

CS 300 Data Structures

Introduction

Course Topics

- Data Structures
- Linux
- C Programming
- Software Development Tools
- Software Development Methods

Introductions

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How to Succeed in CS 300

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UNIX/Linux/GNU

- UNIX is an Operating System (OS)
 - 1969 at Bell Labs
 - Thompson/Ritchie/Kernighan/McIlroy/Ossanna
- UNIX Operating Systems include:
 - MacOS X
 - Sun Solaris
 - OpenBSD
- GNU/Linux is “Unix-Like”
- We will be using a server called zeus
 - Zeus runs OpenSUSE 13.2 64-bit OS

UNIX OS

- UNIX OS is made up of:
 - The kernel
 - The shell
 - The programs
- Linux
 - is just a kernel
- Linux distributions (suse, ubuntu, red hat, ...) include:
 - GUI system
 - GNU utilities (cp, mv, ls, ...)
 - GNU c/c++ compilers
 - Applications (OpenOffice, Firefox, ...)

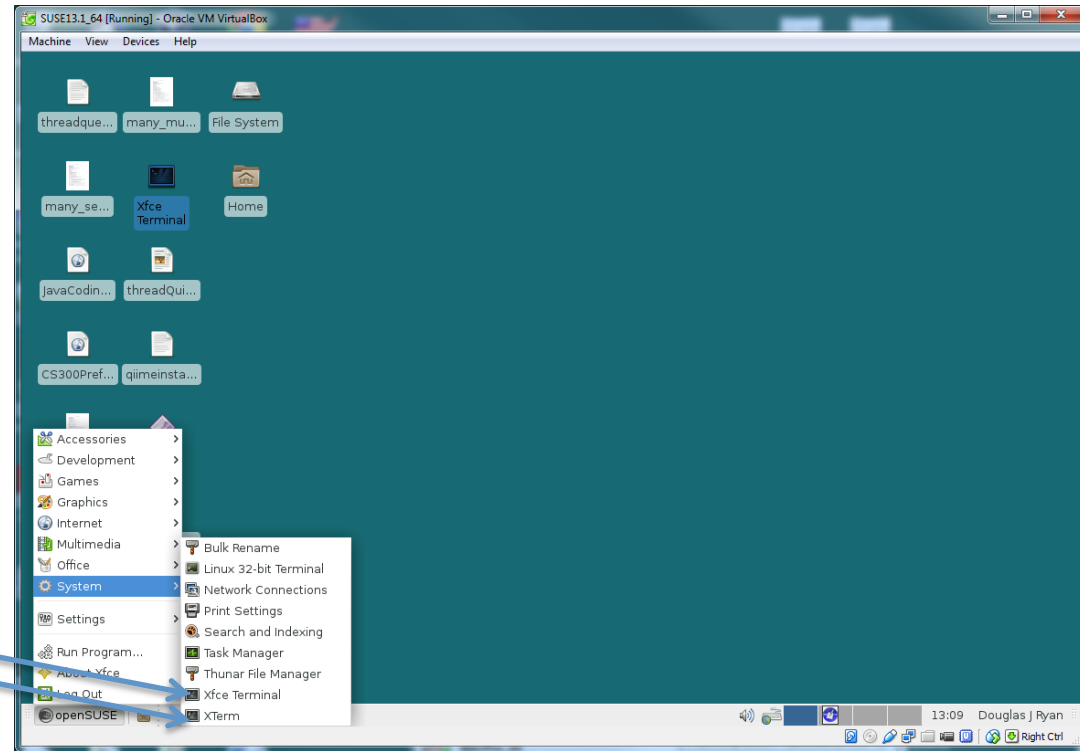
Processes and Files

- Everything in UNIX is a process or file
 - Process is an executing program
 - File is a collection of data
- Directory is a hierarchical structure that groups files
 - Windows = folder
 - UNIX = directory

Login!

Start a terminal

Select either Xcfe Terminal or XTerm. I will use Xcfe.



The kernel

- kernel – code that manages access to shared resources
 - CPU, network, hard drive, RAM
- kernel is responsible for managing system resources through system calls
 - Process management
 - Memory allocation
 - Hardware access

```
shereen@linux:~> uname -a
```

The shell

- Interface between the user and kernel
 - command line interface (CLI)
- The shell interprets commands
- Many different shells exist such as bash, tcsh, ..
 - each has slightly different commands
- My examples use bash
- Your environment is customizable by editing `.bashrc` `.profile`

```
shereen@linux:~>alias ls='ls -al'
```

