



# Linux For Embedded Systems

## *For Arabs*

## Course 102: Understanding Linux

Ahmed ElArabawy



# Lecture 3:

## Basic Concepts and Commands

# Files & Filenames

- Filenames can use any characters

*abc??##.a1 sta\*.pn*

But it is not wise to use special characters in filenames

spaces are accepted but not recommended, use dashes or underscores instead

*test results.txt* => *test\_results.txt* or *test-results.txt*

- File names are case sensitive

*Test\_results.doc test\_results.doc*

But avoid creating files with same names with difference in case

- File names starting with a dot are hidden files

*.bashrc .profile*

- No concept of file extension, the dot is just another character

*file.txt.old .bashrc file.doc.mod .profile.old results.yesterday results*

Still it is a good idea to stick to the popular extensions for clarity

# Paths

- Directory names separated by slashes '/'  
*/usr/src/shared/files/myfile.txt*
- Can be absolute or relative
  - Absolute: Does not depend on where you are  
*/home/aelarabawy/abcd*  
*~/abcd*  
~ means */home/aelarabawy* (home directory of current user)  
*~salah* means */home/salah* (home directory of the user salah)
  - Relative: Depends where you are in the tree  
*./my-project/progress-reports*  
*../my-project/progress-reports*  
. means Current Directory  
.. Means Parent Directory

# Commands

- General form of Commands,  
*\$ <command> [options] [arguments]*
- Commands can be issued on their own  
*\$ ls*  
*\$ pwd*  
*\$ cd*
- The Options are normally optional (by definition)  
The usually start with '-' or '--'  
'-' used with the short name for the option  
*\$ ls -a*  
'--' used with the long name for the option  
*\$ ls --all*

We normally use the short name in CLI and the long name in scripts (for clarity)

# Commands

- If we want to use multiple options Sometimes we join options or keep them separate

*\$ ls -a -R*

*\$ ls -aR*

*\$ ls --all --recursive*

- Sometimes a '--' without a name afterwards will mean end of options (even a following hyphen will not be considered a new option)
  - Arguments are those info passed to the command such as file names and paths
- \$ rm -rf ./project-data*

# Basic Commands

Command	Effect
\$ ls	To list files
\$ tree	To list a tree of files
\$ pwd	To show the current directory
\$ cd	To move around in the tree
\$ mkdir	To Create directories
\$ cp	To copy files and directories
\$ mv	To move or rename files and directories
\$ rm	To delete files and directories
\$ clear	To clear the screen

# Listing Files (ls Command)



**\$ ls (List Current Directory)**

```
mandar@YourOwnLinux: ~  
mandar@YourOwnLinux:~$ ls  
a.c                EvenOdd.sh~       Music  
Add.sh~            examples.desktop  Pictures  
a.out              Fact.sh~           Prime.sh~  
ascii              helloWorld.java    Public  
backup_helloWorld.java helloWorld.sh~     script  
cat_demo.doc       helloWorld.sh.java Sub.sh~  
Desktop            helloWorld.sh.java~ Table.sh~  
Div.sh~            Host.sh            Templates  
Documents           ManU.txt           utorrent-server-3.0-25053.tar.gz  
Downloads           ManU.txt~          Videos  
dropbox.deb         Mul.sh~  
mandar@YourOwnLinux:~$
```



# Listing Files (ls Command)



**\$ ls -a** (List all files, including hidden files)

```
mandar@YourOwnLinux:~$ ls -a
.          .gt5-diffs
..         .gt5.html
a.c        .gtk-bookmarks
Add.sh~    .gvfs
a.out      helloWorld.java
ascii      helloWorld.sh~
backup_helloWorld.java helloWorld.sh.java
.bash_history helloWorld.sh.java~
.bash_logout Host.sh
.bashrc     .ICEauthority
.bluefish   .local
.cache      ManU.txt
cat_demo.doc ManU.txt~
.config     .mission-control
.dbus       .mozilla
Desktop     Mul.sh~
Div.sh~     Music
.dmr        Pictures
.dmr.cache Prime.sh~
Documents   .profile
Downloads   Public
dropbox.deb .pulse
EvenOdd.sh~ .pulse-cookie
examples.desktop script
Fact.sh~    .shotwell
.fontconfig Sub.sh~
```

# Listing Files (ls Command)



**\$ ls -l** (List with long format)

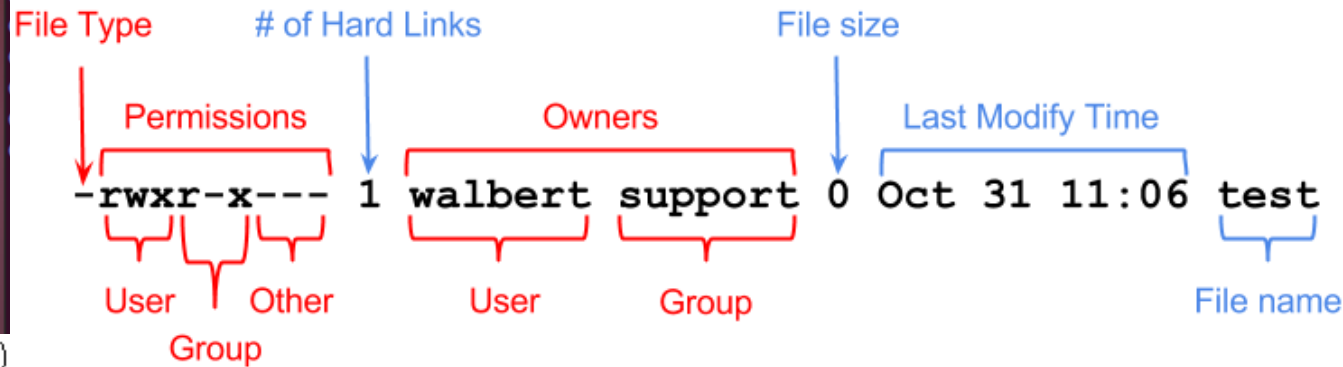
```
robb@ubuntu: ~  
robb@ubuntu:~$ ls -l  
total 40  
drwxr-xr-x 2 robb robb 4096 2011-10-04 22:25 Desktop  
drwxr-xr-x 3 robb robb 4096 2011-05-14 15:57 Documents  
drwxr-xr-x 3 robb robb 4096 2011-10-03 19:34 Downloads  
-rw-r--r-- 1 robb robb 179 2011-05-12 09:11 examples.desktop  
drwxr-xr-x 4 robb robb 4096 2011-09-29 23:37 hw02  
drwxr-xr-x 2 robb robb 4096 2011-05-12 09:15 Music  
drwxr-xr-x 3 robb robb 4096 2011-10-04 22:23 Pictures  
drwxr-xr-x 2 robb robb 4096 2011-05-12 09:15 Public  
drwxr-xr-x 2 robb robb 4096 2011-05-12 09:15 Templates  
drwxr-xr-x 2 robb robb 4096 2011-05-12 09:15 Videos  
robb@ubuntu:~$
```

# Listing Files (ls Command)



**\$ ls -l (List with long format)**

```
robb@ubuntu: ~  
robb@ubuntu:~$ ls -l  
total 40  
drwxr-xr-x 2 robb robb 4096 2011-10-04 22:25 Desktop  
drwxr-xr-x 3 robb robb 4096 2011-05-14 15:57 Documents  
drwxr-xr-x 3 robb robb 4096 2011-10-03 19:34 Downloads  
-rw-r--r-- 1 robb robb 179 2011-05-12 09:11 examples.desktop  
drwxr-xr-x 4 robb robb 4096 2011-09-29 23:37 hw02
```



- (file)
  - d (directory)
  - l (symbolic link)
  - b (block special file)
  - c (character special file)
  - p (named pipe special file)
  - s (local socket special file)
- |   |         |
|---|---------|
| r | read    |
| w | write   |
| x | execute |

# Listing Files (ls Command)



**\$ ls [options] [<dir or file> ..]**

- \$ ls** (list current directory)
- \$ ls -a** (all: show hidden files)
- \$ ls -l** (long: show file details)
- \$ ls -t** (timestamp: sort based on timestamp)
- \$ ls -S** (Size: sort based on file size)
- \$ ls -r** (reverse: make the sort in reverse order)
- \$ ls -d** (directories: Only show directories)
- \$ ls -R** (Recursive: list files inside subdirectories)
- \$ ls <dir>** (List the contents of the mentioned directory)
- \$ ls <file>** (List the mentioned)
- \$ ls <dir or file> <dir or file> <dir or file>** (list selected dirs or files)

**Or a Mix of These Options**

# Displaying the Directory Tree (tree Command)



**\$ tree** (List tree from Current Directory)

```
bashitout@mike-desktop:~/projects$ tree
```

```
.
├── awesomesite
│   ├── awesomesite
│   │   ├── __init__.py
│   │   ├── settings.py
│   │   ├── urls.py
│   │   └── wsgi.py
│   └── manage.py
```

```
2 directories, 5 files
```

```
bashitout@mike-desktop:~/projects$
```

# Displaying the Directory Tree (tree Command)



**\$ tree -a (List tree from Current Directory)**

```
bashitout@mike-desktop:~/projects$ tree -a
```

```
├── awesomesite
│   ├── awesomesite
│   │   ├── __init__.py
│   │   ├── settings.py
│   │   ├── urls.py
│   │   └── wsgi.py
│   ├── .git
│   │   ├── branches
│   │   ├── config
│   │   ├── description
│   │   ├── HEAD
│   │   ├── hooks
│   │   │   ├── applypatch-msg.sample
│   │   │   ├── commit-msg.sample
│   │   │   ├── post-update.sample
│   │   │   ├── pre-applypatch.sample
│   │   │   ├── pre-commit.sample
│   │   │   ├── prepare-commit-msg.sample
│   │   │   ├── pre-rebase.sample
│   │   │   └── update.sample
│   │   ├── info
│   │   │   └── exclude
│   │   ├── objects
│   │   │   ├── info
│   │   │   └── pack
│   │   └── refs
│   │       ├── heads
│   │       └── tags
│   └── manage.py
```

```
12 directories, 17 files
```

```
bashitout@mike-desktop:~/projects$
```

