Session: File System and Commands
Topic: Files and Directories

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Files

- A collection of information stored in a computer
- Analogous to books in a library

Ordinary

- Text - Something you can read
- Binary - Something computer can read

Special

- Include things like "links"

Directory

- Contains other files (like a bound volume or shelf)
- Windows uses the concept of "Folders"

Pathnames

Must be able to name location of files

- "Root" is starting point, named "`/`"
- Sub-directories identified by name, separated by "`/`"
- Absolute pathnames always start with "root"
- Relative pathnames are from current directory

Referencing higher directories

- "`..`" refers to directory above (room outside)
- "`.`" refers to current directory

Referencing user directories

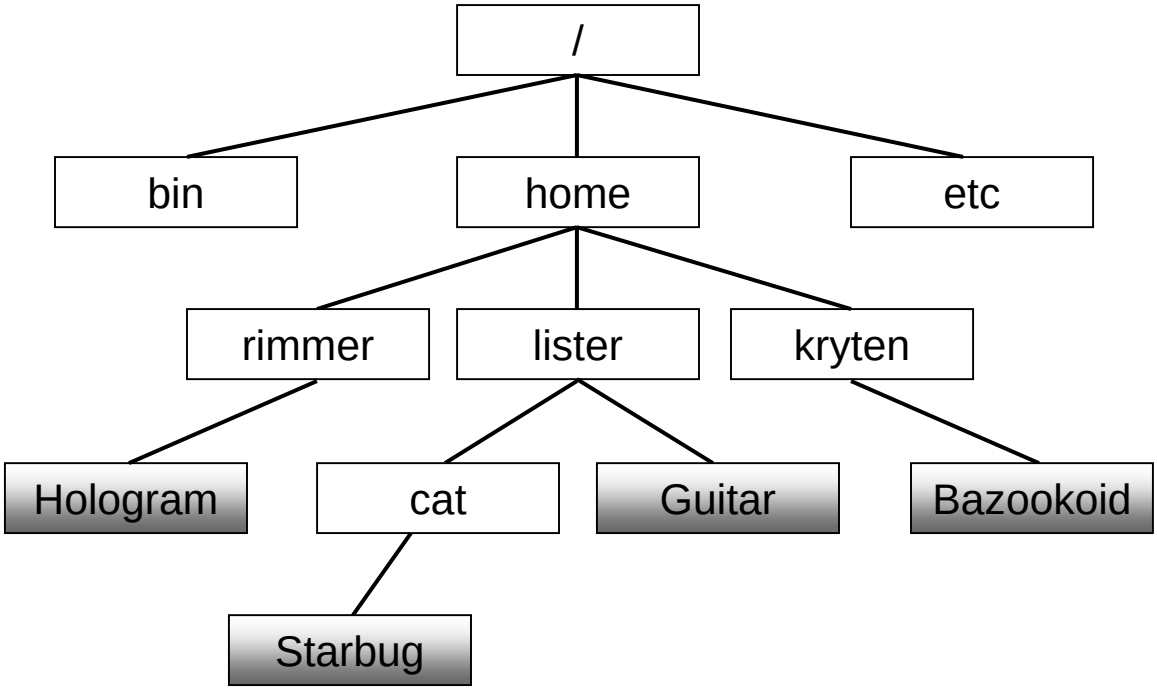
- "`~[username]`" represents the absolute path to a user directory
- "`~/`" represents the absolute path to your user directory

Note

- "Links" (created with "`ln`") totally mess this structure up

Directory Structure

- Lower files are "contained" in the upper ones (directories)
- Starting container is called the "root", symbolized by "/"
- In example below ordinary files are capitalized



Pathnames

- Your username is "lister"
- Your current directory is "cat"

