UNIX Basics

Science & Technology Support Group
High Performance Computing
Ohio Supercomputer Center
1224 Kinnear Road
Columbus, OH 43212

OSC
Innovations in computing, networking, and education

Table of Contents

Purpose of Course

- Introduce the basics of UNIX
- Introduce the basics of UNIX screen editors
- Provide hands-on practice

Acknowledgments

- **Course notes are based on:**

  UNIX Primer Plus, Third Edition

  Don Martin, Stephen Prata, Mitchell Waite, Michael Wessler, and Dan Wilson

  Waite Group Press, A Division of Macmillan USA, Inc., 201 West 103rd Street, Indianapolis, Indiana, 46290 USA © 2000

- **Science and Technology Support Group, OSC**
  - Leslie Southern
  - Troy Baer
  - Scott Brozell
  - Peter Carswell
  - Dave Ennis
  - Jim Giuliani
  - Elaine Landwehr
- **Brian Powell**

UNIX Basics--Introduction

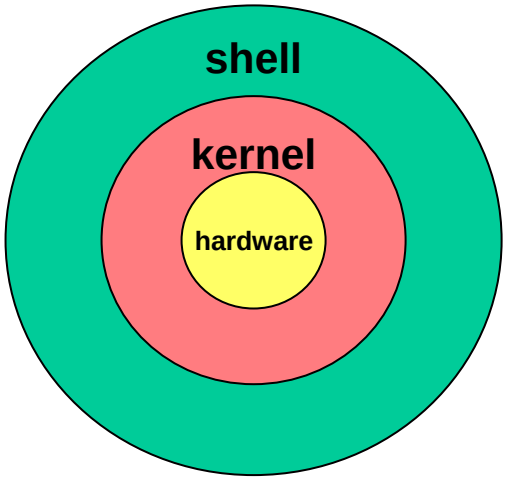
- **What is UNIX?**
  - An operating system **and** attendant applications programs
- **Why use UNIX?**
  - Available on virtually all machines in one format or another
  - Long history
  - Has been adapted to new platforms
- **On what is UNIX based?**
  - Uses C language

UNIX Basics--Software

- **Operating**
  - for the computer
  - liaison between computer and user
- **Application**
  - for the users
    - electronic filing
    - word processing
    - database maintenance
    - electronic mail and networking access

UNIX Basics--Structure

- **Kernel**
  - CPU scheduling
  - memory management
  - process management
  - other duties
  - not for average users
- **Shell**
  - interacts between kernel and user
  - user invokes commands
  - types
    - Bourne shell
    - Korn shell
    - C shell
    - TCshell
    - BASH



Useful Concepts

- Getting out of Trouble
- Terms and Concepts

Getting Out of Trouble

- **Control `c`**
  - stop a process
- **`kill`**
  - kill a job in the works
- **Control `U`**
  - delete a full line to the prompt
- **Control `u`**
  - undo last command
- **Control `s`**
  - stop scrolling
- **Control `q`**
  - resume scrolling
- **What happens if you type a word that is not a command?**

Terms and Concepts

- **Standard input stdin**
  - keyboard
- **Standard output stdout**
  - print on the screen
- **Case sensitive**
  - it matters whether you use uppercase or lowercase
  - UNIX commands--usually lowercase
- **Control key**
  - if it is part of a command, the control key and the second key are pressed simultaneously
- **Return key**
  - almost always used to tell system you have finished typing the command

Terms and Concepts

- **prompt**
  - a symbol (usually % or $)
  - have the ability to change your prompt (later)
  - when cursor is at the prompt, you can enter a command
- **Permission**
  - means ability to read, write, or execute a directory or a file, based on user, group, and other categories

Useful Commands

- Structure
- First (and Last) Commands
- Easy Commands

Structure

- **Command structure**
  - **`command -option argument`**
- **`command`**
  - usually lowercase
  - what you want to do
- ***`-option`***
  - sometimes not required
  - enhances output of command
  - tailors output to your needs
  - can be combined with one or more other options
- ***`argument`***
  - what your command will act upon
  - can have more than one argument
  - sometimes not required

First (and Last) Commands

- **Logging on**
  - userid
    - assigned by systems administrator
    - probably won't change
  - password
    - assigned by systems administrator
    - should not share it
  - **`passwd`**
    - use command to change your default password to one you like
    - should change your password from time to time for security
    - on OSC systems: oscpasswd changes password on all machines
- **Logging off**
  - **`exit`**
    - this is usually the way to log off
    - may differ from system to system

Easy Commands

Command	Options	Arguments
`date`	[no options]	[no arguments]
`cal`	[no options]	***`year`*** or ***`month year`***
`finger`	[***`-m, -l, -s`***]	[name]
`help`		
`man`		[argument]
`man`	***`-k`***	[argument]
`who`	[several options]	
`who am I`		

