

Linux Essentials

Session-2

Command Line Basics

Kahoot!



Basic SHELL Commands



Simple Globbing

Globbing is primarily used to match patterns in filenames or text by using a wildcard character to create the pattern.

Character	Name	Function
?	Question mark	Match any single character
*	Asterisk	Match any number of character(s)
[]	Brackets	Match character from a range
^	Caret	Used to match starting character
\$	Dollar sign	Used to match ending character
{ }	Curly brace	Used to match more than one pattern
 	Pipe	Used for applying more than one condition



Basic Shell Commands

ls [flag] list directory contents

Flags:

- l list details
- s sort results alphabetically
- t sort results by last modified date
- u sort result by last accessed date
- R list recursively (with subdirectories)

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ ls  
classes.html Downloads Music Templates  
Desktop examples.desktop Pictures Videos  
Documents lesson.txt Public  
user@clarusway-linux:~$
```

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ ls -l  
total 48  
-rw-r--r-- 1 user user 16 Mar 2 21:56 classes.html  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Desktop  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Documents  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Downloads  
-rw-r--r-- 1 user user 8980 Mar 2 21:53 examples.desktop  
-rw-r--r-- 1 user user 0 Mar 2 21:55 lesson.txt  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Music  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Pictures  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Public  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Templates  
drwxr-xr-x 2 user user 4096 Mar 2 21:54 Videos  
user@clarusway-linux:~$
```



Basic Shell Commands

- cd [dir]** change current directory
- cd ..** change current directory to one level up
- cd /** change current directory to the root directory
- cd ~** change current directory to the home directory

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ cd test  
user@clarusway-linux:~/test$ cd ..  
user@clarusway-linux:~$ cd /  
user@clarusway-linux:/$ cd ~  
user@clarusway-linux:~$
```



Basic Shell Commands

mkdir [dir] create a new directory

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ ls  
classes.html Downloads Music Templates  
Desktop examples.desktop Pictures test  
Documents lesson.txt Public Videos  
user@clarusway-linux:~$ mkdir clarusway  
user@clarusway-linux:~$ ls  
clarusway Downloads Pictures Videos  
classes.html examples.desktop Public  
Desktop lesson.txt Templates  
Documents Music test  
user@clarusway-linux:~$
```



Basic Shell Commands

rmdir [dir] delete an empty directory

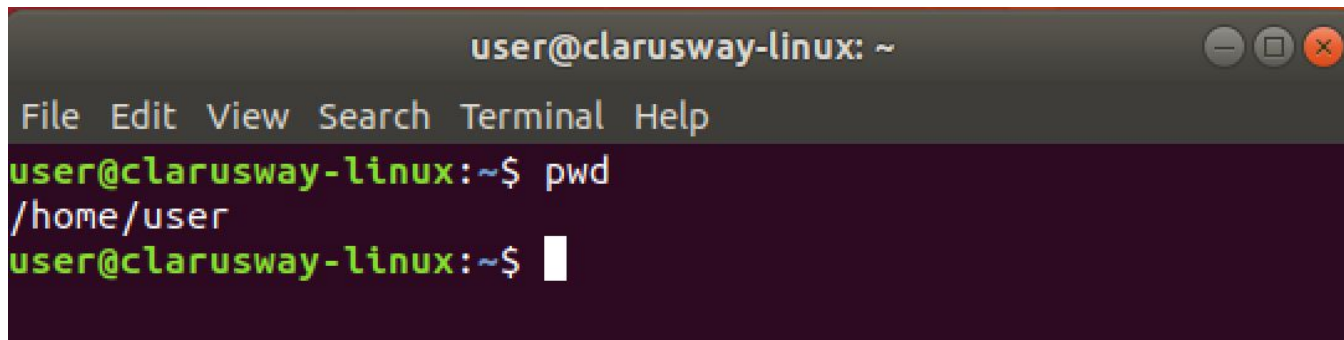
```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ ls  
clarusway Downloads Pictures Videos  
classes.html examples.desktop Public  
Desktop lesson.txt Templates  
Documents Music test  
user@clarusway-linux:~$ rmdir test  
user@clarusway-linux:~$ ls  
clarusway Documents lesson.txt Public  
classes.html Downloads Music Templates  
Desktop examples.desktop Pictures Videos  
user@clarusway-linux:~$
```

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ cd test  
user@clarusway-linux:~/test$ ls  
t.txt  
user@clarusway-linux:~/test$ cd ..  
user@clarusway-linux:~$ rmdir test  
rmdir: failed to remove 'test': Directory not empty  
user@clarusway-linux:~$ ls  
clarusway Downloads Pictures Videos  
classes.html examples.desktop Public  
Desktop lesson.txt Templates  
Documents Music test  
user@clarusway-linux:~$
```




Basic Shell Commands

pwd show current path



```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ pwd  
/home/user  
user@clarusway-linux:~$
```



Basic Shell Commands

touch create a file

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ ls  
clarusway      Downloads      Pictures      Videos  
classes.html  examples.desktop Public  
Desktop        lesson.txt     Templates  
Documents      Music          test  
user@clarusway-linux:~$ touch test-file.txt  
user@clarusway-linux:~$ ls  
clarusway      Downloads      Pictures      test-file.txt  
classes.html  examples.desktop Public      Videos  
Desktop        lesson.txt     Templates  
Documents      Music          test  
user@clarusway-linux:~$
```