Window Manager

- Xfce
 - default in the lab
- GNOME
- KDE
- Lightweight window manager
 - LXDE

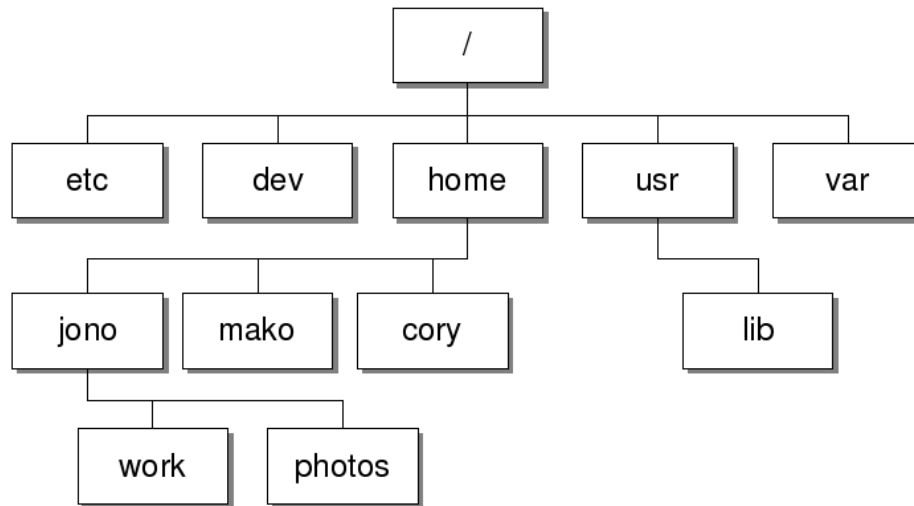
How to add an Icon

- Right Click Desktop widget
- Create new | Link to Application
- Eclipse
- Application
 - Command : `/usr/local/share/eclipse/eclipse`
- General
 - Wrench | Click icon box on left
 - choose Icon

If the icon does not stick, right click the icon | Properties click the icon on the Left.

File System

- The file system is arranged in a hierarchical structure where the top of the hierarchy is called the root
- The root is signified by `/` (forward-slash)
- `ls /`



File and Directory Commands

Command	Type	Meaning
pwd	program	display present working directory
which	program	display which program provides a command
ls	program	list contents of present directory less special files beginning with a .
ls -al	program	show an extended list of all files and directories
cd ..	shell builtin	change to parent directory
cd	shell builtin	change to home directory
cd ~	shell builtin	change to home directory
mkdir backup	program	make a directory called backup
rmdir backup	program	removes an empty directory
passwd	program	change your current password

Specific File Commands

Command	Meaning
cp file1 file2	makes a copy of file1 and names the copied file file2
mv file1 file2	moves (or renames) file1 to file2
rm file1	removes (or deletes) file1 DANGER DANGER DANGER rm -i
rmdir directory	removes (or deletes) an empty directory
clear	clears the display screen
cat file1	displays the contents of a file to the screen
less file1	displays the contents of file1 to the screen one screen at a time spacebar – advances another page q - quits
diff file1 file2	display the differences between file1 and file2

In Class Problems

1. Change your password
2. Using `ls`, list the contents of your present working directory
3. Create a directory called `CS 300` (Linux is case-sensitive) in your home directory

scp

- Copy a file from linux to zeus assuming you are logged in to linux

➤ `scp message punetid@machinename:destination`
`shereen@linux:~> scp message shereen@zeus:Documents/CS300`

- Copy a file from zeus to your present working directory on your local machine

➤ `scp shereen@zeus.cs.pacificu.edu:/home/CS300Public/2015/message .`

In Class Problems

- On Zeus, in the directory `/home/CS300Public/2015` is a file called “message”.

```
ssh zeus.cs.pacificu.edu  
cd /home/CS300Public/2015
```

- Copy the file ‘message’ to the directory CS300 in your home directory on your local machine
`scp message punetid@machinename:CS300`
- List the contents of this file
- Make a backup of this file and call the backup `message.bk`
- Remove `message.bk`

Homework

See Me With Questions

1. Watch the video Basic Linux Commands at <http://zeus.cs.pacificu.edu/PacificCSVideos/linux/basiclinux.html>. Write down any questions that you have on the content.
2. Find a program to take screenshots. What is the name of that program?
3. What does the command `df` do? Use `man df` and/or the Web.
4. What does the `-h` option to `df` do?
5. What does the command `cal` do?
6. How would you copy the file `prog.c` from the present working directory to the parent directory? That is, list the linux command to do so. There is more than one command.
7. Make a folder CS300 in your Documents folder. Copy the file `Hound.txt` from `/home/CS300Public/2015` on zeus into CS300. List the commands that you used to accomplish those steps.
8. The command `grep -i hound Hound.txt | wc -l` outputs the number of lines containing the word hound. Run the command and state the number of lines containing hound.
9. In your own words, describe the difference between `ssh` and `scp`.

Turn in a printout of your typed answers to the above questions at the start of class on Wednesday, September 1.