# Displaying the Directory Tree (tree Command)



**\$ tree [options] [<dir or file> ..]**

***\$ tree*** (display the full tree starting from current dir)

***\$ tree -d*** (only show directories)

***\$ tree -a*** (show all files; including hidden ones)

***\$ tree <dir>*** (show the tree starting from a different point)

**Or a Mix of These Options**

# Print Working Directory (pwd Command)



**\$ pwd**

***\$ pwd*** (Display Current Directory)

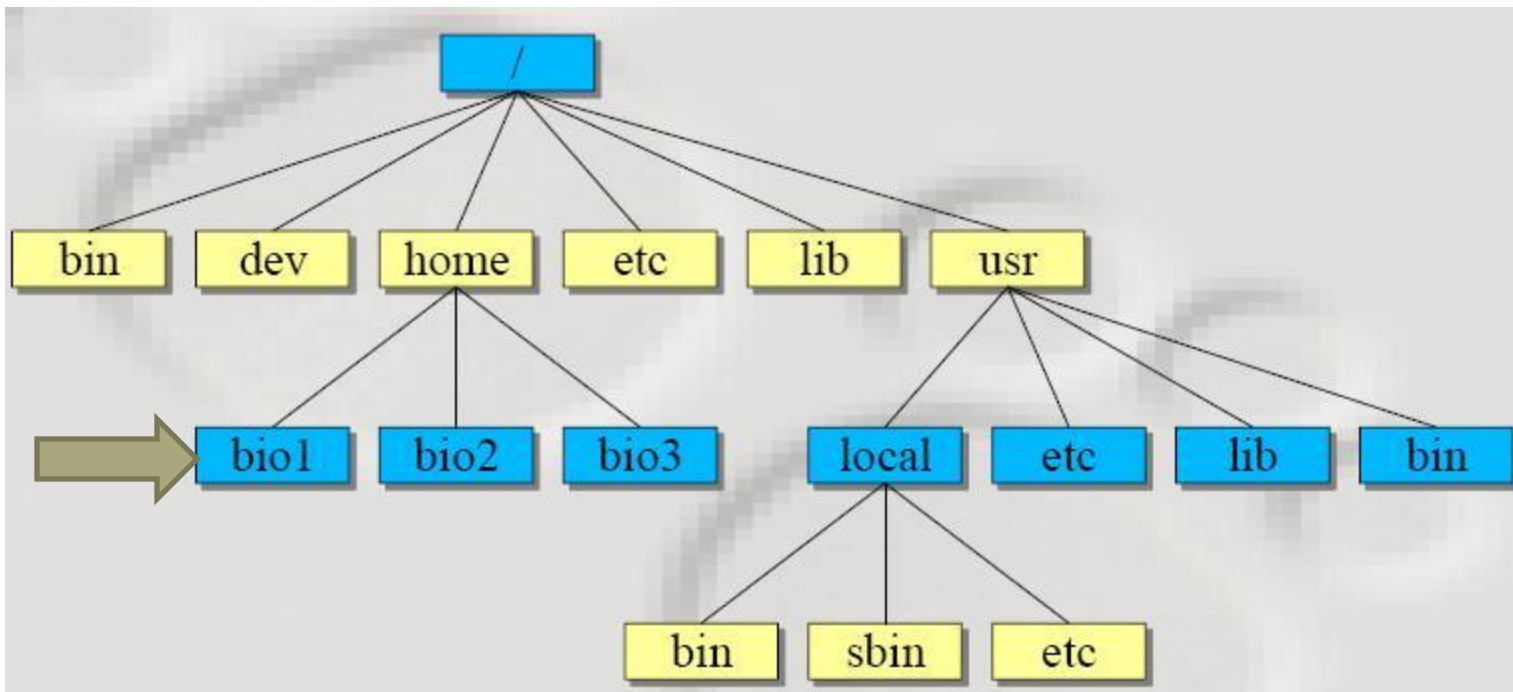
```
vivek@wks01:~/scripts$ pwd
/home/vivek/scripts
vivek@wks01:~/scripts$ ls -l
total 32
-rwxr-xr-x 1 vivek vivek  545 Sep 28  2008 conditions.sh
-rw-r--r-- 1 vivek vivek 1720 Sep 28  2008 gmail_parser.py
-rwxr-xr-x 1 vivek vivek   56 Dec  1  2007 hddmonit.sh
drwxr-xr-x 2 vivek vivek 4096 Mar 10 01:24 php
-rwxr-xr-x 1 vivek vivek 10283 Jul 20  2012 pogodynka.sh
drwxr-xr-x 2 vivek vivek 4096 Mar 10 01:24 python
vivek@wks01:~/scripts$ cd python
vivek@wks01:~/scripts/python$ pwd
/home/vivek/scripts/python
vivek@wks01:~/scripts/python$
```



