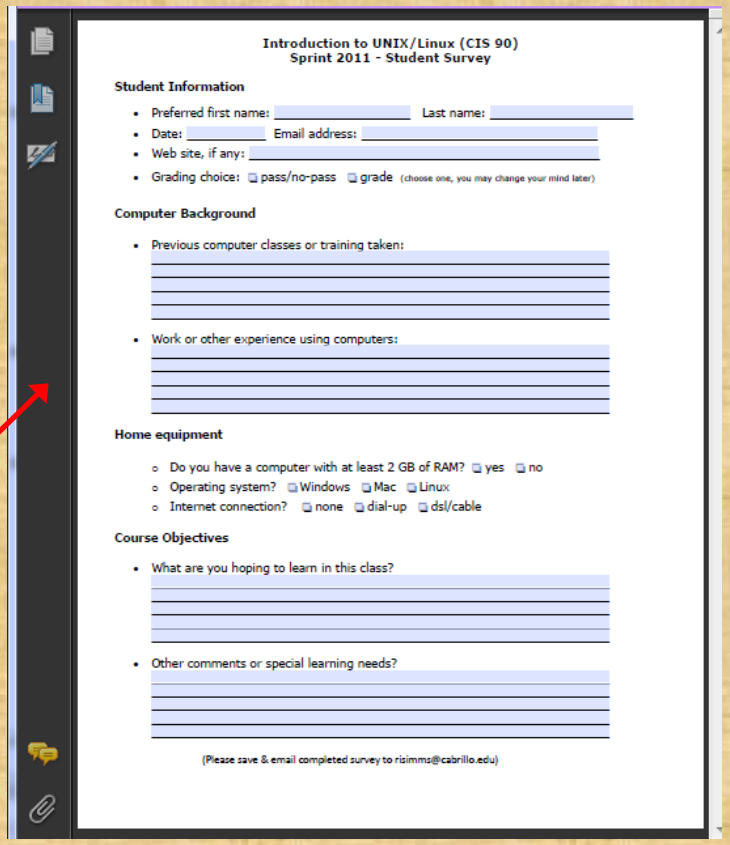




Please download survey, fill it out, save it, and email to risimms@cabrillo.edu

Class Activity





Make sure you can download the survey and fill it out. You can email the filled in form today (risimms@cabrillo.edu) or if you need more time you have till the due date next week.

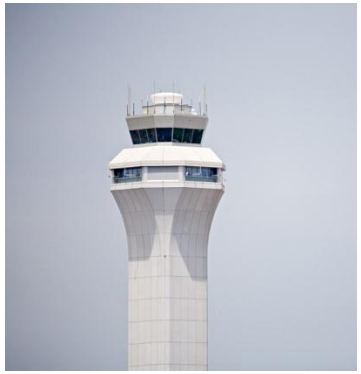
UNIX/Linux Market

Public Works Infrastructure

Roads

Water

Bridges



Airways

Power

Telecomunications

IT (Information Technology) Infrastructure

Network

Servers

Storage

Desktops

Mobile

Software

Computing Infrastructure
Where UNIX/Linux is used

- 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.
- Scientific applications and number-crunching
- Embedded in smartphones and other appliances

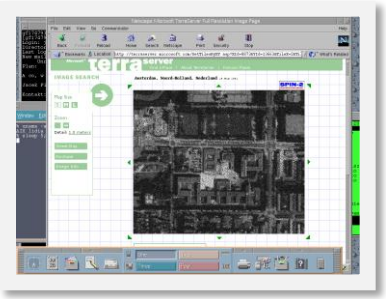
Operating Systems

Various UNIX Based Products

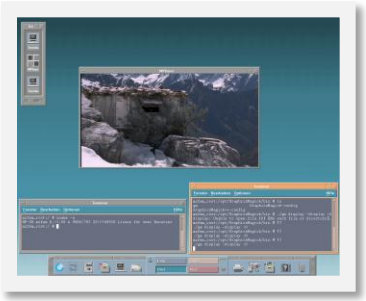
SCO UNIX

Berkeley Software Distribution

AIX



HP-UX



Solaris

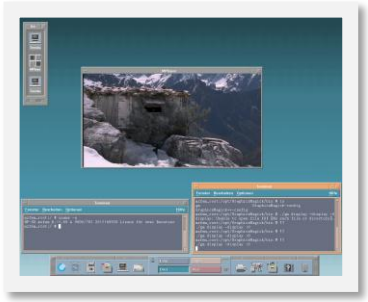
Apple Mac OS X and iOS

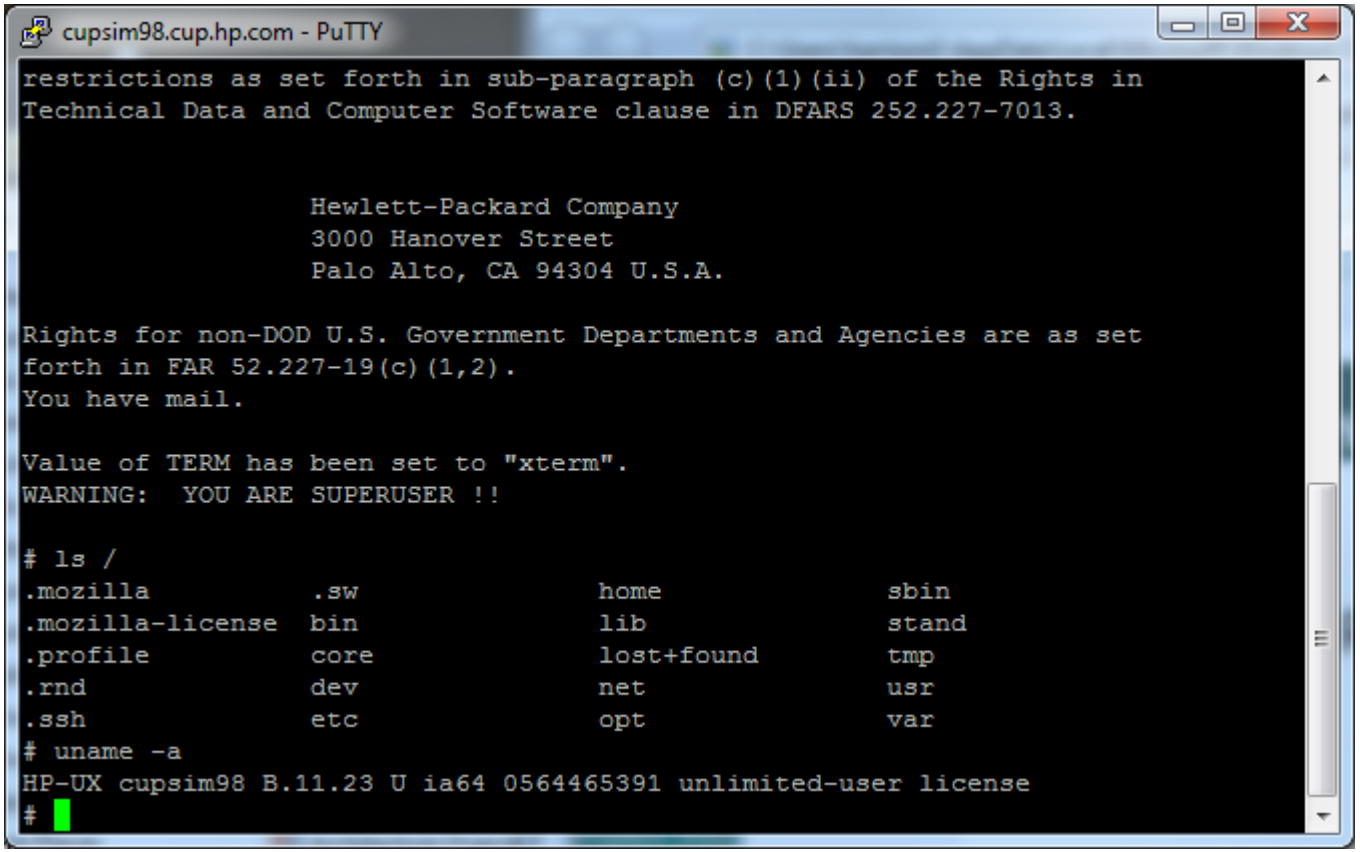
The kernel is UNIX based

Operating Systems

Running a terminal on an HP-UX system

HP-UX



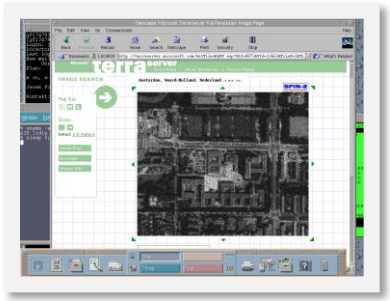


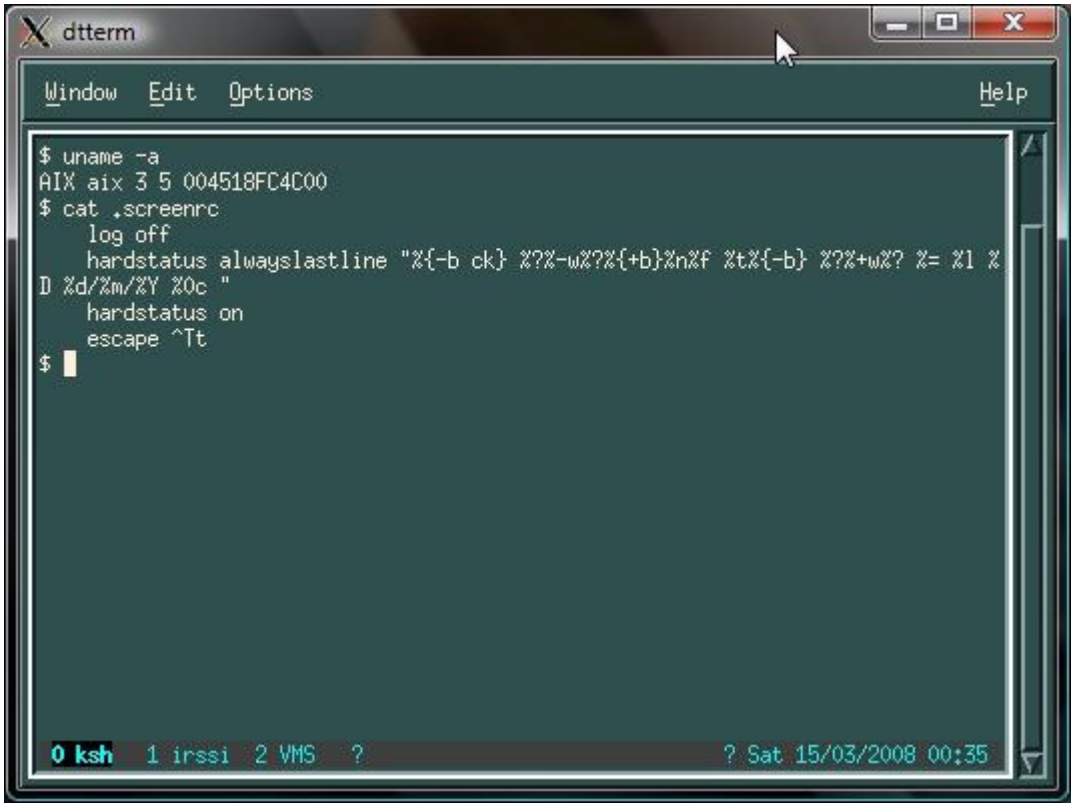
ls and uname

Operating Systems

Running a terminal on an IBM AIX system

AIX





uname and cat commands

http://unixsadm.blogspot.com/2008_03_01_archive.html

Operating Systems
Various Linux Distributions

OpenSUSE

Red Hat Enterprise Linux

Fedora

Debian

CentOS

Ubuntu

Mandriva

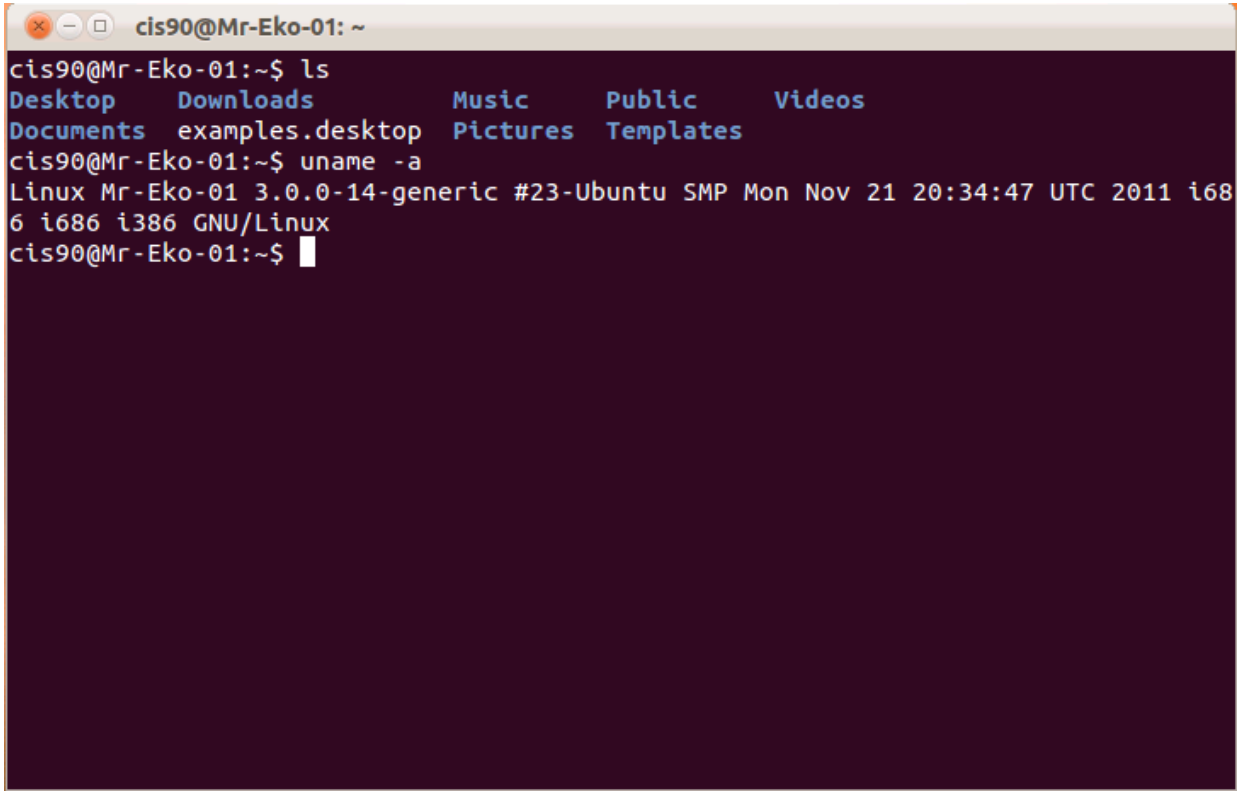
*Note: A distribution is built by a company or organization. They start with the **Linux kernel** then add a custom mix of open source components. They may then add some of their own unique software to differentiate their distribution.*

Tux, the penguin, is the Linux kernel mascot

Operating Systems

Running a terminal on an Ubuntu system

Ubuntu



ls and uname commands

Operating Systems
Embedding Linux in Products

Google Chrome OS
(coming soon)
for Netbooks and Tablets

Tivo

Buffalo
NAS storage

Android

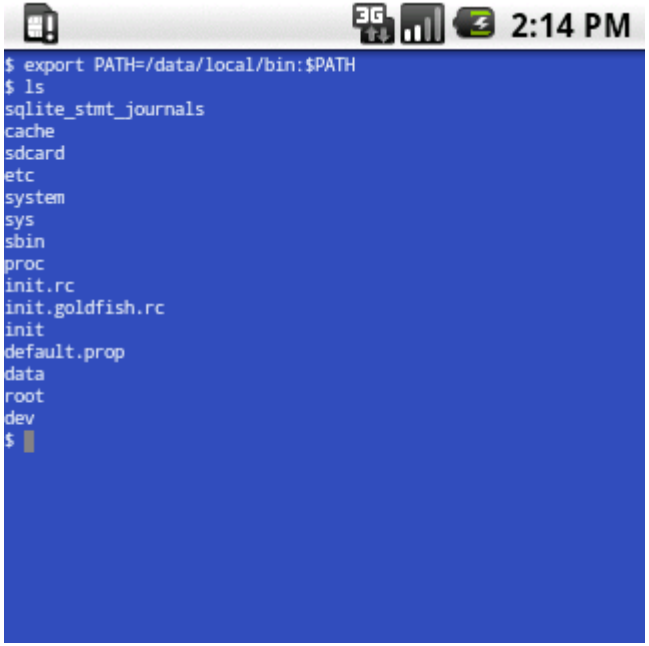
MikroTik Routers

Operating Systems

Running a Terminal on a Droid smartphone

Android

Android Terminal Emulator



export and ls commands

https://market.android.com/details?id=jackpal.androidterm&hl=en

Operating Systems
Embedding UNIX in Products

Apple iOS

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

Source: http://en.wikipedia.org/wiki/Darwin_(operating_system)
http://en.wikipedia.org/wiki/IOS_(Apple)

Operating Systems

Using a Terminal on an iPhone

iPhone

Mobile Terminal

uname command

http://code.google.com/p/mobileterminal/

Operating Systems

Embedding Linux in Products ... maybe?

Is it based on Linux kernel or not?

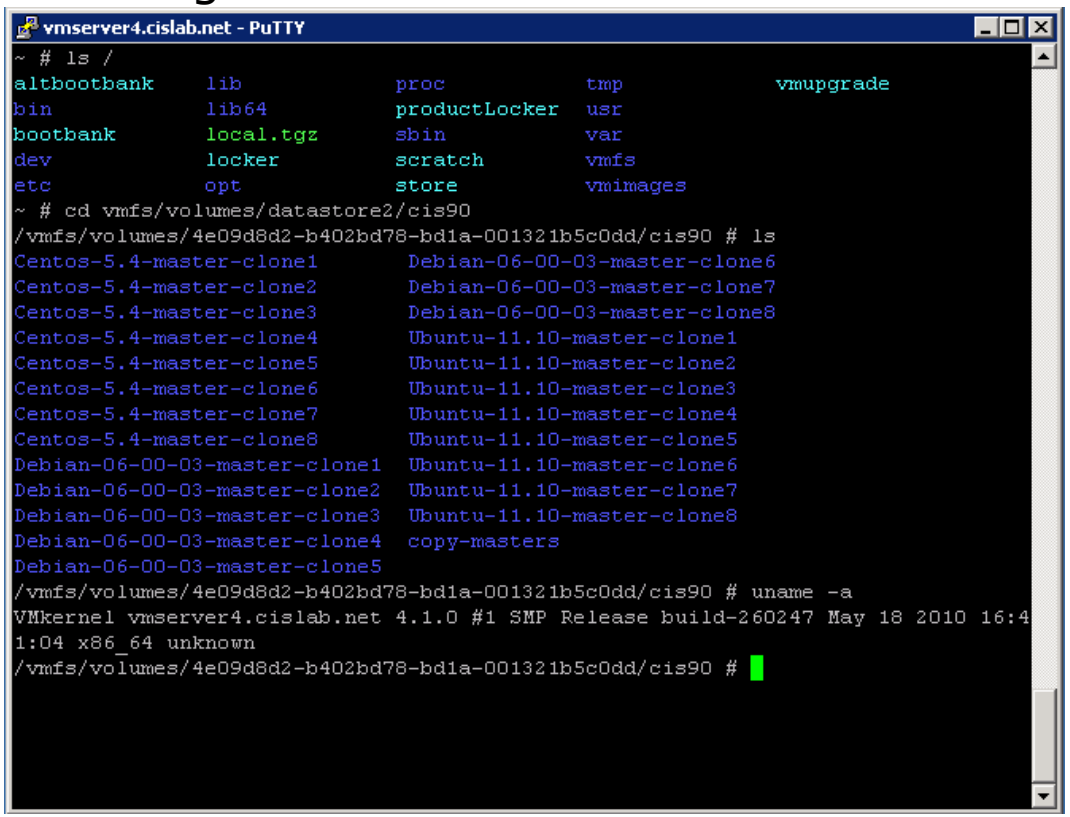
http://blog.scottlowe.org/2007/08/19/the-linux-kernel-binary-modules-and-esx-server/
http://www.theregister.co.uk/2007/08/16/vmware_derived_from_linux/

Operating Systems

Maybe ... embedding Linux in Products?

vmware®

Running terminal on VMware ESXi server

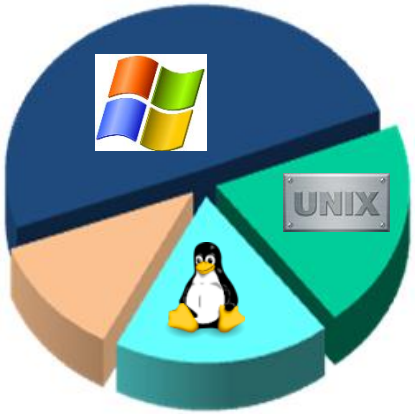


ls, cd and uname commands

UNIX/Linux Overview

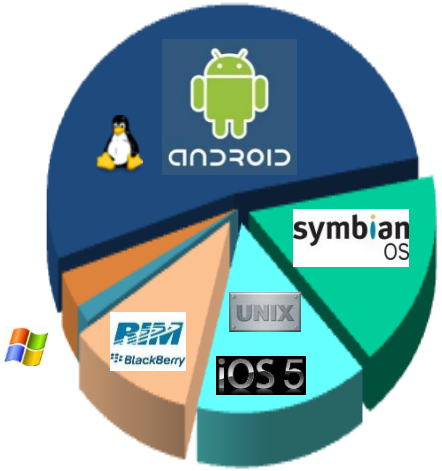
Server, PC, Smartphone markets

Servers



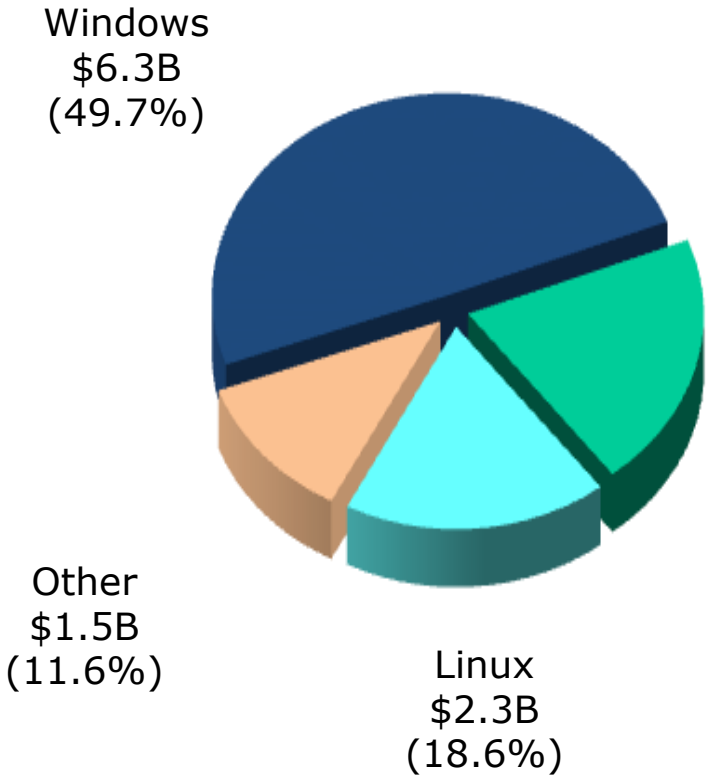
PC's

Smartphones

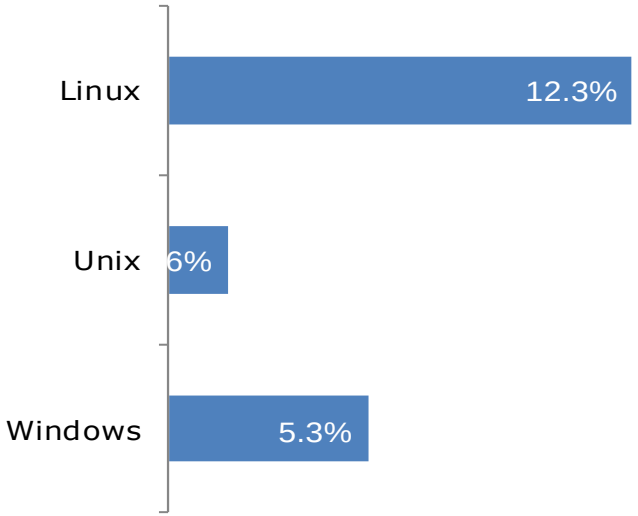


Worldwide Server Market

$12.7B Server Revenue 3Q 2011



Year over Year Change



Source: IDC, Nov 2011

http://www.idc.com/getdoc.jsp?containerId=prUS23179011

Website hits by OS

Implies "ballpark market share" for PCs

Jan 2009[1]

Operating Systems

1	Windows XP	72.17%
2	Windows Vista	13.44%
3	Mac OS X	5.24%
4	Linux	2.13%
5	Windows 2000	2.12%
6	Windows 2003	0.68%
7	Windows 98	0.55%
8	Windows ME	0.22%
9	SymbianOS	0.12%
10	WAP	0.04%

Jul 2010[2]

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%

Dec 2011[3]

Operating Systems

1	Windows 7	37.60%
2	Windows XP	31.72%
3	Windows Vista	8.87%
4	Apple OS X	8.59%
5	Apple iOS	3.96%
6	Linux	1.64%
7	Android	1.64%
8	BlackBerry	0.68%
9	SymbianOS	0.23%
10	Windows 2000	0.09%

1-This report was generated 12/31/2008 based on the last 53,892,847 unique visits to all tracked websites at that time. W3Counter's sample currently includes 19,174 websites. The last 25,000 page views to each website are analyzed to identify unique visits. Some visits may occur before the month of the report.

