

Review

- What did we talk about on Monday?
- What are some components of the UNIX philosophy?
 - How do they align with software development principles?

Jan 11, 2017

Sprenkle - CSCI397

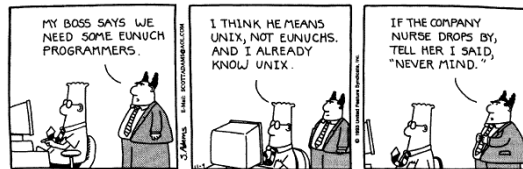
Review: Unix Philosophy

- Make each program do one thing well
 - More complex functionality by combining programs
 - More efficient
 - Better for reuse
- Portability
- No GUIs
- Only error feedback

Jan 11, 2017

Sprenkle - CSCI397

Popular Success



Jan 11, 2017

Sprenkle - CSCI397

Review: Simple Commands

- Sequence of non-blank arguments separated by blanks or tabs
- 1st argument (numbered 0) usually specifies the name of the command to be executed
- Any remaining arguments:
 - Are passed as arguments to that command
 - Depending on command, arguments may be filenames, pathnames, directories or special options
 - Special characters are interpreted by shell

What commands do you know?

Jan 11, 2017

Sprenkle - CSCI397

Example of A Command

```
$ ls -l /bin
lrwxrwxrwx. 1 root root 7 Feb 3 2016 /bin -> usr/bin
$
```

prompt command arguments

- Execute a basic command
- Parsing into command and arguments is called *splitting*

Jan 11, 2017

Sprenkle - CSCI397

Types of Arguments

```
$ tar -c -v -f archive.tar main.c main.h
```

- Options/Flags
 - Convention: *-X* or *--longname*
- Parameters
 - May be files, may be strings
 - Depends on command

Jan 11, 2017

Sprenkle - CSCI397

Getting Help on UNIX

- **man**: display entries from UNIX online documentation
- **what is, apropos**
- Manual entries organization:
 - 1. Commands
 - 2. System calls
 - 3. Subroutines
 - 4. Special files
 - 5. File format and conventions
 - 6. Games
 - 7. Miscellaneous
 - 8. System administration commands and daemons

https://en.wikipedia.org/wiki/Man_page

Jan 11, 2017

Sprenkle - CSCI397

Useful Shortcuts

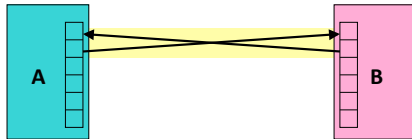
- Up arrow
- !command-prefix
 - != bang
 - Repeat most recent command that begins with prefix

Jan 11, 2017

Sprenkle - CSCI397

Pipes: General Idea

- General idea: The input of one program is the output of the other, and vice versa



- Both programs run at the same time
- Often, only one direction is used
- Syntax: `a | b`

Jan 11, 2017

Sprenkle - CSCI397

The image shows a classic smoking pipe on the left and a black t-shirt on the right. The t-shirt has a white vertical bar and the text "ceci n'est pas une pipe" printed on it. Below the pipe is the text "Ceci n'est pas une pipe." and below the t-shirt is the text "Swarthmore CS dept t-shirt".

“The Treachery of Images”
By French surrealist painter,
René Magritte

Swarthmore CS dept t-shirt

Jan 11, 2017

Sprenkle - CSCI397

BASIC UNIX TOOLS: FILE/DIRECTORY MANAGEMENT

Jan 11, 2017

Sprenkle - CSCI397

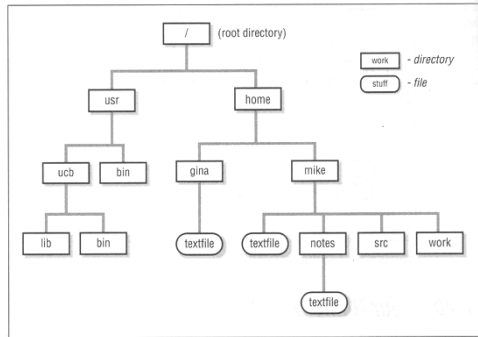
Directory Management Review

- How is Unix’s directory structure organized?