Basic Shell Commands

echo print message to screen

echo > [file] print message into a file

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ echo "test"  
test  
user@clarusway-linux:~$ cat test-file.txt  
user@clarusway-linux:~$ echo "test" > test-file.txt  
user@clarusway-linux:~$ cat test-file.txt  
test  
user@clarusway-linux:~$
```



Basic Shell Commands

rm delete a file

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ ls  
clarusway      Downloads      Pictures      test-file.txt  
classes.html   examples.desktop Public        Videos  
Desktop        lesson.txt     Templates  
Documents      Music          test  
user@clarusway-linux:~$ rm test-file.txt  
user@clarusway-linux:~$ ls  
clarusway      Downloads      Pictures      Videos  
classes.html   examples.desktop Public  
Desktop        lesson.txt     Templates  
Documents      Music          test  
user@clarusway-linux:~$
```



Basic Shell Commands

cp copy a file to another location

cp [flag] [source] [target]

Flags:

- R** copy recursively
- i** interactive, prompt before overwrite

```
user@clarusway-linux: ~/test
File Edit View Search Terminal Help
user@clarusway-linux:~$ cd test
user@clarusway-linux:~/test$ ls
user@clarusway-linux:~/test$ cd ..
user@clarusway-linux:~$ cp test-file.txt test/
user@clarusway-linux:~$ ls
clarusway      Downloads      Pictures      test-file.txt
classes.html   examples.desktop Public        Videos
Desktop        lesson.txt     Templates
Documents      Music          test
user@clarusway-linux:~$ cd test
user@clarusway-linux:~/test$ ls
test-file.txt
user@clarusway-linux:~/test$
```



Basic Shell Commands

mv move a file to another location

mv [flag] [source] [target]

Flags:

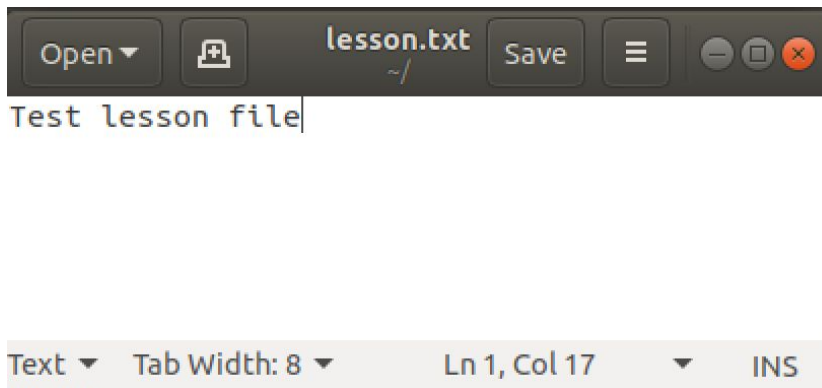
-i interactive, prompt
before overwrite

```
user@clarusway-linux: ~/test
File Edit View Search Terminal Help
user@clarusway-linux:~/test$ ls
user@clarusway-linux:~/test$ cd ..
user@clarusway-linux:~$ ls
clarusway      Downloads      Pictures      test-file.txt
classes.html   examples.desktop Public         Videos
Desktop        lesson.txt     Templates
Documents      Music          test
user@clarusway-linux:~$ mv test-file.txt test/
user@clarusway-linux:~$ ls
clarusway      Downloads      Pictures      Videos
classes.html   examples.desktop Public
Desktop        lesson.txt     Templates
Documents      Music          test
user@clarusway-linux:~$ cd test
user@clarusway-linux:~/test$ ls
test-file.txt
user@clarusway-linux:~/test$
```

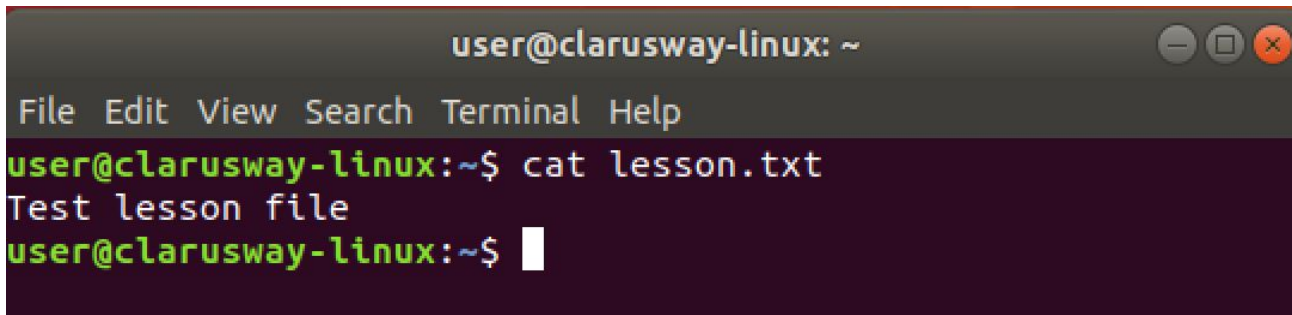


Basic Shell Commands

cat show file contents



A screenshot of a text editor window. The title bar shows 'lesson.txt' and the file path '~/'. The editor contains the text 'Test lesson file' on a single line. The status bar at the bottom indicates 'Text', 'Tab Width: 8', 'Ln 1, Col 17', and 'INS'.