2-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 **12/31/2011** based on the last 15,000 page views to each website tracked by W3Counter. W3Counter's sample currently includes**53,526** websites. The browser market share graph includes data from all versions of the named browser families, not only the top 10 as listed below.

W3Counter

source: http://www.w3counter.com/globalstats.php

Worldwide Smartphone Sales

Table 2
Worldwide Smartphone Sales to End Users by Operating System in 3Q11
(Thousands of Units)

Operating System	3Q11 Units	3Q11 Market Share (%)	3Q10 Units	3Q10 Market Share (%)
Android ↑	60,490.4	52.5	20,544.0	25.3
Symbian ↓	19,500.1	16.9	29,480.1	36.3
iOS ↓	17,295.3	15.0	13,484.4	16.6
Research In Motion ↓	12,701.1	11.0	12,508.3	15.4
Bada	2,478.5	2.2	920.6	1.1
Microsoft	1,701.9	1.5	2,203.9	2.7
Others	1,018.1	0.9	1,991.3	2.5
Total	**115,185.4**	**100**	**81,132.6**	**100**

Google *Nokia* *Apple* *Blackberry*

Source: Gartner (November 2011)

http://www.gartner.com/it/page.jsp?id=1848514
http://www.mobiletechreview.com/smartphone.htm

iso.linuxquestions.org

15 Most Popular Downloads

15 Most Downloaded Distribution Versions (last 30 Days)	15 Most Downloaded Distributions (Ever)
1. Mandriva Linux 2009.1 (13576)	1. Fedora
2. Linux Mint 12 (7307)	2. Mandriva
3. BackTrack 5 R1 (4920)	3. Red Hat Enterprise Linux
4. Ubuntu 11.10 (1368)	4. SUSE
5. BlankOn Linux 7.0 (1046)	5. Ubuntu
6. Damn Small Linux 4.4.10 (900)	6. Damn Small Linux
7. CentOS 5.5 (732)	7. CentOS
8. openSUSE 10.3 Live (641)	8. Linux XP
9. KNOPPIX 5.1.1 (574)	9. Knoppix
10. openSUSE 10.2 Live DVD (520)	10. Debian
11. CentOS 6.2 (483)	11. Slackware
12. CentOS 5.4 (457)	12. MEPIS
13. Debian 3.0r2 (woody) (439)	13. PCLinuxOS
14. Sabayon Linux 7 "Core" (419)	14. Gentoo
15. Fedora 8 (397)	15. Linspire

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

distrowatch.com

Top Ten Jan 2010

1. Ubuntu 9.10
2. Fedora 12
3. openSUSE 11.2
4. Debian 5.0
5. Mandriva 2010
6. Linux Mint 8
7. PCLinuxOS 2009.2
8. Slackware 13.0
9. Gentoo 10.1
10. CentOS 5.4
11. FreeBSD 8.0

Top Ten Sep 2011

1. Ubuntu 11.04
2. Linux Mint 11
3. Fedora 15
4. Debian 6.0
5. openSUSE 11.4
6. Arch Linux 2011.08.19
7. PCLinuxOS 2010.12
8. CentOS 5.6
9. Mageia 1
10. Slackware 13.37
11. FreeBSD 8.2

Top Ten Jan 2012

1. Linux Mint 11
2. Ubuntu 11.10
3. Fedora 16
4. Debian 6.0
5. openSUSE 12.1
6. Arch Linux 2011.08.19
7. PCLinuxOS 2010.12
8. CentOS 6.1
9. Mageia 1
10. Slackware 13.37
11. FreeBSD 8.2

CentOS is a clone distro of Red Hat Enterprise

Linux distros mentioned by top server vendors

Server market share source: IDC 3Q11 report

Vendor	HP (29.8%)	IBM (29.8%)	Dell (15.1%)	Oracle/Sun (6.0%)
Red Hat Enterprise	✓	✓	✓	✓
Novell SUSE	✓	✓	✓	✓
Debian/GNU Linux	✓	✓		
Oracle EL	✓	✓		✓
Asianux	✓	✓		
Ubuntu	✓	✓		
CentOs	✓	✓		
Fedora	✓	✓		
OpenSUSE	✓	✓		

For CIS 90 we will be primarily using Red Hat Enterprise Linux

Class Activity

Let's see if Q4'11 server market numbers are out yet ...

Browse to google.com and do a search for:

idc worldwide server market

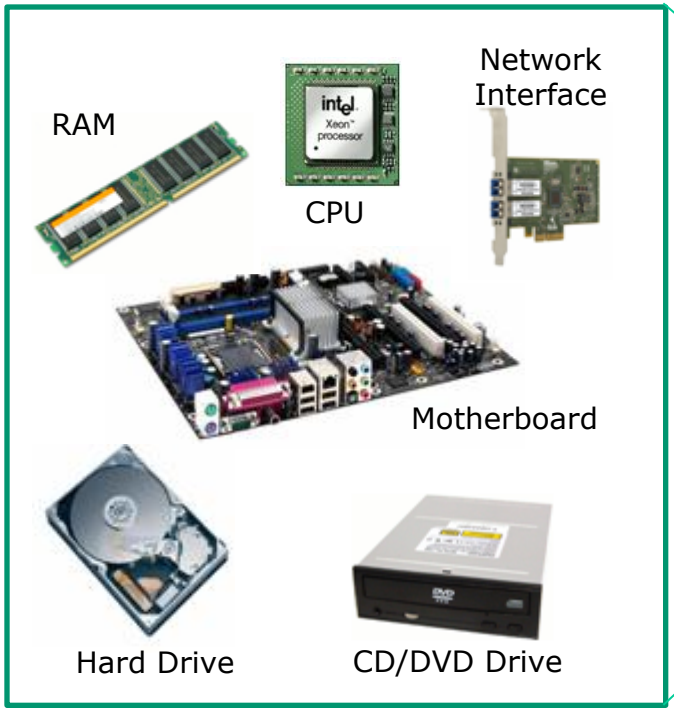
What is a computer

What is a computer?

Desktops

Usually one user at a time

Hardware



Desktop or Workstation

Software

Programs

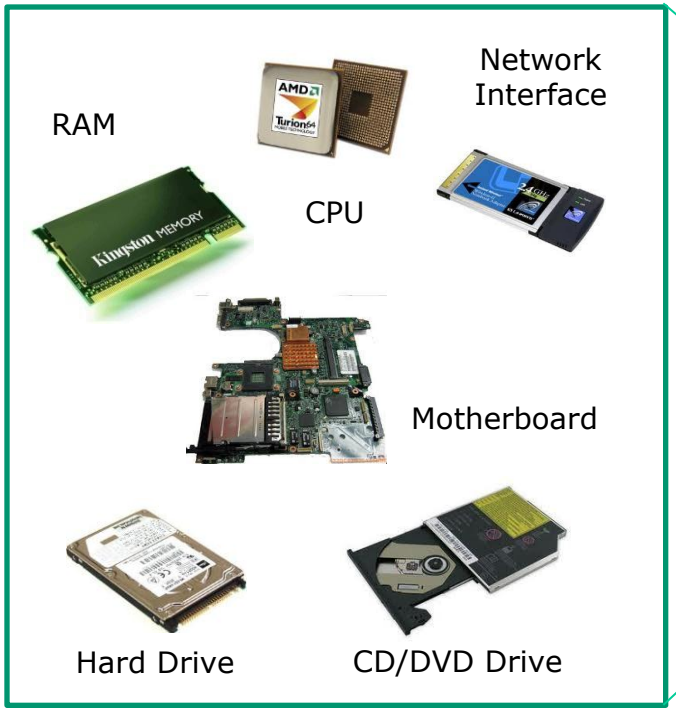
Operating System

What is a computer?

Mobile Devices

Usually one user at a time

Hardware



Mobile Devices
(designed for mobility)

Software

Programs

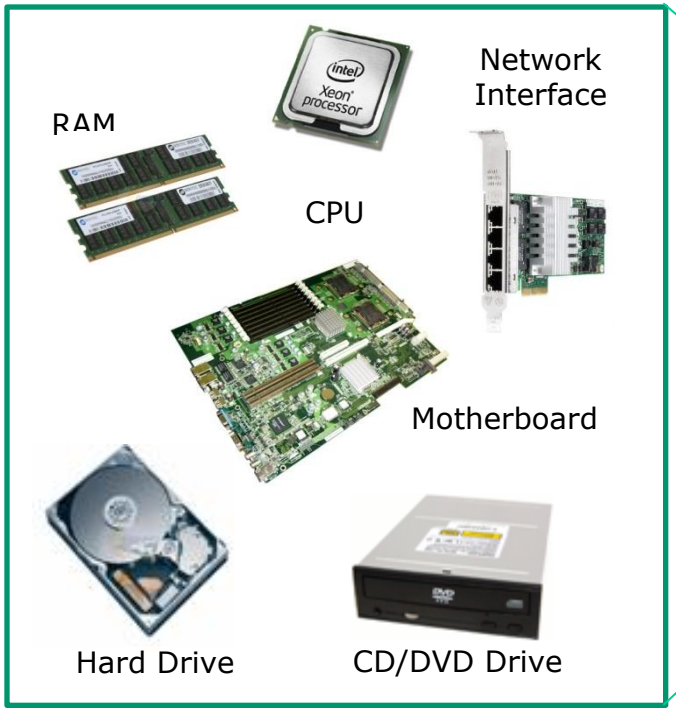
Operating System

What is a computer?

Servers

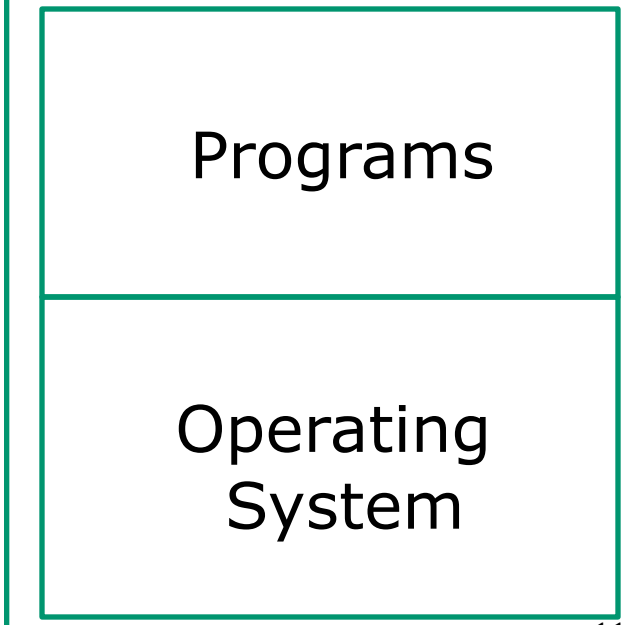
Usually many users at the same time

Hardware



Server Blade
(designed for uptime)

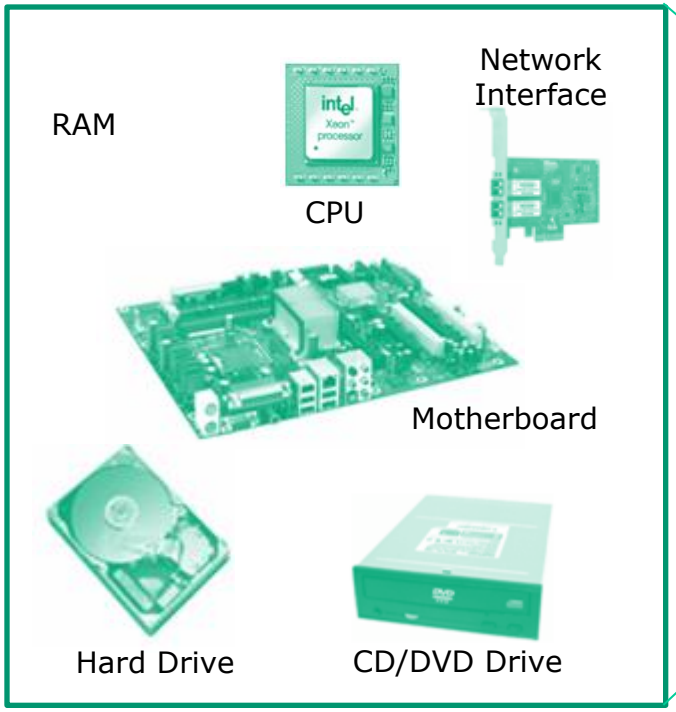
Software



What is a computer?

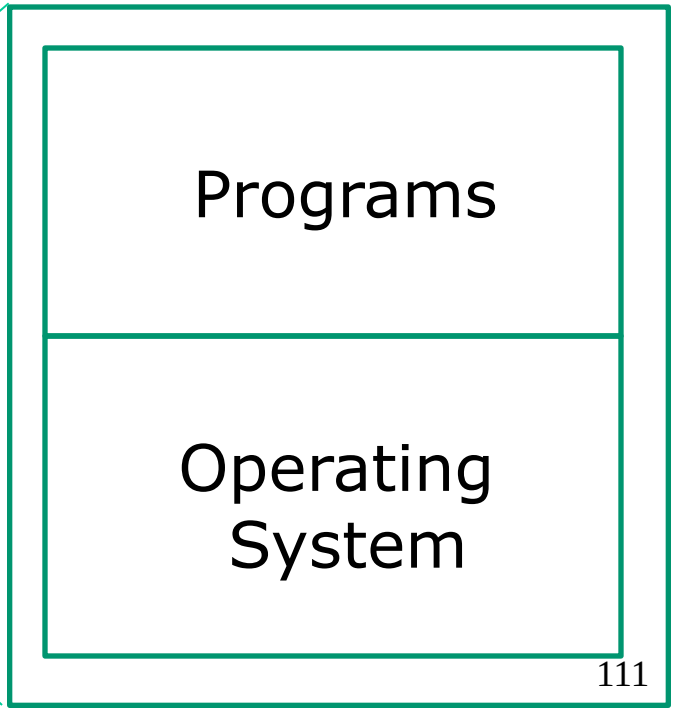
Virtual Machines

Virtual Hardware



Virtual Machine

Software

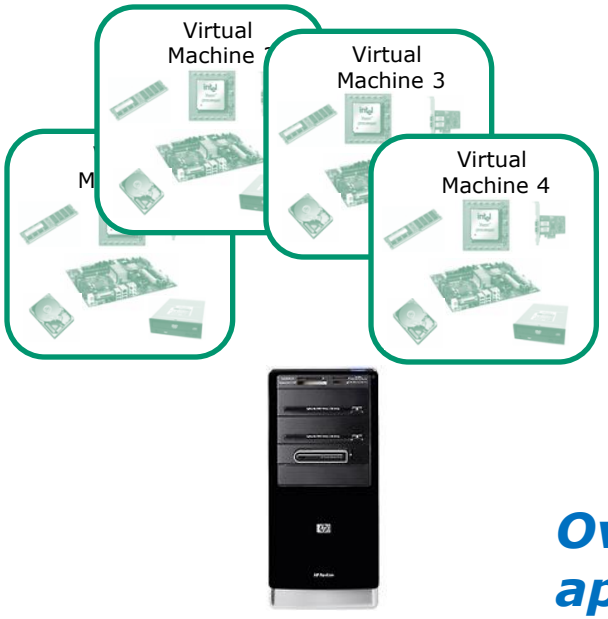


Virtual Machines

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.

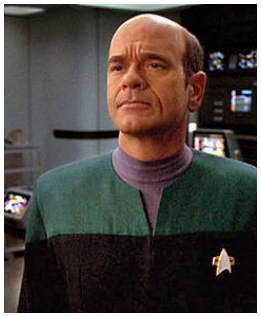
- These simulated computers are called virtual machines or VMs.



- 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.

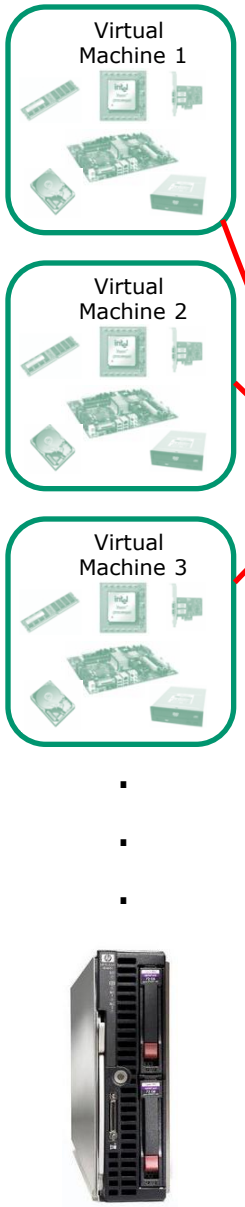


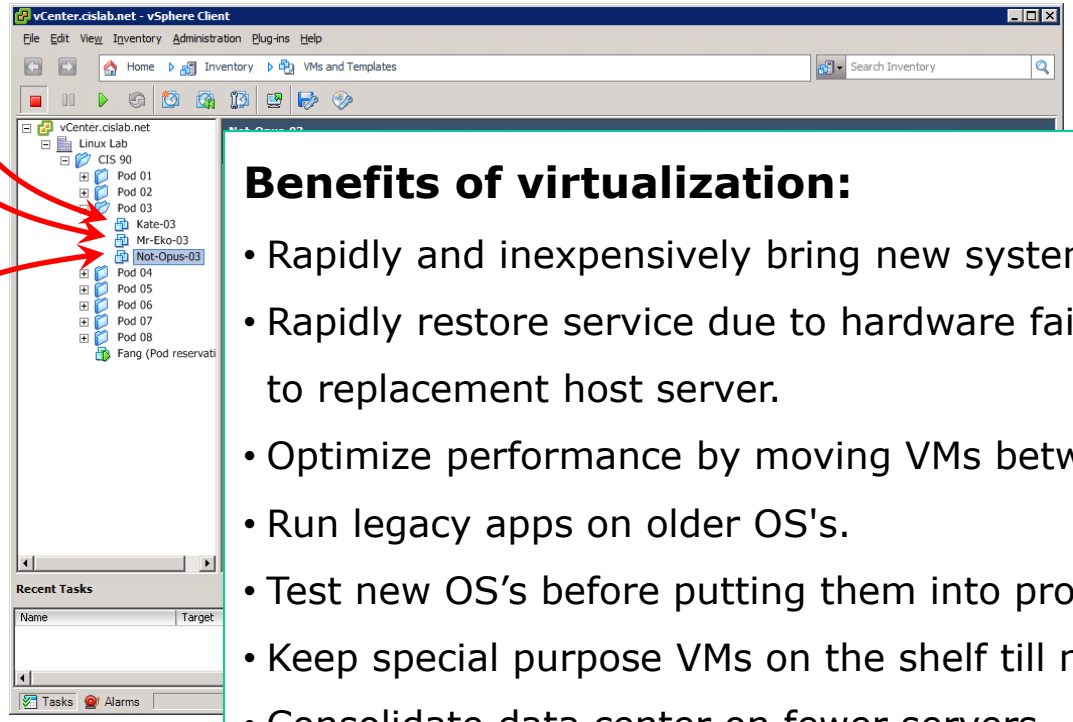
The EMH doctor on Star Trek Voyager was a simulation

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

Virtual Machines

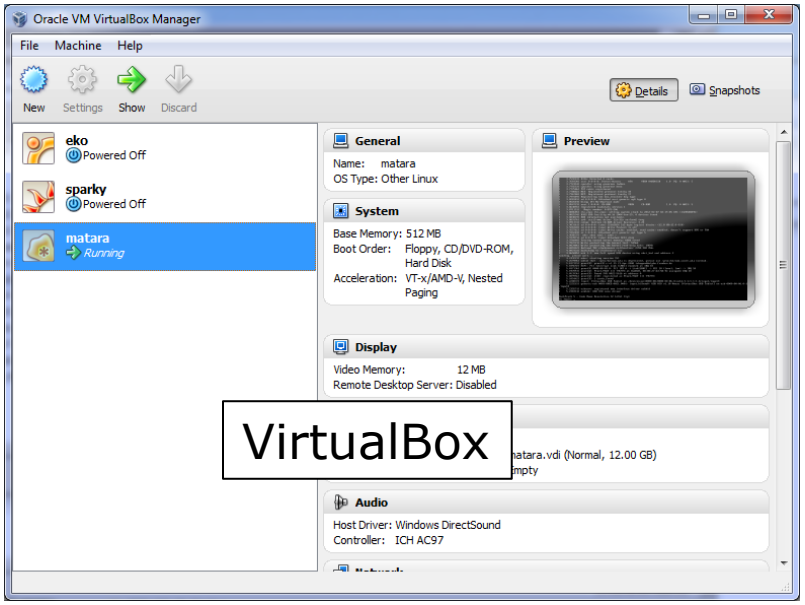
Multiple computers on one computer
… running at the same time
… sharing the same physical hardware