# Moving Around (cd Command)



**\$ cd [destination]**



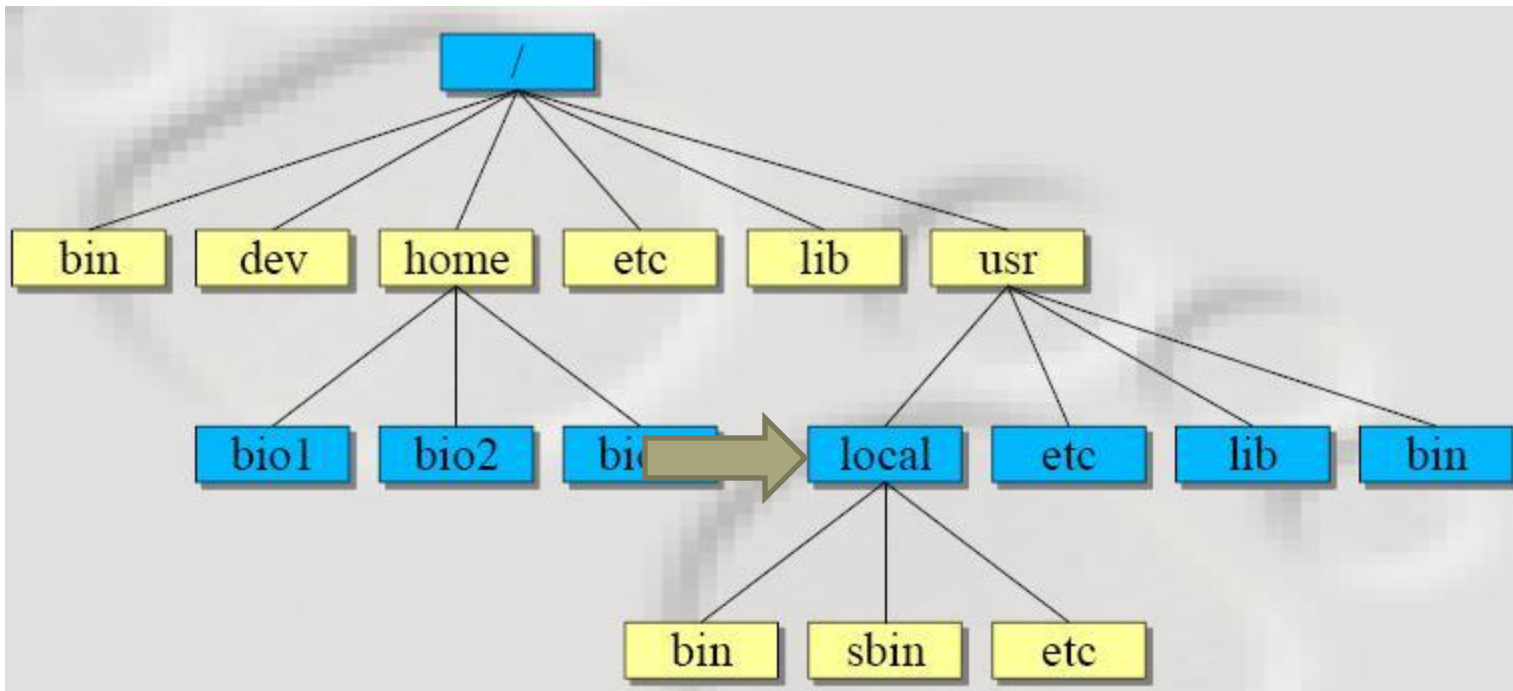
***\$ pwd***

***/home/bio1/***

# Moving Around (cd Command)



**\$ cd [destination]**

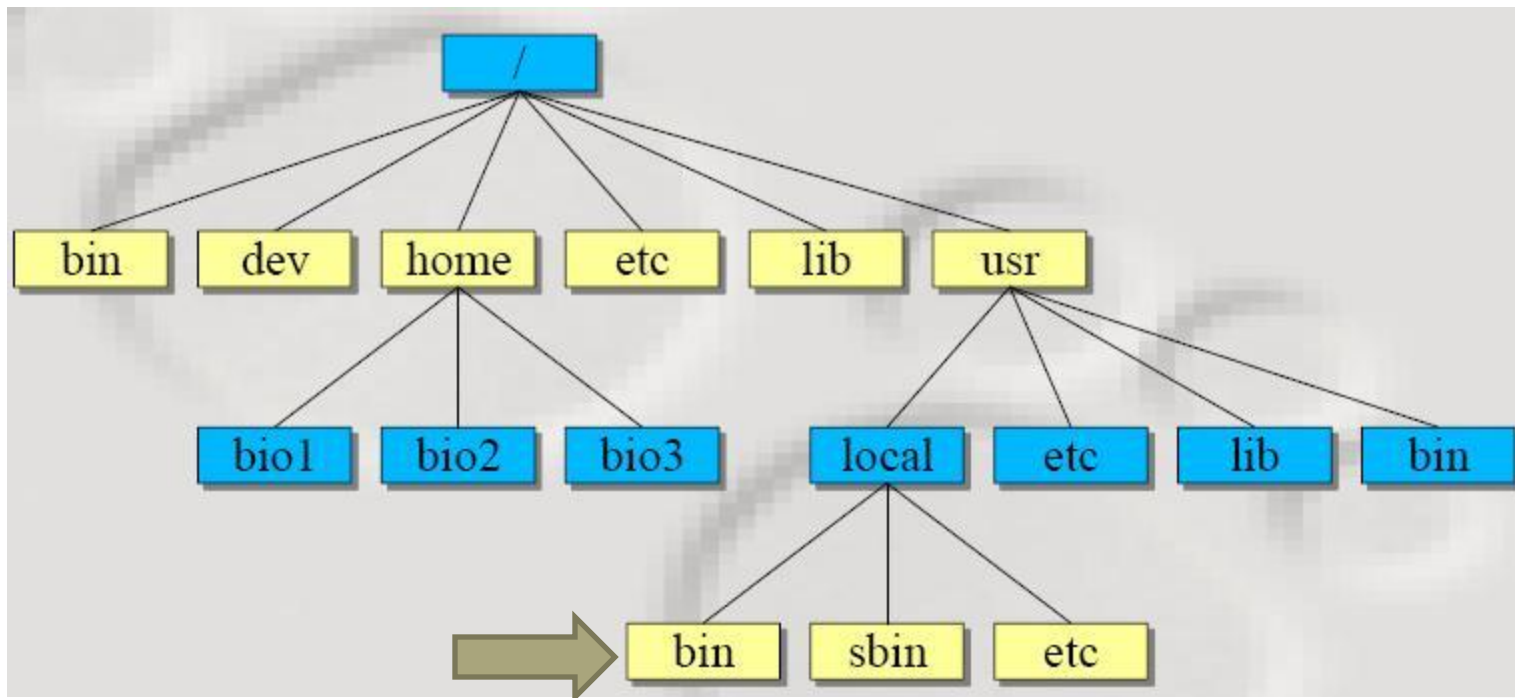


***\$ cd /usr/local***

# Moving Around (cd Command)



**\$ cd [destination]**



***\$ cd /usr/local/bin***

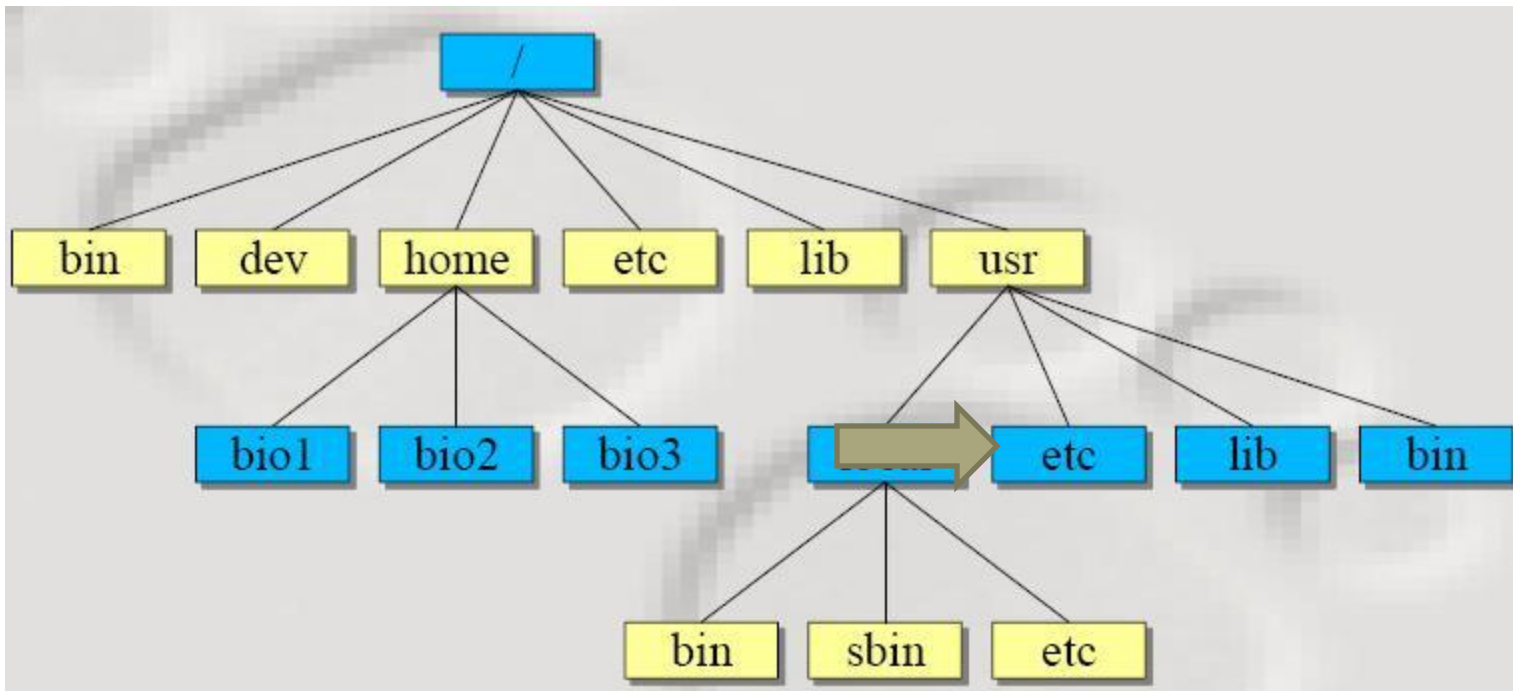
***\$ cd ./bin***

***\$ cd bin***

# Moving Around (cd Command)



**\$ cd [destination]**



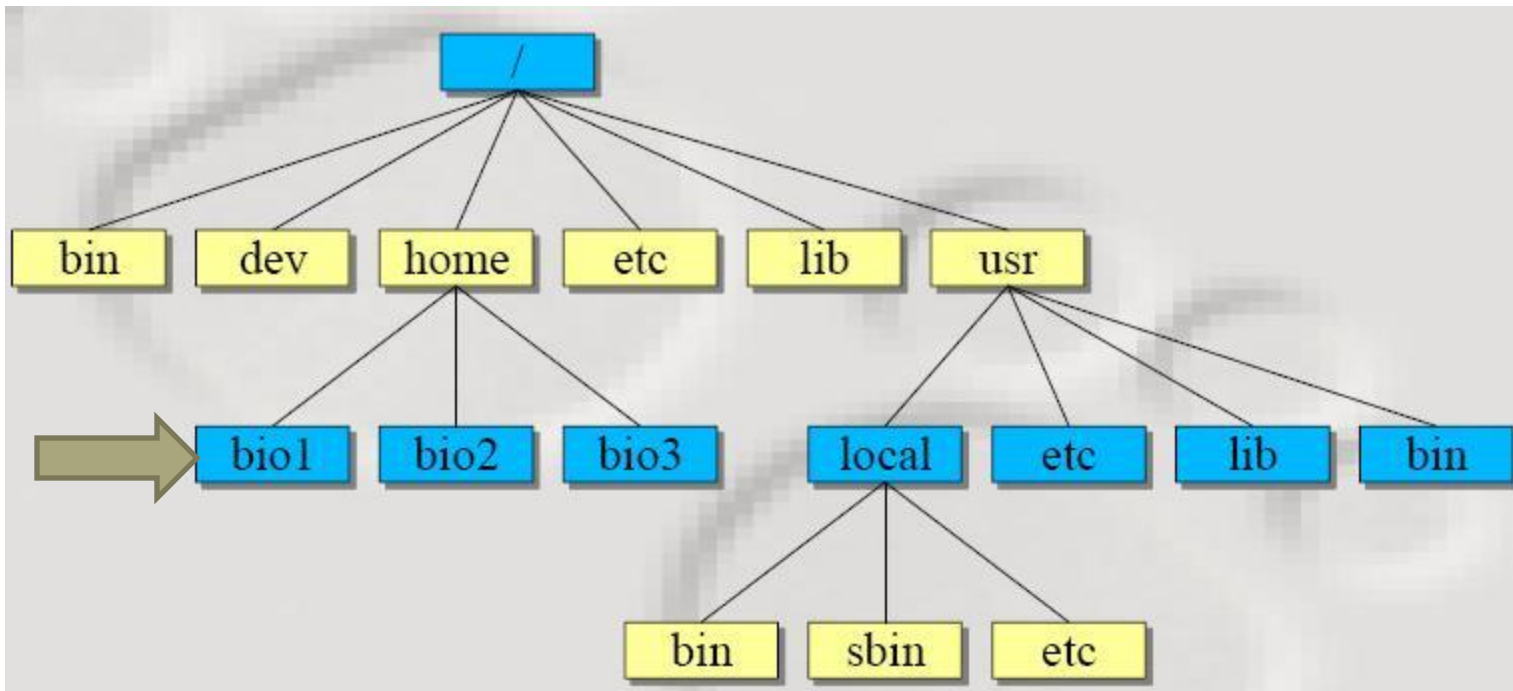
***\$ cd /usr/etc***

***\$ cd ../../etc***

# Moving Around (cd Command)



**\$ cd [destination]**



***\$ cd ~***

***\$ cd***

# Moving Around (cd Command)



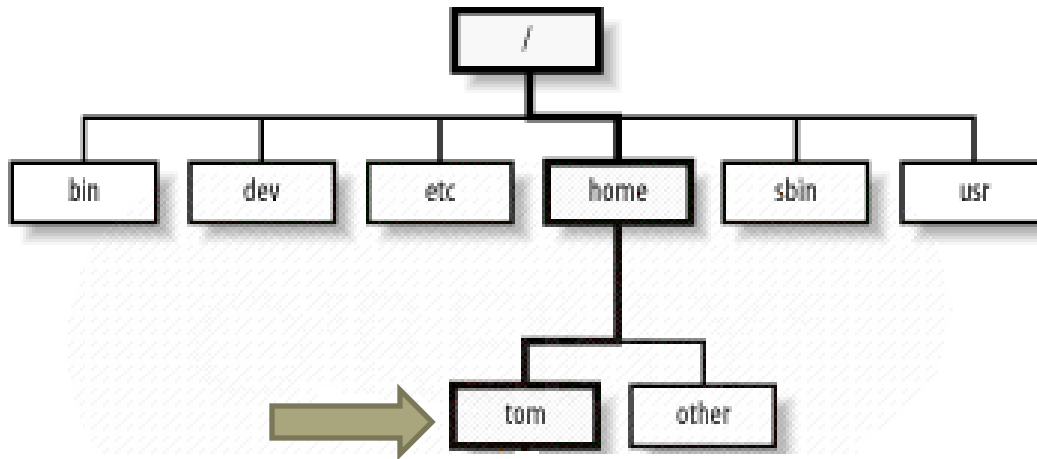
## \$ cd [destination]