NOTE: end commands with a return

OSC Innovations in computing, networking, and education

Easy Commands--Try This

type

```
date
```

type

```
cal year_you_were_born
```

type

```
who
```

type

```
finger woodall
```

type

```
finger -s woodall
```

type

```
finger -s woodall
```

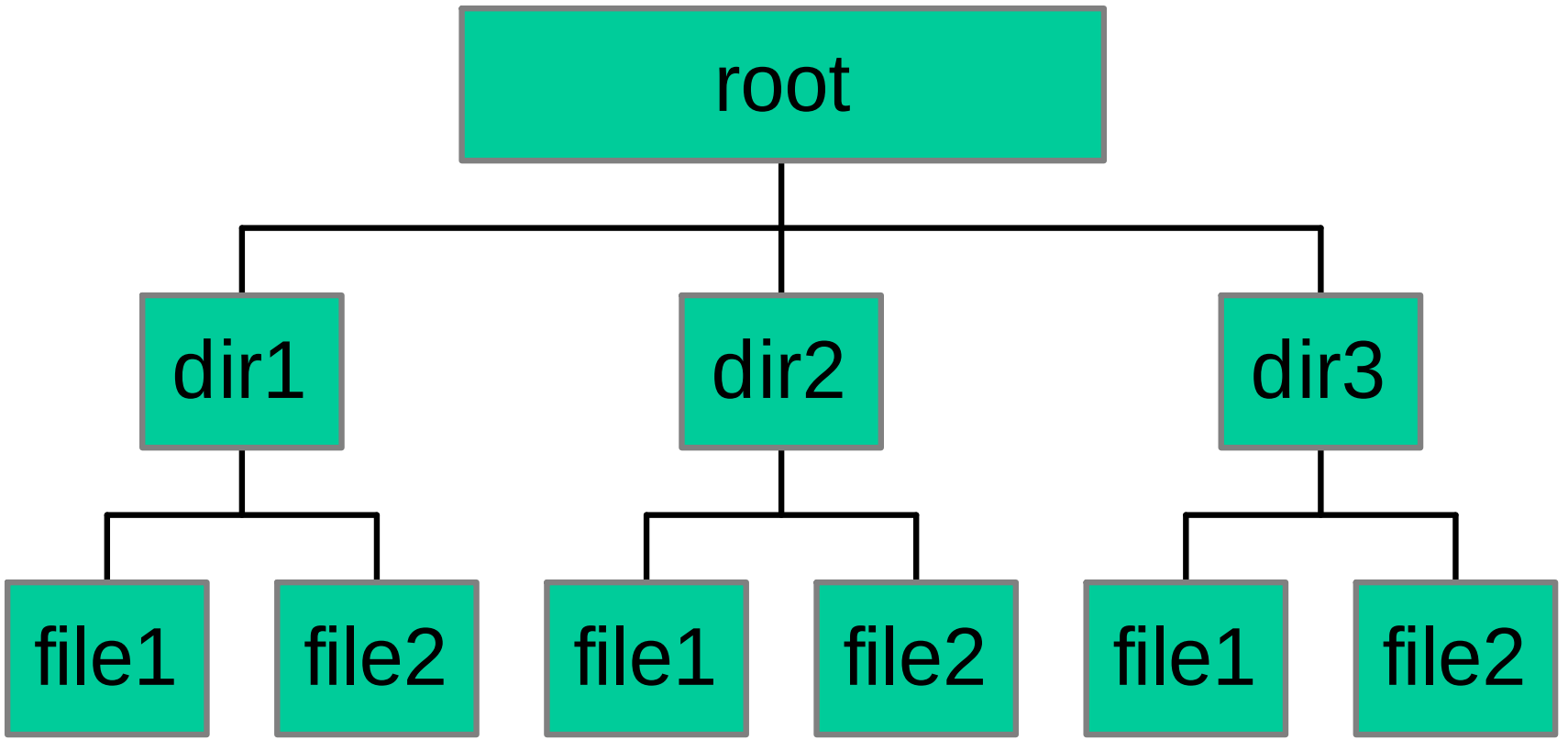
NOTE: end commands with a return

OSC
Innovations in computing, networking, and education

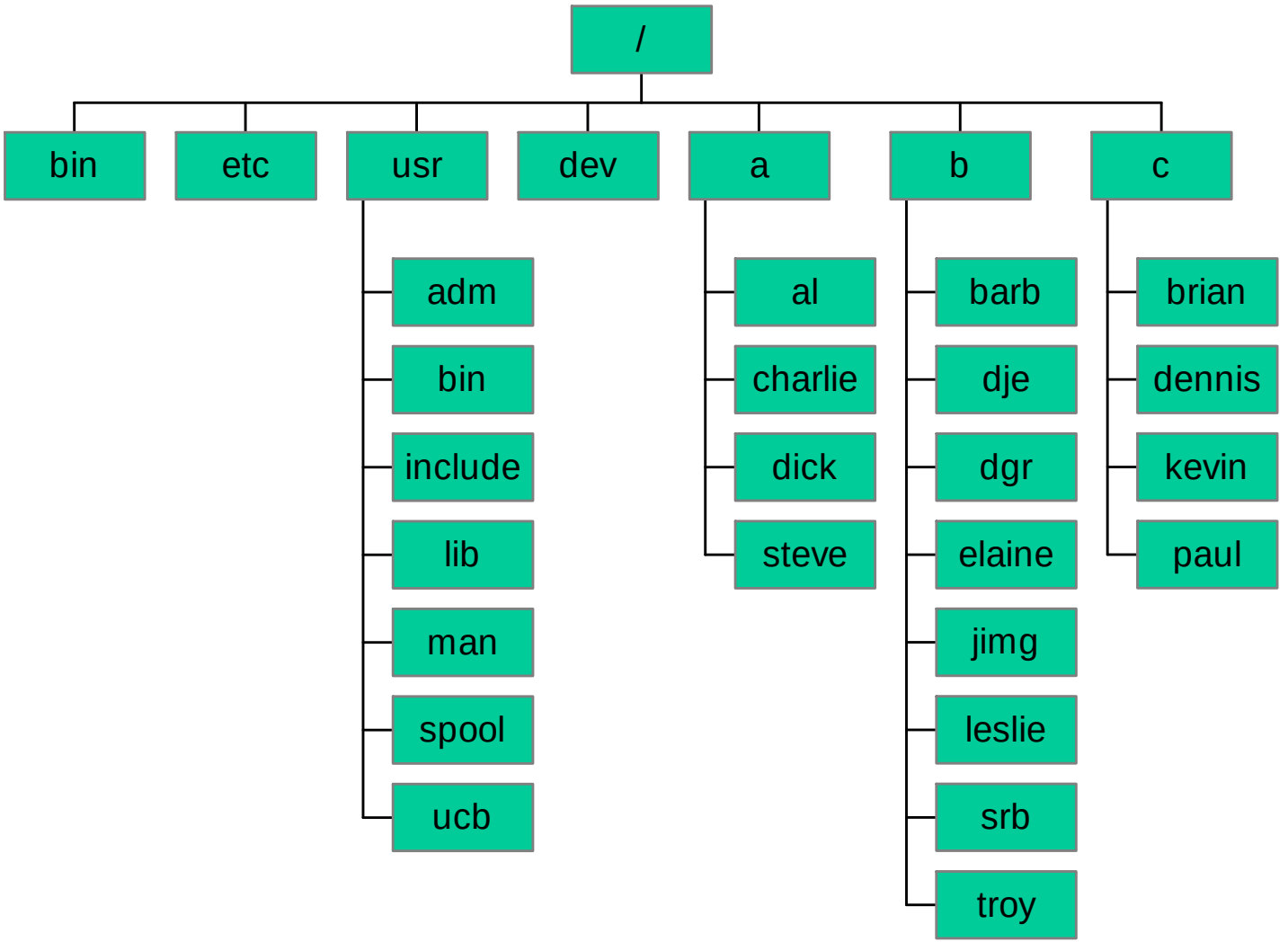
Files and Directories, Part I

- File Hierarchy
- Where Are You
- Files and Directories--First Commands
- Files and Directories--Naming
- Files--Creating

File Hierarchy



File Hierarchy



Where Are You

pwd

- tells you where are you are in the file hierarchy
- important in increasingly complex hierarchy
- important for moving files
- important in moving to and from directories of others

Files and Directories--First Commands

```
$ ls  -a -c -l -f -r -s -t directory -R

$ cat [several] file

$ more [several] file

$ lpr -l[others] file

$ rm file
```

OSC
Innovations in computing, networking, and education

Files and Directories--Try This

```
$ ls

$ ls -a

$ ls -l

$ ls -F

$ ls -r

$ ls -R

$ ls -al
```

OSC
Innovations in computing, networking, and education

Files and Directories--Naming

- avoid spaces; separate words with dots or underscores
  - **my.file**
- begin directory names with capital letters
  - **My.directory**
- avoid special characters
  - **/ \ ‘ “ ; - ? [ ] ( ) ~ ! $ { } < >**
- make names descriptive
  - **letter**
    - **not particularly descriptive**
  - **woodall.010403.letter**
    - **more information**
- avoid ending file name with a number
  - **can cause problems in converting files, depending upon your system**

Files--Creating

```
cat > file
  line
  line
  line

  control d
```

now type

```
more file
```

- using > to redirect output from a command to a file
  - *command > file*
  - more *file*

```
cal > calendar
more calendar
```

Files--Creating--Try This

```
$ cat > workshop
  first line
  second line
  third line
  control d
$ more workshop
$ cal > calendar
$ ls
$ more calendar
$ more workshop
$ cal > workshop
$ ls
$ more workshop
$ ls
$ rm workshop
$ ls
```

Do you have a file called workshop?