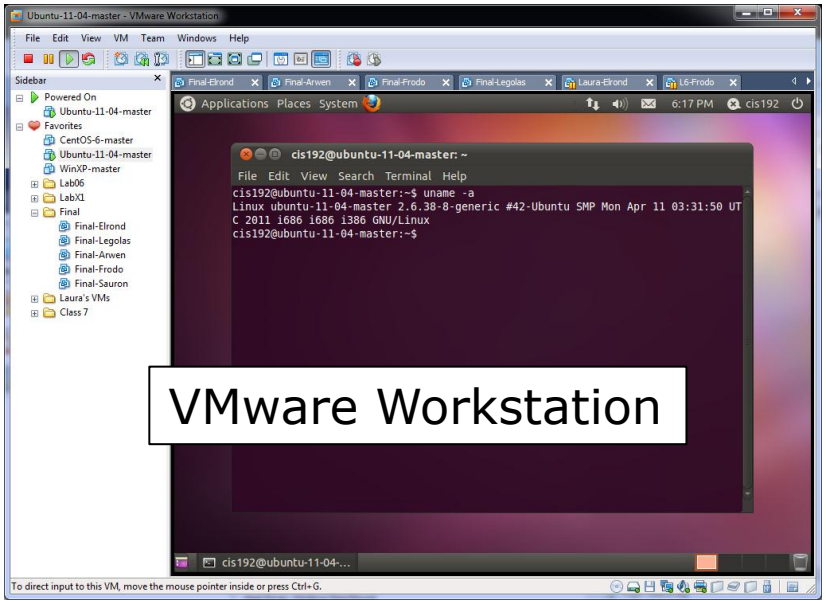


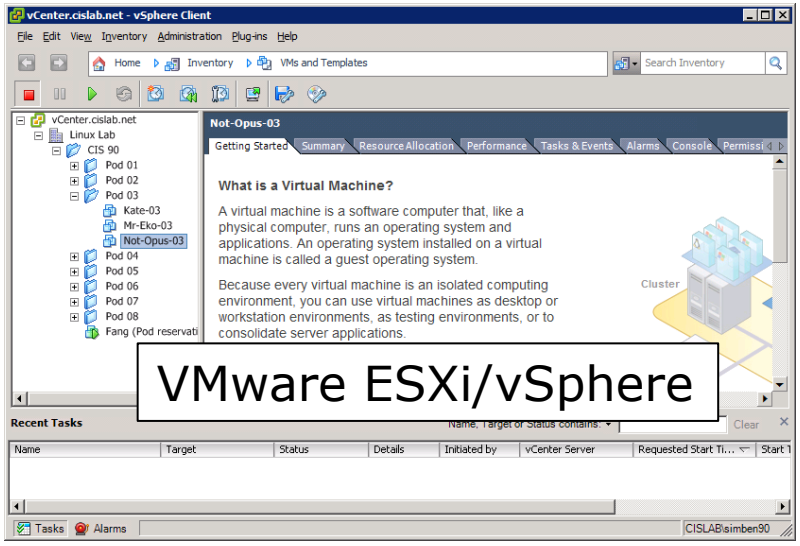


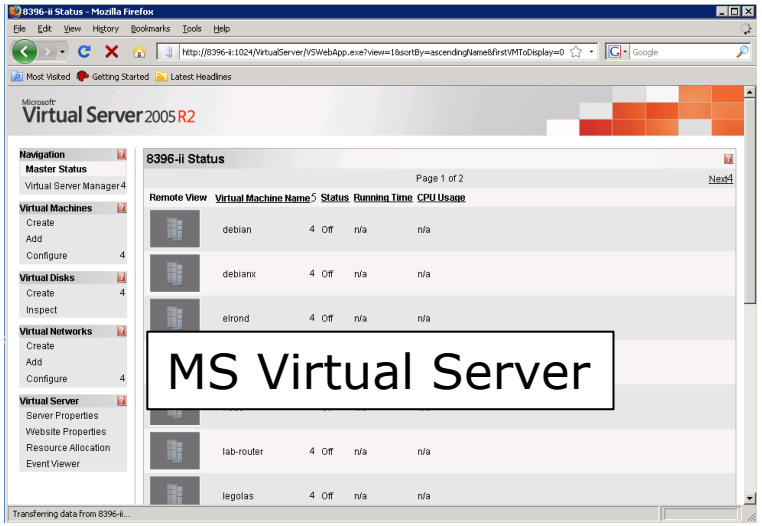
Benefits of virtualization:

- 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!


Oracle VM VirtualBox Manager
File Machine Help
New Settings Show Discard
Details Snapshots
eko
Powered Off
sparky
Powered Off
matara
Running
General
Name: matara
OS Type: Other Linux
Preview
System
Base Memory: 512 MB
Boot Order: Floppy, CD/DVD-ROM, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging
Display
Video Memory: 12 MB
Remote Desktop Server: Disabled
Audio
Host Driver: Windows DirectSound
Controller: ICH AC97
VirtualBox


Ubuntu-11-04-master - VMware Workstation
File Edit View VM Team Windows Help
Sidebar
Powered On
Ubuntu-11-04-master
Favorites
CentOS-6-master
Ubuntu-11-04-master
WinXP-master
Lab06
LabX1
Final
Final-Elrond
Final-Legolas
Final-Arwen
Final-Frodo
Final-Sauron
Laura's VMs
Class 7
Applications Places System
6:17 PM cis192
cis192@ubuntu-11-04-master: ~
File Edit View Search Terminal Help
cis192@ubuntu-11-04-master:~$ uname -a
Linux ubuntu-11-04-master 2.6.38-8-generic #42-Ubuntu SMP Mon Apr 11 03:31:50 UTC 2011 i686 i686 i386 GNU/Linux
cis192@ubuntu-11-04-master:~$
cis192@ubuntu-11-04-...
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.
VMware Workstation


vCenter.cislab.net - vSphere Client
File Edit View Inventory Administration Plug-ins Help
Home Inventory VMs and Templates
Search Inventory
vCenter.cislab.net
Linux Lab
CIS 90
Pod 01
Pod 02
Pod 03
Kate-03
Mr-Eko-03
Not-Opus-03
Pod 04
Pod 05
Pod 06
Pod 07
Pod 08
Fang (Pod reservati
Not-Opus-03
Getting Started Summary Resource Allocation Performance Tasks & Events Alarms Console Permissi
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.
Cluster
Recent Tasks
Name Target Status Details Initiated by vCenter Server Requested Start Ti... Start T
Tasks Alarms
CISLAB\simben90
VMware ESXi/vSphere


8396-ii Status - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Most Visited Getting Started Latest Headlines
Microsoft Virtual Server 2005 R2
Navigation
Master Status
Virtual Server Manager
Virtual Machines
Create
Add
Configure
Virtual Disks
Create
Inspect
Virtual Networks
Create
Add
Configure
Virtual Server
Server Properties
Website Properties
Resource Allocation
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debianx Off n/a n/a
elrond Off n/a n/a
lab-router Off n/a n/a
legolas Off n/a n/a
MS Virtual Server

Software

Software - The Programs

Users





Software

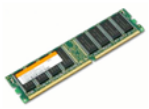
Programs

- Some programs come as part of the OS
- Some programs are add-ons purchases or downloads
- Provide the interface between user and computer
- Depends on the OS for all access to the hardware

Operating System

Hardware




Software - The Programs

Users





Software

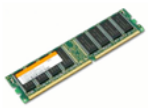
Programs (examples)

Common		Enterprise	UI	Browsers
Word games vi	Photoshop email iTunes	SAP Oracle custom	Explorer bash cmd.exe	Firefox IE Safari

Operating System

Hardware




Software - The Operating System

Users





Software

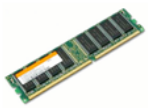
Programs

Operating System

- Interface to the hardware
- Shares hardware resources
- Schedules/executes programs
- Process management
- Input/output services
- System monitoring
- Network stack

Hardware




Software - The Operating System

Users





Software

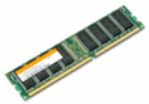
Programs

Operating System (examples):

		
Windows 7 Windows Server	Red Hat Linux Ubuntu Linux	Mac OS X HP-UX

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

- Source code is available
- Community of developers doing online collaboration
- Pragmatic redistribution licenses
- Examples: Apache, Firefox, Android, OpenOffice

Free Software Movement

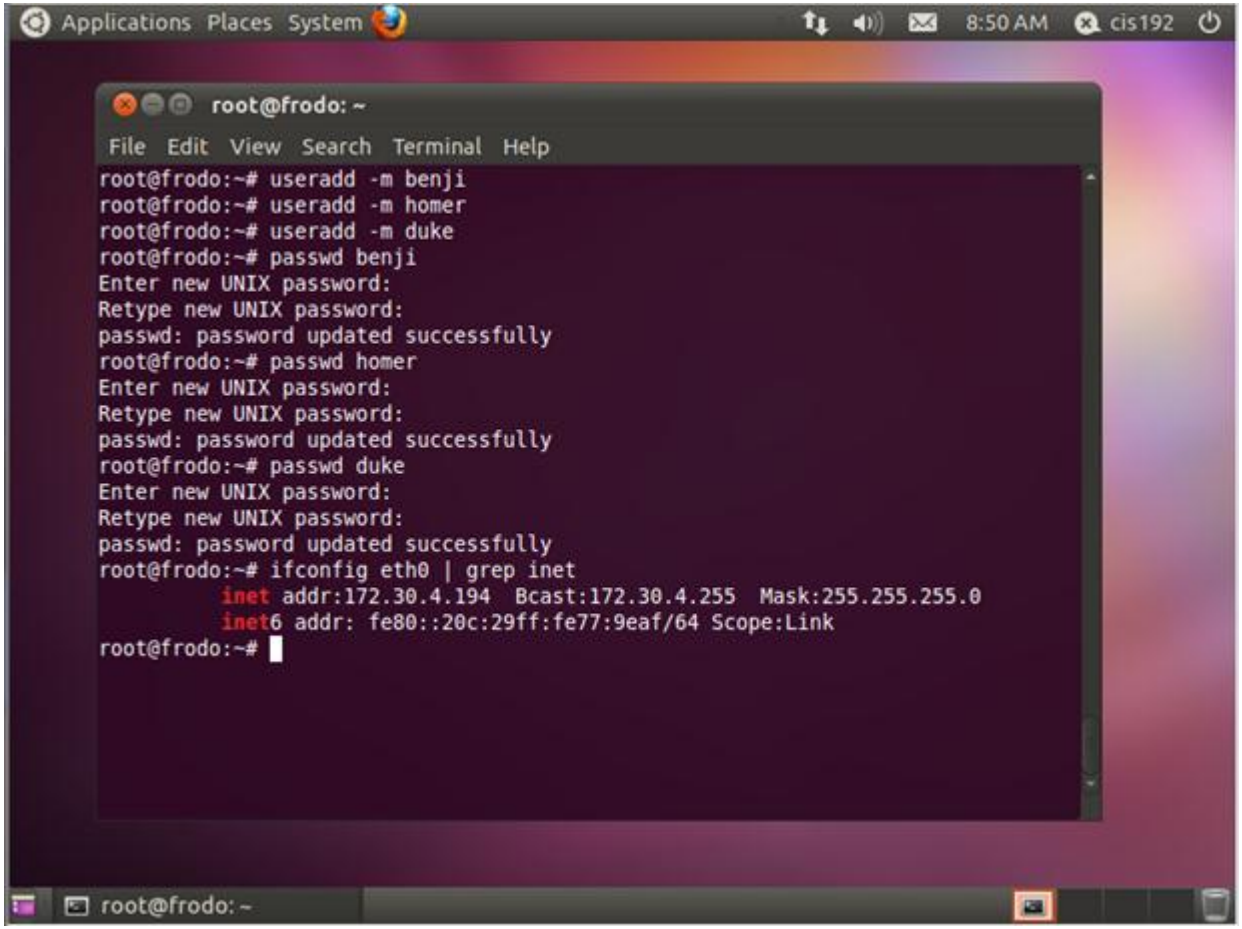
- Source code is available
- GNU (“GNU is not UNIX”) license, COPYLEFT
- Examples: GNU/Linux, GIMP

Proprietary

- Intellectual property
- Copyright law
- Examples: Adobe Photoshop, Microsoft Windows, Mac OS X, AT&T UNIX System V

Multiuser Multitasking OS

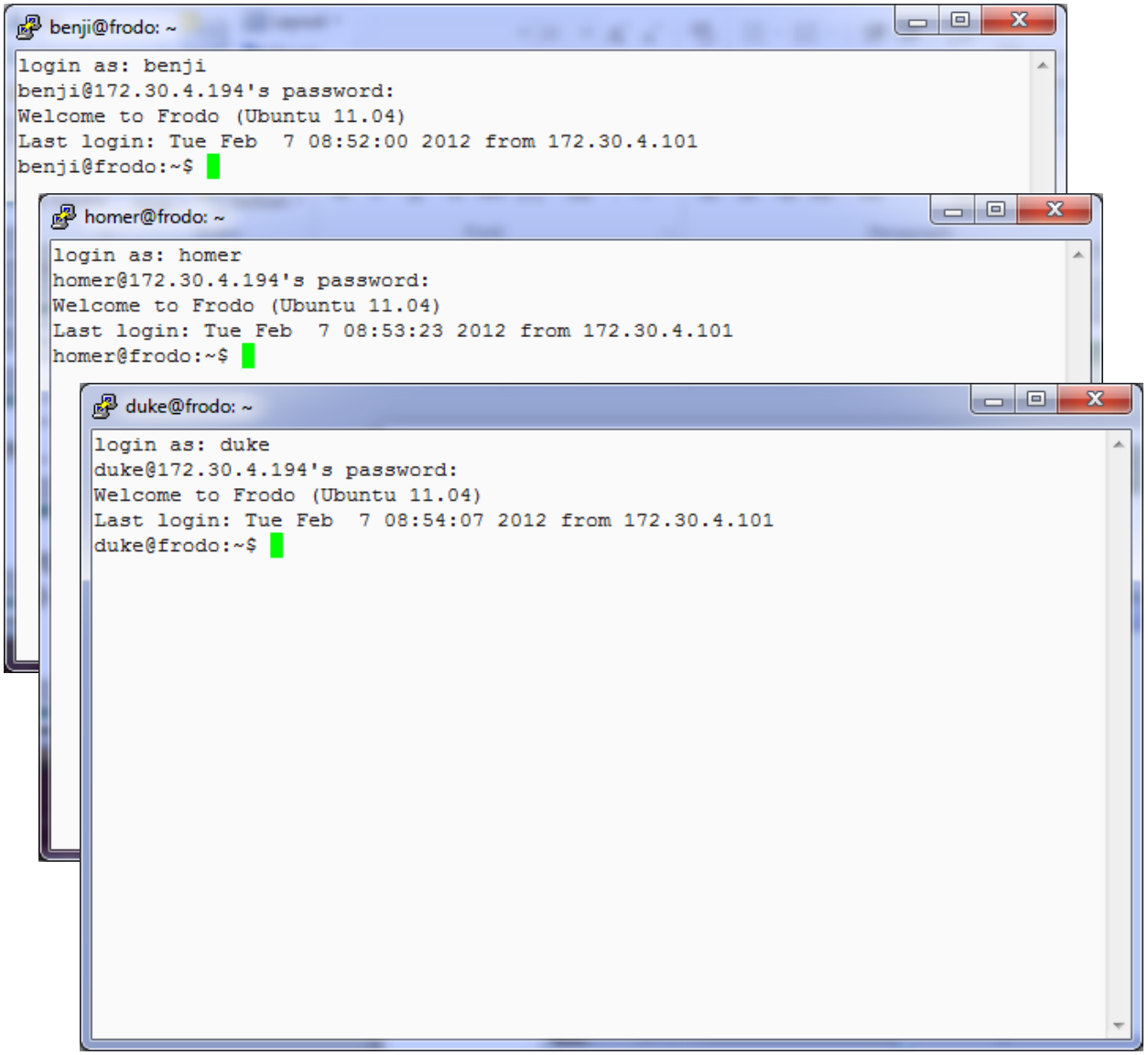
Multiuser/Multitasking Operating System



Let's add some more users to this Ubuntu server named Frodo

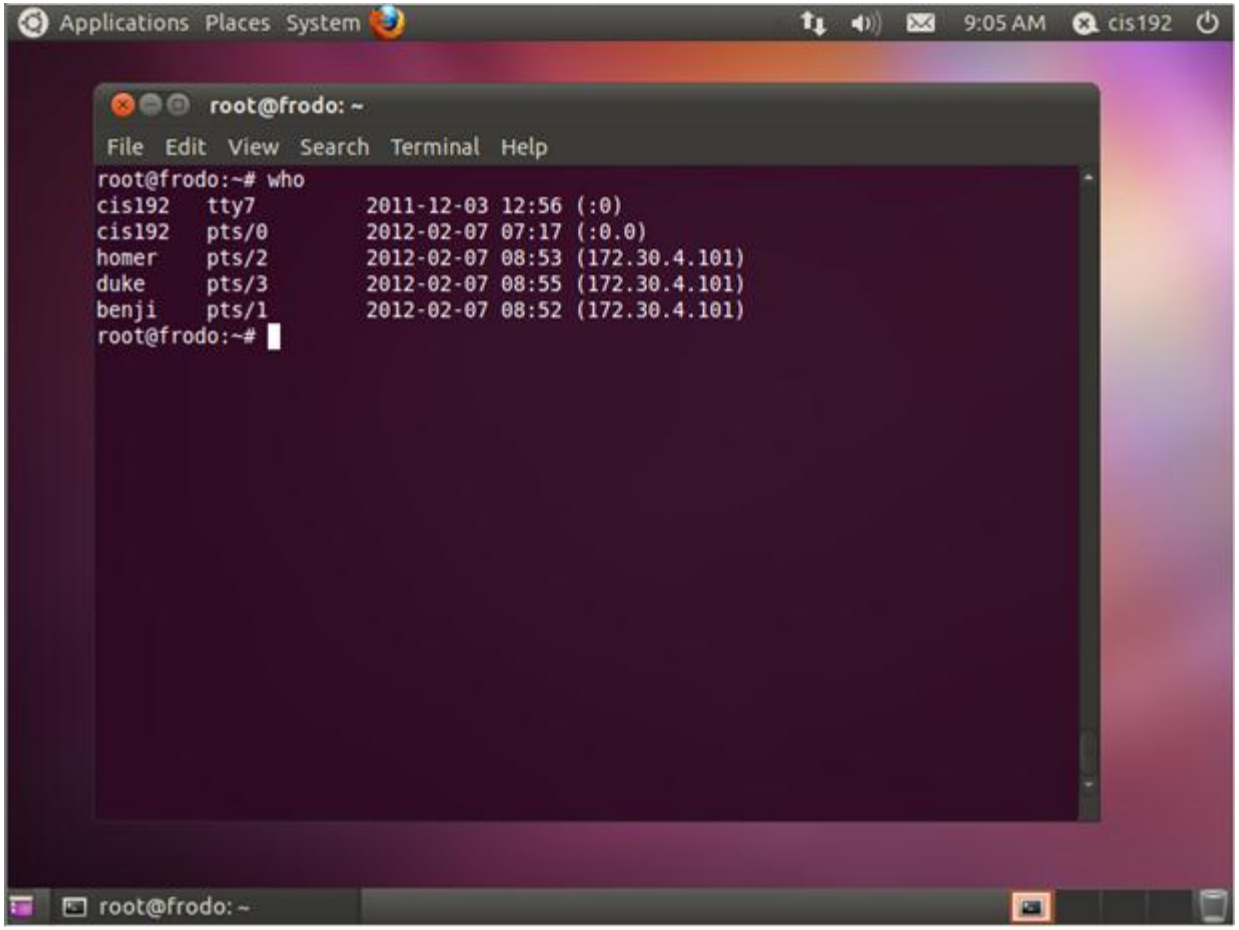
Note: You will learn system administration skills like this in CIS 191AB

