

# Introduction to Linux

- UNIX is an **operating system** which was first developed in the 1960s.



the suite of programs which make the computer work

- UNIX systems also have a graphical user interface (GUI) similar to Microsoft Windows which provides an easy to use environment, however certain operations can not be done via graphical interface, but need commands from the Terminal.
- There are many different versions of UNIX, although they share common similarities. The most popular varieties of UNIX are Sun Solaris, GNU/Linux, and MacOS X

Open  
Terminal



## Path

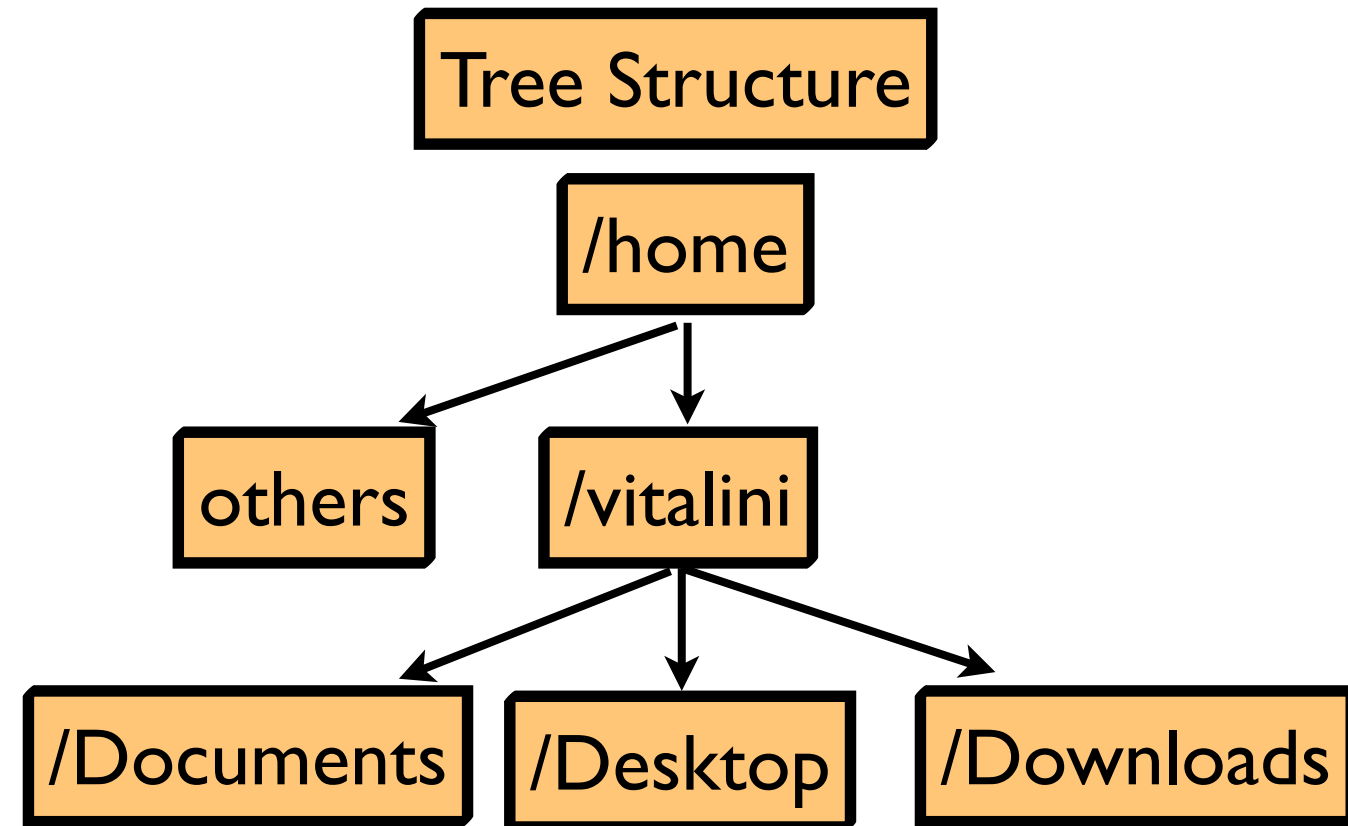
```
[vitalini@qcm01] 703 (~): pwd  
/home/vitalini  
[vitalini@qcm01] 704 (~):
```