OSC
Innovations in computing, networking, and education

Screen Editors

- vi
- emacs
- Other Editor--Pico

vi editor

- early form of word processing
- not especially easy to use
- HOWEVER--exists on all UNIX systems
- good to know, even if you use different editor
- approximately 100 commands

vi--Opening a File; Modes

- **open a file**
  - **`vi` *`file`***
- **modes**
  - input
    - different ways to get into input mode
    - only one way to get out of input mode: escape key
  - command
    - always in command mode when you open up a file in vi

vi--First Commands, Part I

- **open a file**
  - **`vi` *`file`***
  - **`vedit` *`file`*** (bottom line will show when you are in insert mode)
- **move the cursor**
  - **`h`** (left), **`j`** (down), **`k`** (up), **`l`** (right)
- **enter insert mode**
  - **`a`** (append after cursor), **`A`** (append at end of line), **`i`** (insert at cursor), **`I`** (insert at beginning of line), **`o`** (opens a line below the cursor), **`O`** (opens a line above the cursor)
- **leave insert mode**
  - Escape key
- **delete or replace**
  - **`x`** (delete character), **`dd`** (delete line), **`r`** (replace one character, do not enter insert mode)

vi--First Commands, Part I--Try This

- **`vedit practice`**
- **watch bottom right of screen**
- **`i`**
  - What happens
- **Escape**
  - What happens
- **`i characters`**
- **move in and out of insert/append/open mode**
- **look at the differences between the various ways of going into input mode**
- **type some lines, press Escape, use `h`, `j`, `k`, and `l` to move cursor**

vi--First Commands, Part II

- **undo**
  - **`u`** (last command)
- **save and quit the editor**
  - **`ZZ`** (save the changes and quit), **`:w`** (save the changes, do not quit), **`:q!`** (quit, do not save the changes), **`:wq`** (save the changes and quit)
- **erase**
  - delete key
  - sometimes need to use Control h combination
- **set line wrap**
  - only for current editing session; must reset each time you open the file
  - **`:set wm=`*`15`***

vi--First Commands, Part II--Try This

- **type a few characters; press Control u**
- **type a line that goes beyond the line on the screen; move cursor up; note that this is one line**
- **go into command mode, type `:set wm=15`**
- **type another long line**
- **close the file; reopen it; type another long line**
  - What happens?

vi--Additional Commands, Part I

- **position cursor**
  - Control **d** (scrolls cursor down, usually 12 lines), Control **f** (scrolls the cursor forward, usually 24 lines), Control **b** (scrolls the cursor back, usually 24 lines), Control **u** (scrolls the cursor up, usually 12 lines); **e** (end of word), **b** (beginning of word), **G** (end of document), ***n*G** (go to line *n* of the document)
  - Control **g** (get line number where cursor is)
  - ***/pattern*** (search forward for pattern), **n** (search for next instance of pattern), ***?pattern*** (search backward for pattern)
  - **$** (from the cursor to the end of the line), **0** (from just before the cursor to the beginning of the line), **)** (from the cursor to the beginning of the next sentence), **(** (from just before the cursor back to the beginning of the sentence where cursor is), **}** (from the cursor to the end of the paragraph), **{** (from just before the cursor back to the beginning of a paragraph)

vi--Additional Commands, Part I--Try

- open your document
- move your cursor around
- insert more text
- save, exit, reopen

- search for a character, e.g., a letter e; find the next e
- search backwards for a character; find the next earlier occurrence

vi--Additional Commands, Part II

- **operate on words, lines, paragraphs**
  - **c** (change word or words as indicated and enter insert mode), **d** (delete items as indicated and store in buffer for possible placement elsewhere), **y** (copy lines as indicated and store in buffer for possible duplication elsewhere)
    - abbreviations for words, sentences, lines, or paragraphs: **w**, **b**, **e**, **c**, **(**, **)**, **0**, **$**, **{**, **}**
- **print storage buffers**
  - **p** (print buffer contents after the cursor), **P** (print buffer contents before the cursor)
- **join lines**
  - **J**
- **change case of letters**
  - **~** (a toggle)
- **check spelling**
  - **spell *file*** or **spell *file* | more**

vi--Additional Commands, Part II--Try

- **position cursor at beginning of a word**
  - **`cw`**
  - what do you see?
  - type some characters
  - Escape
- **position cursor in middle of a word**
  - **`cw`**
  - what do you see
  - type some characters
  - Escape
- **position cursor at beginning of a word**
  - **`2cw`**
  - what do you see
  - type some characters
  - Escape

emacs

- free-to-download
- widely available
- more modern
- online help
- online tutorial
- no modes
- document has prompts for user