Multiuser/Multitasking Operating System



Next let's log into Frodo from another computer using each of the new usernames

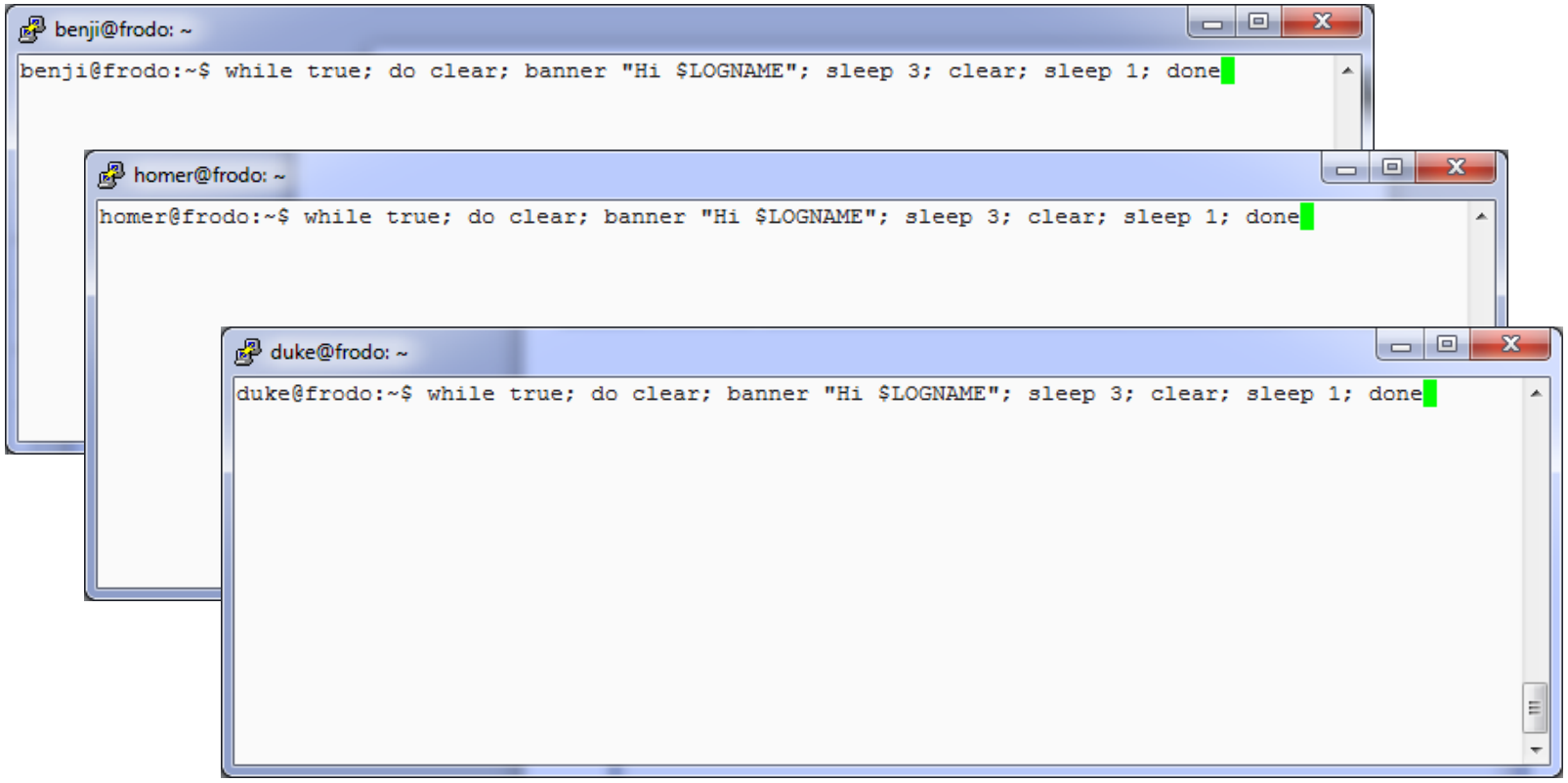
Multiuser/Multitasking Operating System



Back on Frodo, use the **who** command to show all the users currently logged in

This shows the **multi-user** capability of the OS

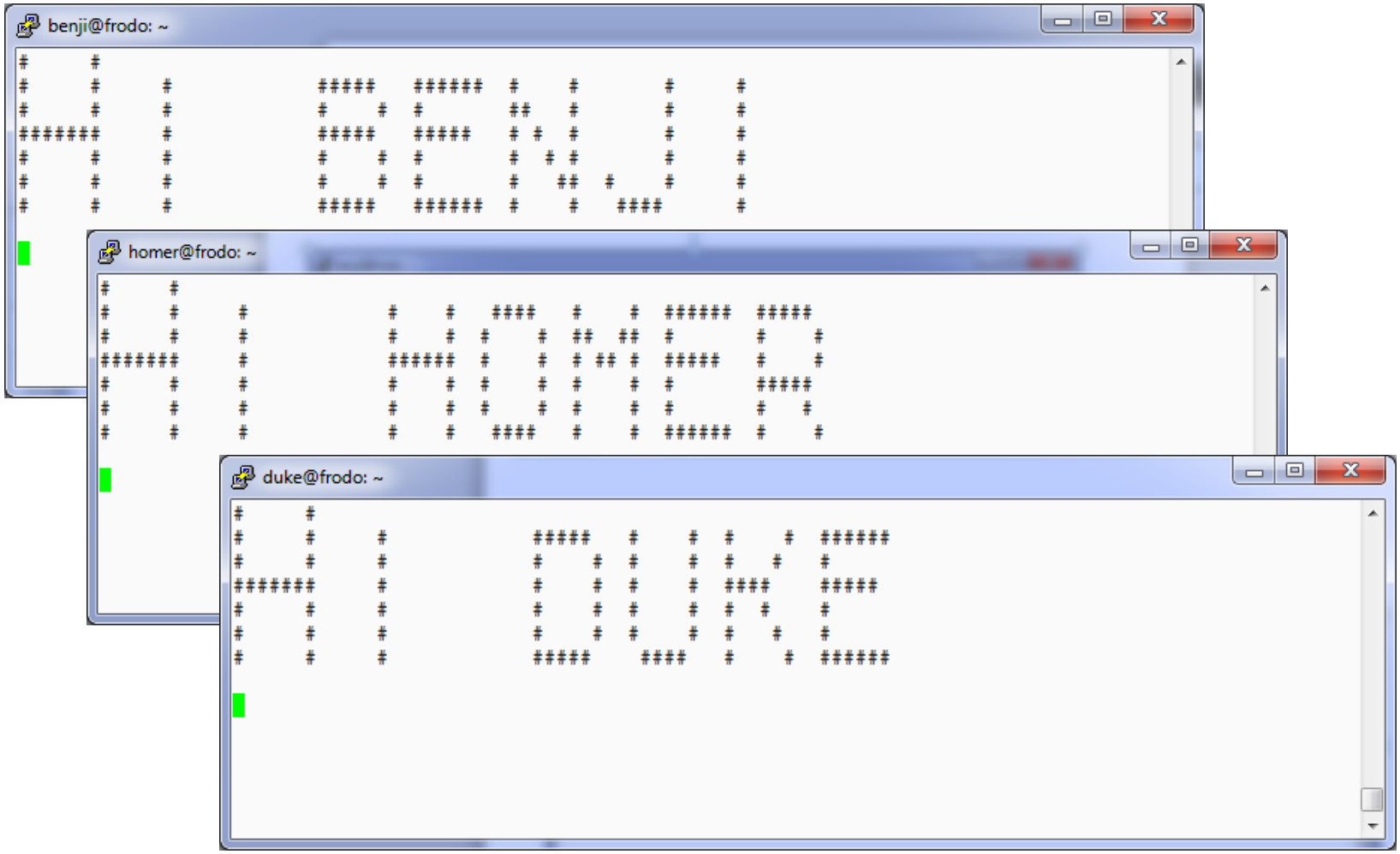
Multiuser/Multitasking Operating System



Next have each user run a simple script that flashes a banner of their name on screen repeatedly.

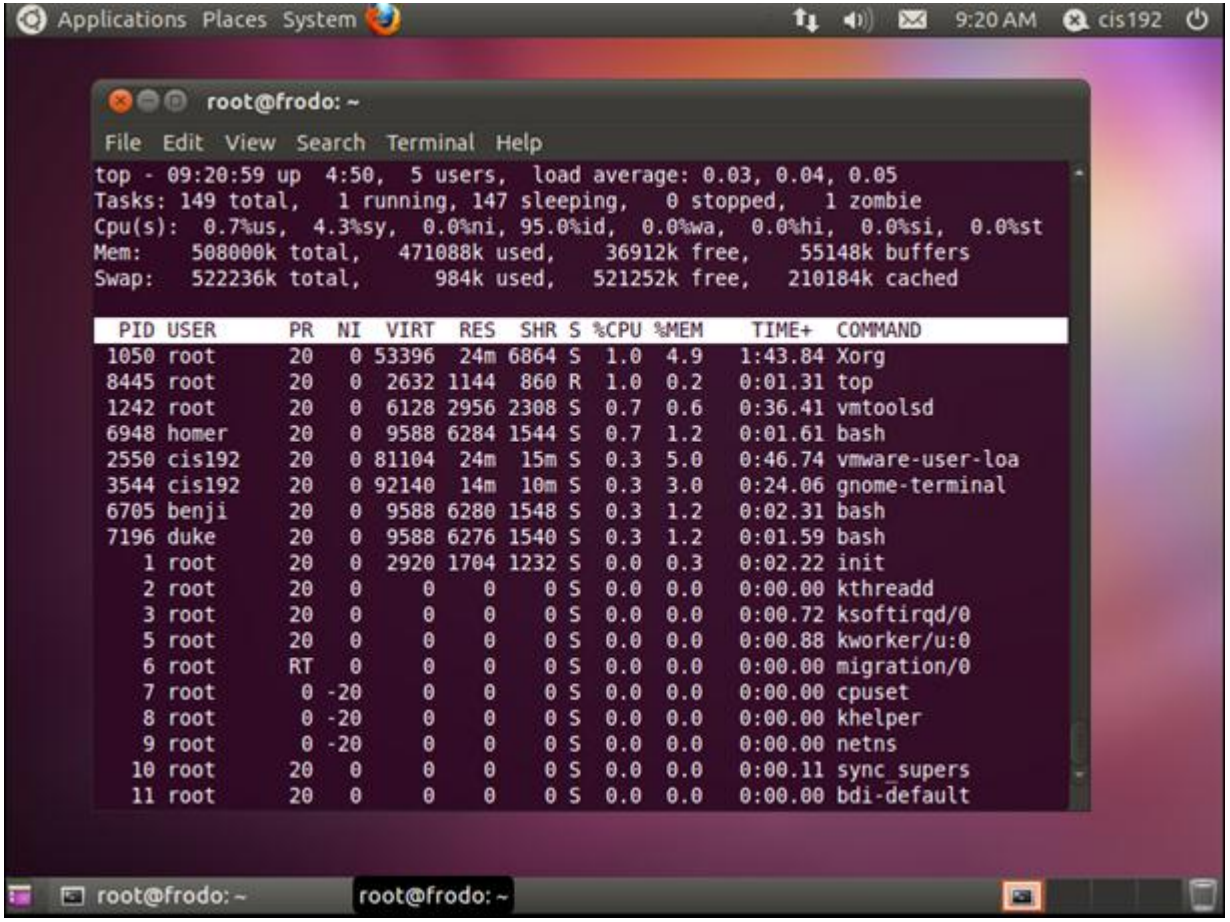
Note: You will learn UNIX scripting skills like this in CIS 130

Multiuser/Multitasking Operating System



These simple scripts loop forever

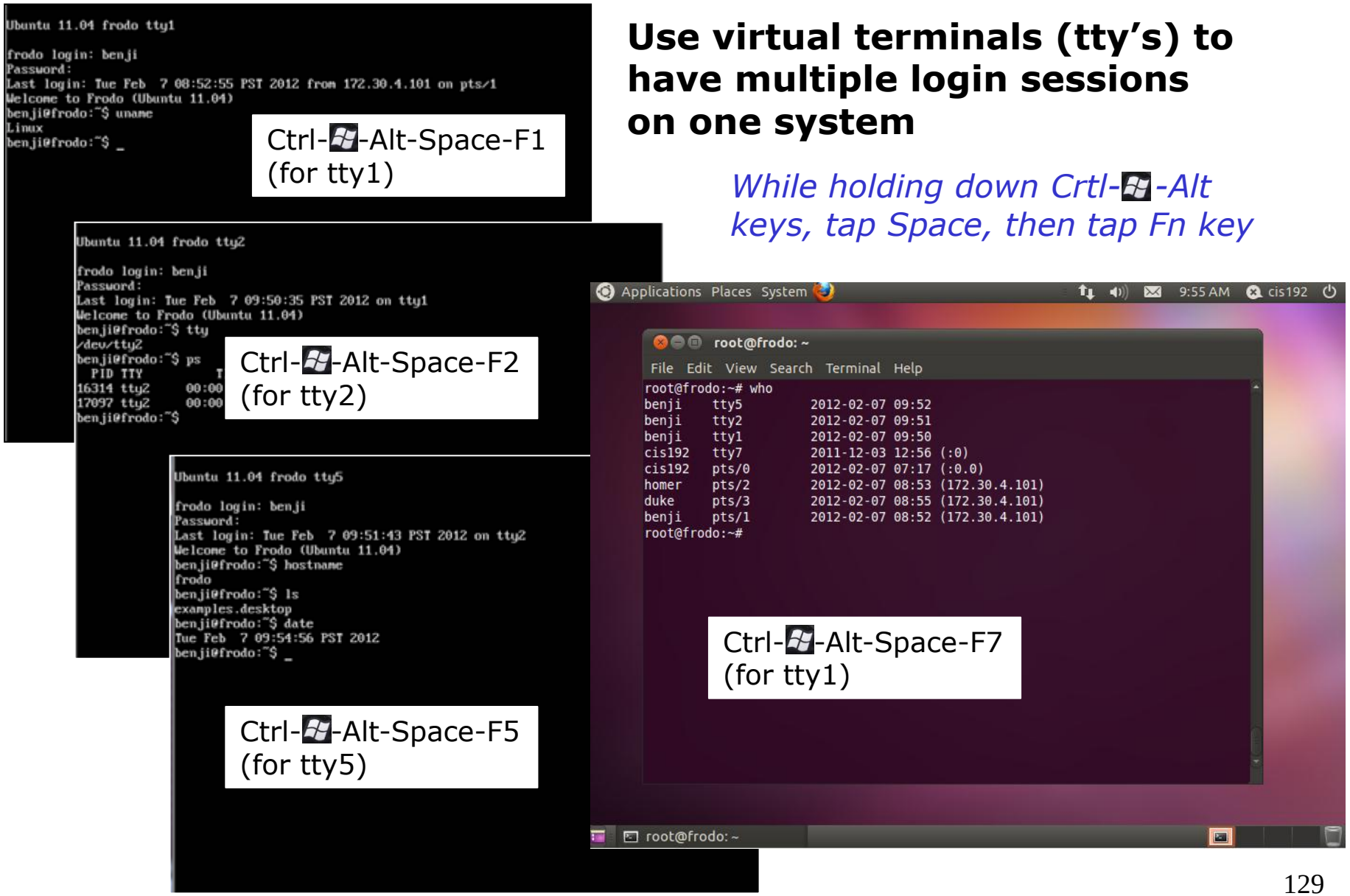
Multiuser/Multitasking Operating System



Each PID represents a process being run by the operating system. This includes the scripts being run by the three new users.

They are all being run at the same time.

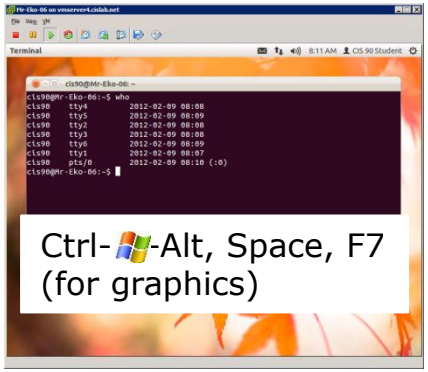
This illustrates **Multitasking**



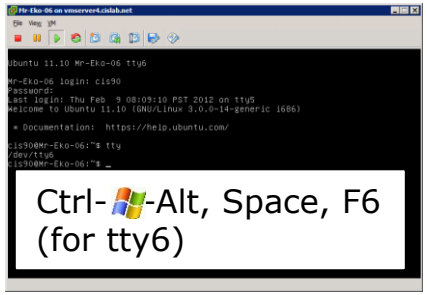
Use virtual terminals (tty's) to have multiple login sessions on one system

While holding down Crtl-⊞-Alt keys, tap Space, then tap Fn key

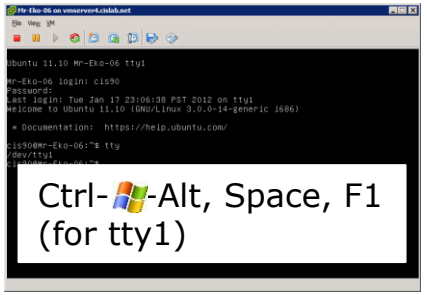
Changing Virtual Terminals using VMware vSphere

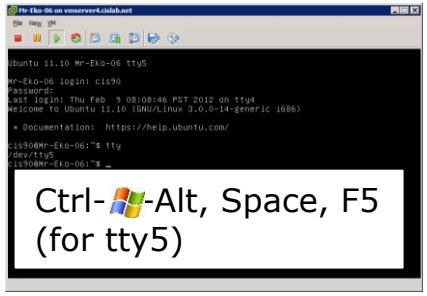


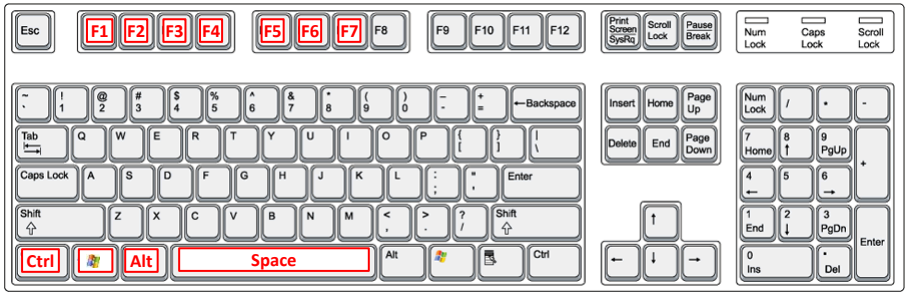
Windows PC Keyboard

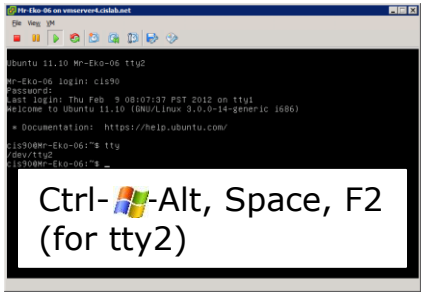


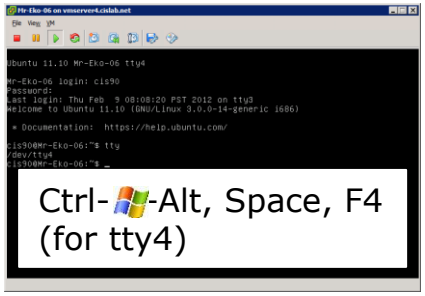
While holding down Crtl-⊞-Alt keys, tap Space, then tap Fn key*

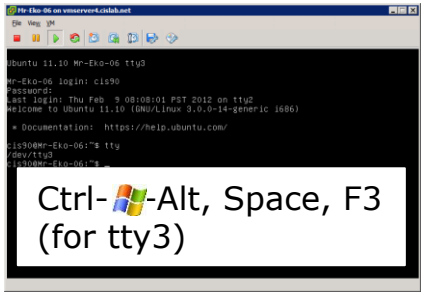










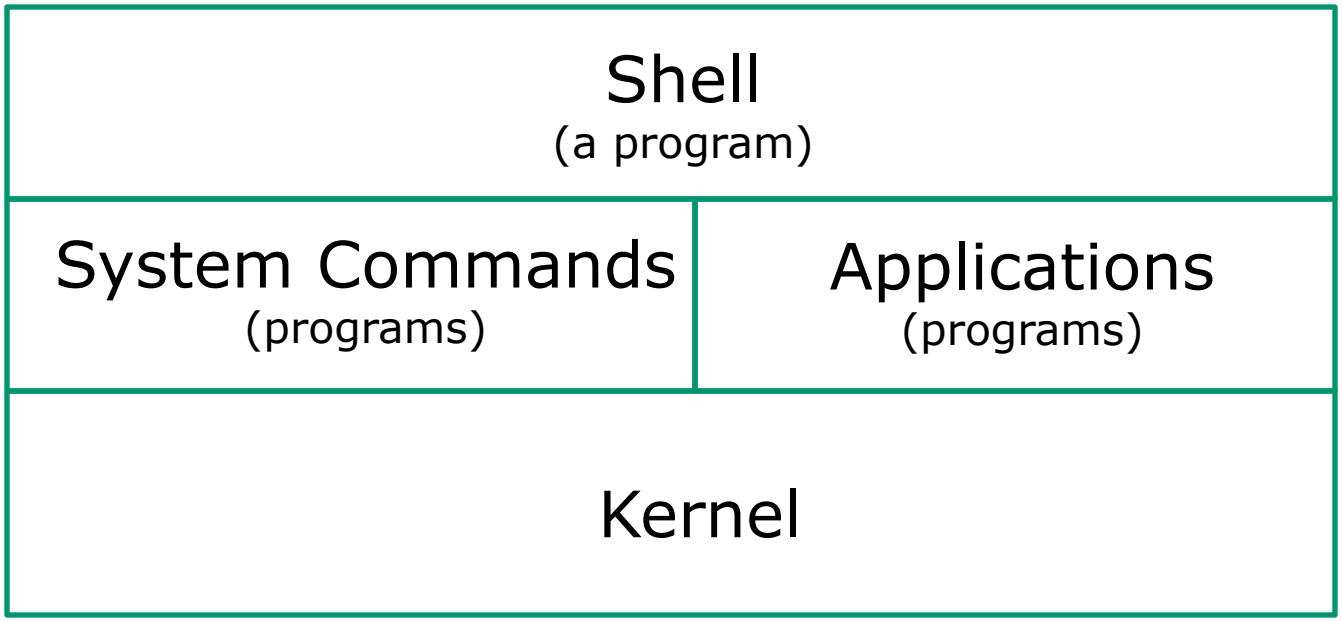


*On some PC keyboards it is not necessary to use the ⊞ key

UNIX/Linux Architecture simplified

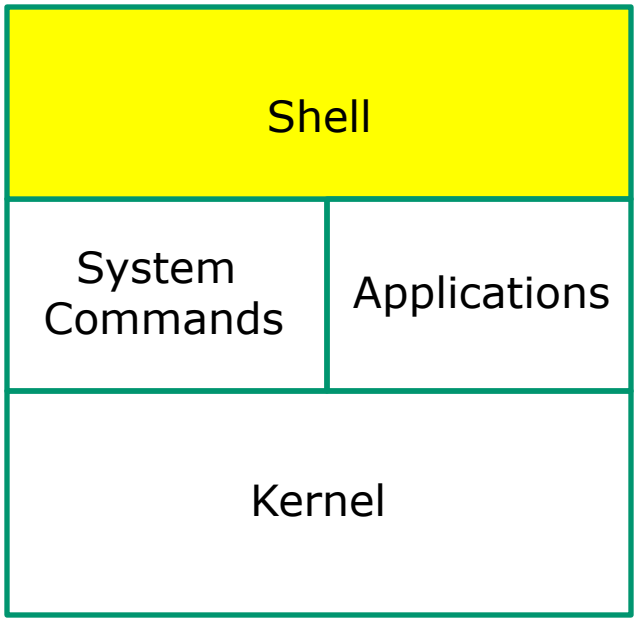
UNIX/Linux Architecture

Simplified View - Four Major Components



UNIX/Linux Architecture

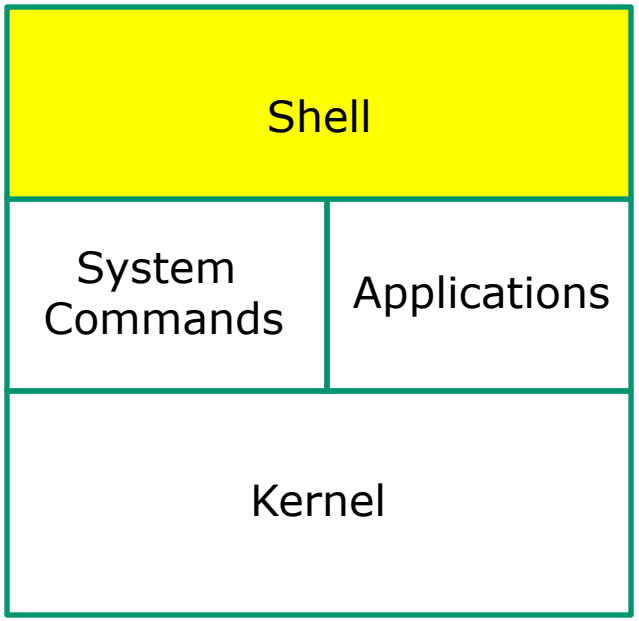
The Shell

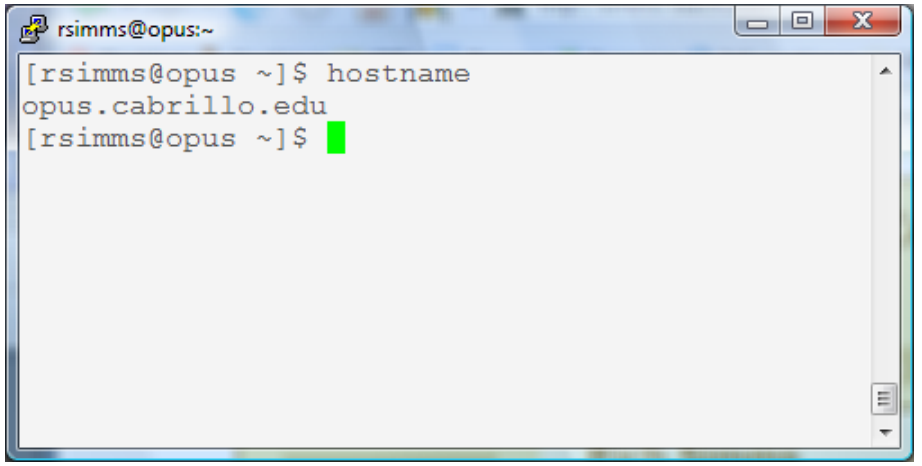


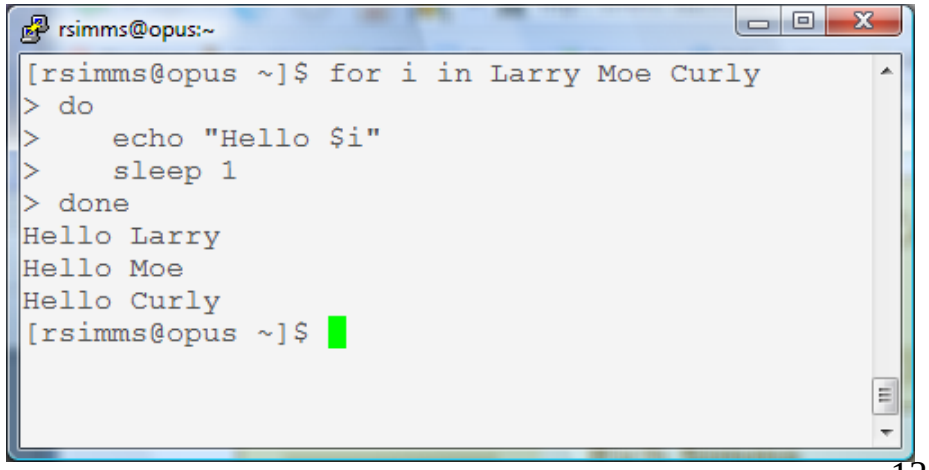
- Allows users to interact with the computer via a "command line".
- Prompts for a command, parses the command, finds the right program and gets that program executed.
- Called a "shell" because it hides the underlying operating system.
- Many shell programs are available: sh (Bourne shell), bash (born 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