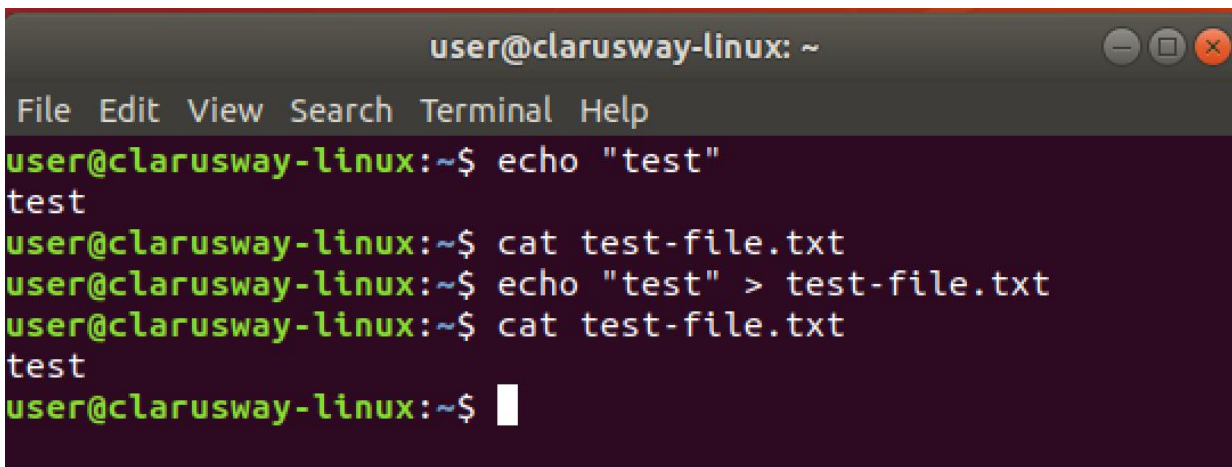
A screenshot of a terminal window with the title 'user@clarusway-linux: ~'. The terminal shows the command 'cat lesson.txt' being executed, which outputs 'Test lesson file'. The prompt 'user@clarusway-linux:~\$' is visible before and after the command.