- \$ cd /etc/network*** (absolute path)
- \$ cd ../project/*** (relative path)
- \$ cd ./project*** (relative path)
- \$ cd project*** (relative path, same as ***./project***)
- \$ cd ~*** (go to my home directory ***/home/aelarabawy/***)
- \$ cd ~user\_name*** (go to ***/home/user\_name***)
- \$ cd*** (same as ***cd ~***)
- \$ cd ..*** (go to parent directory)
- \$ cd -*** (go to previous directory)

# Making New Directories (mkdir Command)



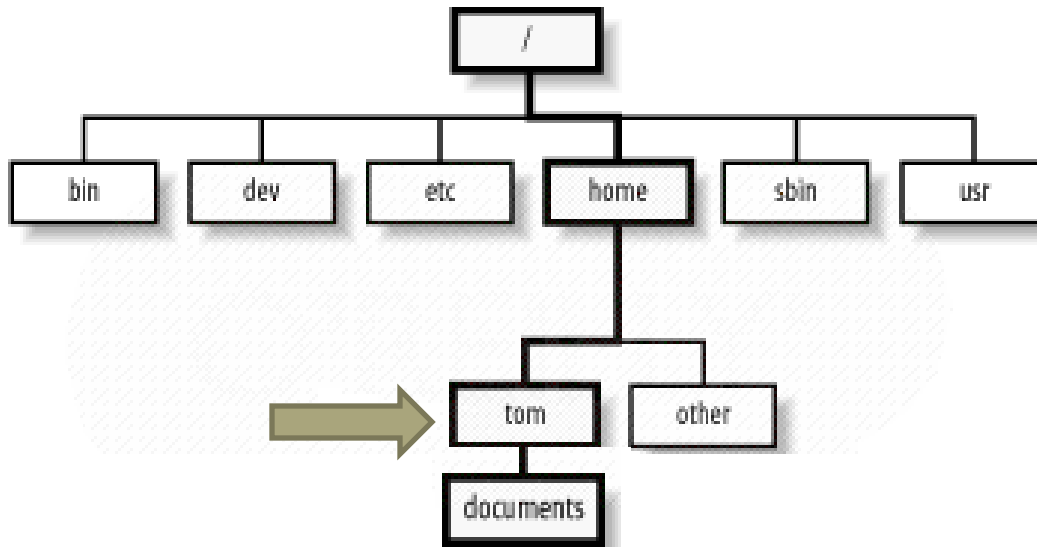
**\$ mkdir <new directory name with path>**



