

Bash: Files and Directories

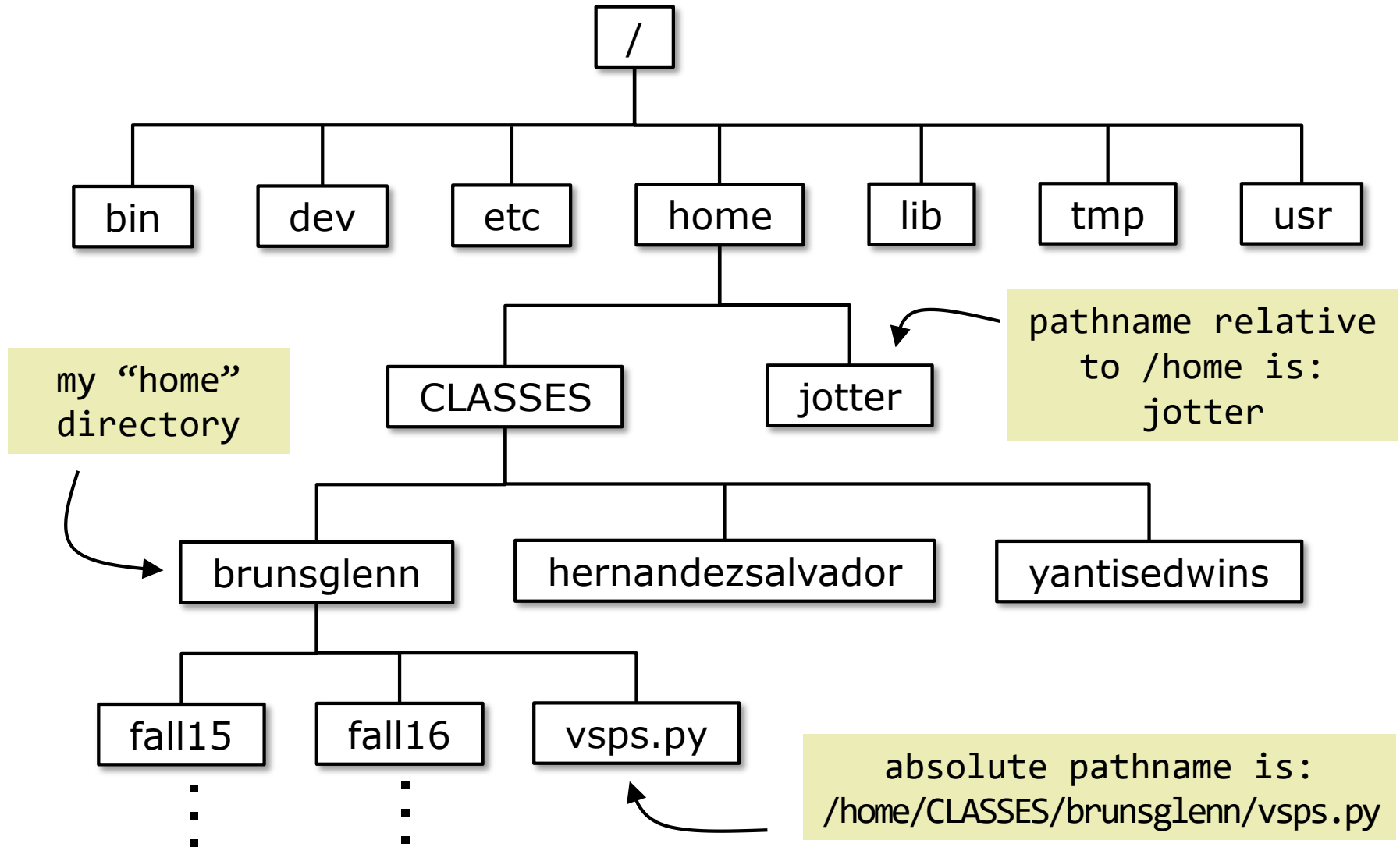
Glenn Bruns
CSUMB

Lecture Objectives

After this lecture, you should be able to:

- ❑ explain Linux file and directory naming
- ❑ use Linux commands for file and directory handling

File and directory names



File and directory commands

Very common operations at the command line:

- move to a directory, copy a file, etc.

We'll cover them in an object-oriented way:

- what **file** operations can we perform?
- what **directory** operations can perform?

Question: what operations on files would you expect to find?

Creating a file

```
$ touch foo.txt # if no foo.txt, create it  
                # (created file is empty)
```

```
$ cat > foo.txt  
here's some lines of text  
for  
my file  
ctrl-d          # ends the input
```

Of course, you can also create a file with a text editor.

Moving a file

```
$ mv foo.txt ..          # mv file to parent dir
```

```
$ mv bar.txt bar1.txt # renaming is a special  
                        # case of moving!
```

```
$ mv homework1.txt backup # move file to a  
                           # backup directory
```

Deleting a file

```
$ rm temp.txt
```

```
$ rm temp.txt
```

```
$ rm: cannot remove `temp.txt': No such file  
or directory
```

```
$ rm -f temp.txt
```

```
$ # no error reported
```

Bash command options

```
$ rm -f temp.txt
```



a command option

The general form of the rm command is:

```
rm [OPTIONS] FILE
```

Options are given in two ways:

-f dash then single letter

--force two dashes then word

With the single letter form, you can combine options:

```
$ rm -r -f temp.txt
```

```
$ rm -rf temp.txt
```


Copying a file

```
$ cp temp.txt temp1.txt
```

```
    # copy temp1.txt is in same dir
```

```
$ cp temp.txt ../temp2.txt
```

```
    # copy temp2.txt is in parent dir
```

```
$ cp temp.txt /home/classes/brunsglenn
```

```
    # copy temp.txt is in given dir
```

```
    # note that no target filename given
```

```
$ cp temp.txt temp2.txt    # this is a comment!
```

Micro quiz!

