

# CSE 314

## Shell Commands

# Introduction

- A good command line interface is a marvelously expressive way of communicating with a computer in much the same way the written word is for human beings.
- Graphical user interfaces make easy tasks easy, while command line interfaces make difficult tasks possible
- The *shell* is a program that takes keyboard commands and passes them to the operating system to carry out.
- Almost all Linux distributions supply a shell program from the GNU Project called bash.

# Starting up

Launch terminal. You'll see something like:

```
username@machinename~$
```

Here ~ indicates the current working directory and \$ indicates a normal user. If the last character is # then it means a superuser.

(These will be clear to you very soon!)

# Hello World

*echo Hello World*

*echo 'Hello World'*

*echo "Hello World"*

It is not essential to surround the string with quotes. But doing so also doesn't repeat them on the screen.

Actually *echo* can do lots of other powerful things. They will come later.

# Exploring

*pwd*

prints the current directory

*cd <directoryname>*

- moves to *directoryname*
- Path can be absolute or relative (be careful!!)
- . means the current directory
- .. means the parent of the current directory
- Default directory is HOME
- HOME also represented by ~
- Can return HOME from anywhere by entering

*cd*

# Exploring

*ls [OPTION] [FILE]*

- Lists information about directory or file
- In Linux hidden files have names starting with . and they are not shown by *ls*
- *ls -a* lists the hidden files also
- *ls -l* lists in details
- *ls -R* recursively lists subdirectories
- *ls -S* sorts files by size
- There are lots of others options and it is impossible to exhaustively list them all. We'll learn about an easier technique in the next slide

# My friend *man*

## *man command*

- Shows the manual for *command*
- You should frequently use it besides Google.
- Now you can see all the options associated with *ls* by

*man ls*

- You can learn more from

*man man*

# Files and Directories

*mkdir [OPTION] <directory1> <directory2> ....*

- Makes each directory if it already doesn't exist
- -v Shows a verbose description
- -p No prompt if it exists, make parent as needed



# Files and Directories

## *cp*

- Copy files and directories
- *cp SOURCE DEST* copy SOURCE to DEST  
(Remember the order!)
- *cp SOURCE... DIRECTORY* copy multiple SOURCES to DIRECTORY
- *-r* copy directories recursively
- *-i* interactive i.e. prompts before overwriting

# Files and Directories

*rm [OPTION]... FILE...*

- Remove each of FILEs if exists
- -f ignores non-existent files, never prompts
- -i interactive i.e. prompts before deleting
- -r remove contents recursively (Can be used to remove a directory)
- -v shows verbose description

# Files and Directories

*mv*

- *mv SOURCE DEST*      moves file from SOURCE to DEST
- *mv SOURCE... DIRECTORY*      moves files to DIRECTORY
- *-i*      interactive i.e. prompts before overwriting

*pushd*

*popd*

# Permissions

- Linux is a multiuser system.
- A user may *own* files and directories. When a user owns a file or directory, the user has control over its access.
- Users can, in turn, belong to a *group* consisting of one or more users who are given access to files and directories by their owners.
- In addition to granting access to a group, an owner may also grant some set of access rights to everybody, which in Unix terms is referred to as the *world*.
- To find out information about your identity, use the *id* command:

# Permissions

- Access rights to files and directories are defined in terms of *read access*, *write access*, and *execution access*.
- If you run the `ls -l` command, in the first column you will see 10 characters which might look something like this:

drw-rw-r-

# Permissions

*drw-rw-r—*

- These first 10 characters of the listing are the *file attributes*
- The first of these characters is the *file type*.
- The remaining nine characters of the file attributes, called the *file mode*, represent the read, write, and execute permissions for the file's owner, the file's group owner, and everybody else.

# Permissions

Example:

`-rw-r--r--` means it is a file which has read and write permissions for the owner, read permission for group and read permission for others.

<https://unix.stackexchange.com/questions/21251/execute-vs-read-bit-how-do-directory-permissions-in-linux-work>

# Permissions

## *chmod*

- change the mode (permissions) of a file or directory
- only the file's owner or the superuser can change the mode of a file or directory.
- *chmod* supports two distinct ways of specifying mode changes: octal number representation and symbolic representation



# Permissions

## *chmod*

- Symbolic notation is divided into three parts: whom the change will affect, which operation will be performed, and which permission will be set.
- To specify who is affected, a combination of the characters *u*, *g*, *o*, and *a* is used
- The operation may be  
a + indicating that a permission is to be added, a - indicating that a permission is to be taken away
- Permissions are specified with the *r*, *w*, and *x* characters

*chmod go+rw filename*

adds read and write permissions to group and others.