Root

Username

## List

```
[vitalini@qcm01] 703 (~): pwd  
/home/vitalini  
[vitalini@qcm01] 704 (~): ls  
Desktop/ Documents/ Downloads/  
[vitalini@qcm01] 705 (~):
```



## New folder

```
[vitalini@qcm01] 724 (~): pwd  
/home/vitalini
```

```
[vitalini@qcm01] 725 (~): ls
```

```
██████████/ ██████████/ Desktop/ Documents/ Downloads/
```

```
[vitalini@qcm01] 726 (~): mkdir test
```

mkdir= make directory  
test = directory name + location ( here)

```
[vitalini@qcm01] 727 (~): ls -ltr
```

-ltr shows files  
sorted according  
to time

```
total 432  
drwxr-xr-x 2 vitalini zedat      6 Nov  4 10:36 Templates/  
drwxr-xr-x 2 vitalini zedat      6 Nov  4 10:36 Public/  
drwxr-xr-x 2 vitalini zedat      6 Nov  4 10:36 Documents/  
drwxr-xr-x 2 vitalini zedat      6 Nov  4 10:36 Music/  
drwxr-xr-x 2 vitalini zedat      6 Nov  4 10:36 Pictures/  
drwxr-xr-x 2 vitalini zedat      6 Nov  4 10:36 Videos/  
drwxr-xr-x 3 vitalini zedat     15 Feb 24 15:36 mnt/  
drwxr-xr-x 7 vitalini zedat    102 Feb 28 08:58 ██████████/  
drwxr-xr-x 3 vitalini zedat     26 Feb 28 09:03 ██████████/  
drwxr-xr-x 3 vitalini zedat     38 Feb 28 09:13 ██████████/  
drwxr-xr-x 2 vitalini zedat     89 Apr  2 14:25 Desktop/  
-rw-r--r-- 1 vitalini zedat 437403 Apr  7 09:46 ██████████ (1)  
drwxr-xr-x 3 vitalini zedat   4096 Apr  8 12:09 Downloads/  
drwxr-xr-x 2 vitalini zedat     6 Apr  9 08:30 test/
```

```
[vitalini@qcm01] 728 (~):
```



## Change folder

```
[vitalini@qcm01] 731 (~): cd test
[vitalini@qcm01] 732 (~/.test): pwd
/home/vitalini/test
[vitalini@qcm01] 733 (~/.test): █
```

cd= Change Directory

new path

## Go one folder up

```
[vitalini@qcm01] 735 (~): pwd
/home/vitalini
[vitalini@qcm01] 736 (~): cd test
[vitalini@qcm01] 737 (~/.test): pwd
/home/vitalini/test
[vitalini@qcm01] 738 (~/.test): cd ../
[vitalini@qcm01] 739 (~): pwd
/home/vitalini
[vitalini@qcm01] 740 (~): █
```

. means current directory  
 ../ means directory one level above  
 cd brings you at the top of the tree

## Go home

```
[vitalini@qcm01] 741 (~/.test): pwd
/home/vitalini/test
[vitalini@qcm01] 742 (~/.test): cd
[vitalini@qcm01] 743 (~): pwd
/home/vitalini
[vitalini@qcm01] 744 (~): █
```