emacs--Opening a File; Information

- **open a file**
  - **`emacs` *`file`***
- **information areas**
  - echo area
    - displays certain commands
    - prompts you for input to a command
    - when cursor is in echo area, can use any emacs editing tools that work on one line to change what you have typed
      - to abort a command started on the echo area: Control **g**
  - mode line
    - can be ignored when working on simple text editing on single files

emacs--First Commands

- **position cursor**
  - Control **p** (up), Control **n** (down), Control **b** (left), Control **f** (right)
  - (may be able to use arrow keys, depending on how your terminal is set up)
- **position cursor, additional**
  - Control **a** (beginning of line), Control **e** (end of line)
- **position cursor, with numerical arguments**
  - precede numerical argument with an Escape key
  - examples
    - Escape ***4*** Control **p** (move up 4 lines)
    - Escape ***5*** Control **f** (move forward to 5th character)
    - Escape ***8*** Control **n** (move down 8 lines)

emacs--Basic Editing

- **add text**
  - move cursor to the correct position and start typing
- **delete text**
  - Control **d** (delete character at cursor), Delete key (delete character before the cursor, Escape Delete (delete word before the cursor), Escape **d** (kill the word after the cursor), Control **k** (kill from cursor to end of line), Control **y** (yank back a previous kill)
  - concepts
    - delete: not meant to use deleted characters again
    - kill: killed characters go into a buffer; limited capacity; deletes oldest kills when new ones are added

emacs--Basic Editing

- **cut and paste**
  - kill and yank--the usual ways to cut and paste
  - commands
    - Escape **d** (kill one word), Control **n** (move the cursor), Control **k** (kill one line), Control **y** (yank back the killed line), Escape **y** (replace yanked-back line with killed word), Escape **y** (replace killed word with previous kill), Escape **y** (replace previous kill with next previous kill, etc.)
- **undo changes**
  - Control **x** **u** (undo last change), Control **x** Control **c** (leave without saving--prompt appears), Escape **x** (restore buffer to original contents)
- **conserve CPU time**
  - in documents with text already entered, insert a couple of blank lines and type there (prevents screen from having to redraw with the addition of every character)

emacs--Basic Editing--Try This

- **`emacs workshope`**
  - identify the echo line
  - note the changes and information in echo line as you type
  - identify the mode line (in reverse type)
- **type some lines**
- **move the cursor--practice using key combinations, as well as using the arrow key**
- **move cursor with numerical arguments**
  - Escape **4** Control **p**
- **practice deleting a character, the rest of a line, restoring a deleted character**

emacs--Basic Editing

- **manage line length**
  - press Return at end of line
  - use **`auto-fill mode`**, for current editing session only
    - Escape **`x auto-fill-mode`** (toggle auto-fill), Escape **`64`** Escape **`x set fill-column`** (set line length to 64 characters), Escape **`64`** Control **`x f`** (alternative method of setting line length to 64 characters)

emacs--Commands

- **more than 400**
  - have long names
  - can have abbreviations
  - abbreviations are bound to a command
  - for abbreviations, refer to command dispatch table
- **long name use**
  - Escape **x** ***command-name***
- **long name use--workarounds**
  - keystroke abbreviation (e.g., Control **n**)
  - typing assistance
  - list of possible commands in echo area
  - prompts in the echo area

emacs--Help

- **written manual**
- **reference card from manual**
- **online tutorial**
- **online help system**
  - Control **h** help options
  - Control **h** Control **h** (possible help options, prompts you to type desired help option)
  - third Control **h** displays what the option means

emacs--Online Help Options

- **cancel commands**
  - Control **g**
- **examples of options in help**
  - Control **h t** (tutorial), Control **h a *word*** (all commands containing the word), Control **h b** (command dispatch table), Control **h k *key*** (name and information about the command key), Control **h l** (list last 100 characters typed), Control **h i** (run program for browsing files, including complete emacs manual)

emacs--Try This

- **open your file**
- **set the line length for 64 characters**
- **Control `h b` to get the dispatch command table**
- **back in your file, type Escape `next-line`**
  - what appears in the echo area?
- **`q` to quit the help pages**
- **Control `h a print`**
- **Escape `x n`**
  - What happens
- **Control `q`**

emacs--Search Options

- **search for text strings**
  - Control **s *string*** (incremental search forward for string), Control **r *string*** (incremental search backward for string)
- **search and replace**
  - Escape **<** (go to beginning of buffer), Escape **%** ***book*** Return ***epic*** Return (replace, depending on next key): Spacebar (make change and advance to next occurrence); Delete (skip change and advance to next occurrence); Escape (exit query-replace); **!** (replace all remaining occurrences); **^** (back up to previous occurrence); Control **h** (display help)