# Making New Directories (mkdir Command)



**\$ mkdir <new directory name with path>**



***\$ mkdir documents***

***\$ mkdir ./documents***

***\$ mkdir /home/tom/documents***

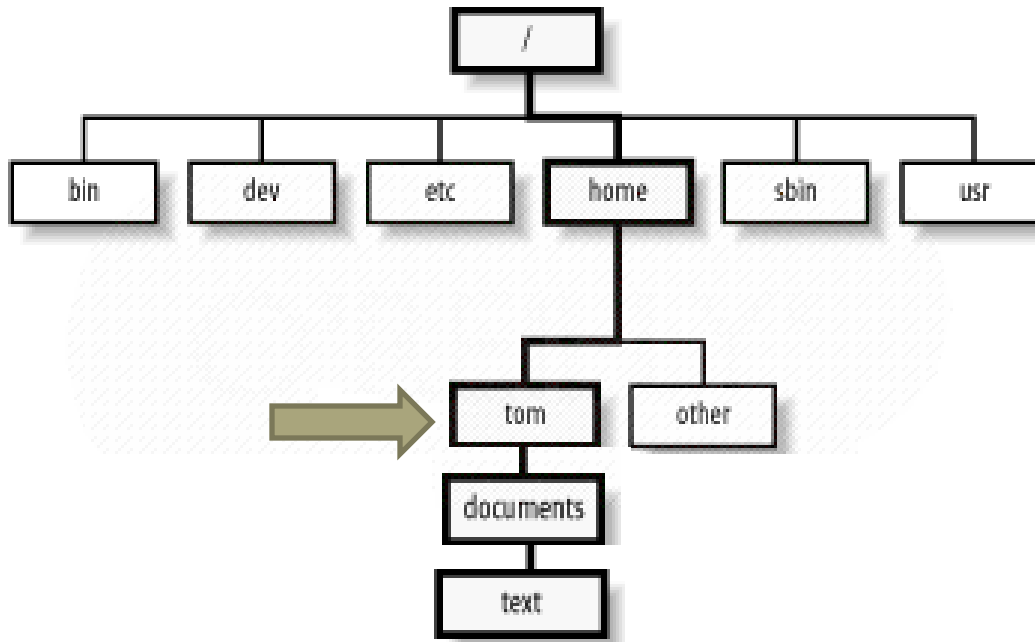
***\$ mkdir ~/documents***



# Making New Directories (mkdir Command)



**\$ mkdir <new directory name with path>**

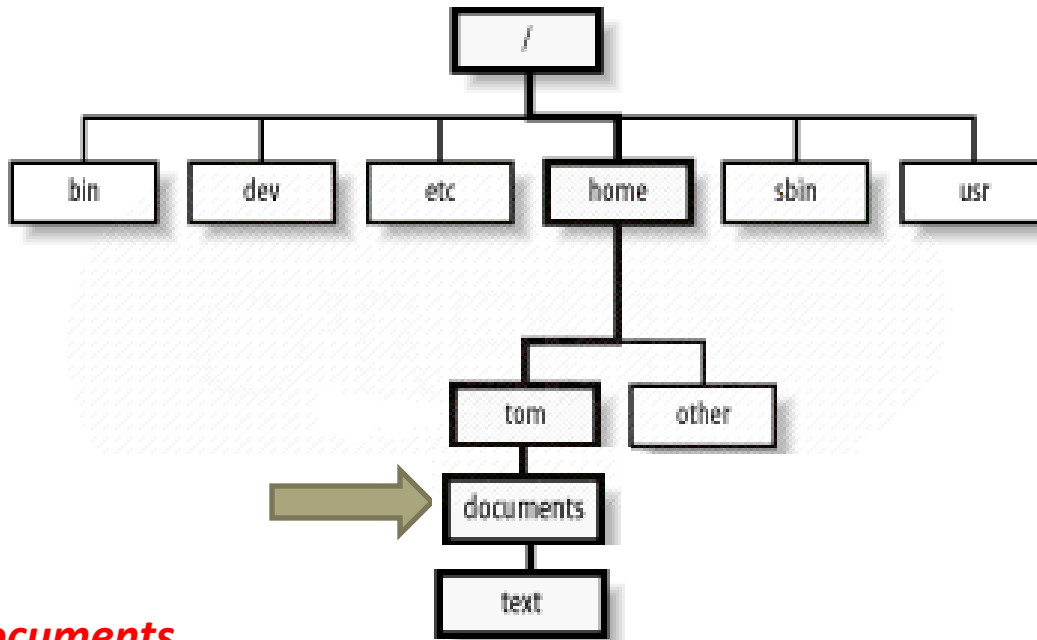


***\$ mkdir documents/text***

# Making New Directories (mkdir Command)



**\$ mkdir <new directory name with path>**

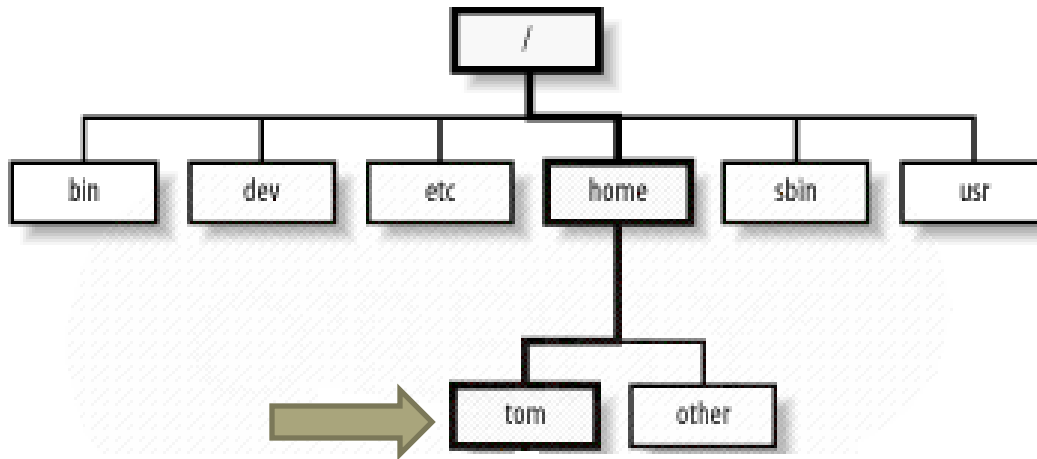


***\$ cd documents***  
***\$ mkdir text***

# Making New Directories (mkdir Command)



**\$ mkdir <new directory name with path>**

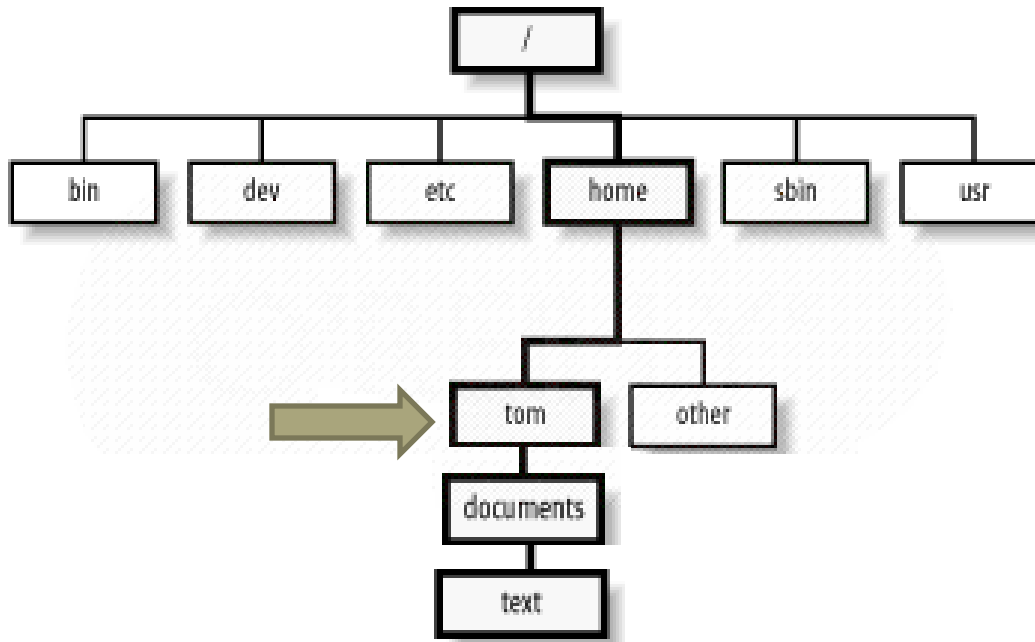


*\$ mkdir documents/text* **X**

# Making New Directories (mkdir Command)



**\$ mkdir <new directory name with path>**



***\$ mkdir -p documents/text***

# Making New Directories (mkdir Command)



**\$ mkdir <new directory name with path>**

***\$ mkdir project1*** (create a new directory from current location)

***\$ mkdir project1 project2*** (create 2 directories)

***\$ mkdir /home/aelarabawy/lectures*** (absolute path)

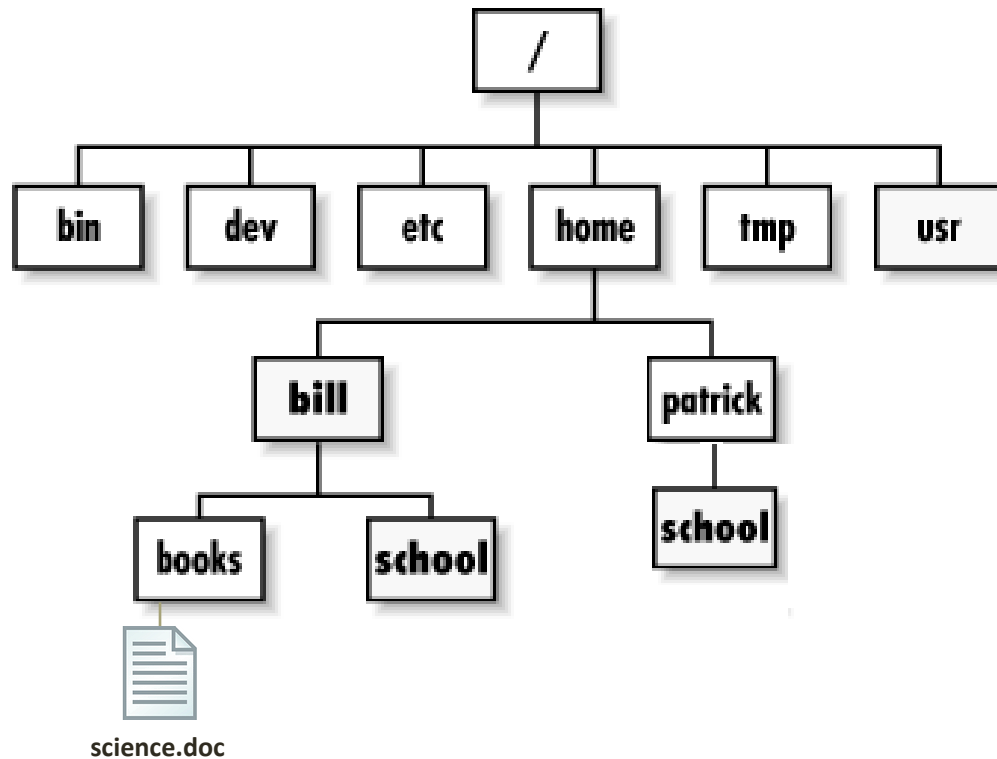
***\$ mkdir ../projects/project1*** (relative path)

***\$ mkdir -p ../projects/project1*** (create intermediate folders if needed)

# Copying Files & Directories (cp Commands)



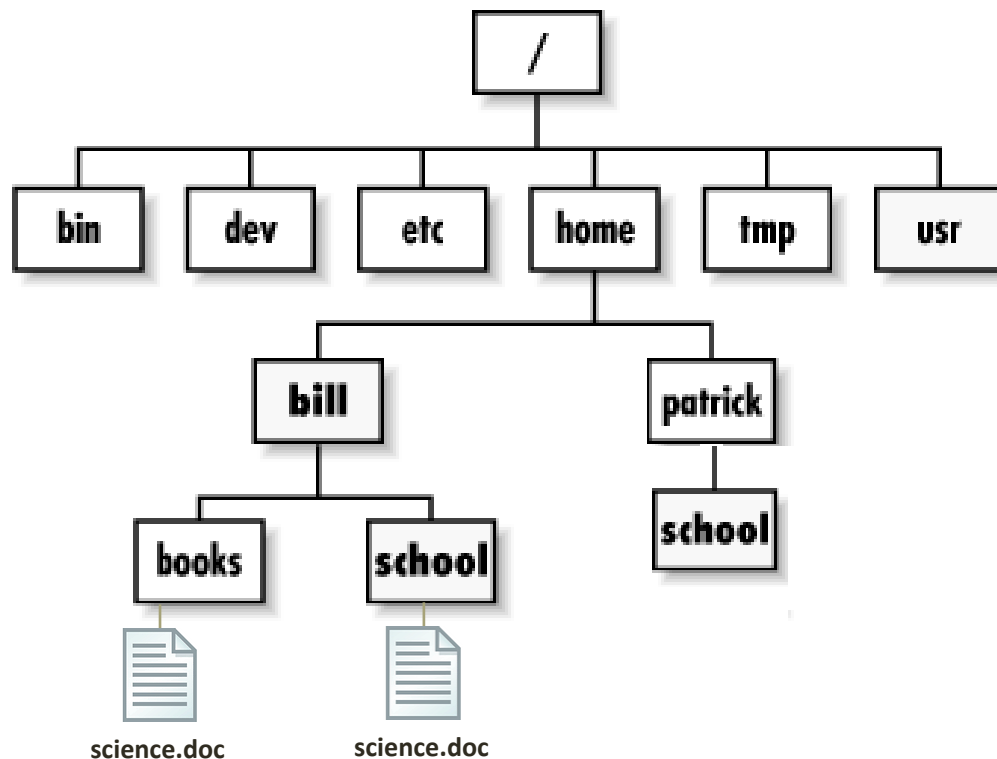
**\$ cp <existing file or dir> <new filename & destination>**



# Copying Files & Directories (cp Commands)



**\$ cp <existing file or dir> <new filename & destination>**



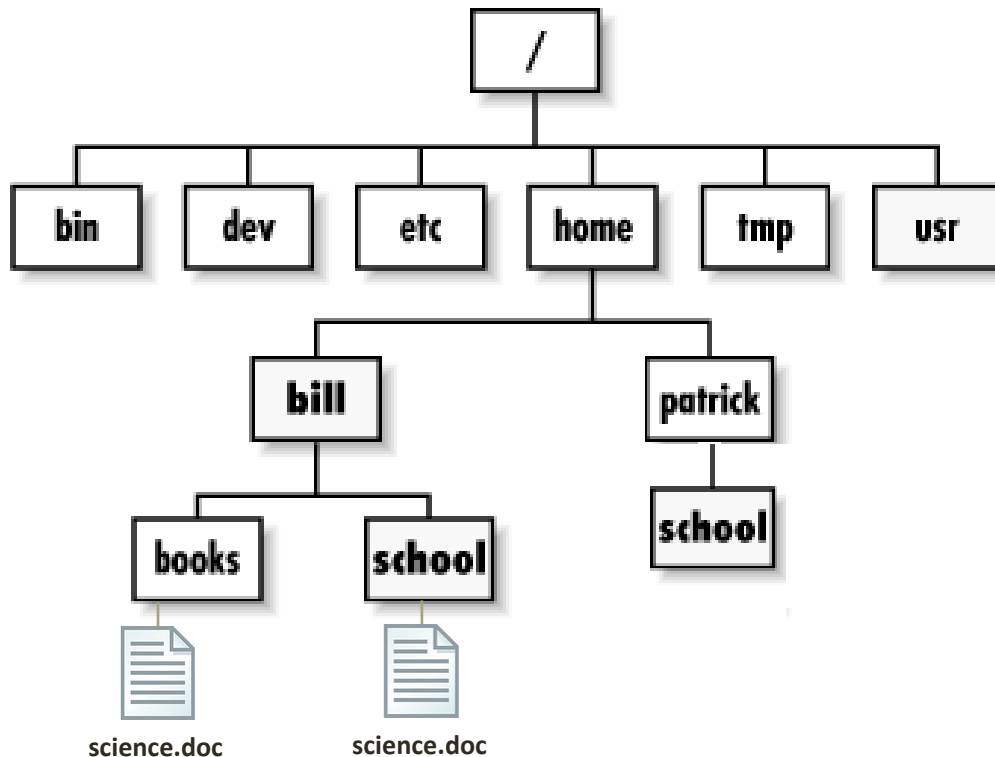
***\$ cp ~/books/science.doc ~/school/science.doc***