## Understand Paths

```
[vitalini@qcm01] 746 (~): ls
████████████████████ Desktop/ Downloads/
████████████████████ Documents/ Downloads\ (1)
[vitalini@qcm01] 747 (~): ls ~ → home
████████████████████ Desktop/ Downloads/
████████████████████ Documents/ Downloads\ (1)
[vitalini@qcm01] 748 (~): cd test
[vitalini@qcm01] 749 (~/.test): ls
[vitalini@qcm01] 750 (~/.test): ls Downloads
ls: cannot access Downloads: No such file or d
[vitalini@qcm01] 751 (~/.test): ls ../Downloads
2014_vitalini_employment.docx
BoardingPass\ (1).pdf
BoardingPass.pdf
Coupon_201404070573001.pdf
Dienstreisen_en_Application_for_reimbursement_t
Francesca_Vitalini_CV_and_Certificates.zip
[vitalini@qcm01] 752 (~/.test):
```

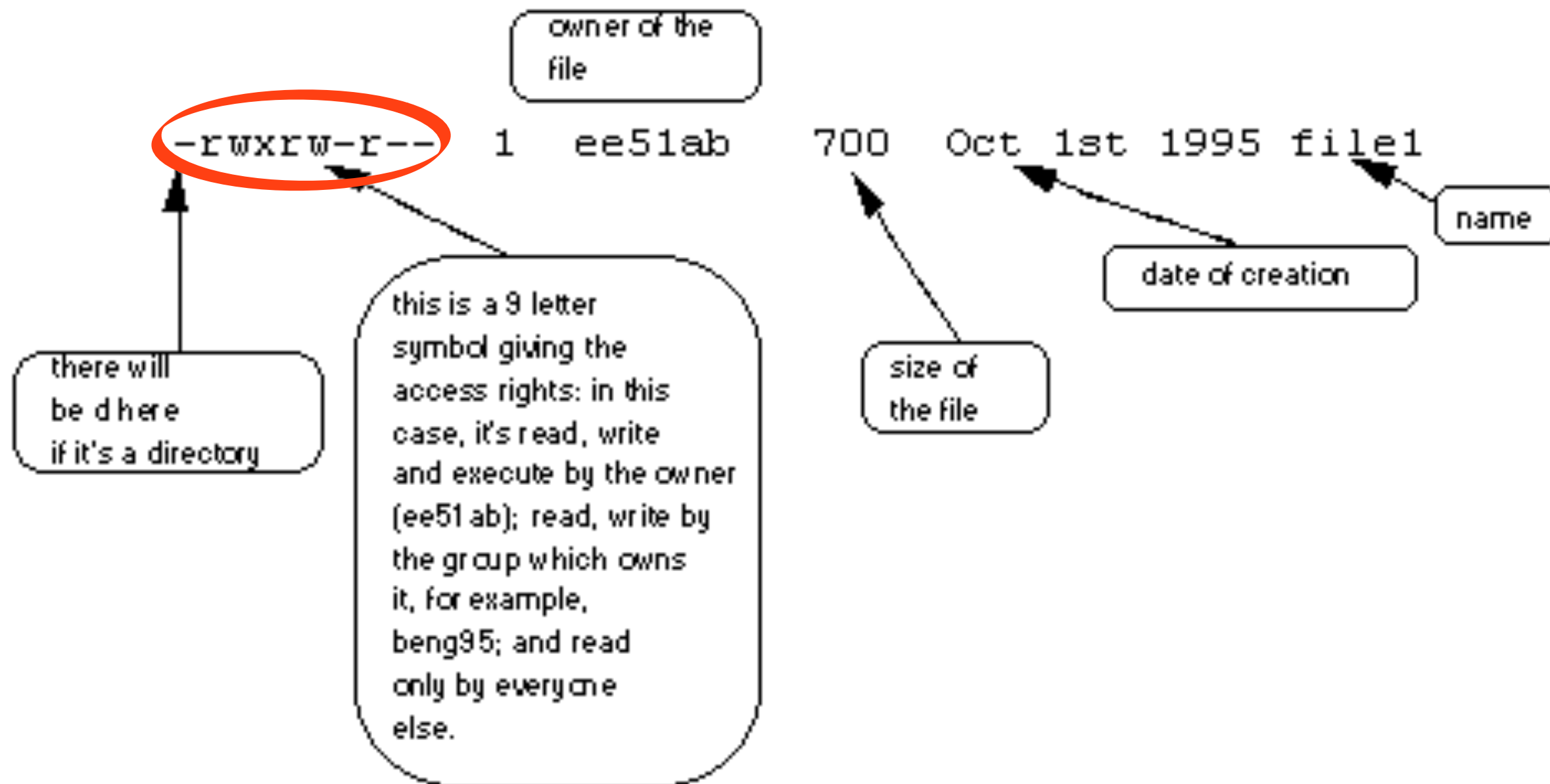
## Summary

Command	Meaning
<code>ls</code>	list files and directories
<code>ls -a</code>	list all files and directories
<code>mkdir</code>	make a directory
<code>cd <i>directory</i></code>	change to named directory
<code>cd</code>	change to home-directory
<code>cd ~</code>	change to home-directory
<code>cd ..</code>	change to parent directory
<code>pwd</code>	display the path of the current directory



## Files security

- `ls -l` → List “long”.



## Files security

- `-rwxrw-r--` ➔ first 3 indicate rights of owner.  
second 3 indicate rights of group.  
last 3 indicate rights of all others.
- r allows users to list files in the directory/ read file content;
- w means that users may delete files from the directory or move files into it/ modify file content;
- x means the right to access files in the directory (provided you have read permission on the individual files) / execute files.

## Files security

- **chmod** ➔ Changes rights to single files or directories.

Symbol	Meaning
u	user
g	group
o	other
a	all
r	read
w	write (and delete)
x	execute (and access directory)
+	add permission
-	take away permission