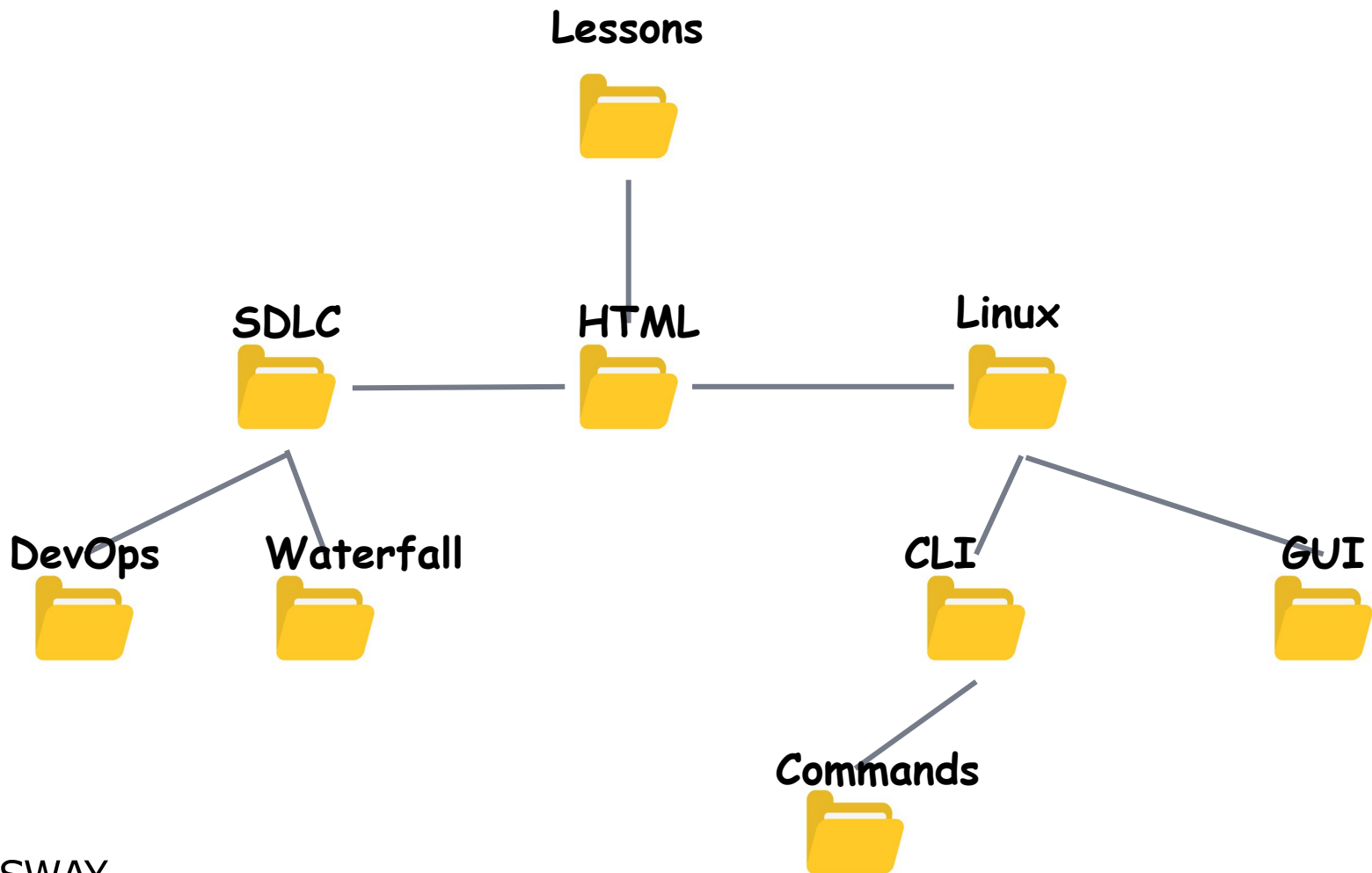
Basic Shell Commands

echo print message to screen

echo > [file] print message into a file



```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ echo "test"  
test  
user@clarusway-linux:~$ cat test-file.txt  
user@clarusway-linux:~$ echo "test" > test-file.txt  
user@clarusway-linux:~$ cat test-file.txt  
test  
user@clarusway-linux:~$
```



Exercise



clarusway



lessons



linux.txt

“I love linux”



html.txt

“I can create a website”



materials



pre-class



lms.txt



post-class



try-it.txt



Basic Shell Commands

~/clarusway

~/clarusway/lessons

~/clarusway/lessons/linux.txt

“I love linux”

~/clarusway/lessons/html.txt

“I can create a website”

~/clarusway/materials

~/clarusway/materials/pre-class

~/clarusway/materials/pre-class/lms.txt

~/clarusway/materials/post-class

~/clarusway/materials/pre-class/try-it.txt



Basic Shell Commands

```
~/clarusway
~/clarusway/lessons
~/clarusway/lessons/linux.txt
    "I love linux"
~/clarusway/lessons/html.txt
    "I can create a website"
~/clarusway/materials
~/clarusway/materials/pre-class
~/clarusway/materials/pre-class/lms.txt
~/clarusway/materials/post-class
~/clarusway/materials/pre-class/try-it.tx
```

```
136 ls
137 mkdir clarusway
138 cd clarusway
139 mkdir lessons
140 cd lessons
141 touch linux.txt
142 echo "I love linux" > linux.txt
143 touch html.txt
144 echo "I can create a web site" > html.txt
145 cd ..
146 mkdir materials
147 cd materials
148 mkdir pre-class
149 cd pre-class
150 touch lms.txt
151 cd ..
152 mkdir post-class
153 cd post-class
154 touch try-it.txt
```

Multiple File/Directory Operations



- ? used for a single character
- * used for multiple characters.

```
user@clarusway-linux: ~  
File Edit View Search Terminal Help  
user@clarusway-linux:~$ ls  
clarusway      examples.desktop  Music      Videos  
classes.html  html.txt          Pictures    xml.txt  
Desktop        lessons           Public  
Documents      lesson.txt        Templates  
Downloads      linux.txt         test  
user@clarusway-linux:~$ ls l*.*  
lesson.txt  linux.txt  
user@clarusway-linux:~$ ls ?tml.txt  
html.txt  xml.txt  
user@clarusway-linux:~$
```



Hidden Files and Directories



Any file or directory starts with period (.)

.abc

```
root@DESKTOP-4QQ1S5L:~# ls
root@DESKTOP-4QQ1S5L:~# ls -a
. .bash_history .bashrc .profile .viminfo
root@DESKTOP-4QQ1S5L:~# touch .file5
root@DESKTOP-4QQ1S5L:~# ls -a
. .bash_history .bashrc .file5 .profile .viminfo
root@DESKTOP-4QQ1S5L:~#
```

How to Hide
Files And
Directories
in Linux



Basic SHELL Commands



File Commands

ls - directory listing
ls -al - formatted listing with hidden files
cd *dir* - change directory to *dir*
cd - change to home
pwd - show current directory
mkdir *dir* - create a directory *dir*
rm *file* - delete *file*
rm -r *dir* - delete directory *dir*
rm -f *file* - force remove *file*
rm -rf *dir* - force remove directory *dir* *
cp *file1 file2* - copy *file1* to *file2*
cp -r *dir1 dir2* - copy *dir1* to *dir2*; create *dir2* if it doesn't exist
mv *file1 file2* - rename or move *file1* to *file2*
if *file2* is an existing directory, moves *file1* into directory *file2*
ln -s *file link* - create symbolic link *link* to *file*
touch *file* - create or update *file*
cat > *file* - places standard input into *file*
more *file* - output the contents of *file*
head *file* - output the first 10 lines of *file*
tail *file* - output the last 10 lines of *file*
tail -f *file* - output the contents of *file* as it grows, starting with the last 10 lines

Process Management

ps - display your currently active processes
top - display all running processes

System Info

date - show the current date and time
cal - show this month's calendar
uptime - show current uptime
w - display who is online
whoami - who you are logged in as
finger *user* - display information about *user*
uname -a - show kernel information
cat /proc/cpuinfo - cpu information
cat /proc/meminfo - memory information
man *command* - show the manual for *command*
df - show disk usage
du - show directory space usage
free - show memory and swap usage
whereis *app* - show possible locations of *app*
which *app* - show which *app* will be run by default

Compression

tar cf *file.tar files* - create a tar named *file.tar* containing *files*
tar xf *file.tar* - extract the files from *file.tar*
tar czf *file.tar.gz files* - create a tar with Gzip compression
tar xzf *file.tar.gz* - extract a tar using Gzip
tar cjf *file.tar.bz2* - create a tar with Bzip2 compression
tar xjf *file.tar.bz2* - extract a tar using Bzip2
gzip *file* - compresses *file* and renames it to *file.gz*