What do you think happens when you perform this command?

```
$ cp foo.txt x
```

when:

- ☐ x is a file
- ☐ x is a directory
- ☐ x does not exist

Seeing a file's attributes

\$ wc temp.txt # word count

\$ 15 165 1106 temp.txt

\$ wc -l temp.txt # show lines only

\$ 15 temp.txt

\$ file temp.txt # show file info

\$ temp.txt: ASCII English text

you can also try command 'stat'

Seeing a file's contents

`$ cat temp.txt` `# show entire contents`

`$ Welcome to the MLC 104 Server.`

`$ (etc.)`

`$ more temp.txt` `# show file; space to page`
 `# forward, q to quit`

`$ head temp.txt` `# show first 10 lines`

`$ head -3 temp.txt` `# show first 3 lines`

`$ tail temp.txt` `# show last 10 lines`

`$ tail -100 temp.txt` `# show last 100 lines`

Operations on directories

We've covered basic operations on files.

Next: operations on directories

Creating a directory

```
$ mkdir /home/CLASSES/brunsglenn/fall19
```

```
# uses absolute filename
```

```
$ mkdir fall19 # uses relative filename
```

Moving to another directory

```
$ cd /home/CLASSES/brunsglenn/fall19
```

```
$ cd ..          # move to parent directory
```

```
$ cd             # move to "home" directory
```

Special symbols for some directories:

- current directory
- .. parent directory
- ~ home directory

```
$ cp foo.txt ~/..
```

```
# copies foo.txt to parent of home directory
```

Moving a directory

```
$ mv fall16 backup/fall16-v1
```

```
# moves directory and all contents
```

```
$ mv fall16 fall16-old
```

```
# simply renames the directory
```


Finding the name of the current dir

```
$ pwd
```

```
# prints "current working directory" name
```

Deleting a directory

```
$ rmdir data1
```

```
$ rmdir: failed to remove `data1': Directory  
not empty
```

```
# rmdir requires that directory be empty
```

```
$ rm -r data1
```

```
# remove files "recursively"
```

Copying a directory

```
$ cp data1 data2
```

```
$ cp: omitting directory `data1'
```

```
# using cp directly doesn't work
```

```
$ cp -r data1 data2
```

```
# as with rm, -r means "recursively"
```

Seeing the files of a directory

`$ ls` # show files in current dir

`all.tar data users.txt`

`$ ls data` # show files in 'data' dir

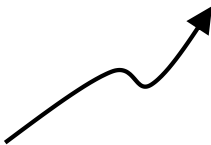
`complaints.csv doe.csv`

`$ ls -l data` # long format – shows details


`-rw-r--r--. 1 brun1992 shell_faculty 67216929 Aug 16 11:47 complaints.csv`

`-rw-r--r--. 1 brun1992 shell_faculty 186623 Aug 16 11:36 doe.csv`

creator of file



file size (in bytes)



modification time



More variants of ls

`$ ls -t` `# list files by modification time`

`doe.csv` `complaints.csv`

`$ ls -lt` `# combining options -l and -t`

`-rw-r--r--. 1 brun1992 shell_faculty 186623 Aug 16 12:15 doe.csv`

`-rw-r--r--. 1 brun1992 shell_faculty 67216929 Aug 16 11:47 complaints.csv`

`$ ls -a` `# show all files (even `.` files)`

`.bash_rc` `data` `data1`

File globbing

Also known as **pathname expansion**

```
$ ls h*tar
hw13.c.tar  hw14-c.tar  hw2.tar  hw3.tar  hw4.tar  hw5.tar
hw8-solutions.tar
$
$ ls *ck*
check.awk  check-rwlock.awk  mlc104-backup-jan-1-2018.tar.gz
rwlock.tar
$
$ ls *.tgz
hw6.tgz  most-proc.tgz  solutions.tgz  submissions.tgz  test-
scripts.tgz
```

File globbing details

Globbing is not regular expressions! It is different and much more limited.

Basics of pathname expansion:

- * matches any string, including the null string
- ? matches any single character
- [...] matches any of the enclosed characters

Important:

When bash sees a pattern, it replaces it with an alphabetically-sorted list of files that match the pattern

Summary

We introduced some important Linux commands for handling files and directories:

files: touch, cat, mv, rm, cp, cat, head, tail, more

directories: ls, mkdir, cd, mv, pwd, rmdir

We also learned about file globbing (aka pathname expansion)

Hints on learning bash

- ❑ The labs and homework won't give you enough practice to learn bash well.
- ❑ Start using bash in your everyday life.
- ❑ "Command line is a lifestyle"
- ❑ Also, try these bash flash cards:

cram.com/flashcards/bash-practice-6518378