## Make a text file

```
[vitalini@qcm01] 754 (~/.test): pwd  
/home/vitalini/test  
[vitalini@qcm01] 755 (~/.test): vi test.txt
```

```
□  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
test.txt
```

Empty file



## Make a text file

```
[vitalini@qcm01] 754 (~/.test): pwd
/home/vitalini/test
[vitalini@qcm01] 755 (~/.test): vi test.txt
```

push key "i" to  
enter insert mode  
and start writing

```

[
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
test.txt
-- INSERT --
```

```
writing test
~
~
~
~
~
~
~
~
~
~
~
~
test.txt [+]
-- INSERT --
```

## Make a text file

```
[vitalini@qcm01] 754 (~/.test): pwd
/home/vitalini/test
[vitalini@qcm01] 755 (~/.test): vi test.txt
```

```
writing test
```

push key “esc” and  
write “wq” to write  
= save and quit

```
~
~
~
~
~
~
~
~
~
~
~
```

```
[vitalini@qcm01] 757 (~/.test): ls
test.txt
[vitalini@qcm01] 758 (~/.test):
```

```
test.txt [+]
```

```
:wq
```

## copy files and move them

```
[vitalini@qcm01] 757 (~/.test): ls
test.txt
[vitalini@qcm01] 758 (~/.test): cp test.txt test1.txt
[vitalini@qcm01] 759 (~/.test): ls
test.txt test1.txt
[vitalini@qcm01] 760 (~/.test): mv test1.txt Test1.txt
[vitalini@qcm01] 761 (~/.test): ls
Test1.txt test.txt
[vitalini@qcm01] 762 (~/.test): mkdir ./new_test
[vitalini@qcm01] 763 (~/.test): ls
Test1.txt new_test/ test.txt
[vitalini@qcm01] 764 (~/.test): cp test.txt new_test
axelschild has logged on pts/10 from 192.108.69.177.
[vitalini@qcm01] 765 (~/.test): ls
Test1.txt new_test/ test.txt
[vitalini@qcm01] 766 (~/.test): ls new_test
test.txt
[vitalini@qcm01] 767 (~/.test): mv Test1.txt new_test
[vitalini@qcm01] 768 (~/.test): ls
new_test/ test.txt
[vitalini@qcm01] 769 (~/.test): ls new_test
Test1.txt test.txt
[vitalini@qcm01] 770 (~/.test):
```

cp copies a file into another file-name/location (the original file remains).