UNIX/Linux Architecture

The Shell is a user interface and a programming language

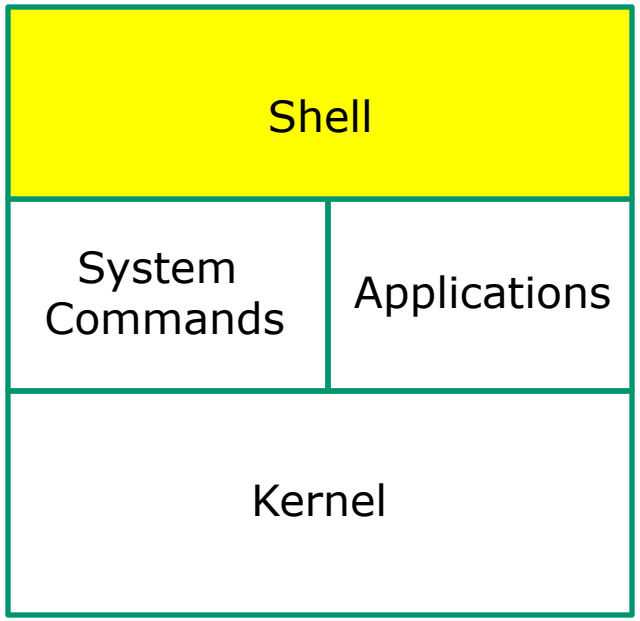






UNIX/Linux Architecture

Shells, graphical shells and in-between

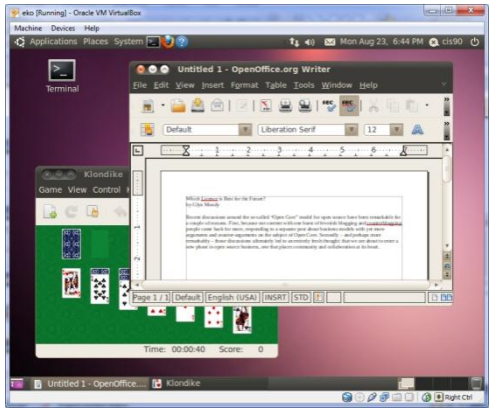


Shell Command Line Interface (CLI)

```
[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]#
```

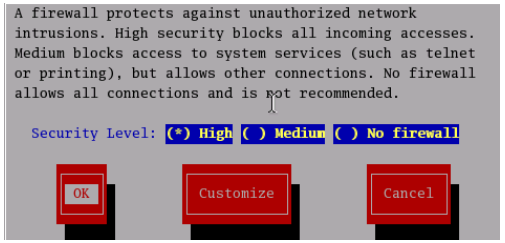
bash

Graphic shells or desktops (GUI)



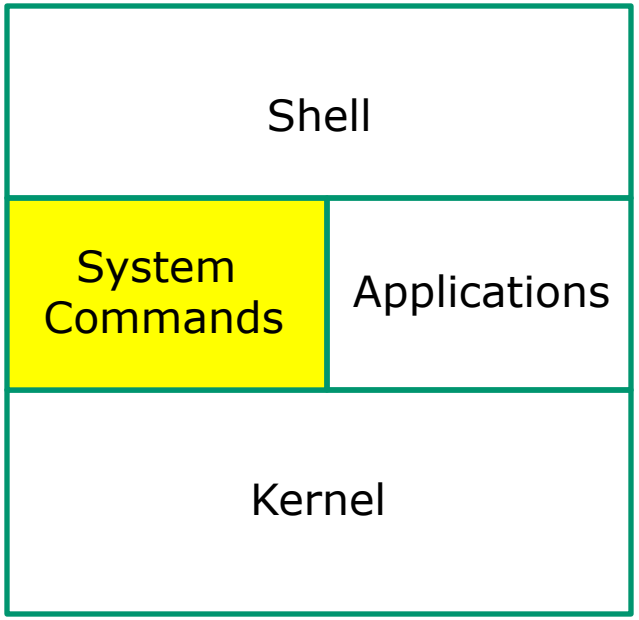
gnome

Text User Interface (TUI)



Lokkit Utility (uses curses library)

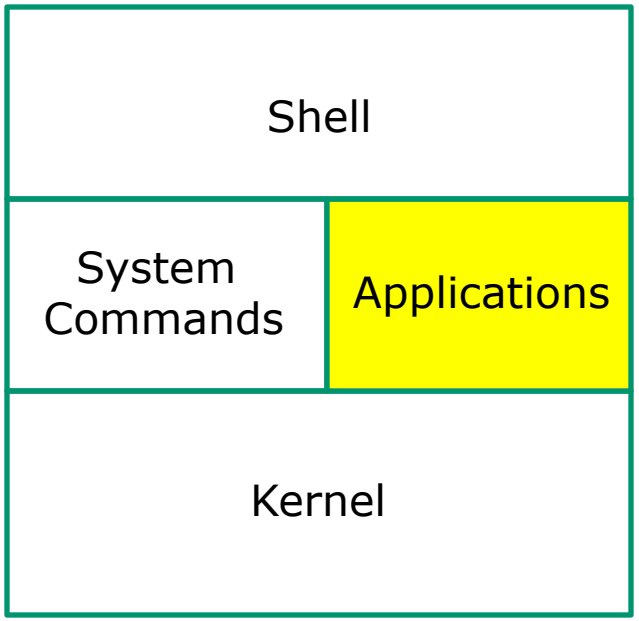
UNIX/Linux Architecture
System Commands



- 100's of system commands and utilities .
- Commands like **ls** (list directories), **cat** (print a file), **rm** (remove a file), … etc.
- Utilities like **vi** (text editor), **sort** (sorts file contents), **find** (searches), … etc.
- Larger utilities like **sendmail** (email), **tar** (backup), **tcpdump** (sniffer), … etc.
- Administrative utilities like **useradd**, **groupadd**, **passwd** (change password), … etc.

UNIX/Linux Architecture

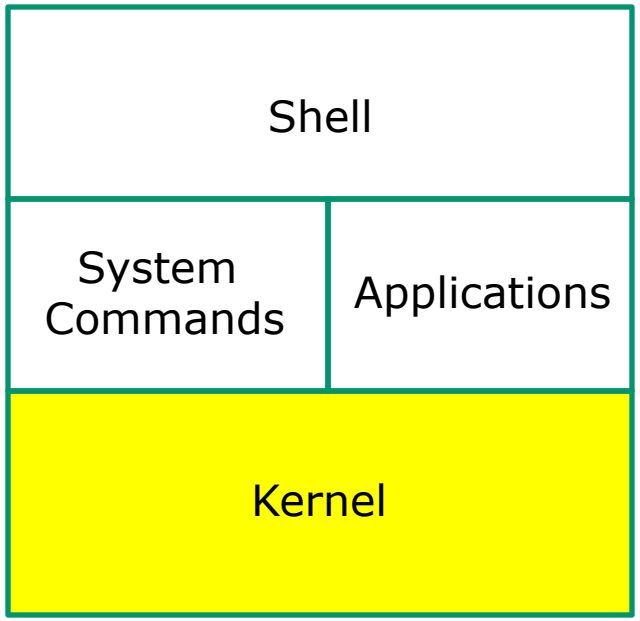
Applications



- 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.

UNIX/Linux Architecture

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

UNIX/Linux Architectures

How is UNIX/Linux put together?

What are the fundamental components?

GNU/Linux Distributions

OpenSUSE

RedHat Enterprise Linux

Fedora

Debian

CentOS

Ubuntu

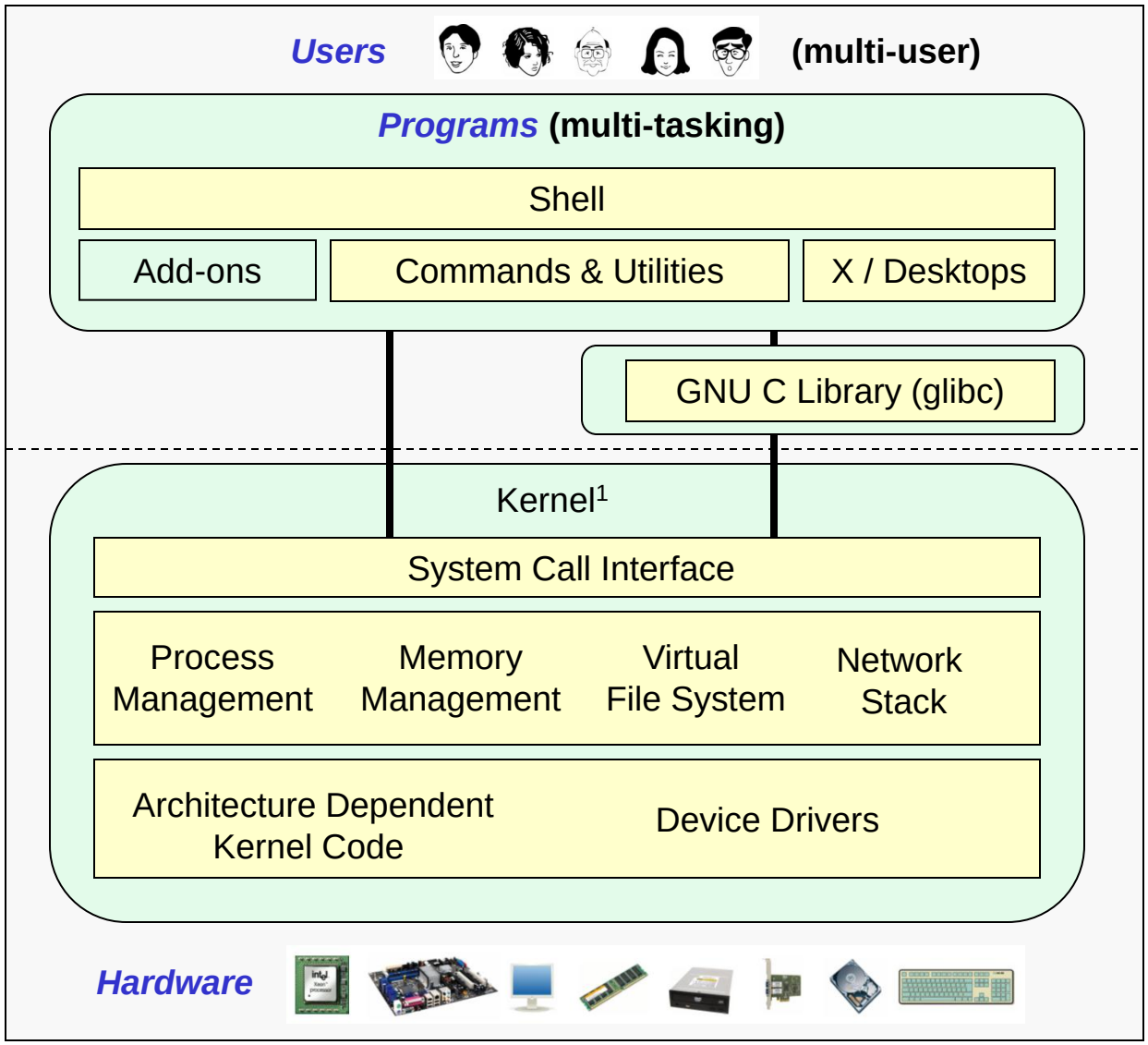
Mandriva

Lets peel off the covers and look inside

All Linux distros are based on the GNU/Linux Operating System Architecture

User Space

Kernel Space



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.

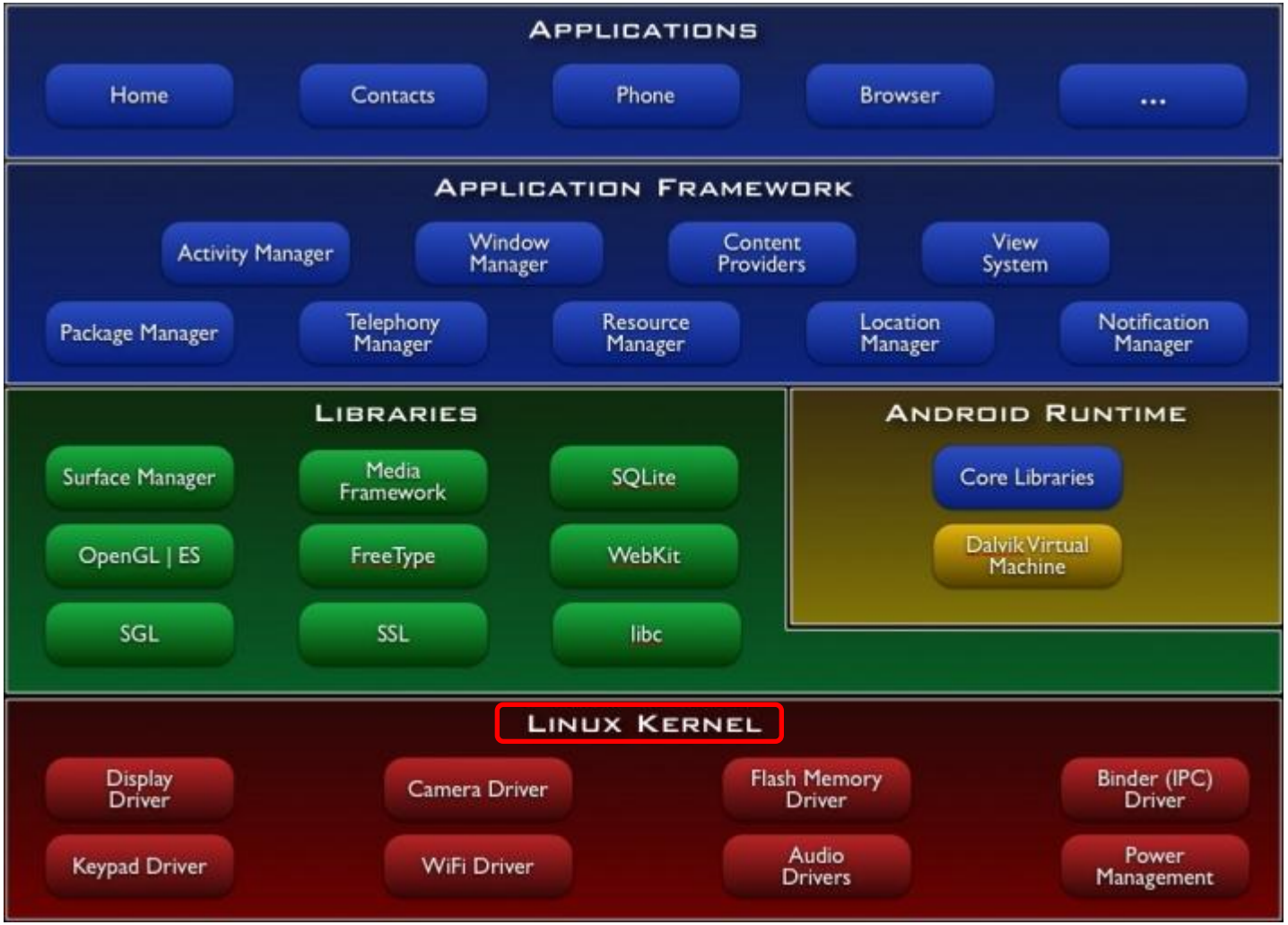
[1]See "Anatomy of the Linux kernel" by M. Tim Jones at http://www-128.ibm.com/developerworks/linux/library/l-linux-kernel/

The Android software stack uses the Linux 2.6 kernel 

Android

Lets peel off the covers and look inside

The Android software stack uses the Linux 2.6 kernel 



Source: http://developer.android.com/guide/basics/what-is-android.html

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 "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 !!

Course Lingo

Some lingo for this class

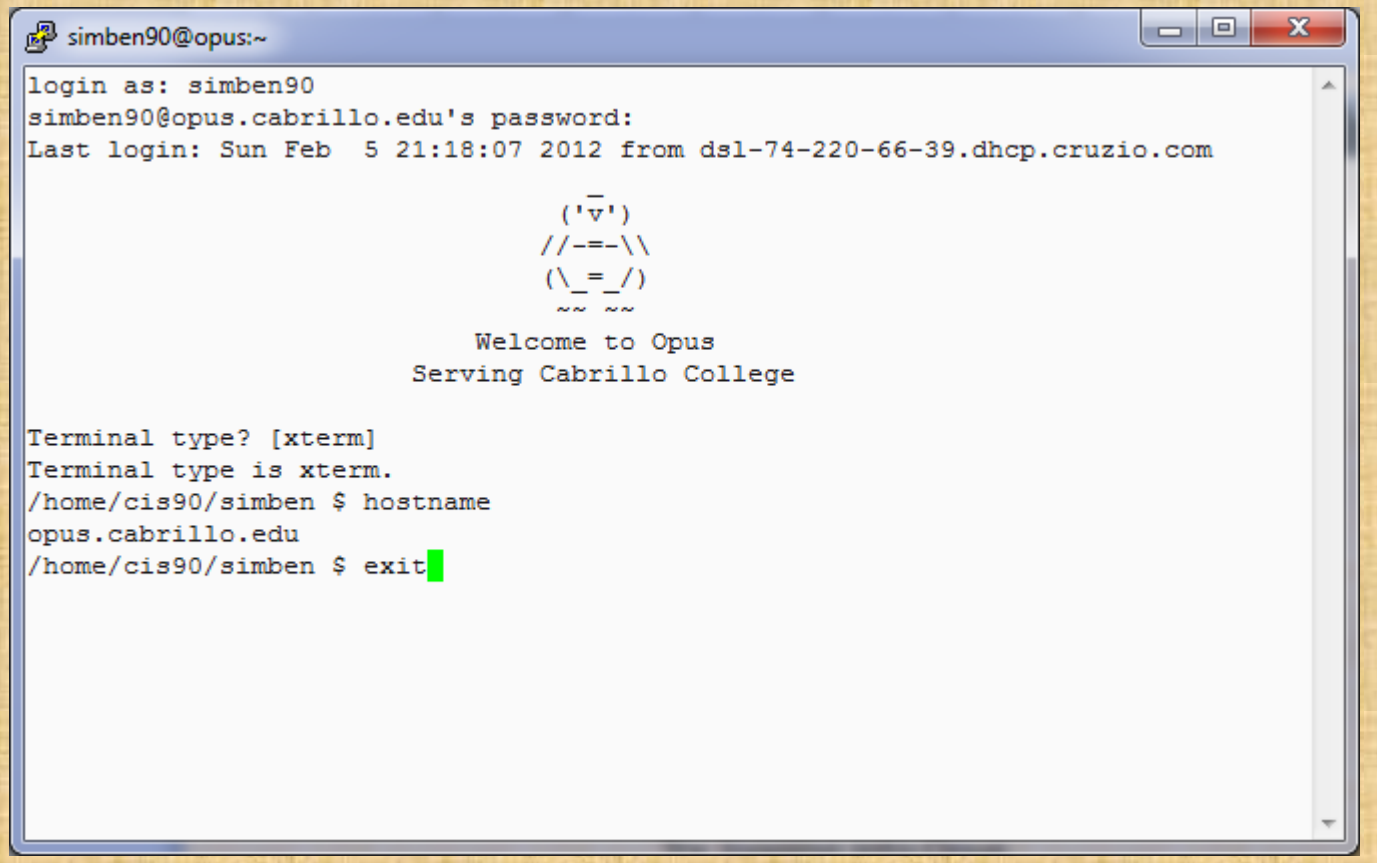
- "**VM**" = a virtual machine
- "**machine**" = the hardware portion of a computer
- "**system**" = a computer (hardware and software)
- "**host**" = a computer or system on the network
- "**OS**" = Operating System
- "**distro**" = a distribution of Linux, e.g. Red Hat, SUSE, Ubuntu.
- "**SSH**" = secure shell
- "**shell**" = The user interface to UNIX/Linux
- "**SSH into Opus**" = use Putty if on Windows or the ssh command if on Linux to connect to Opus.
- "**Putty into Opus**" = run the Putty program on windows and connect remotely using SSH to the computer on campus named Opus.cabrillo.edu
- "**revert a VM to it's snapshot**" = restore a VM back to the original pristine state. This undoes any configuration changes, VMware settings and restores the contents of the hard drive(s)
- "**start up a VM**" = the same as powering up any computer, first the BIOS runs, then the OS is loaded, then services are started

Some lingo for this class

- "**VMware or VirtualBox host**" = the physical computer that all the VMs are running on.
- "**VMware or VirtualBox guest**" = the virtual machine running on the VMware host.
- "**Guest OS**" = the operating system running on the VM.
- "**console**" = a local terminal for entering commands. No scrollbars.
- "**virtual terminal**" = when using a local console there are a number of virtual terminals that can be used. Ctrl-Alt-F*n*, where *n*=1 to 7 will bring up different terminals. For example, Ctrl-Alt-F2 brings up tty2. These terminals have no scroll bars.
- "**tty**"= a teletype, very early and noisy way to interact with a computer. A teletype had a keyboard and a printer and was connected to a computer. The virtual terminals are named tty1, tty2, etc.
- "**graphical terminal**" = A terminal program that can be run on a graphical desktop. These terminals have scroll bars.
- "**bring up tty2**" - bring up the tty2 console by pressing Ctrl-Alt-F2 keys at the same time

Commands

Class Activity



Log into your account on Opus and as we learn the new commands in the upcoming section, try them out on Opus

who

shows who is logged in and which terminals they are using

```
[rsimms@frida rsimms]$ who
root     tty1         Jul  3 13:54
root     tty2         Jul  3 13:55
rsimms   tty3         Jul  3 13:55
cisco    :0           Jul  3 13:48
cisco    pts/0        Jul  3 13:49 (:0.0)
cisco    pts/1        Jul  3 13:49 (:0.0)
bsimms   pts/2        Jul  3 13:53 (192.168.0.26)
hmiller  pts/3        Jul  3 13:55 (192.168.0.26)
droddy   pts/4        Jul  3 13:57 (192.168.0.25)
```