***\$ cp ~/books/science.doc ~/school/***

# Copying Files & Directories (cp Commands)



**\$ cp <existing file or dir> <new filename & destination>**



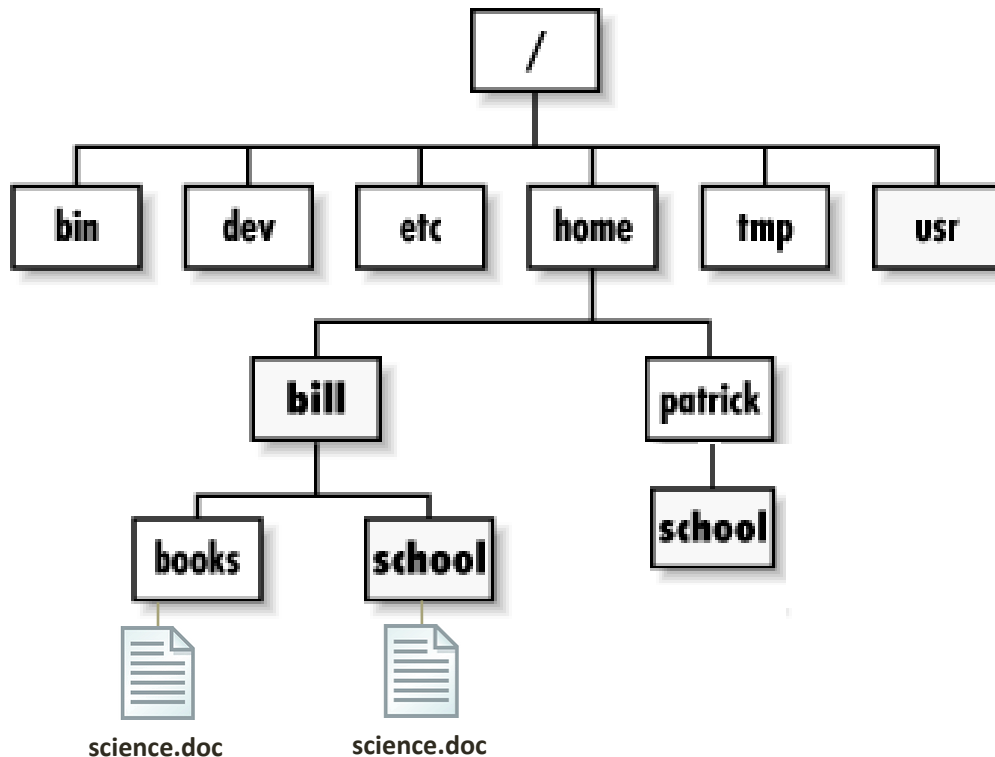
***\$ cp /home/bill/school /home/patrick/*** 



# Copying Files & Directories (cp Commands)



**\$ cp <existing file or dir> <new filename & destination>**



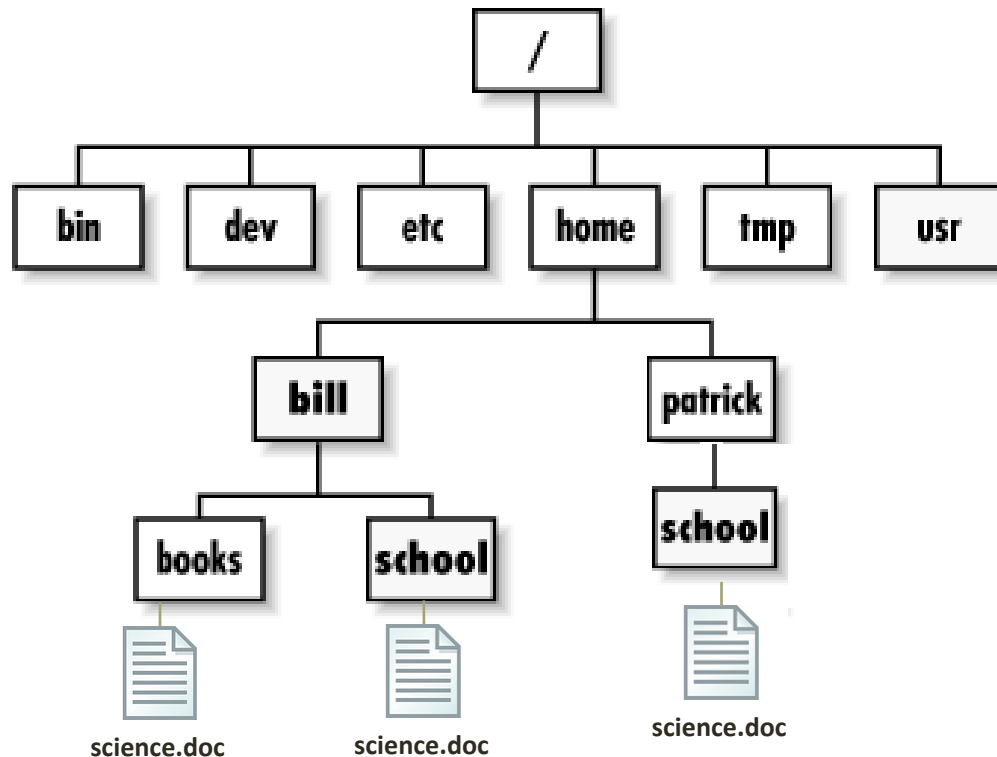
***\$ sudo cp /home/bill/school /home/patrick/***



# Copying Files & Directories (cp Commands)



**\$ cp <existing file or dir> <new filename & destination>**



***\$ sudo cp -r /home/bill/school /home/patrick***

# Copying Files & Directories (cp Commands)



**\$ cp <existing file or dir> <new destination>**

***\$ cp file1 file2*** (copy file1 to a new file file2 same location)

***\$ cp file1 ../projects/*** (copy file1 to the new location)

***\$ cp -r folder1 ../projects/*** (copy the folder with its contents)

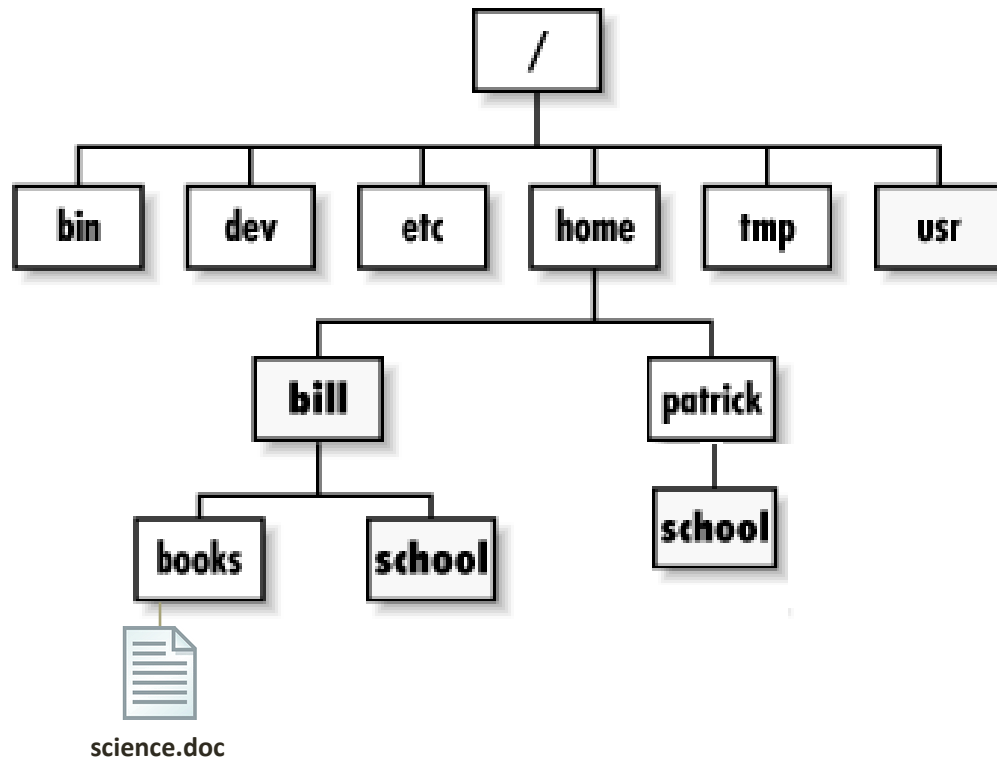
***\$ cp -r folder1 ../projects/folder2*** (copy the folder with new name)

***\$ cp /etc/passwd .*** (copy the file ...to here )

# Moving/Renaming Files & Directories (mv Command)



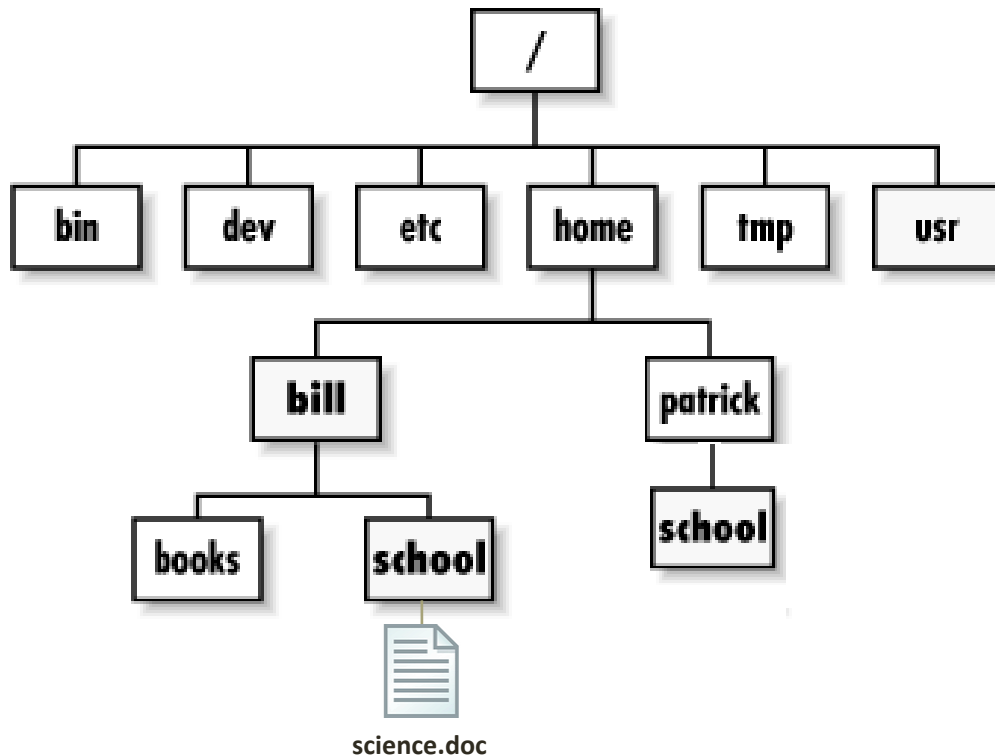
**\$ mv <existing file or dir> <new filename & destination>**