mv moves the original file into another file-name/location

## remove files and directories

```
[vitalini@qcm01] 771 (~/.test): ls
new_test/  test.txt
[vitalini@qcm01] 772 (~/.test): rm test.txt
[vitalini@qcm01] 773 (~/.test): ls
new_test/
[vitalini@qcm01] 774 (~/.test): rm -r new_test
[vitalini@qcm01] 775 (~/.test): ls
[vitalini@qcm01] 776 (~/.test):
```

`rm` removes files, not directories.

`rm -r` removes files and directories. Or you can use `rmdir`.

`rm *` removes all files in current directory but not subdirectories.



## Display files

- **clear** ➔ clears all text in terminal window.
- **cat filename.txt** ➔ displays content of a file in terminal window.
- **less filename.txt** ➔ displays content of a file a page at a time in terminal window.
- **head filename.txt** ➔ displays first 10 lines of a file in terminal window.
- **tail filename.txt** ➔ displays last 10 lines of a file in terminal window.
- **grep 'word' filename.txt** ➔ prints out all lines of a file which contain the word word. Is case sensitive.
- **wc -w filename.txt** ➔ Counts words in file.
- **history** ➔ Prints list of all used commands.

## Summary

Command	Meaning
<code>cp file1 file2</code>	copy file1 and call it file2
<code>mv file1 file2</code>	move or rename file1 to file2
<code>rm file</code>	remove a file
<code>rmdir directory</code>	remove a directory = <code>rm -r</code>
<code>cat file</code>	display a file
<code>less file</code>	display a file a page at a time
<code>head file</code>	display the first few lines of a file
<code>tail file</code>	display the last few lines of a file
<code>grep 'keyword' file</code>	search a file for keywords
<code>wc file</code>	count number of lines/words/characters in file

## Redirection

- `>` ➔ Redirects output.
- `>>` ➔ appends to file.

## Wildcards

- `*word` ➔ will match all files containing word.
- `?word` ➔ will match exactly one character

## Other commands

- `diff file1 file2` ➔ Prints differences between file1 and file2.
- `find . -name "*.txt" -print` ➔ To search for all files with the extension .txt, in the current directory (.) and all sub-directories, then printing the name of the file to the screen.

## File naming convention

Good filenames	Bad filenames
project.txt	project
my_big_program.c	my big program.c
fred_dave.doc	fred & dave.doc

- / \* & % → Should be avoided.



## Getting Help

- **man commandname** ➔ Prints manual for the command.
- **apropos commandname** ➔ Prints commands similar to commandname.

## Processes

A process is an executing program identified by a unique PID (process identifier). To see information about your processes, with their associated PID and status, type

- **ps** ➔ Gives the PID of the running processes.

Suspend the process running in the foreground by typing [**Ctrl**]**Z** Then to put it in the background,.

- **bg** ➔ To send a process to the background.
- **fg jobnumber** ➔ To send a process to the foreground.
- **jobs** ➔ To list jobs and job numbers running on the background.

## Processes

- **kill %jobnumber** ➡ To kill a process to the background.
- **nohup command &** ➡ To run a command background. Output redirected to nohup.out .
- **top/htop** ➡ To show processes running on the background.

## Other commands

- **quota -v** ➡ To list space on your home.
- **du** ➡ Outputs number of kilobytes occupied by each file and each subdirectory.
- **gzip/tar** ➡ To compress file/directory.

**Online tutorial: <http://www.ee.surrey.ac.uk/Teaching/Unix/index.html>**