Usernames

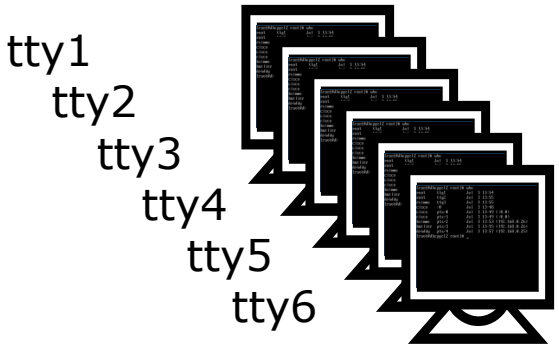
Terminal devices

Date and time of login

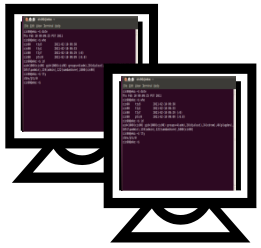
Where logged in from (blank or :0.0) if local, hostname or IP if remote

Note the same user can login more that once using different terminals

tty's (virtual terminals)



pts's
(graphical terminal windows)

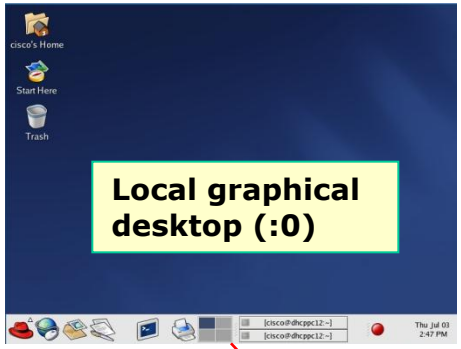


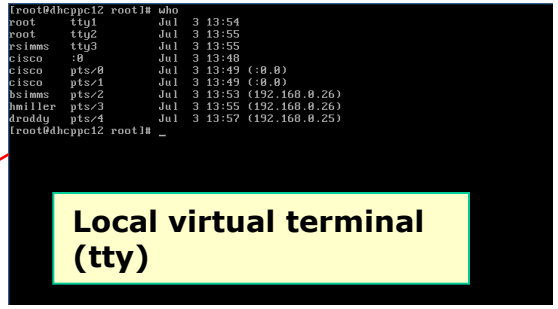
More pts's (SSH logins)

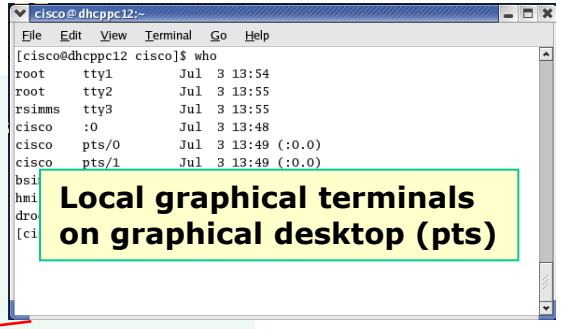
Always keep this mental model in mind that every UNIX/Linux computer has lots of terminals attached

who

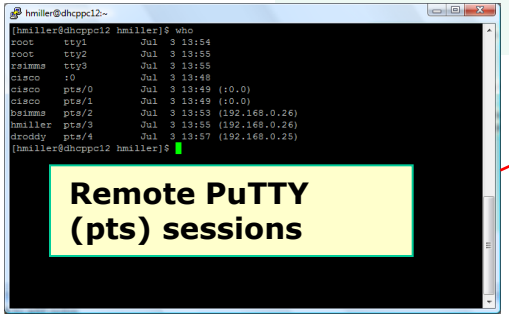
show who is logged on








```
[rsimms@frida rsimms]$ who
root     tty1         Jul  3 13:54
root     tty2         Jul  3 13:55
rsimms   tty3         Jul  3 13:55
cisco    :0           Jul  3 13:48
cisco    pts/0        Jul  3 13:49 (:0.0)
cisco    pts/1        Jul  3 13:49 (:0.0)
bsimms   pts/2        Jul  3 13:53 (192.168.0.26)
hmiller  pts/3        Jul  3 13:55 (192.168.0.26)
droddy   pts/4        Jul  3 13:57 (192.168.0.25)
```

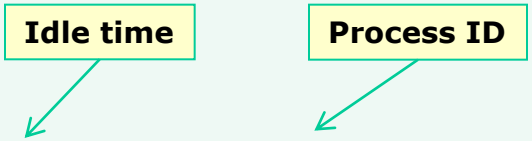


We can tell from this who output that root and rsimms are logged in on virtual terminals (tty1, tty2, and tty3). cisco has logged into the graphical desktop (:0) and opened two terminals there (:0.0). bsimms, hmiller and droddy are remotely logged in using PuTTY (pts/2, pts/3 and pts/4)

who (continued)

various who command options

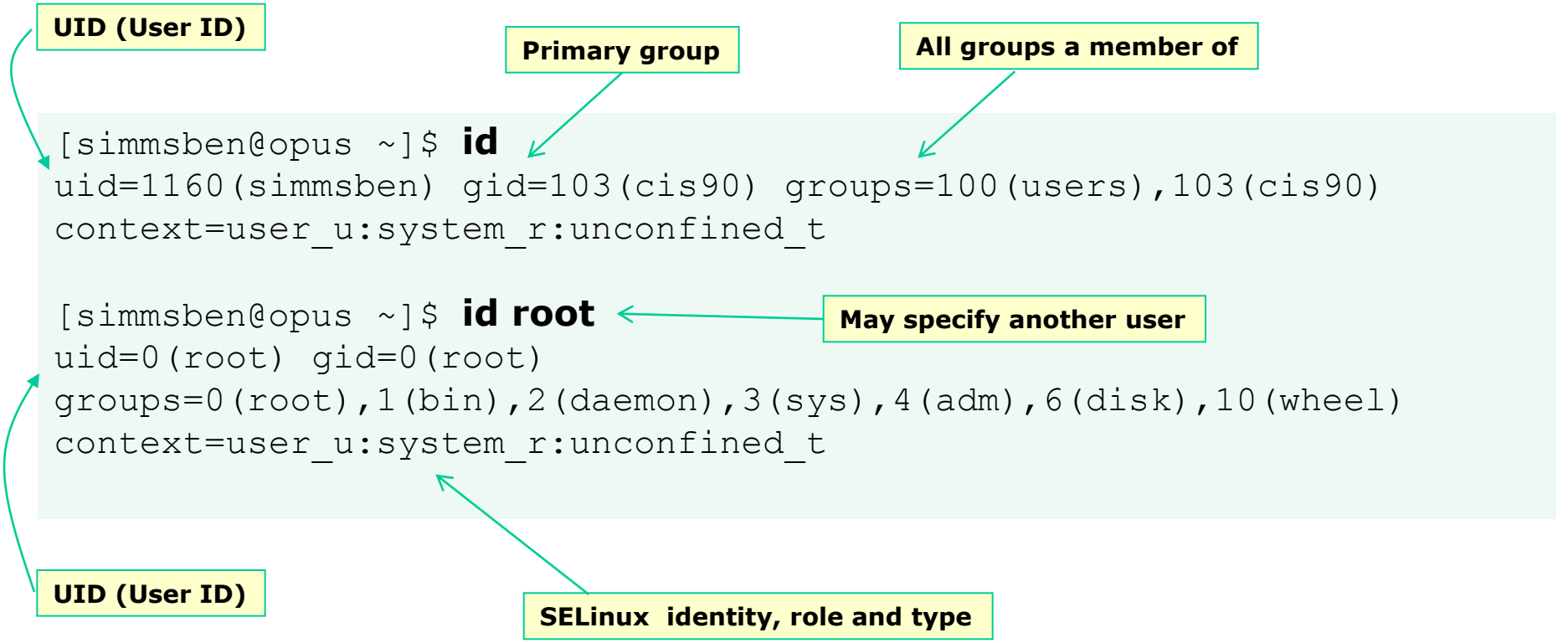
```
[rsimms@frida rsimms]$ who am i
rsimms   tty3         Jul  3 13:55

[rsimms@frida rsimms]$ who -Hu
NAME     LINE         TIME         IDLE          PID COMMENT
root     tty1         Jul  3 13:54 00:07        1390
root     tty2         Jul  3 13:55 00:07        1391
rsimms   tty3         Jul  3 13:55 00:07        1392
cisco    :0           Jul  3 13:48   ?          1451
cisco    pts/0        Jul  3 13:49 00:03        1581 (:0.0)
cisco    pts/1        Jul  3 13:49 00:08        1581 (:0.0)
bsimms   pts/2        Jul  3 13:53 00:08        1753 (192.168.0.26)
hmiller  pts/3        Jul  3 13:55   .          1924 (192.168.0.26)
droddy   pts/4        Jul  3 13:57 00:04        1962 (192.168.0.25)

[rsimms@frida rsimms]$ who -q
root root rsimms cisco cisco cisco bsimms hmiller droddy
# users=9
```



H=add heading, u=show idle time, q=login names and count

id

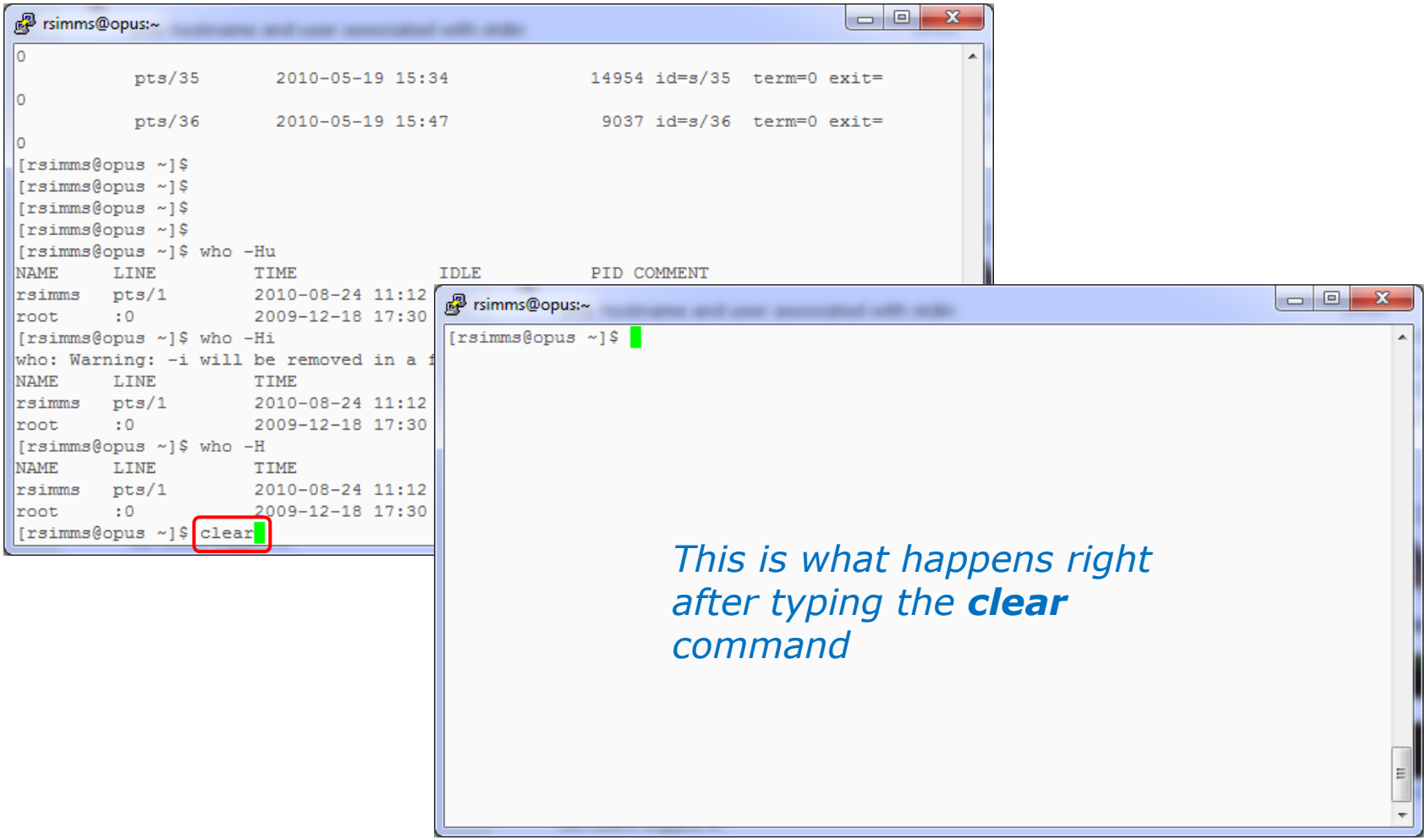
Show user's UID, group membership and other info



*The **uid** (user ID number) of the simmsben user is 1160, the **uid** of root is 0. root is the "superuser" account.*

clear

clear the terminal display



hostname

show the name of the current computer

```
/home/cis90/guest $ hostname
opus.cabrillo.edu
```

Connected to Opus using PuTTY

```
cis90@eko:~$ hostname
eko
```

Connected to Eko using PuTTY

```
C:\Users\Administrator> hostname
dv2000
```

In the DOS command prompt on Windows

Hostname will always tell you the name of the computer you are talking to. It even works in Windows!

cal

show calendar

```
[simmsben@opus ~]$ cal
     June 2008
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

[simmsben@opus ~]$ cal 9 2001
   September 2001
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
```

If month and year not specified then current month is shown

*What day of the week were you born on? Specify your birth month and year as arguments to the **cal** command*

cal

show calendar

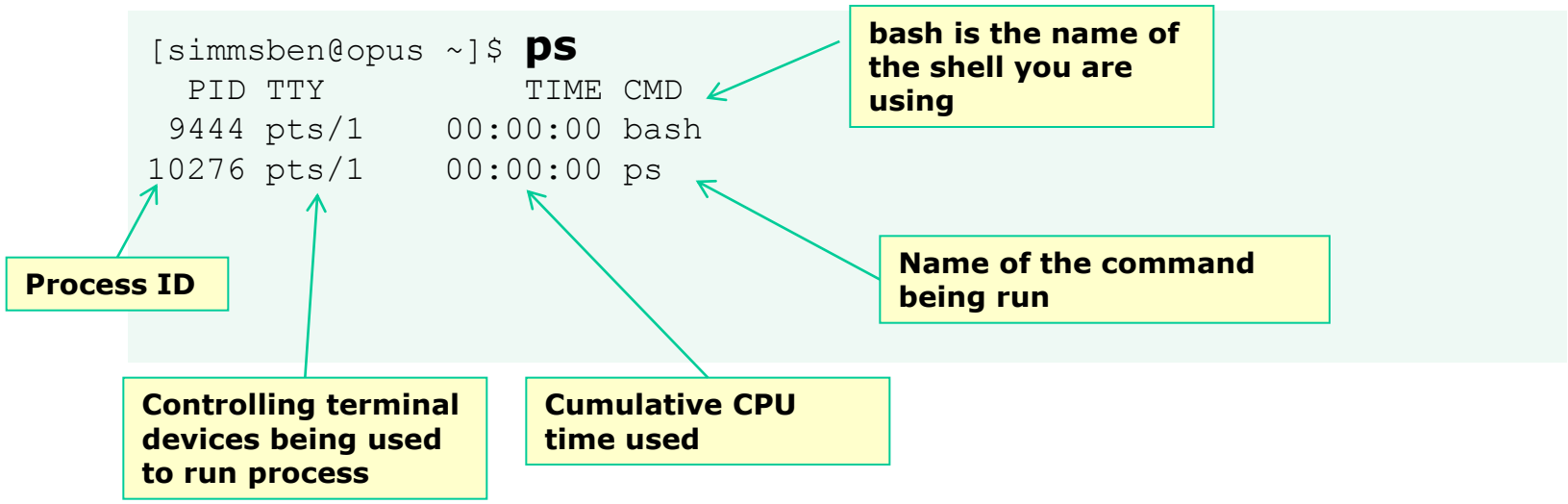
```
/home/cis90/guest $ cal 2010
                                2010

       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            1  2  3  4  5  6            1  2  3  4  5  6
 3  4  5  6  7  8  9    7  8  9 10 11 12 13    7  8  9 10 11 12 13
10 11 12 13 14 15 16   14 15 16 17 18 19 20   14 15 16 17 18 19 20
17 18 19 20 21 22 23   21 22 23 24 25 26 27   21 22 23 24 25 26 27
24 25 26 27 28 29 30   28                     28 29 30 31
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                      1            1  2  3  4  5
 4  5  6  7  8  9 10    2  3  4  5  6  7  8    6  7  8  9 10 11 12
11 12 13 14 15 16 17    9 10 11 12 13 14 15   13 14 15 16 17 18 19
18 19 20 21 22 23 24   16 17 18 19 20 21 22   20 21 22 23 24 25 26
25 26 27 28 29 30      23 24 25 26 27 28 29   27 28 29 30
                       30 31

       July                  August                September
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
 4  5  6  7  8  9 10    8  9 10 11 12 13 14    5  6  7  8  9 10 11
11 12 13 14 15 16 17   15 16 17 18 19 20 21   12 13 14 15 16 17 18
18 19 20 21 22 23 24   22 23 24 25 26 27 28   19 20 21 22 23 24 25
25 26 27 28 29 30 31   29 30 31              26 27 28 29 30

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

Specify just the year to see all 12 months

ps

show active processes

When a program is loaded into memory and being executed (run) by the kernel it is called a process



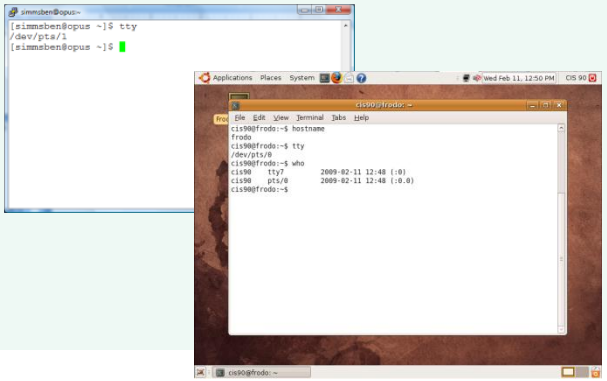
TIP: For Lab 1 this is how you answer the question on which shell you are using!

tty

show which terminal is being used for session

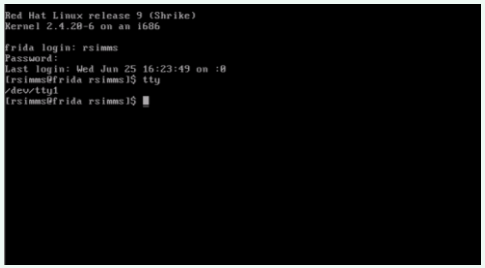
```
[simmsben@opus ~]$ tty
/dev/pts/1
```

pts's are pseudo terminal devices. You will see these used for remote PuTTY sessions and for terminals you open on the graphical desktop.



```
[rsimms@frida rsimms]$ tty
/dev/tty1
```

tty's are virtual teletype terminal devices tty1 through tty6. They are available locally by pressing Ctrl-Alt-F1 though Ctrl-Alt-F6



uname

show name of the operating system kernel

```
[simmsben@opus ~]$ uname
Linux
```

uname shows the name of the operating system kernel

history

show command history

```
/home/cis90/guest $ history
    1  date
    2  cal
    3  who
    4  who am i
    5  hostname
    6  id
    7  clear
    8  ps
    9  tty
   10  uname
   11  exit
   12  history
```

Separate histories are maintained for the same user while using different terminals.

Histories are merged when user has logged off them.

/sbin/ifconfig

show network interface status