# Moving/Renaming Files & Directories (mv Command)



**\$ mv <existing file or dir> <new filename & destination>**



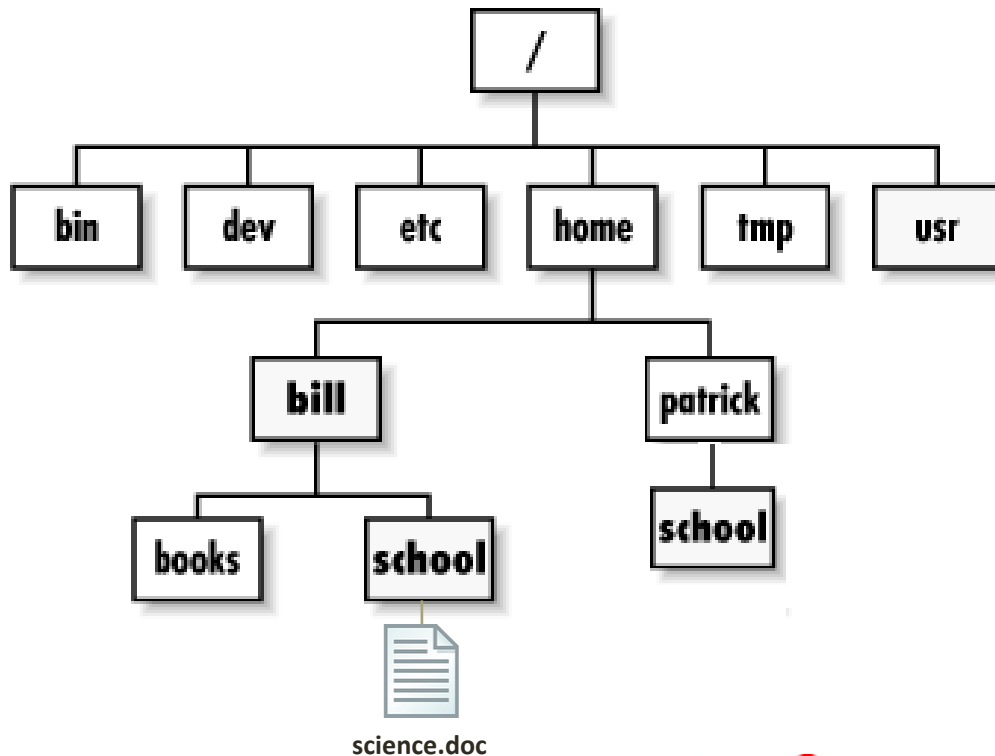
***\$ mv ~/books/science.doc ~/school/science.doc***

***\$ mv ~/books/science.doc ~/school/***

# Moving/Renaming Files & Directories (mv Command)



**\$ mv <existing file or dir> <new filename & destination>**



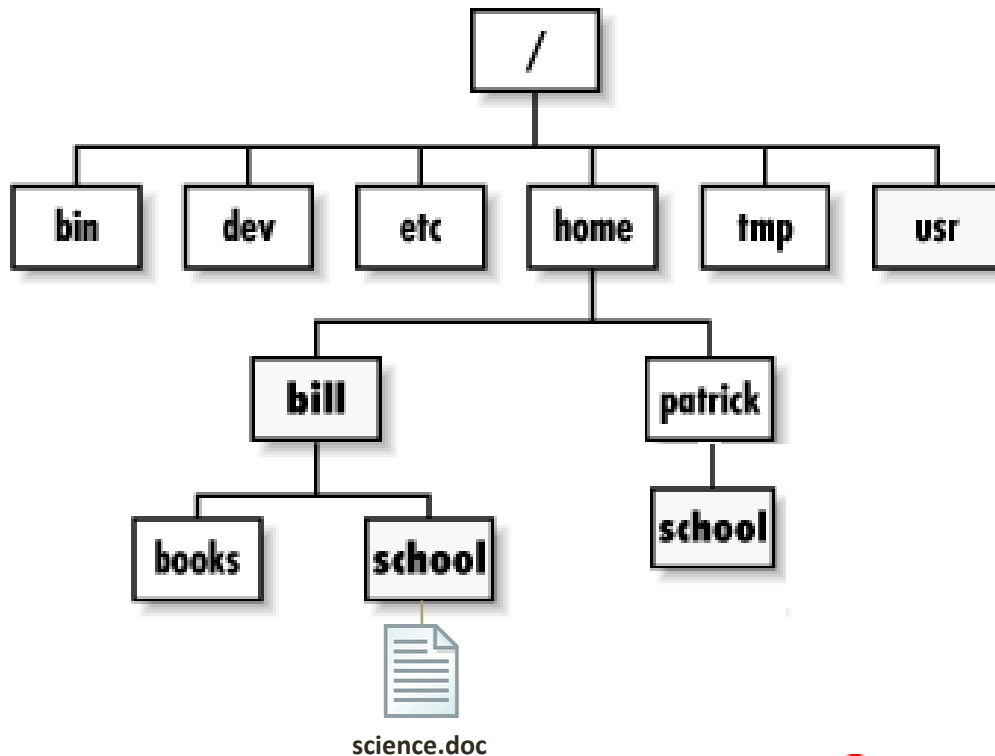
***\$ mv /home/bill/school /home/patrick/***



# Moving/Renaming Files & Directories (mv Command)



**\$ mv <existing file or dir> <new filename & destination>**



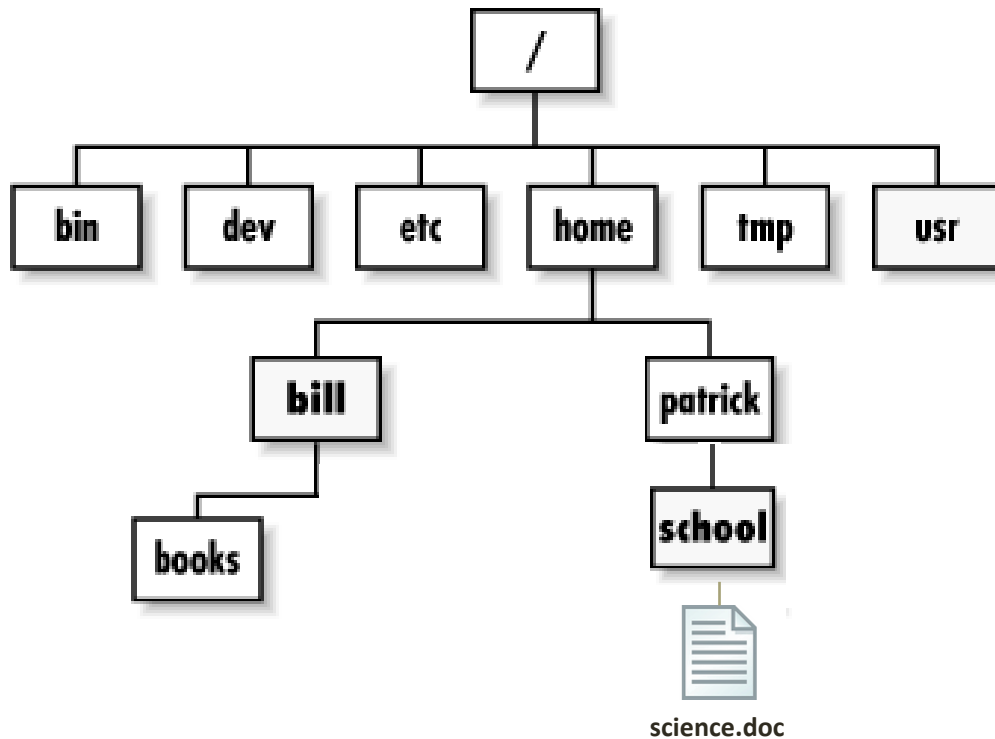
***\$ sudo mv /home/bill/shool /home/patrick/***



# Moving/Renaming Files & Directories (mv Command)



**\$ mv <existing file or dir> <new filename & destination>**



***\$ sudo mv -r /home/bill/school /home/patrick***



# Moving/Renaming Files & Directories (mv Command)



**\$ mv <existing file or dir> <new destination>**

***\$ mv file1 file2***

(rename file1 to file2)

***\$ mv file1 ../projects/***

(move file1 to the new location)

***\$ mv -r folder1 ../projects/***

(move the folder with its contents)