Basic SHELL Commands

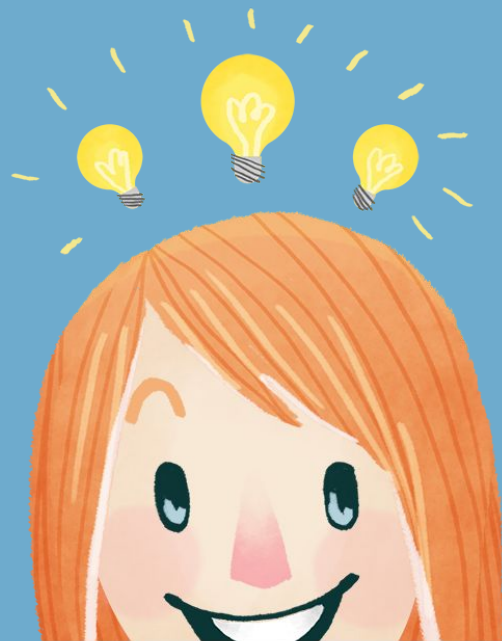


File system Commands	
ls	lists directories and files
ls -a	lists all files including hidden files
ls -lh	formatted list including more data
ls -t	lists sorted by date
pwd	returns path to working directory
cd dir	changes directory
cd ..	goes to parent directory
cd /	goes to root directory
cd	goes to home directory
touch file_name	creates an empty file
cp file file_copy	copy a file
cp -r	copy files contained in directories
rm file	deletes a file
rm -r dir	deletes a directory and its files
mv file1 file2	moves or renames a file
mkdir dir_name	creates a directory
rmdir dir_name	deletes a directory

Text handling commands	
command > file	saves STDOUT in a file
command >> file	appends STDOUT in a file
cat file	concatenate and print files
cat file1 file2 > file3	merges files 1 and 2 into file3
cat *fasta > all.fasta	concatenates all fasta files in the current directory
head file	prints first lines from a file
head -n 5 file	prints first five lines from a file
tail file	prints last lines from a file
tail -n 5 file	prints last five lines from a file
less file	view a file
less -N file	includes line numbers
less -S file	wraps long lines
grep 'pattern' file	Prints lines matching a pattern
grep -c 'pattern' file	counts lines matching a pattern
cut -f 1,3 file	retrieves data from selected columns in a tab-delimited file
sort file	sorts lines from a file



Write a command
that lists all files
which have 3-letter
extension starting
with “y”.



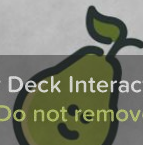
Pear Deck



USWAY
REINVENT YOURSELF

Students, write your response!

Pear Deck Interactive Slide
Do not remove this bar





Using the Command Line to Get Help

Table of Contents



- ▶ Man Pages
- ▶ Info Pages



1 Man Pages





Man Pages

man [command]

A man page (short for manual page) is a form of software documentation usually found on a Unix or Unix-like operating system.

if we install a package to do some task, the man page for that package will typically be installed at the same time. This gives us the ability to take a look at that documentation and make sure that we're using it in a manner consistent with its design.

The man page for a particular command is invoked by preceding the command with **man**.





Man Pages

man ls

```
LS(1)                                User Commands                                LS(1)

NAME
  ls - list directory contents

SYNOPSIS
  ls [OPTION]... [FILE]...

DESCRIPTION
  List information about the FILES (the current directory by default). Sort entries alphabetically if none of
  -cftuvSUX nor --sort is specified.

  Mandatory arguments to long options are mandatory for short options too.

  -a, --all
      do not ignore entries starting with .

  -A, --almost-all
      do not list implied . and ..

  --author
      with -l, print the author of each file

  -b, --escape
      print C-style escapes for nongraphic characters

  --block-size=SIZE
      scale sizes by SIZE before printing them; e.g., '--block-size=M' prints sizes in units of 1,048,576
      bytes; see SIZE format below

  -B, --ignore-backups
      do not list implied entries ending with ~

  -c      with -lt: sort by, and show, ctime (time of last modification of file status information); with -l:
          show ctime and sort by name; otherwise: sort by ctime, newest first

  -C      list entries by columns

  --color[=WHEN]
      colorize the output; WHEN can be 'always' (default if omitted), 'auto', or 'never'; more info below

  -d, --directory
      list directories themselves, not their contents

Manual page ls(1) line 1 (press h for help or q to quit)
```

NAME

Program or Function name(s) followed by descriptions of functionality.

SYNOPSIS

A short overview of available options

DESCRIPTION

Detailed information about arguments and options.

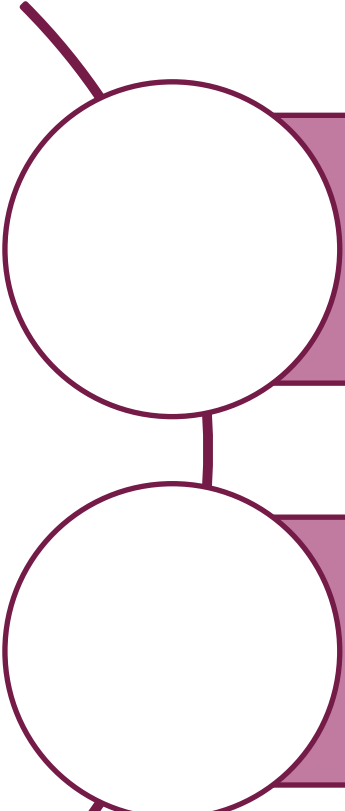


2 Info Pages



Info Pages

info [command]



Info pages are additional documentation with more robust capability in detail. Info Page normally provides more detailed information about a command than its respective man page. Additionally, Info uses a structure for linking these pages together, and they may be assembled into a larger collection.