# Permissions

## *chmod*

- With octal notation we use octal numbers to set the pattern of desired permissions.
- Since each digit in an octal number represents three binary digits, this maps nicely to the scheme used to store the file mode

## *chmod 755 filename*

755 => 111 101 101 => rwx r-x r-x

# Permissions

*chown username <file or directory>*

- Changes the owner of a file or directory

*chgrp groupname <file or directory>*

- Changes the group of a file or directory

# Permissions

*su [user]*

switch user

*sudo command*

execute command as a superuser

*sudo adduser <username>*

create a new user

*sudo userdel -r <username>*

delete a user

# File Viewing

*more*

*less*

*head*

*tail*

*cat [FILE...]*

concatenate contents of files

*wc [FILE...]*

count the line, word and bytes

*grep PATTERN [FILE...]*

searches FILE for a match with PATTERN

*file <filepath>*

# I/O Redirection

- By default, output goes to the screen and input comes from the keyboard (we'll deal with inputs later), but with I/O redirection we can change that.
- I/O redirection allows us to change where output goes and where input comes from.

# I/O Redirection

- < get input from a file other than keyboard
- > output to a file other than the screen
- >> append output to a file

*ls -l > out.txt*

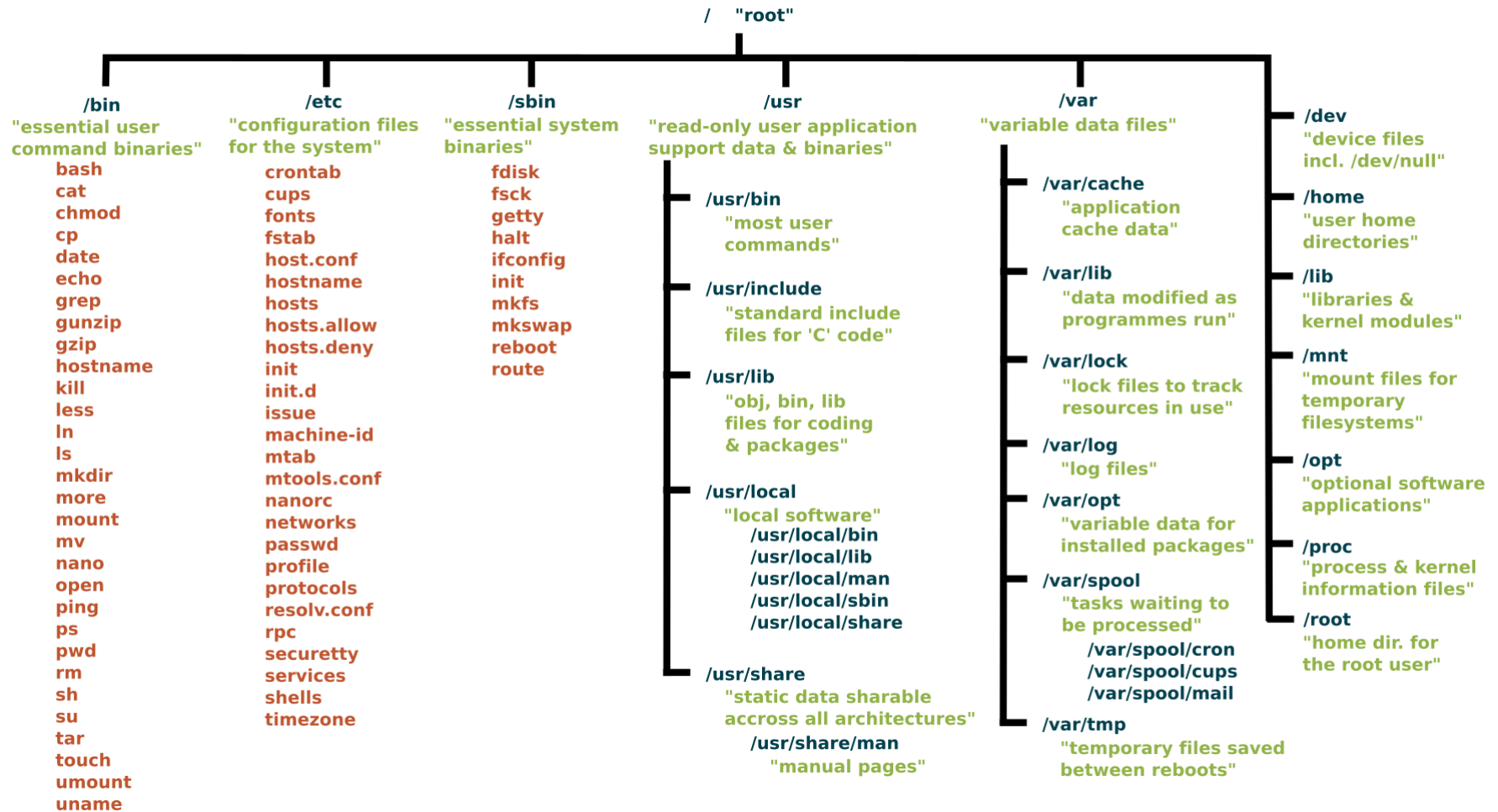
# Pipelines

- Input of a command may come from output of another command
- Can be extended to several stages

*ls /bin /usr/bin | sort | uniq | less*



# Linux File System



# Finish

*exit*

**Thank you**