emacs--Defining Regions

- **selecting text**
  - point
    - beginning of region
    - where the cursor is
  - mark
    - end of region
    - marked by Control @ or Control Spacebar
  - region
    - between point and mark
- **how to select text**
  - move cursor to beginning of region
  - Control @
  - move cursor to end of region
  - Control **x** Control **x**--check location of mark; this keystroke combination exchanges point and mark
  - act on region (see next slide)

emacs--Acting on Regions

- **commands**
  - **`upcase-region`** (Control **`x`** Control **`u`**)
  - **`downcase-region`** (Control **`x`** Control **`l`**)
  - **`append-to-file`** ***`file`*** (append region to a file)
  - **`write-region`** ***`file`*** (write region to a file)
  - **`kill-region`** (Control **`w`**) (kill the region)
  - **`copy-region-as-kill`** (Escape **`w`**) (copy region to kill buffer)
  - **`fill-region`** (Escape **`g`**) (justify region)

emacs--Try This

- **open your file**
- **search forward for a character (Control s)**
- **search backwards for a character (Control r)**
- **search for a word and replace it with another**
  - Escape %***word*** Return ***word2*** Return
  - watch what happens
- **define a region**
  - Control @ (at beginning)
  - move cursor to character after last of desired region
  - Control **x** Control **x**
  - Escape **w**
  - Escape **y**
  - watch what happens

emacs--Formatting

- `auto-fill-mode` (word wrap at right margin)
- `fill-region` (justify region)
- Escape `q` (justify paragraph at right margin)
- Escape *n* Control `x f` (set right margin at *n* characters)

emacs--Multiple Windows

- **splitting the screen**
  - display two parts of the same file
  - display two different files
- **commands**
  - Control **x** 2 (divide current window into two windows vertically)
  - Control **x** **3** (divide current window into two windows horizontally)
  - Control **x** **1** (delete all windows but the current one)
  - Control **x** **0** (delete current window, redistribute space)
  - Control **x** **o** (switch to other window, cycle through all)
  - Escape Control **v** (page other window)
  - Control **x** **^** (increase current window by one line vertically)
  - Control **x** **}** (increase current window by one line horizontally)

emacs--Multiple Windows

- **create multiple buffers**
  - Control **`x b`** ***`file1`*** (create new buffer or switch to buffer named file1)
  - Control **`x k`** ***`file1`*** (kill the buffer called file1)
  - Control **`x`** Control **`f`** ***`file2`*** (find file2, put it in a buffer, switch to it)
  - Control **`x`** Control **`b`** (list all buffers in separate window)
- **work with multiple buffers and multiple windows**
  - most convenient way to display two buffers in two separate windows
    - start **`emacs`** on a file (first buffer)
    - **Control `x4`*`f`*** (or ***`b`*** or **`.`**) filename (display second file in own window)

emacs--File Management

- **commands for dealing with files**
  - **`emacs` *`file`*** (create a file)
  - Control **`x`** Control **`s`** (save changes)
  - Escape **`x write-file` *`file`*** (usually used to change file name)
  - Escape **`x append-region-to-file` *`file`*** (must mark region)
  - Control **`x i` *`file`*** (insert a file into buffer at cursor)
  - Control **`x`** Control **`r` *`file`*** (read a file, no editing permitted)
  - Control **`x`** Control **`v` *`file`*** (visit and replace a file)

Other Editor--Pico

- **pico**
  - comes with the mail system, pine
  - very simple
  - menu based
  - limited, but easy to use
  - for more power, use vi
  - not always available
  - ask systems administrator for access to it

Files and Directories, Part II

- Files and Directories--Basic Concepts
- Manipulating Files and Directories
- Wildcards/Metacharacters
- Directory Abbreviations

Files and Directories--Basic Concepts

- **pathname**
  - path through the directory system to the file
  - example
    - /usr/Workshop1/Subdirectory/file
  - tail (basename)
    - last part of pathname
  - head
    - everything except the tail
  - full pathname
    - shown when you type **pwd**
- **/ (slash)**
  - two meanings
    - very first one means root or top of the file system
    - all others separate directory or file names from one another

Manipulating Files and Directories

- **`rm -i -r`** ***`file`***
  - irreversible
- **`cp -i`** ***`file1 file2`*** **or** ***`file(s) pathname`***
  - irreversible; make sure you aren't using an existing file name for file2
- **`mv -i`** ***`file1 file2`*** **or** ***`file(s) pathname`***
  - irreversible
- **`ln`** ***`[none] file1 name2`*** **or** ***`file(s) pathname`***
- **`mkdir`** ***`[none] directory`***
- **`rmdir`** ***`[none] directory`***
  - directory must be empty if you use **`rmdir`**; delete files in the directory, then run **`rmdir`**
  - irreversible
- **`cd`** ***`[none] directory`***
- **`pwd`** ***`[none] [none]`***