Jan 11, 2017

Sprenkle - CSCI397

The UNIX File Hierarchy



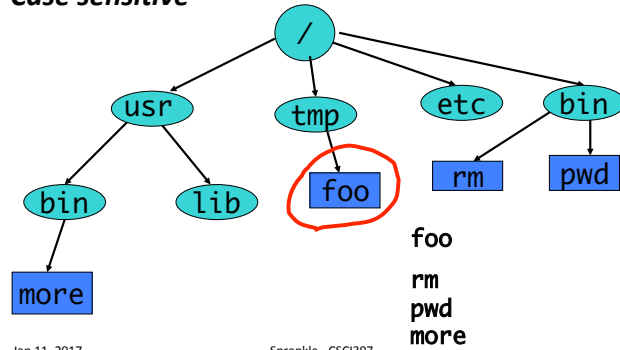
Jan 11, 2017

Sprenkle - CSCI397

Definition: Filename

A sequence of characters other than slash

Case sensitive



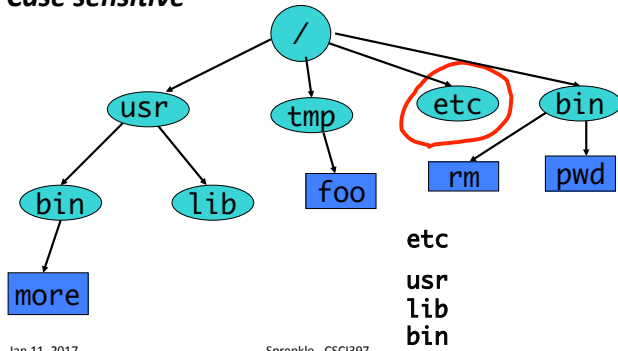
Jan 11, 2017

Sprenkle - CSCI397

Definition: Directory

Holds a set of files or other directories

Case sensitive

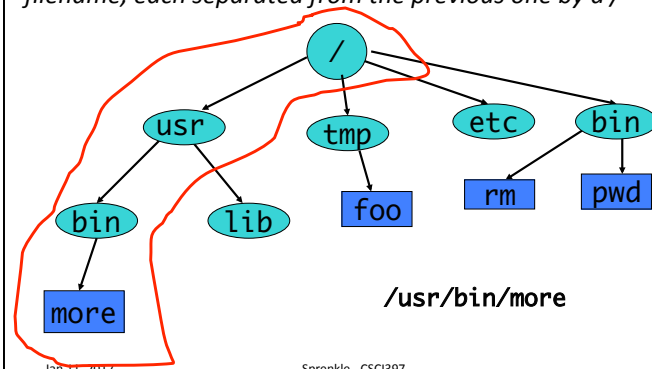


Jan 11, 2017

Sprenkle - CSCI397

Definition: Pathname

A sequence of directory names followed by a simple filename, each separated from the previous one by a /

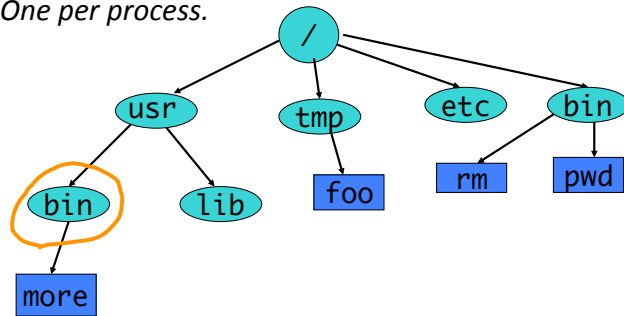


Jan 11, 2017

Sprenkle - CSCI397

Definition: Working Directory

Directory the process is currently in.
One per process.