The info page for a particular command is invoked by preceding the command with **info**



Info Pages

info echo

```
Next: printf invocation, Up: Printing text
15.1 'echo': Print a line of text
=====

'echo' writes each given STRING to standard output, with a space between
each and a newline after the last one.  Synopsis:

    echo [OPTION]... [STRING]...

Due to shell aliases and built-in 'echo' functions, using an
unadorned 'echo' interactively or in a script may get you different
functionality than that described here.  Invoke it via 'env' (i.e., 'env
echo ...') to avoid interference from the shell.

The program accepts the following options.  Also see *note Common
options::.  Options must precede operands, and the normally-special
argument '--' has no special meaning and is treated like any other
STRING.

'-n'
    Do not output the trailing newline.

'-e'
    Enable interpretation of the following backslash-escaped characters
    in each STRING:

        '\a'
            alert (bell)
        '\b'
            backspace
        '\c'
            produce no further output
        '\e'
            escape
        '\f'
            form feed
        '\n'
            newline
        '\r'
            carriage return
        '\t'
            tab

-----Info: (coreutils)echo invocation, 78 lines --Top-----
Welcome to Info version 6.5.  Type H for help, h for tutorial.
```

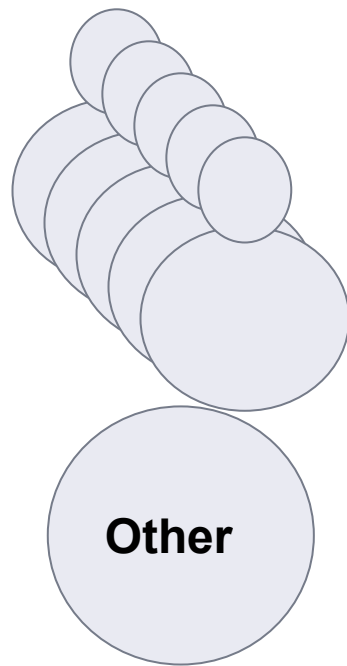
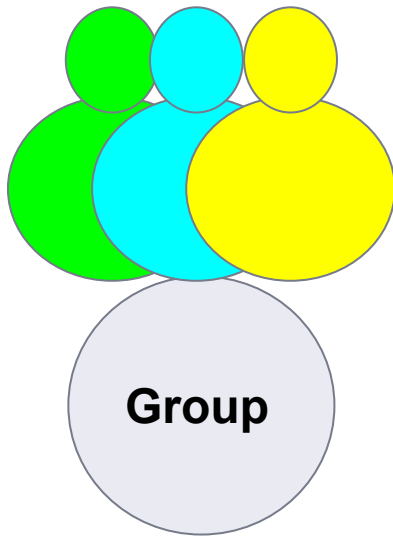
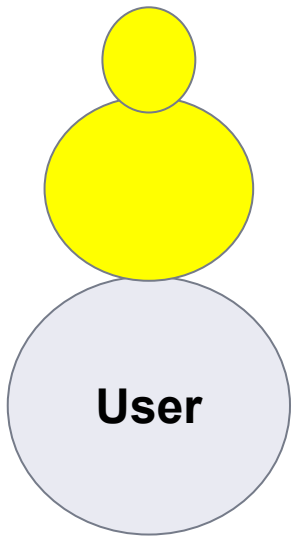


File Permission

File Permission



Ownership



File Permission



Ownership

User

- A user is the owner of the file.

Group

- A user- group can contain multiple users.

Other

- Any other user who has access to a file.

Permission

Read

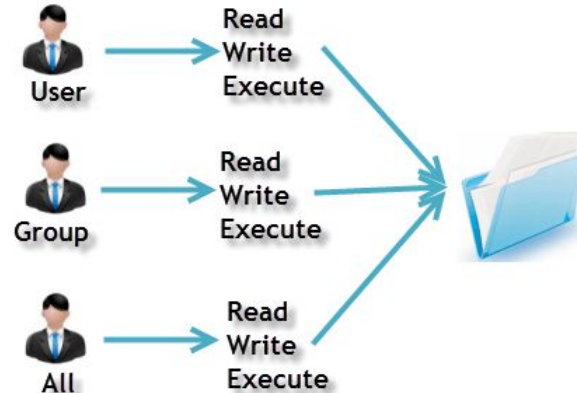
- This permission give you the authority to open and read a file.

Write

- The write permission gives you the authority to modify the contents of a file.

Execute

- you cannot run a program unless the execute permission is set.