Files and Directories--Try This

- create four short files; run list
- remove one file; run list
- remove one file with the `-i` option--what happens
- run list
- copy one file to another existing file: `cp file1 file2`
- run list; open file2; what has happened
- move one file to another existing file; open the new file
- run list; what has happened
- create a directory; run list
- change to that directory; print your working directory; run list
- go back to your home directory

Files and Directories--Try This, cont'd

- copy a file to the new directory

```
$ cp filex directory/filex
$ ls
$ cd directory
$ ls
$ pwd
$ cd
$ pwd
```

Wildcards/Metacharacters

- save time and typing
- pattern searching

Wildcards/Metacharacters

- **?**
  - match one character, and one character only
- *****
  - match zero or more characters
- **[ ]**
  - match one character of the ones listed inside the brackets
- **examples**

```
ls yo?          ls *
ls yo??         ls ?yo*
ls ?yo?         ls yo*
ls ?yo          ls *yo
ls [abc]        ls [abs]*
ls *[abc]       ls [xyz]a[rst]
ls [a-f]        ls [A-F]
```

Wildcards/Metacharacters--Try This

- `ls`
- `pwd`
- **create new files**
  - alabama — `cat > alabama`
  - alaska — `cat > alaska`
  - florida — `cat > florida`
  - massachusetts — `cat > massachusetts`
  - connecticut — `cat > connecticut`
- **try listing these with different wildcards and metacharacters**

```
ls al*              ls *a
ls ?la              ls ?la*
ls [a-f]*           ls [b-z]labama
ls [a-f]labama      ls *[i]*
ls m*               ls C*
```

Directory Abbreviations

- **. (one period)**
  - current working directory
- **.. (two periods)**
  - directory above the one in which you are working
- **~ (tilde)**
  - your home directory
- **cd**
  - takes you to your home directory

Permissions

- **used to allow or restrict access to files and directories**
- **`chmod` *`ugo±rwx file`* `chmod` *`ugo±rwx directory`***

```
$ ls -l
drwxr-xr-x …
-rw-r--r-- …
```

  - d = directory
  - columns 2, 3, 4: permissions for user (read, write, execute)
  - columns 5, 6, 7: permissions for group
  - columns 8, 9, 10: permissions for others
- **change your home directory's permission by writing, e.g.,**
  - **`chmod g+rwx .`**

Permissions--Try This

- create a file called `filez`

```
$ ls -l
$ chmod g+rwx filez
$ ls -l
```

- make a directory

```
$ ls -l
```

- change to new directory

```
$ pwd
$ cd
$ chmod u-rwx directory
$ ls -l
$ cd directory
```

Permissions--Try This, cont'd

- what happens

```
$ chmod u+rwx directory
$ ls -l
$ cd directory
$ pwd
```

UNIX Shell

- UNIX Shell--Basic Concepts
- Job Control

UNIX Shell--Basic Concepts

- **two functions**
  - command interpreter between machine and user
  - programming language
    - can string together basic commands to perform larger task
    - format

      `command -`*`option argument`*

      - » separated by one space
    - usually use the “pipe” (|) to combine commands
      - the pipe takes the output of one command and uses it as the input to another command

Job Control

- **Job control**
  Control **z**
    - stop current job

  `fg`
    - resume stopped job
- **Multiple `-l`**
  – list and label the jobs you've begun

```
[2]     Stopped       vi file1
[3]   -  Stopped      vi file2
[4]   +  Stopped      vi file3
[5]     Running       command
```

  `fg %n`
    - brings job number ***n*** to the foreground

  `bg %n`
    - sends job number ***n*** to the background

Job Control, continued

- **Job control**

  `$ ps`

PID	TT	STAT	TIME	COMMAND
431	A5	R	0:05	sort file1
432	A5	R	0:00	ps

- **Killing a job that is out of control**

  `kill %`*`I`* or **`kill pid`**

  – even more sure kill: **`kill -9 %`*`n`***

OSC
Innovations in computing, networking, and education

Selected References

- Lasser, Jon. *Think UNIX*. QUE Corporation
- Levine, John R. and Margaret Levine Young. *UNIX for Dummies*. Dummies Press, a division of IDG Books Worldwide, Inc.
- Martin, Don, et al. *UNIX Primer Plus*. Waite Group Press, A Division of Macmillan USA, Inc.
- Ray, Deborah S. and Eric J. Ray. *Visual Quickstart Guide: UNIX*. Peachpit Press.
- Reichard, Kevin and Eric Foster-Johnson. *UNIX in Plain English*. M&T Books.
- Lamb, Linda and Arnold Robbins. *Learning the vi Editor*. O'Reilly
- Pedersen, Jesper, et al. *SAMS Teach Yourself Emacs in 24 Hours*. Sams, A Division of Macmillan Computer Publishing.