```
cis192@frodo:~$ /sbin/ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0c:29:6f:53:d9
          inet addr:192.168.0.24  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe6f:53d9/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:113172 errors:0 dropped:0 overruns:0 frame:0
          TX packets:728 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:15963968 (15.9 MB)  TX bytes:84589 (84.5 KB)
          Interrupt:18 Base address:0x1400
<snipped>
```

*The **inet addr** is the IP address for your system. Use this with Putty or SSH command for remote logins.*

Learn more on Linux Network Administration by taking CIS 192AB

ssh

login to a remote system

Syntax: **ssh** *user***@***hostname*

Where
- *user* = the user login name
- *hostname* = the name or IP address of the remote computer

Examples:

ssh simben90@opus.cabrillo.edu

ssh cis90@172.30.4.198

ssh root@frida

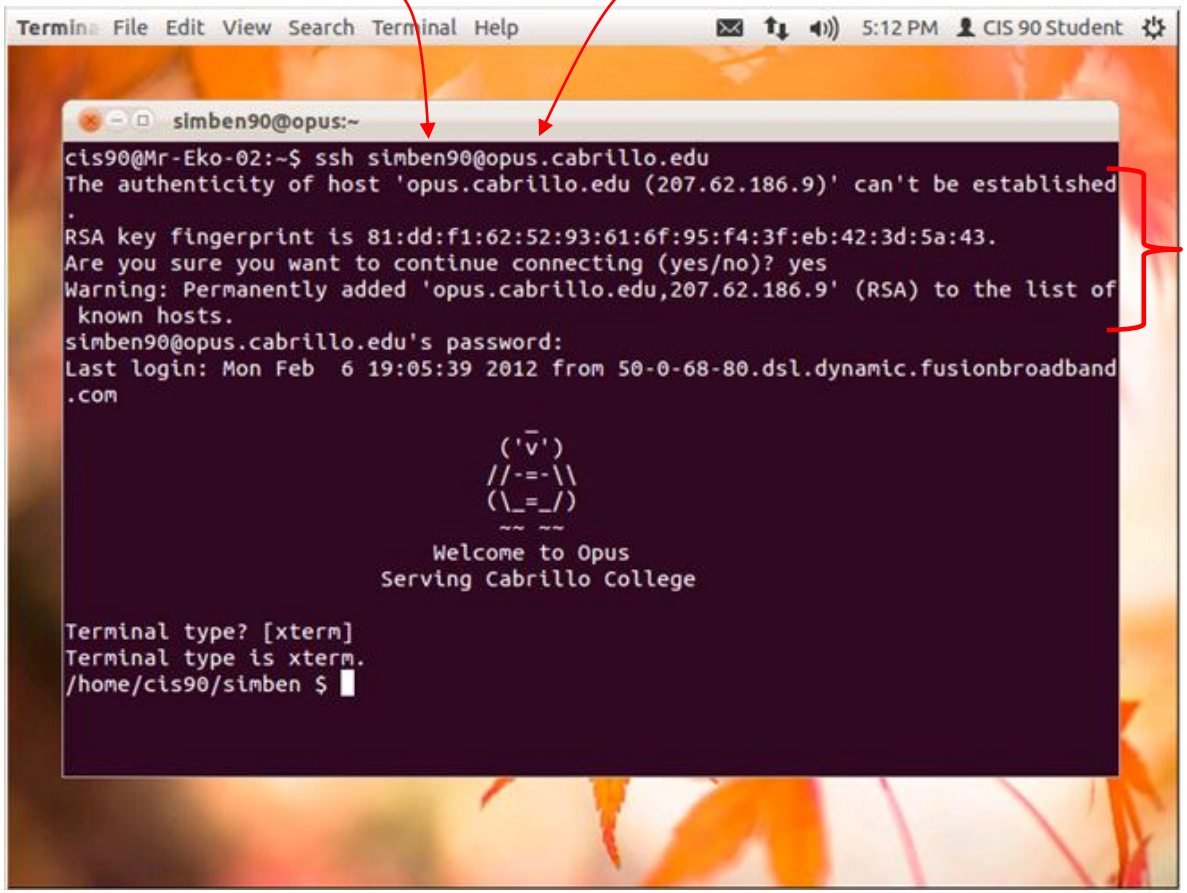
ssh

login to a remote system

Example: ssh simben90@opus.cabrillo.edu

*user is **simben90***

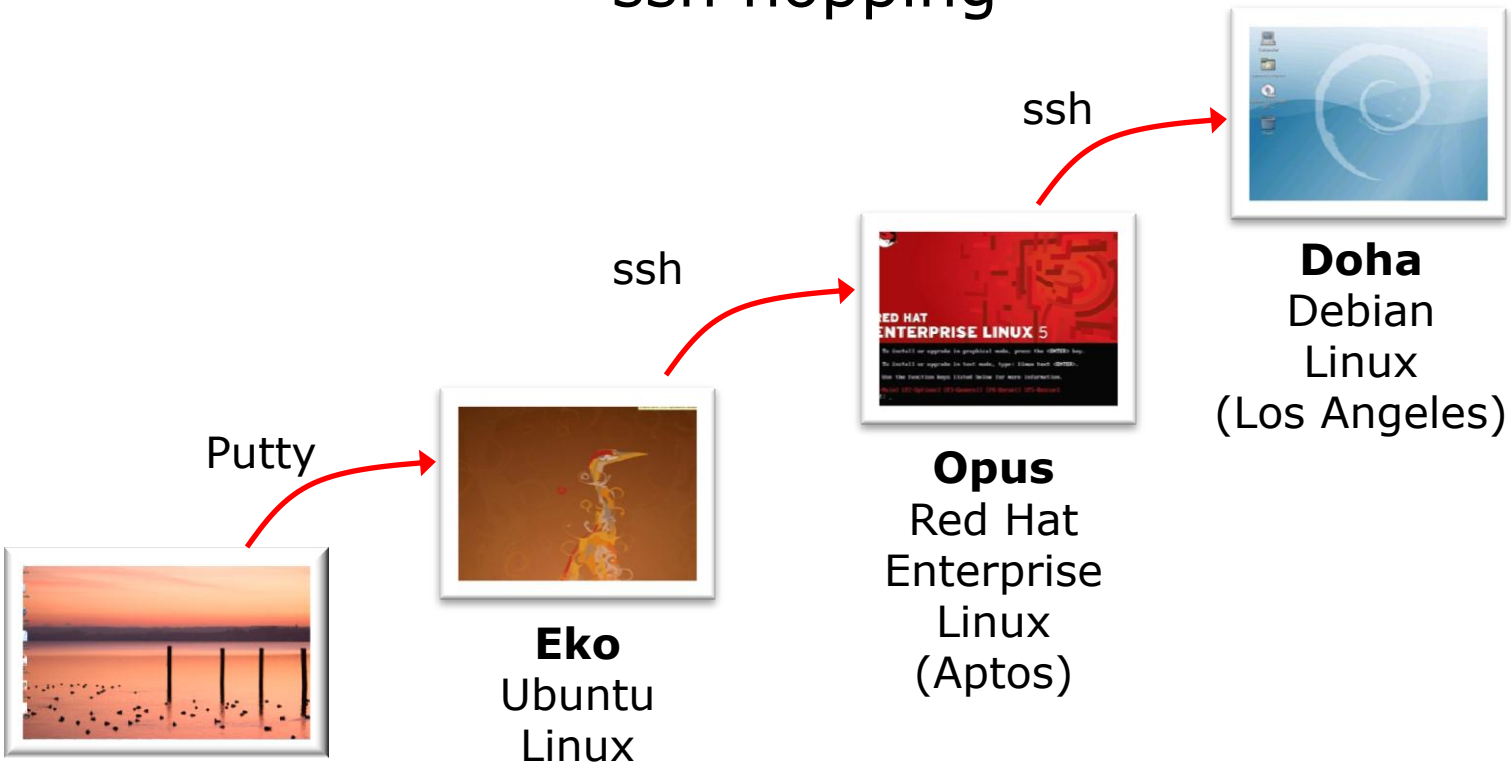
*host is **opus.cabrillo.edu***



*The first time you login to a remote computer you will get this message, type **yes** to continue*

ssh

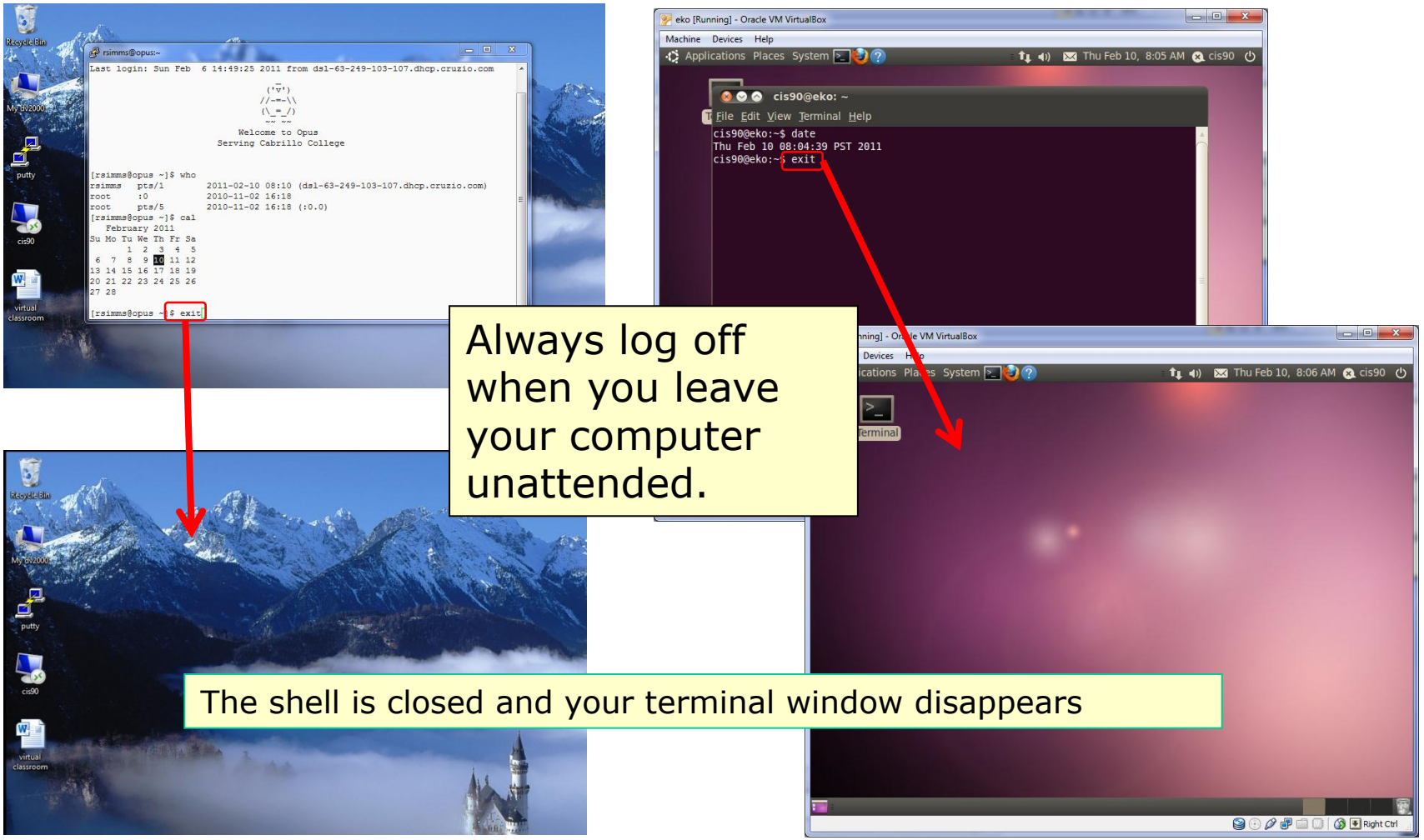
"ssh hopping"



We will start on my Windows notebook computer dv2000. From dv2000 Putty into Eko. From Eko, ssh into Opus. From Opus ssh into simms-teach.com

exit

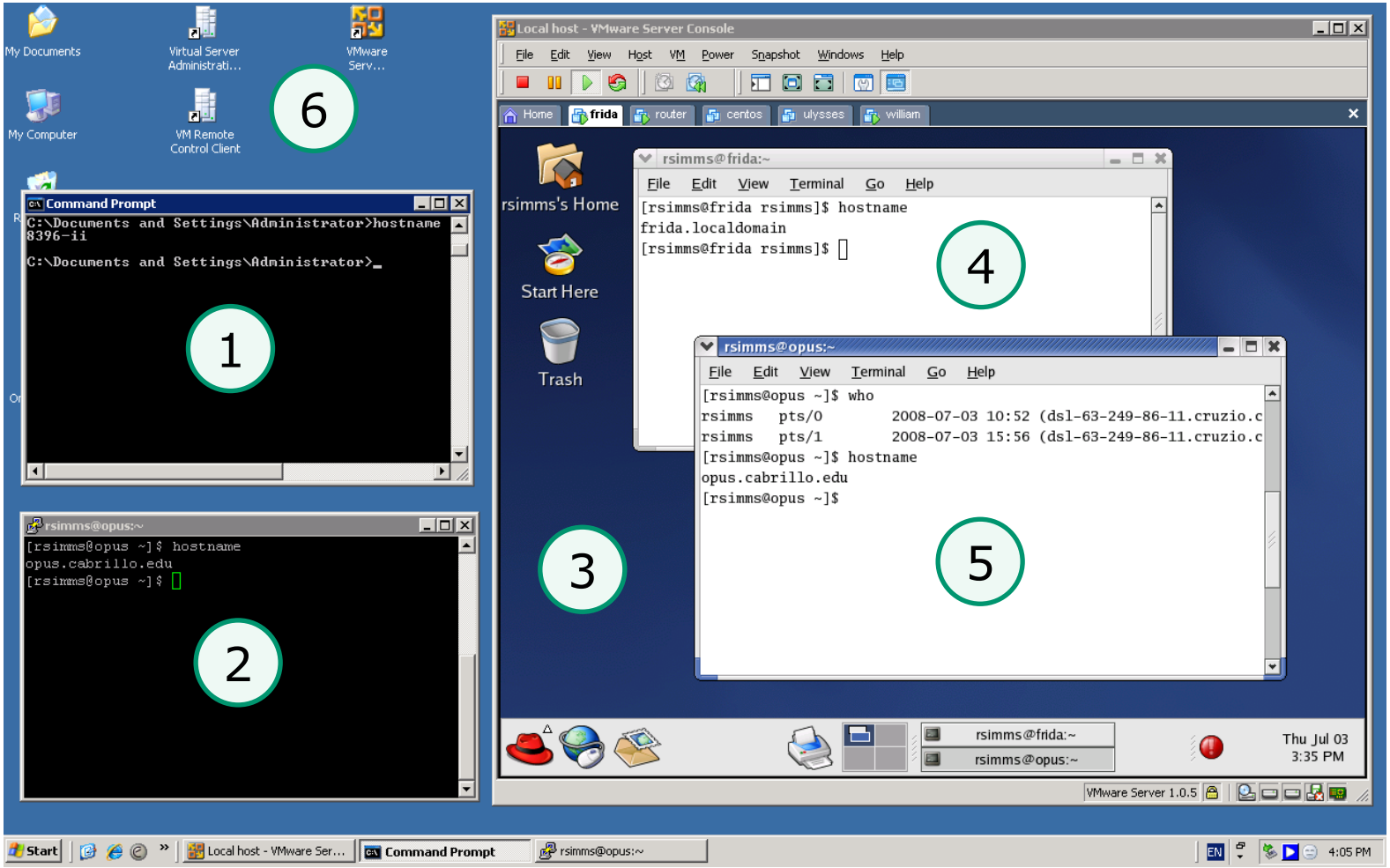
terminate shell and log off



Excuse me, but who am I talking to?

What computer are we talking to?

Is it 8396-II (Windows), Opus (RHEL) or Frida (RH9)?

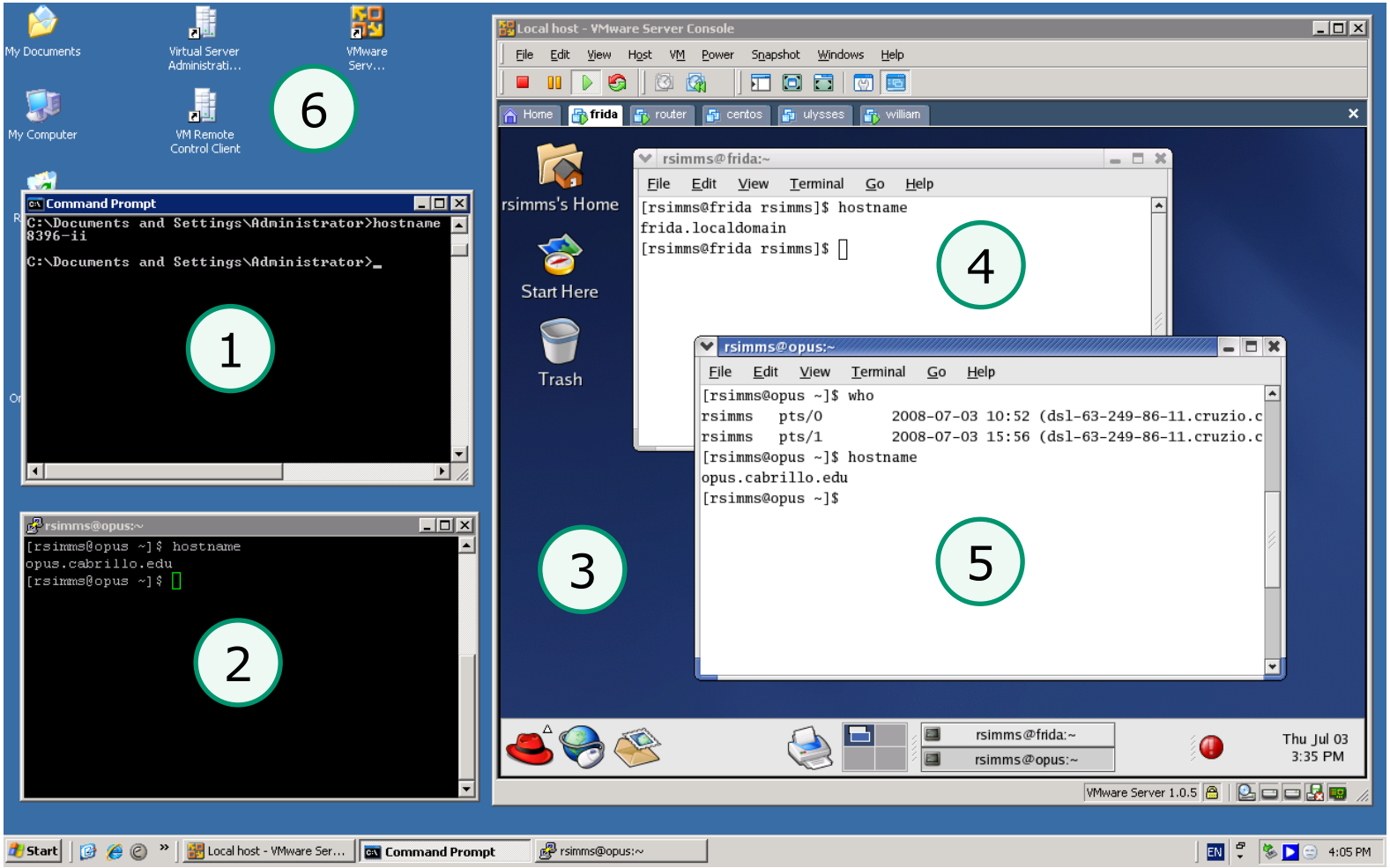


1=????? 2=????? 3=?????

4=????? 5=????? 6=?????

What computer are we talking to?

8396-II (Windows), Opus (RHEL) or Frida (RH9)

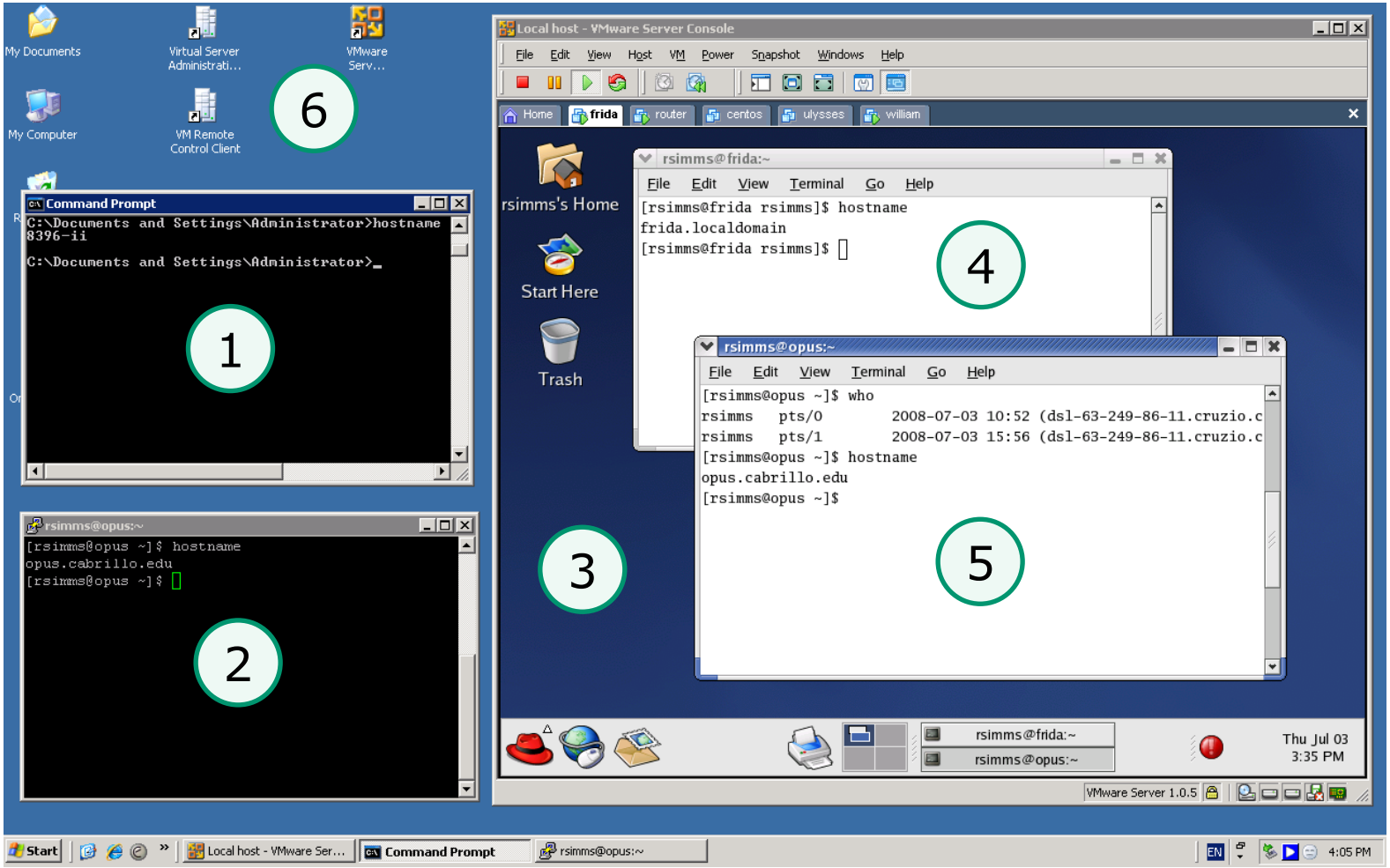


1=8396-ii 2=?????? 3=??????

4=?????? 5=?????? 6=??????

What computer are we talking to?

8396-II (Windows), Opus (RHEL) or Frida (RH9)

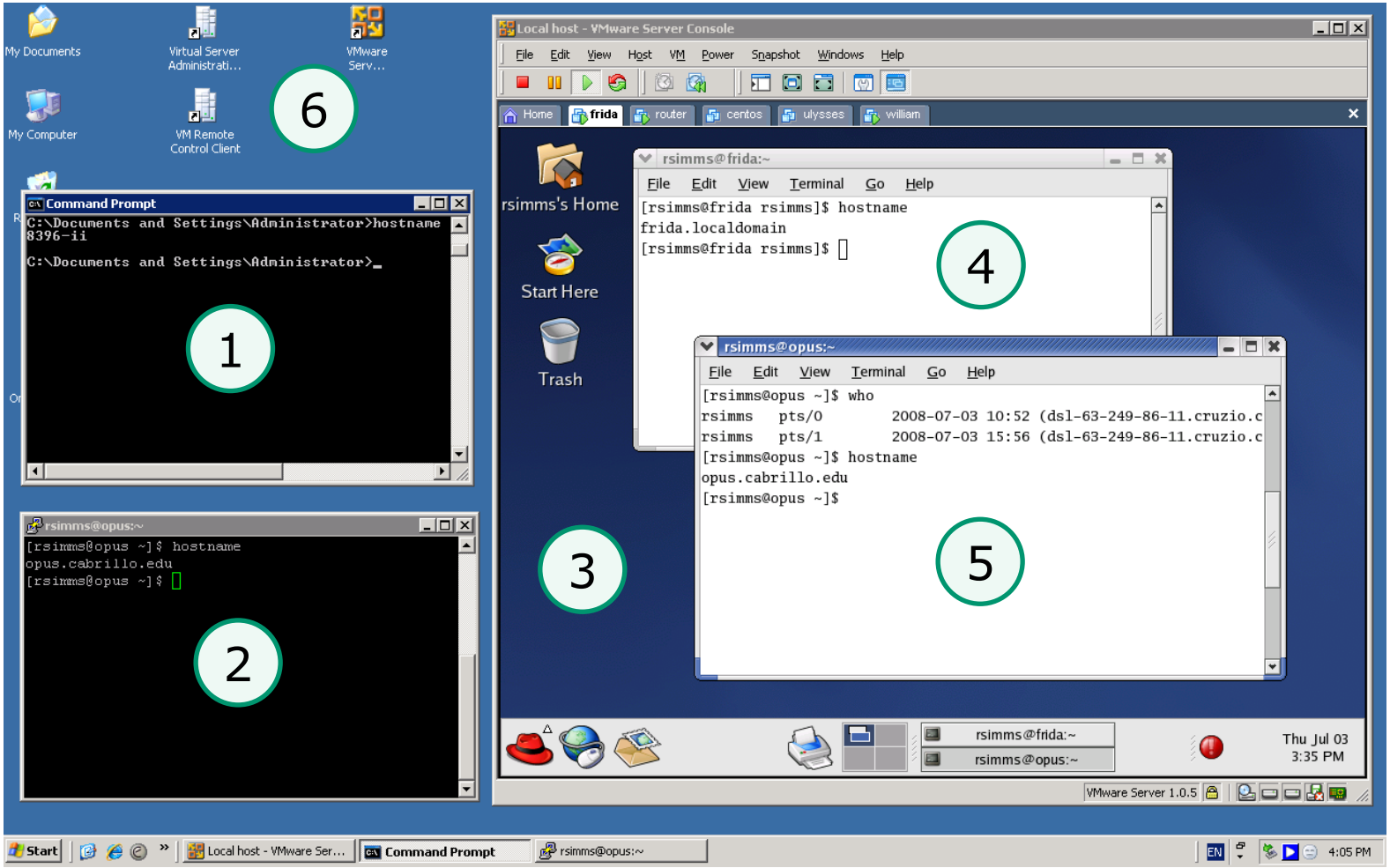


1=8396-ii 2=Opus 3=??????

4=?????? 5=?????? 6=??????

What computer are we talking to?

8396-II (Windows), Opus (RHEL) or Frida (RH9)

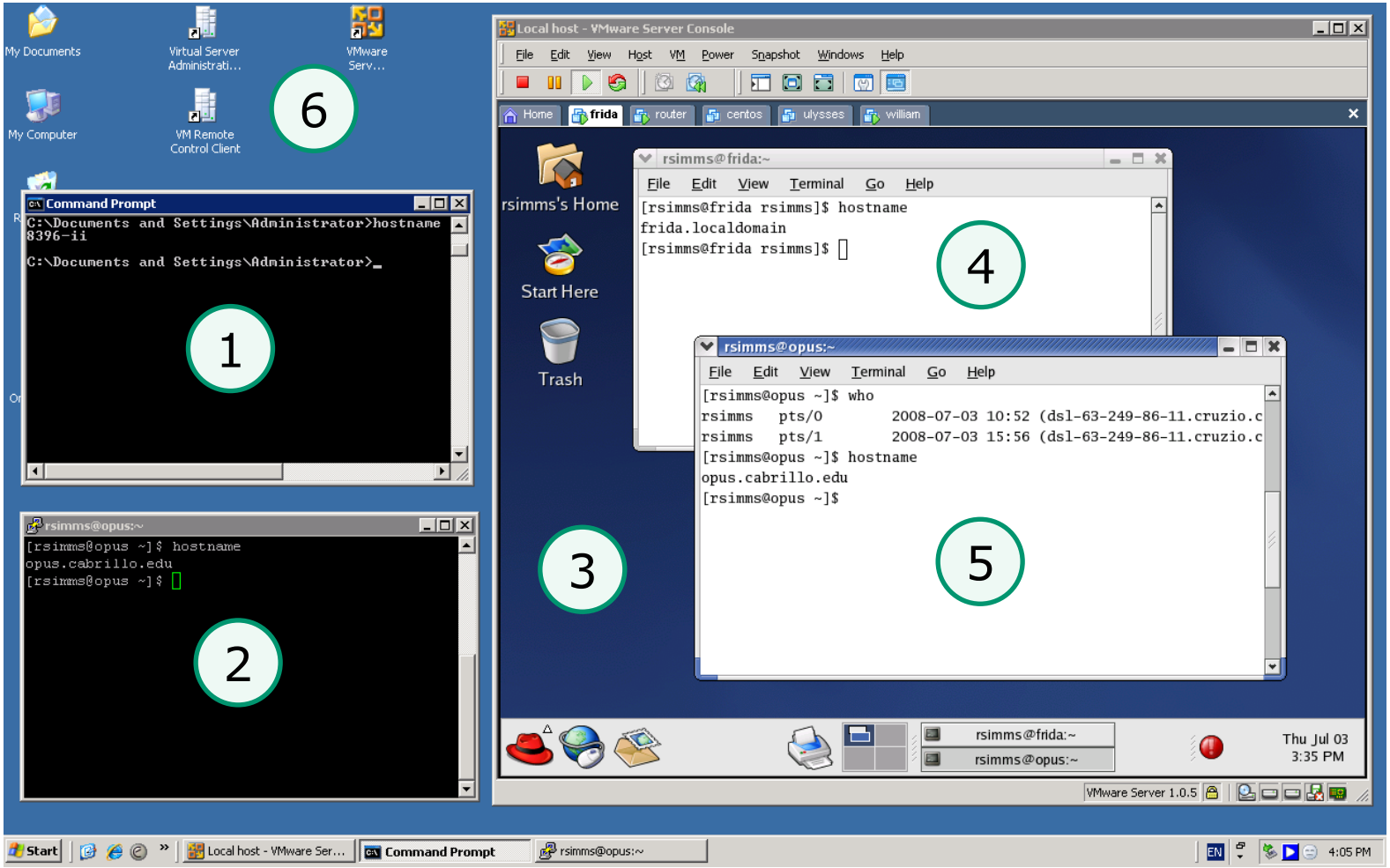


1=8396-ii 2=Opus 3=Frida

4=?????? 5=?????? 6=??????

What computer are we talking to?

8396-II (Windows), Opus (RHEL) or Frida (RH9)

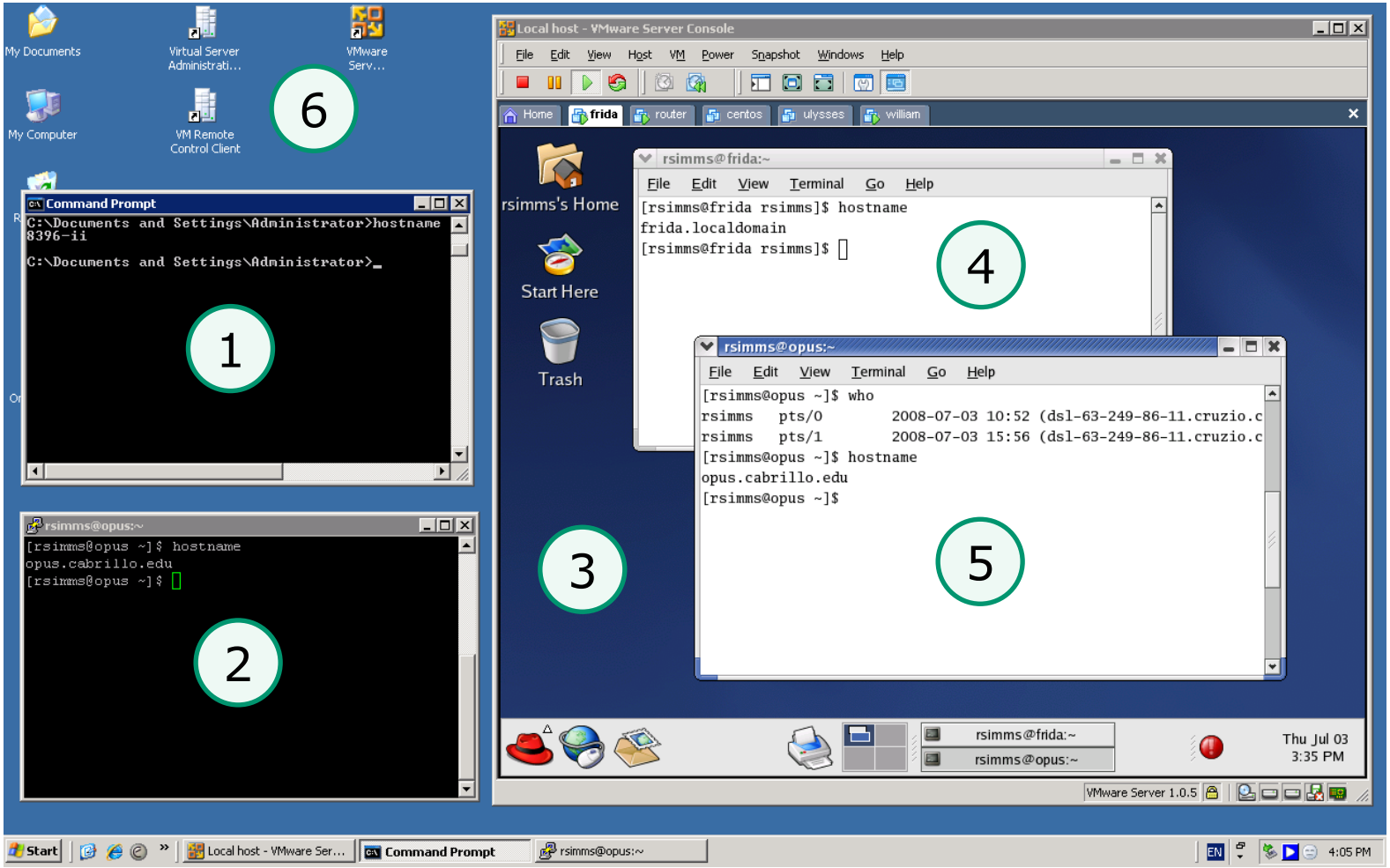


1=8396-ii 2=Opus 3=Frida

4=frida 5=?????? 6=??????

What computer are we talking to?

8396-II (Windows), Opus (RHEL) or Frida (RH9)

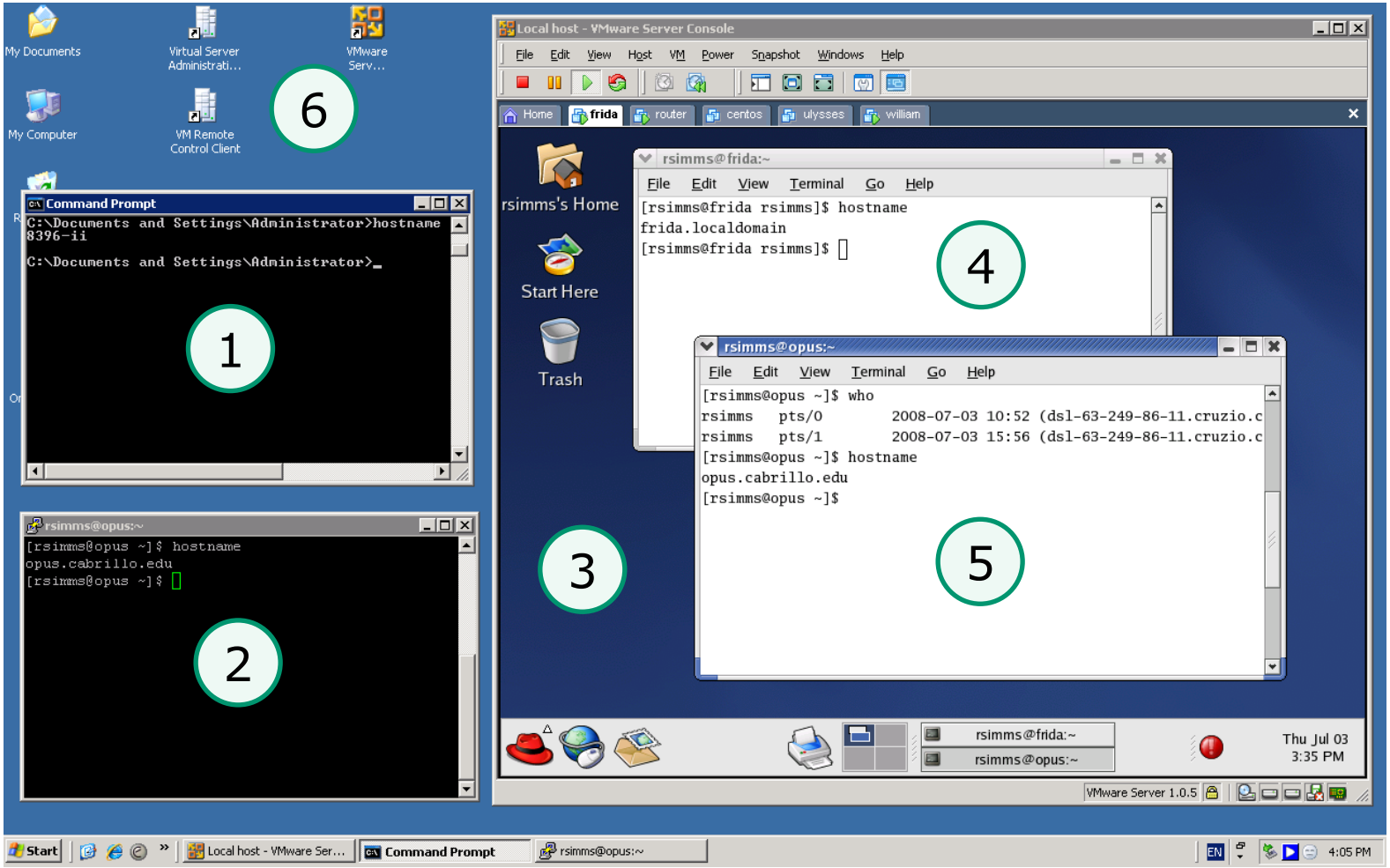


1=8396-ii 2=Opus 3=Frida

4=frida 5=Opus 6=??????

What computer are we talking to?

8396-II (Windows), Opus (RHEL) or Frida (RH9)



1=8396-ii 2=Opus 3=Frida

4=Frida 5=Opus 6=8396-ii

Lab 1

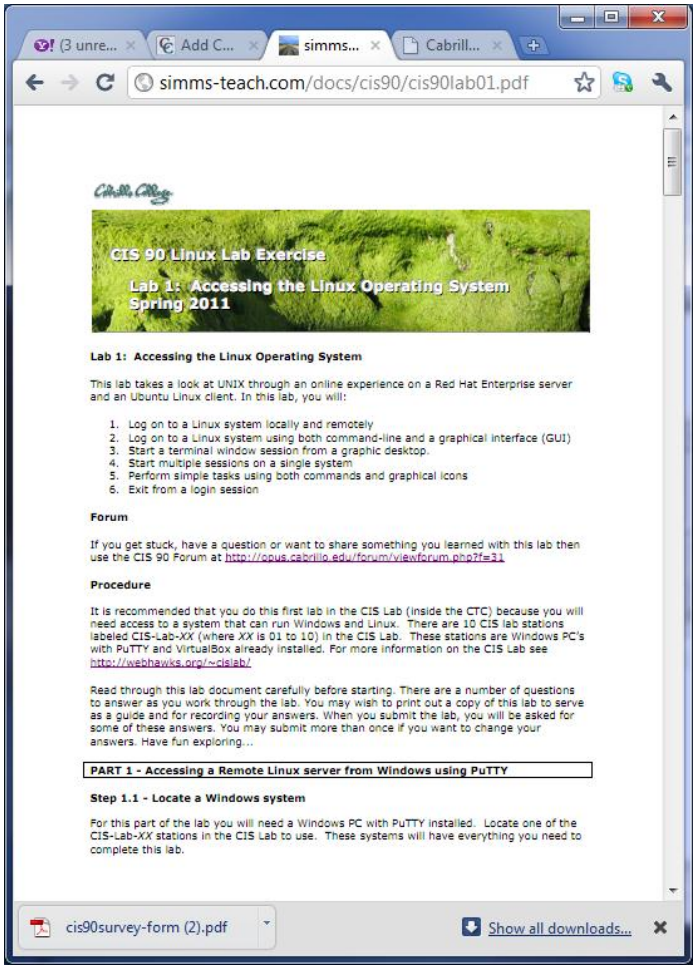
http://simms-teach.com/cis90calendar.php

1	2/8	• Presentation slides (download) • Logins Sheet (download) • CIS VLab RDP file: (download) **Supplemental** • Howto #103: Installing PuTTY (download) • Video #100: Remote Putty login to Opus (view) **Assignment** • Student Survey • Lab 1 **CCC Confer** • Enter virtual classroom • Class archives	2,4,5, p113-115, p164-172 (Hahn)	
2	2/15	**Quiz 1** **Commands** • Understand 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 documentation when online **Materials** • Presentation slides (download) • Howto #106: Configuring Putty (download)	2.3-2.7 2.11 3.7-3.20 4.19-4.22 9.1-9.2 (Gillay)	Lab 1 Student Survey

Note: The first lab assignment and student survey is due by 11:59PM of the next class meeting!

Please remember that late work is not accepted

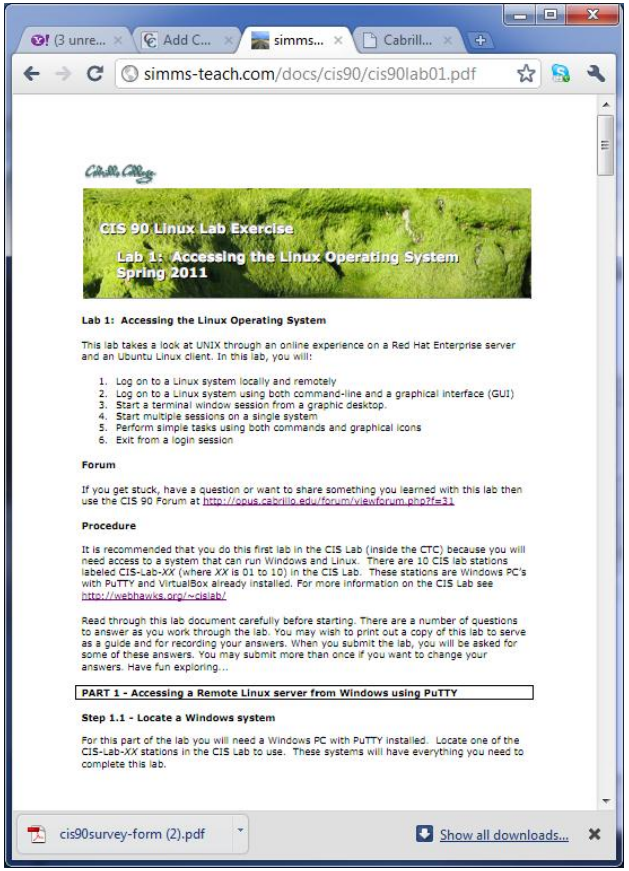
Lab Assignment Tips



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.