File Permission



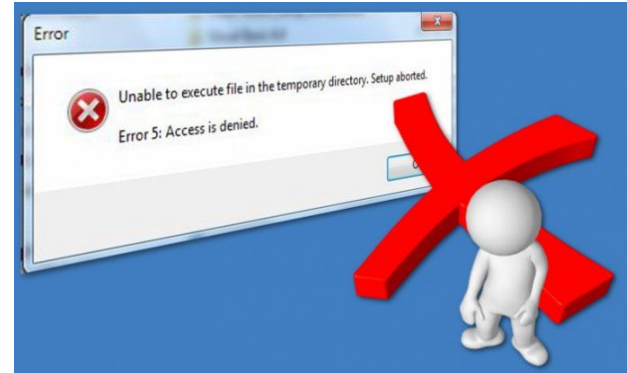
Permissions



Read



Write



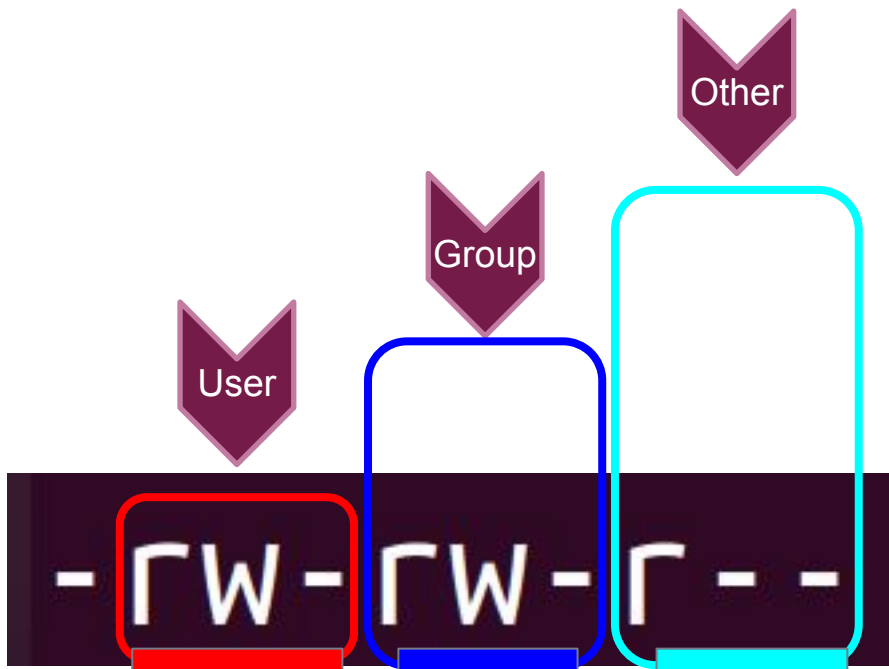
Execute



File Permission



Ownership

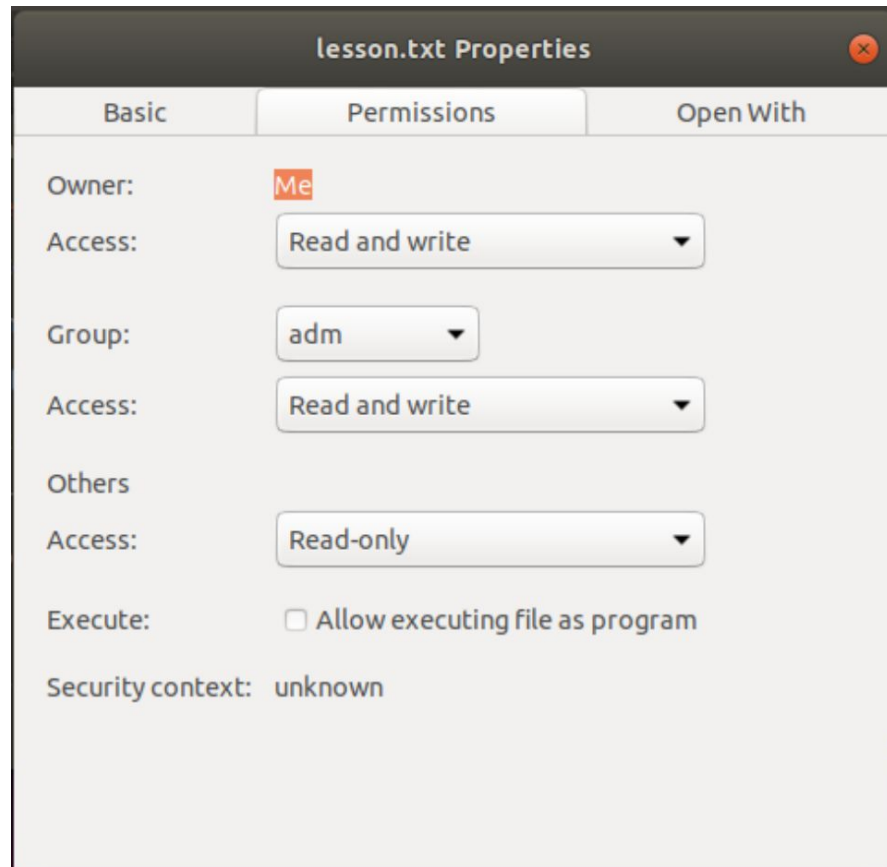


```
-rw-rw-r-- 1 zk zk 0 Dec 7 15:39 html.txt
```



File Permission

```
raymond@clarusway-linux: ~  
File Edit View Search Terminal Help  
raymond@clarusway-linux:~$ ls -l lesson.txt  
-rw-rw-r-- 1 raymond adm 8 Mar  2 21:19 lesson.txt  
raymond@clarusway-linux:~$
```