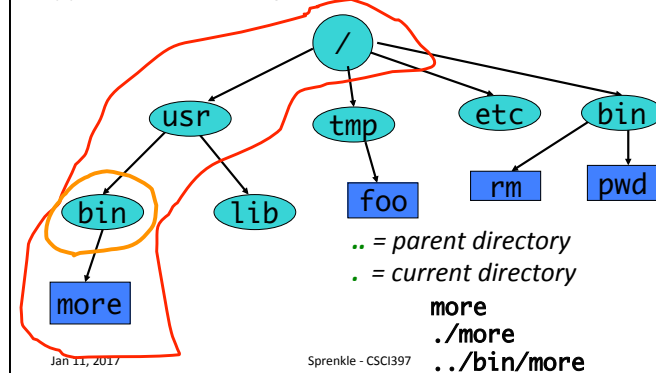


Jan 11, 2017

Sprengle - CSCI397

Definition: Relative Pathname

A pathname **relative** to the working directory (as opposed to **absolute pathname**)



Jan 11, 2017

Sprengle - CSCI397

Files and Directories

- Files are just a sequence of bytes
 - No file types (data vs. executable)
 - Example of UNIX philosophy
- Directories are a list of files and status of the files:
 - Creation date
 - Attributes
 - etc.

Jan 11, 2017

Sprengle - CSCI397

Directory Management Review

- How do you see a directory's contents?
 - How can you find out more information about the contents?
 - How can you list the content in time order?
- How do you go into a directory?
 - Home directory?
 - Parent directory?
- How can you help avoid a lot of typing when you're trying to go into a directory?

Jan 11, 2017

Sprengle - CSCI397

Tilde Expansion

- Each user has a *home* directory
- Most shells (ksh, csh) support ~ operator:
 - ~ expands to my home directory
 - ~/myfile → /home/faculty/sprenkle/myfile
 - ~user expands to user's home directory
 - ~unixtool/file2 → /home/unixtool/file2
- Useful because home directory locations vary by machine

What is your home directory?

Jan 11, 2017

Sprenkle - CSCI397

Directory Management Review

- How do you know what directory you're in?
- How do you make a new directory?
 - How do you make a series of directories, for example cs397/practice/tmp, in one command?
 - What if cs397/practice/ doesn't exist?
- How do you delete an empty directory?

Jan 11, 2017

Sprenkle - CSCI397

File Management Review

- How do you copy a file?
 - A directory and its contents?
- How do you move/rename a file?
- What is the short cut for the current directory?
- How do you delete a file?
- How do you delete a whole directory?

Jan 11, 2017

Sprenkle - CSCI397

Displaying File Contents

- **cat** can be used to display the contents of a file in the terminal
 - When invoked with a list of file names, it concatenates them
- Some options:
 - -n number output lines (starting from 1)
 - -v display control-characters in visible form (e.g. ^C)

cat file*

ls | cat -n

Practice: handouts directory's last name file
→ Do **not** CD into that directory

Jan 11, 2017

Sprenkle - CSCI397

Displaying File Contents

- Interactive commands **more** and **less** show a page at a time
 - Searching with /
- To view the beginning of a file
 - **head**
 - Use **-#** to view more or fewer lines
- To view the end of a file
 - **tail**
 - Use **-#** to view more or fewer lines

Jan 11, 2017

Sprenkle - CSCI397

head and tail examples

```
head /etc/passwd
head *.py
tail -1 /etc/passwd
ls -lt | tail -3
head -100 /etc/passwd | tail -5
tail -f /usr/local/httpd/access_log
```

What is the “net effect” of these commands?

Jan 11, 2017

Sprenkle - CSCI397

Useful Shortcuts: {}

- Examples:
 - **mv file{,.bak}**
 - Expands to mv file file.bak
 - **tar cfz myDir{.tar.gz,}**
 - Expands to tar cfz myDir.tar.gz myDir
 - **cp index.{html,php}**
 - Expands to cp index.html index.php

Jan 11, 2017

Sprenkle - CSCI397

Assignment for Wednesday

- Practice UNIX commands
 - **script** command
- Exploring UNIX commands

Jan 11, 2017

Sprenkle - CSCI397