- Use Google when trouble-shooting
- Late work is not accepted so submit what you have for partial credit.

Lab 1 Demo


simms-teach.com/docs/cis90/cis90lab01.pdf
CIS 90 Linux Lab Exercise
Lab 1: Accessing the Linux Operating System
Spring 2011
Lab 1: Accessing the Linux Operating System
This lab takes a look at UNIX through an online experience on a Red Hat Enterprise server and an Ubuntu Linux client. In this lab, you will:
1. Log on to a Linux system locally and remotely
2. Log on to a Linux system using both command-line and a graphical interface (GUI)
3. Start a terminal window session from a graphic desktop.
4. Start multiple sessions on a single system
5. Perform simple tasks using both commands and graphical icons
6. Exit from a login session
Forum
If you get stuck, have a question or want to share something you learned with this lab then use the CIS 90 Forum at http://opus.cabrillo.edu/forum/viewforum.php?f=31
Procedure
It is recommended that you do this first lab in the CIS Lab (inside the CTC) because you will need access to a system that can run Windows and Linux. There are 10 CIS lab stations labeled CIS-Lab-XX (where XX is 01 to 10) in the CIS Lab. These stations are Windows PC's with PuTTY and VirtualBox already installed. For more information on the CIS Lab see http://webhawks.org/~cislab/
Read through this lab document carefully before starting. There are a number of questions to answer as you work through the lab. You may wish to print out a copy of this lab to serve as a guide and for recording your answers. When you submit the lab, you will be asked for some of these answers. You may submit more than once if you want to change your answers. Have fun exploring...
PART 1 - Accessing a Remote Linux server from Windows using PuTTY
Step 1.1 - Locate a Windows system
For this part of the lab you will need a Windows PC with PuTTY installed. Locate one of the CIS-Lab-XX stations in the CIS Lab to use. These systems will have everything you need to complete this lab.
cis90survey-form (2).pdf
Show all downloads...

Wrap up

New commands:

cal	- show calendars
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
ifconfig	- show network interface info
ps	- show processes (loaded programs) being run
ssh	- secure login to a remote system
uname	- show OS name
tty	- show terminal information
who	- show who else is logged on
who am i	- Identifies which login session you are using
Ctrl-Alt-F1 to Ctrl-Alt-F7	- Change between terminals and X windows (graphics)

New Files and Directories:

VMware:

Ctrl-Alt	- to move mouse cursor out of VM

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:

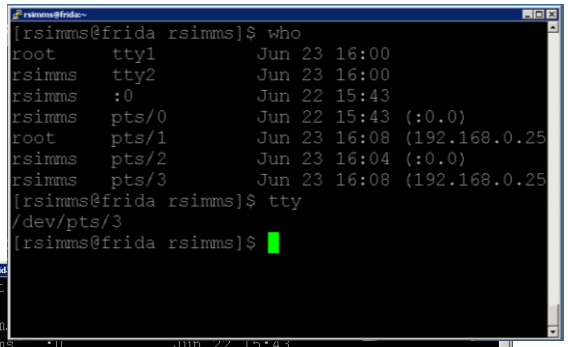
- What part of UNIX/Linux is both a user interface and a programming language?
- What is the lowest level, inner-most component of a UNIX/Linux Operating System called?
- What command shows the other users logged in to the computer?

END

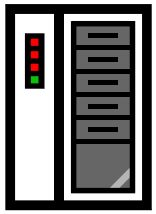
Backup

Teletype Terminals (tty), Pseudo Terminals (pts), X windows displays

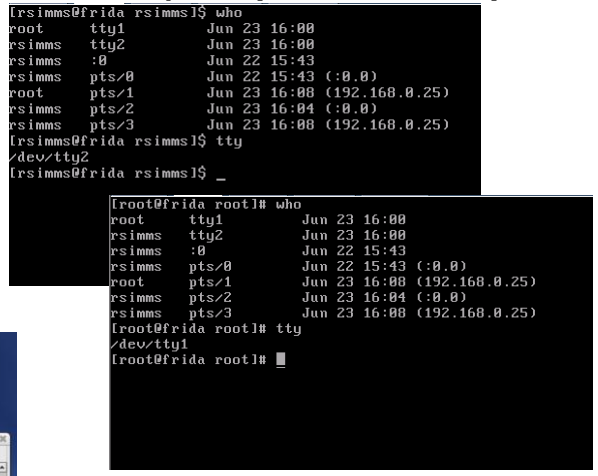
/dev/pts/3 (Putty)



/dev/pts/1 (Putty)

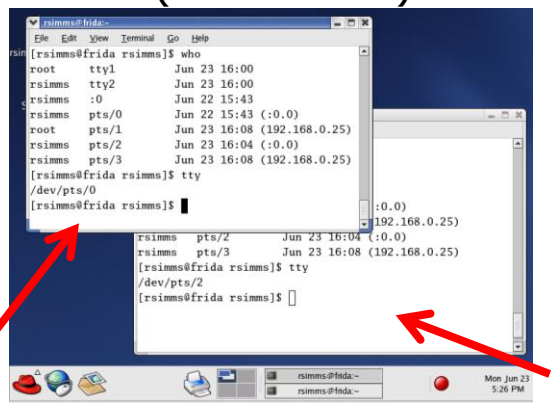


/dev/tty/2 (Ctrl-Alt-F2)



/dev/tty/1 (Ctrl-Alt-F1)

:0 (Ctrl-Alt-F7)



/dev/pts/0

/dev/pts/2

Output from who command:

```
root     tty1         Jun 23 16:00
rsimms   tty2         Jun 23 16:00
rsimms   :0           Jun 22 15:43
rsimms   pts/0        Jun 22 15:43 (:0.0)
root     pts/1        Jun 23 16:08 (192.168.0.25)
rsimms   pts/2        Jun 23 16:04 (:0.0)
rsimms   pts/3        Jun 23 16:08 (192.168.0.25)
```

Notes:

:0 = X display 0

:0.0 = X display 0, screen 0

No scroll bars on tty's