File Permission



```
gakeko2018@DESKTOP-JA07K2U:~$ ls
cert.pem
gakeko2018@DESKTOP-JA07K2U:~$ ls -la
.  .. .bash_history .bash_logout .bashrc .local .profile .ssh cert.pem
gakeko2018@DESKTOP-JA07K2U:~$ ls -al
total 12
drwxr-xr-x 1 gakeko2018 gakeko2018 4096 Jan 13 09:41 .
drwxr-xr-x 1 root      root      4096 Dec 25 18:19 ..
-rw-r--r-- 1 gakeko2018 gakeko2018 236 Jan 14 12:21 .bash_history
-rw-r--r-- 1 gakeko2018 gakeko2018 220 Dec 25 18:19 .bash_logout
-rw-r--r-- 1 gakeko2018 gakeko2018 3771 Dec 25 18:19 .bashrc
drwxrwxrwx 1 gakeko2018 gakeko2018 4096 Jan 13 09:38 .local
-rw-r--r-- 1 gakeko2018 gakeko2018 807 Dec 25 18:19 .profile
drwx----- 1 gakeko2018 gakeko2018 4096 Jan 13 09:41 .ssh
-r----- 1 gakeko2018 gakeko2018 1675 Jan 13 09:38 cert.pem
```

File type and Access Permissions

```
-rw-r--r-- 1 gakeko2018 gakeko2018 807 Dec 25 18:19 .profile
```

indicates File

```
drwxr-xr-x 1 gakeko2018 gakeko2018 4096 Jan 13 09:41 .
```

d represents directory

Group

User Others

r: Read
w: Write
x: Execute

```
-rw-rw-r--
```

no execute permission

r = read permission
w = write permission
x = execute permission
- = no permission



File Permission

Changing Permission with chmod Command

We can use the **chmod** command which stands for **change mode**.
we can set permissions (read, write, execute) on a file/directory for the owner, group and the world.

```
chmod permissions filename
```

```
chmod u=rwx,g=rx,o=r myfile
```

Symbol	Permission Type
---	No Permission
--x	Execute
-w-	Write
-wx	Execute+Write
r--	Read
r-x	Read+Execute
rw-	Read+Write
rwX	Read+Write+Execute



File Permission

zk@ubuntu:~/ASSIGNMENT/Lessons/HTML\$ ls -l

total 0

! !

-rwx-----	1	zk	zk	0	Dec	7	15:39	cas.txt
-----rwx---	1	zk	zk	0	Dec	7	15:39	html.txt
-----rwx	1	zk	zk	0	Dec	7	15:39	java.txt
-rwxrwxrwx	1	zk	zk	0	Dec	7	17:10	js.js
-rwxrw---x	1	zk	zk	0	Dec	7	17:11	k.txt
-r--r--r--	1	zk	zk	0	Dec	7	17:13	l.txt

File Permission

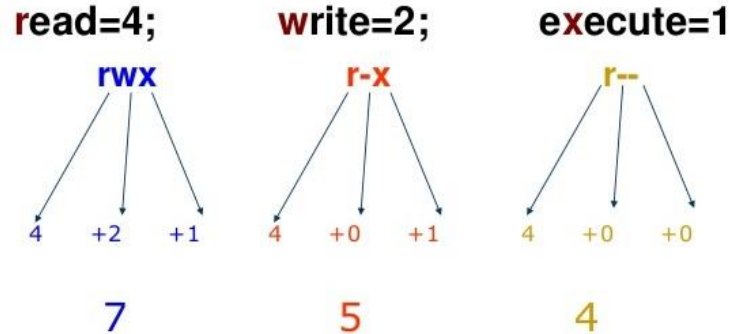


```
root@DESKTOP-4QQ1S5L:~# ls -l
total 0
-rw-rw-rw- 1 root root 0 Dec 29 17:53 file1
-r--r--rwx 1 root root 0 Dec 29 17:53 file2
root@DESKTOP-4QQ1S5L:~# chmod 754 file2
root@DESKTOP-4QQ1S5L:~# ls -l file2
-rwxr-xr-- 1 root root 0 Dec 29 17:53 file2
root@DESKTOP-4QQ1S5L:~#
```

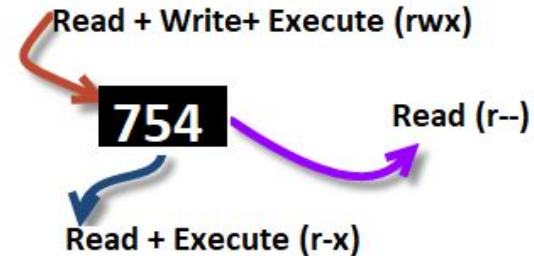
754 code says;

- Owner can read, write and execute
- User's group can read and execute
- Other can only read

Permissions



`chmod u=rwx,g=rx,o=r myfile`
`chmod 754 myfile`



File Permission



	Owner			Group			Other Users		
- or d	r	w	x	r	w	x	r	w	x
4	2	1	4	2	1	4	2	1	
7			7			7			

Read + Write + Execute (rwx)

764

Read (r--)

Read + Write (rw-)

d	r	w	x	r	-	x	r	-	-
	read	write	exec	read	write	exec	read	write	exec
File type	Owner permissions			Group permissions			User permissions		
(directory)	4	2	1	4	2	1	4	2	1
	7			5			4		



Set permissions of myfile.txt to;

owner : full access

group : read and execute

others : no access



Students, write your response!



THANKS!

Any questions?