Exercises--Easy Commands

- type `fenger` and correct it to `finger`
- how do you determine all of the people logged on to the system
- how do you find the time of day
- how do you find the calendar for the year 1066
- on what day of the week was your birthday in 1995
- type a command and then kill the whole line
- find out what options you can use with the command `who`

Exercises--Easy Commands: Answers

- use the backspace to delete characters back to the incorrect one, then retype
- type `who`
- type `date`
- `cal 1066`
- `cal` *`month year`*
- use Control `U` to delete an entire line
- type `man who` to get the whole online manual page for `who`

Exercises--Files--Creating

- list your home directory's contents, using different options and combinations of options
- create a file using redirection containing the output of the command `ls -l`
- type the command `lss`; what happens
- use `cat` to create a new file called ***`filea`***; use `cat` to create another file called ***`fileb`***; use redirection to create a new file called ***`filec`*** containing the contents of both ***`filea`*** and ***`fileb`***; look at the contents of ***`filec`***
- use redirection to add the contents of ***`filea`*** to ***`filec`***; look at the contents of ***`filec`***; what has happened?

Exercises--Files--Creating: Answers

- `ls`, `ls -a`, `ls -l`, `ls -al`
- `ls -l > filename`
- you get a “command not found” message; when you type something that is not a command, either nothing happens or you get a little error message
- `cat > filea` (add some short text)
  `cat > fileb` (add some short text)
  `cat filea fileb > filec`
  `cat filec` (has the contents of both files)
- `cat filea > filec`
  `cat filec` (now has the contents of only `filea`)

Note the difference between redirecting a file to a new file and redirecting a file to an existing file; the latter is an irreversible overwriting of the existing file

Exercises--vi Editor

- **create a file called *letter*; set the word wrap margin to 15; type (with appropriate end of line insertions)**
  - Dear Author, Never have I read such an interesting book. Your writing inspires me. I hope you write an infinite number of books. Sincerely, Reader

  - save the letter but don't exit it
  - change the word Reader to your name
  - join two lines
  - insert some text
  - undo some typing
  - save and close the letter and run a spelling check
  - reopen the file and correct typos
  - yank a line and paste it elsewhere
  - delete a line and paste it elsewhere

Exercises--vi Editor: Answers

- `vedit letter` or `vi letter`
- `:set wm=15`
- type the text
- `:w!`
- `J`
- insert desired text using `i`, `I`, `a`, `A`, `o`, `O`
- from the insert mode: Escape u
- `ZZ` at the shell prompt type `spell letter`
- `vedit letter` correct typos by moving cursor, using `x` to delete a character, and then entering insert mode with `i` or by using `r` to overwrite a character without entering insert mode

Exercises--vi Editor: Answers, cont'd

- move cursor to line you want to yank

  yy

  move cursor to line where you want to place the yanked line

  p

- move cursor to line you want to delete and paste elsewhere

  dd

  move cursor to line where you want to place the deleted line

  p

Exercises--emacs Editor

- create a file with emacs

  set line length to 64

  type a letter

  save without exiting

  search for a string

  delete a line and put it elsewhere

  exit the file without saving changes

  reopen the file search for a word and replace it with another word

  practice search/replace with options
- look at the dispatch command table
- look at the tutorial and move through it

Exercises--emacs Editor, cont'd

- open your file
  define a region
  capitalize all the letters in that region

Exercises--emacs Editor--Answers

- **`emacs` *`file`* (to open a new file)**

  Escape 64 Escape `set fill-column` (set line length)

  Control `x` Control `s` (save without exiting)

  Control `s` *`string`* (to look for some string; string could be a letter, a character, or more than one characters)

  Control `k` (move cursor) Control `y` (to delete a line and place it elsewhere)

  Control `x` Control `c` (to close the file without saving)

  `emacs` *`file`* (to reopen an existing file)

  Escape `%` *`word1`* Return *`word2`* Return (to search for word1 and replace it with word2)

  Control `hb` (to look at the dispatch command table)

  Control `ht` (to look at the tutorial)

  Control `g` (to cancel any command)

Exercises--emacs Editor--Answers, ctd

- **`emacs` *`filename`* (your existing file)**

  Control @ (select the point)

  move cursor to end of region

  Control x Control x (indicate the mark)

  Control x Control u

Exercises--after last section

- create files
- create directories
- watch what happens when you move files (`mv`), copy files (`cp`), remove files (`rm`)
- create subdirectories and move into them (`cd`), use `pwd` to show where you are; `cd` up one level
- use `rmdir` to delete a directory (directory must be empty)
- change permissions and run `ls -l` to see the differences
- run `ls -al` to look at the permissions on your home directory (the file indicated by .--a single dot)
- change permissions on your home directory to remove execute privileges from others (`chmod o-x`)
- PRACTICE, PRACTICE, PRACTICE
- TAKE THE NEXT UNIX WORKSHOP AT OSC