Absolute pathnames

- bin
- Guitar

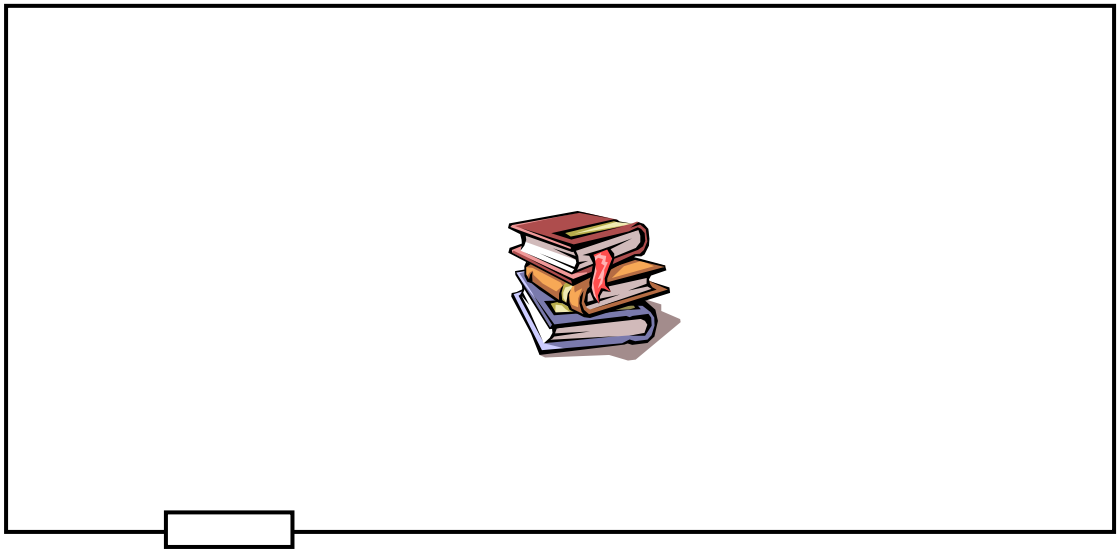
Relative pathnames

- Starbug
- home
- Guitar
- rimmer

Where could you use user directory references? (~)

Directory Structure (Alternative)

- Think of "root" as a house (named "/") without the rooms



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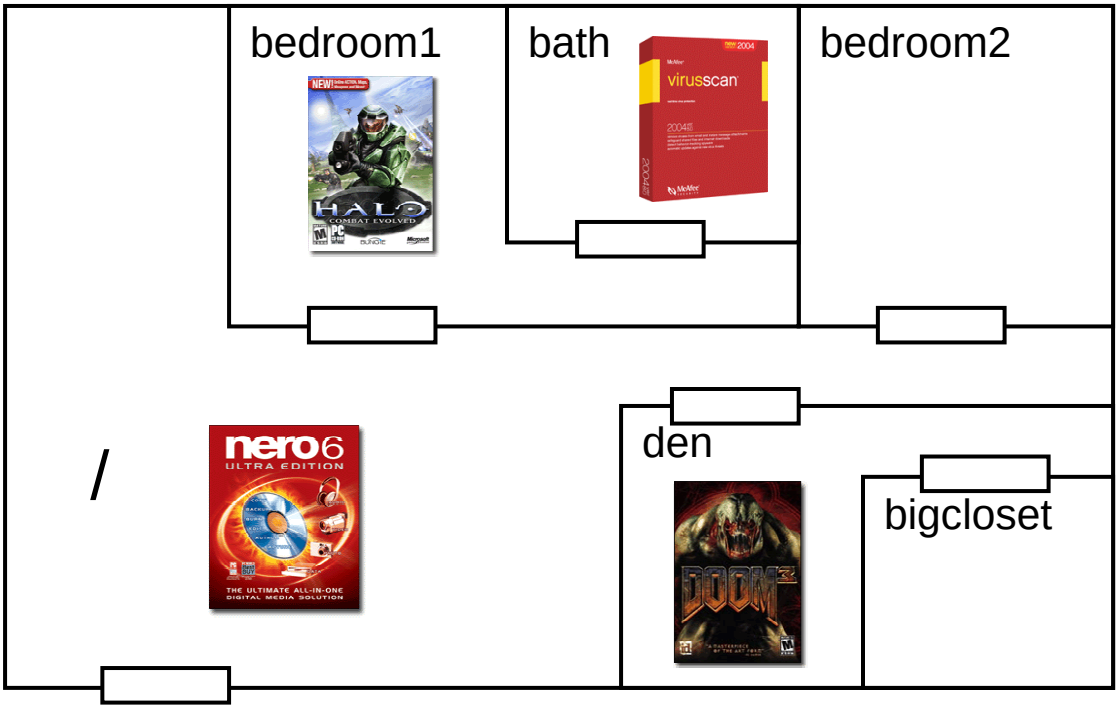
Directory Structure

- Think of directories as rooms within the house (each with a name)
- Some rooms may have other rooms within them (such as a bathroom inside a bedroom)
- Then files are simply objects (like books) lying on the floor in a room



Absolute Pathnames

- Simply give directions on how to get to a room, assuming you were standing outside the house
- Do not forget the separators
- Go to the house ("/"), then go to "bedroom1", then ("/") go to "bath" to get the program "virusscan"

Relative Pathnames

- Give directions on how to get to a room, assuming you are already standing inside a room in the house
- If you are in "bedroom2"
- Go out of the room ("../"), then go to "den" to get the program "Doom3"

Absolute Pathnames

nero6:

virusscan:

doom3:

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Relative Pathnames - From "bedroom1"

virusscan:

nero6:

doom3:

Commands

- Name typically represents a UNIX program (file) located somewhere (ex. "`/usr/bin`")
- Typical command structure:

  `commandname` `[`*`flags`*`] [`*`parameters`*`]`

Flags

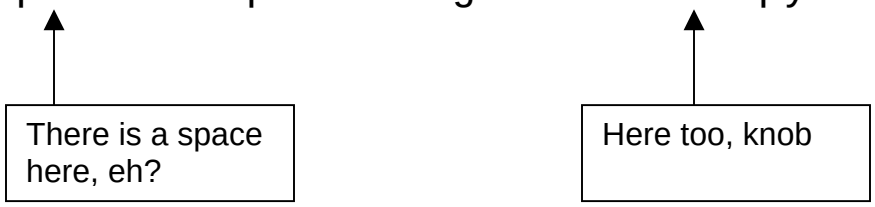
- Commands often accept one or more flags after command name
- Each flag starts with "-", and is separated from other flags by spaces
- Individual flags may be combined with a single "-"

```
ls -l -a
ls -la
```

Parameters

- Commands often accept one or more parameters after command name
- Parameters are typically pathnames representing files affected by command
- Parameters are separated by spaces (otherwise the command name would be "cp@&a0had" not "cp")

```
cp /home/spike/original.txt copy.txt
```



Some File Commands

`ls`	list files
`cat`	view file contents
`more`	view file contents (pause each screen)
`touch`	creates file / updates time stamp
`cp`	copy file to a new file
`mv`	move file to a new directory, rename file
`rm`	delete file

Some Directory Commands

`pwd`	display absolute pathname to current directory
`mkdir`	create directory
`rmdir`	remove directory
`cd`	navigate directories

Other commands

`man`	displays "manual" page on commands
`ln`	links a filename to an actual file in a different location

Command Reference

`ls` `[-a][-l][-p][-r][-R][-x] [pathname]`

Description: Lists the files in a directory.

Options:

- `[-a]` Display all files
- `[-l]` Displays all information
- `[-r]` Reverses order
- `[-R]` Includes sub-directories

Examples:

```
ls
ls -al
ls -al *.exe
```

`touch` `filename`

Description: Immediately creates an empty file, or updates the time stamp on an existing file.

cp [**-i**][**-R**][**-r**] *srcfile directory*[*/newfile*]

Description: Copies the contents of a file or directory to another file or directory.

Options:

- `[-i]` Ask before you replace
- `[-R]` Copy directories and contents
- `[-r]` Same as `[-R]`
- `srcfile` - File you want to copy
- `directory` - New location of file
- `newfile` - New name of file

Example:

```
cp .plan .plan.backup
cp -r ~/public_html/*  /temp/
```

mv [**-i**] *oldfilename newfilename*
mv [**-i**] *oldfilename directory*[*/newfilename*]

Description: Renames or moves a file from one directory to another, either with the same name or a different one. Note the original file (and name) will no longer exist. This is not a copy.

Options:

- `[-i]` Prompt you before replacing a file
- `oldfilename` - existing file.
- `newfilename` - new name of the file
- `directory` - location of new file

Example:

```
mv this.out that.in
mv this.out PhDResearch\
mv this.out PhDResearch\that.in
```

rm [**-i**][**-r**] *filename*

Description: Deletes files permanently. There is no recovery or undo command for this deletion.

Options:

- `[-i]` Prompt you before replacing a file
- `[-r]` Recursive, deletes an entire directory and all contents and subdirectories. Very serious.
- `filename` - the name of the file that you want to delete. Wildcards are allowed.

Example:

```
rm this.out
rm -i this.*
rm *.*
```

more [**-s**][**-u**][*filename*]

Description: Displays the contents of a file to standard output. The output is paused after each full screen.

Options:

- [-s] Squeezes out extra blanks
- [-u] Ignores "_" or backspace

Example:

```
more .tcshrc
```

less [*filename*]

Description: Less is more.

wc [**-c**][**-l**][**-w**][*filename*]

Description: Counts characters, lines, or words in a file.

Options:

- [-c] Number of characters
- [-l] Number of lines
- [-w] Number of words

pwd

Description: Displays the current directory location.

cd [*directory*]

Description: Changes current working directory.

Examples:

```
cd classes
cd ~dchang
cd /usr/include/java/classes
cd ../public_html/classes
```

mkdir *directory*

Description: Creates a new directory. Use absolute or relative pathnames.

Examples:

```
mkdir classes
mkdir ~dchang/classes/cop3502
```

rmdir *directory*

Description: Removes the specified directory. Use absolute or relative pathnames.

Examples:

```
rmdir classes
rmdir ~dchang/classes/cop3502
```

man *command*

Description: Displays manual page for a command.

ln [**-s**] [*target*] [*link_name*]

Description: Creates a "link" to a file or directory in a different locatin, that can be accessed using a link name. By default "hard" links are created, but the majority of the time a "symbolic" link would be desired.

Deleting a symbolic link will (should) not delete the target.

Options:

- [-s] Create symbolic instead of hard link. This is what you want.
- [*target*] Pathname to the file or directory to link to
- [*link_name*] The filename to be created in the current directory that will link to "target"

Example:

```
mkdir realdir
touch realdir/realfile
ln -s realdir ldir
ln -s realdir/realfile lfile

pico lfile   (would actually edit "realdir/realfile")
cd ldir   (would actually change current dir to "realdir/")
```