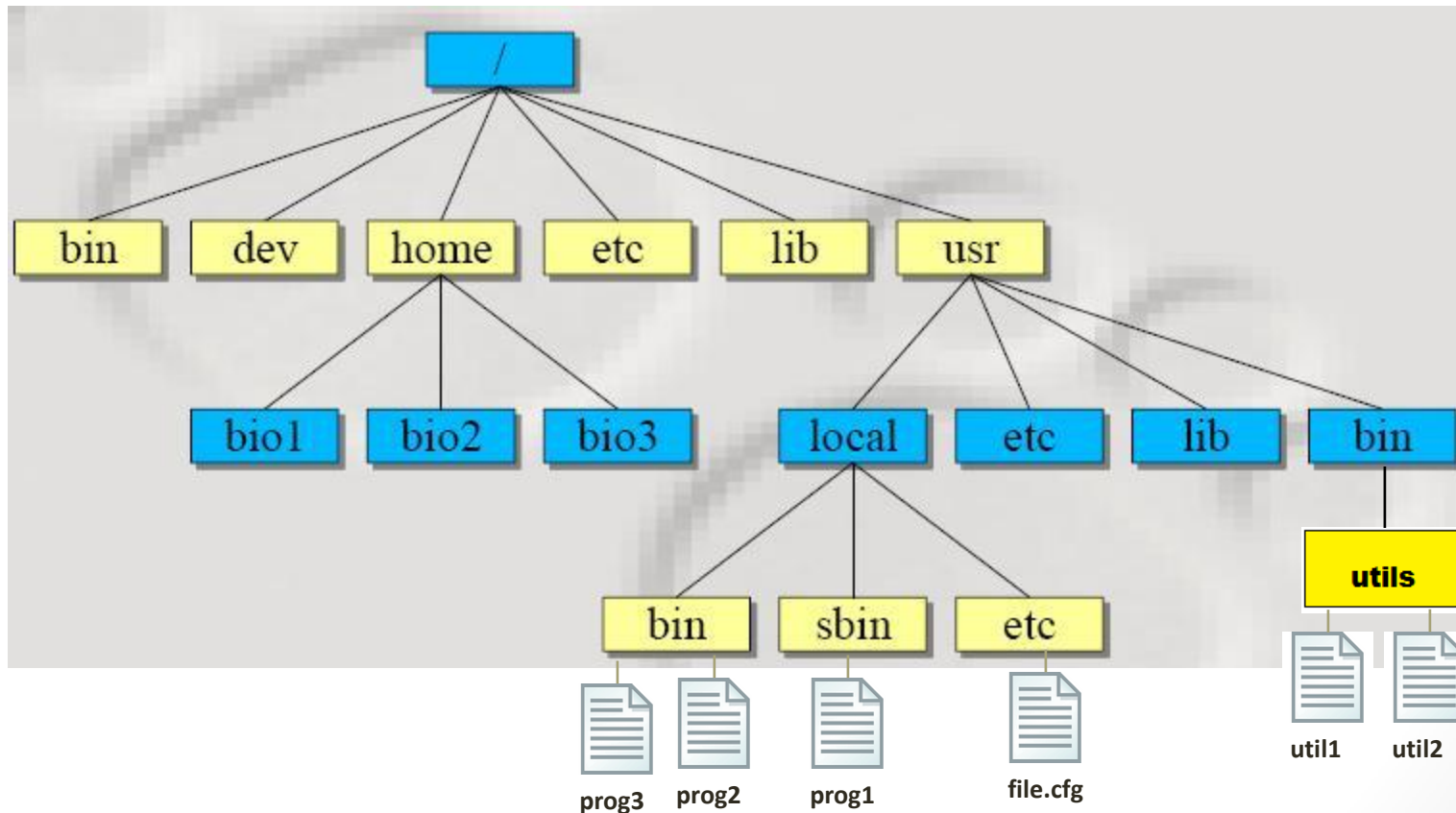
***\$ mv -r folder1 ../projects/folder2***

(move with new name)

# Removing files and Directories (rm Command)



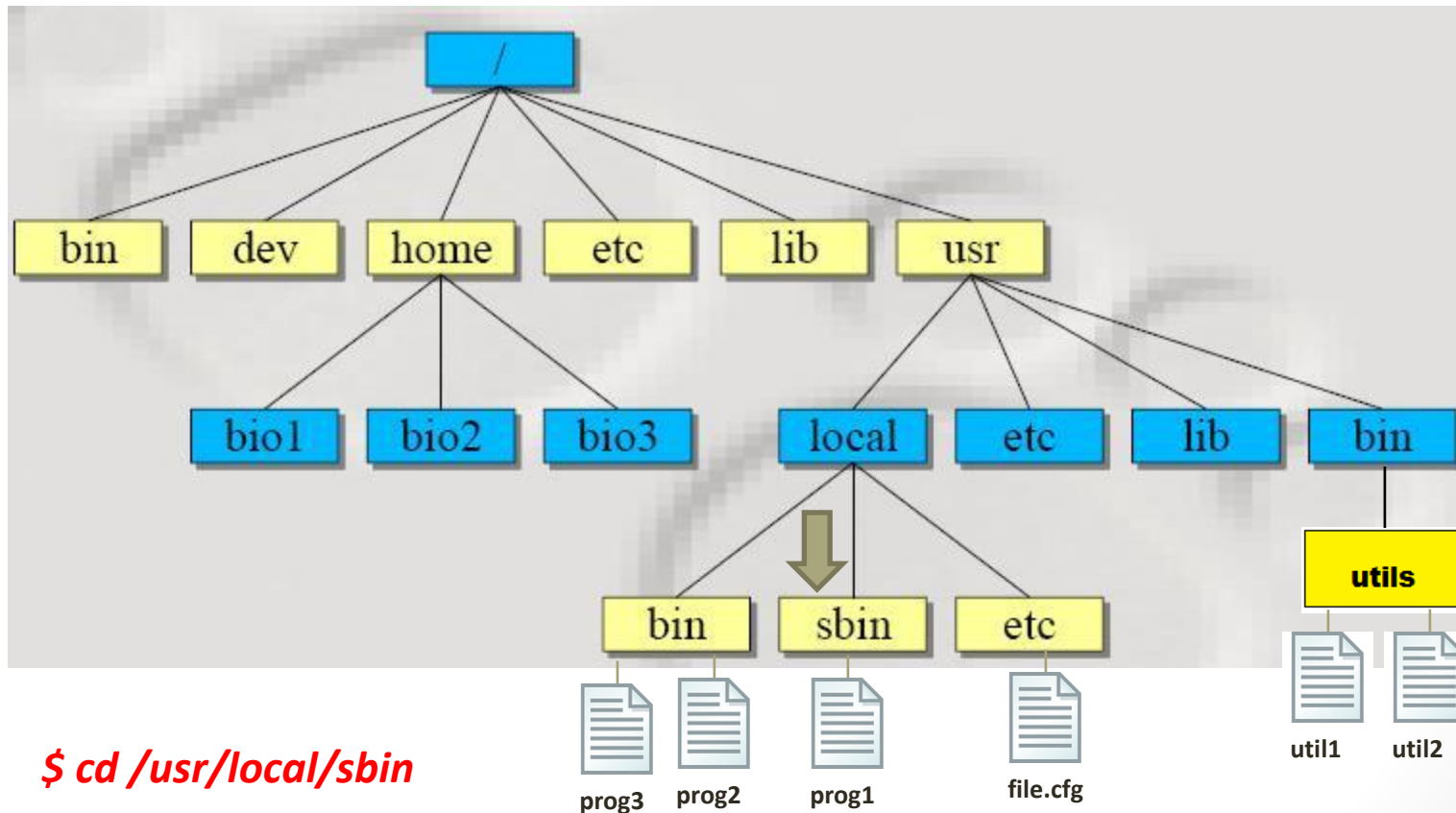
**\$ rm [options] <file or dir list>**



# Removing files and Directories (rm Command)



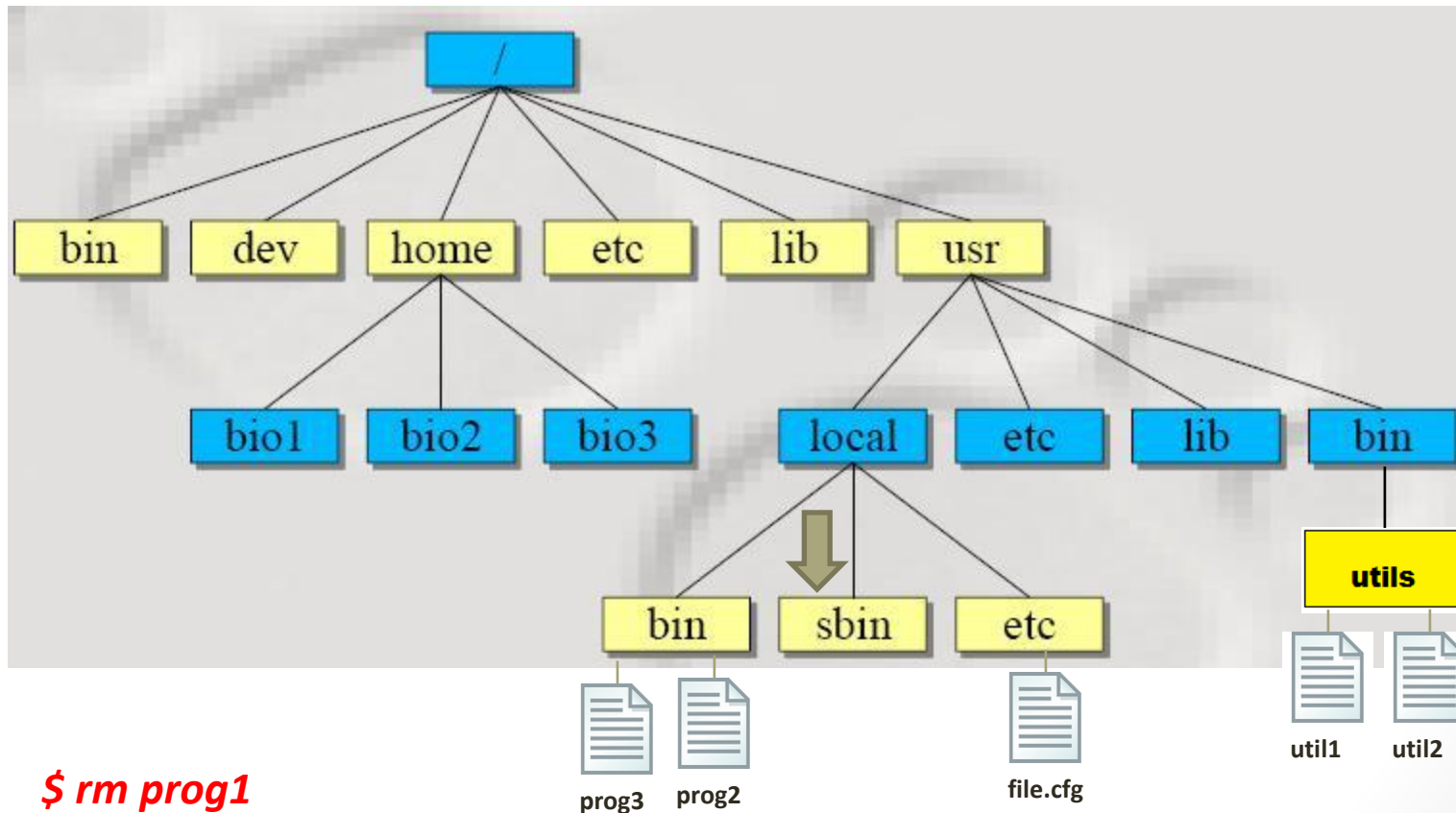
**\$ rm [options] <file or dir list>**



# Removing files and Directories (rm Command)



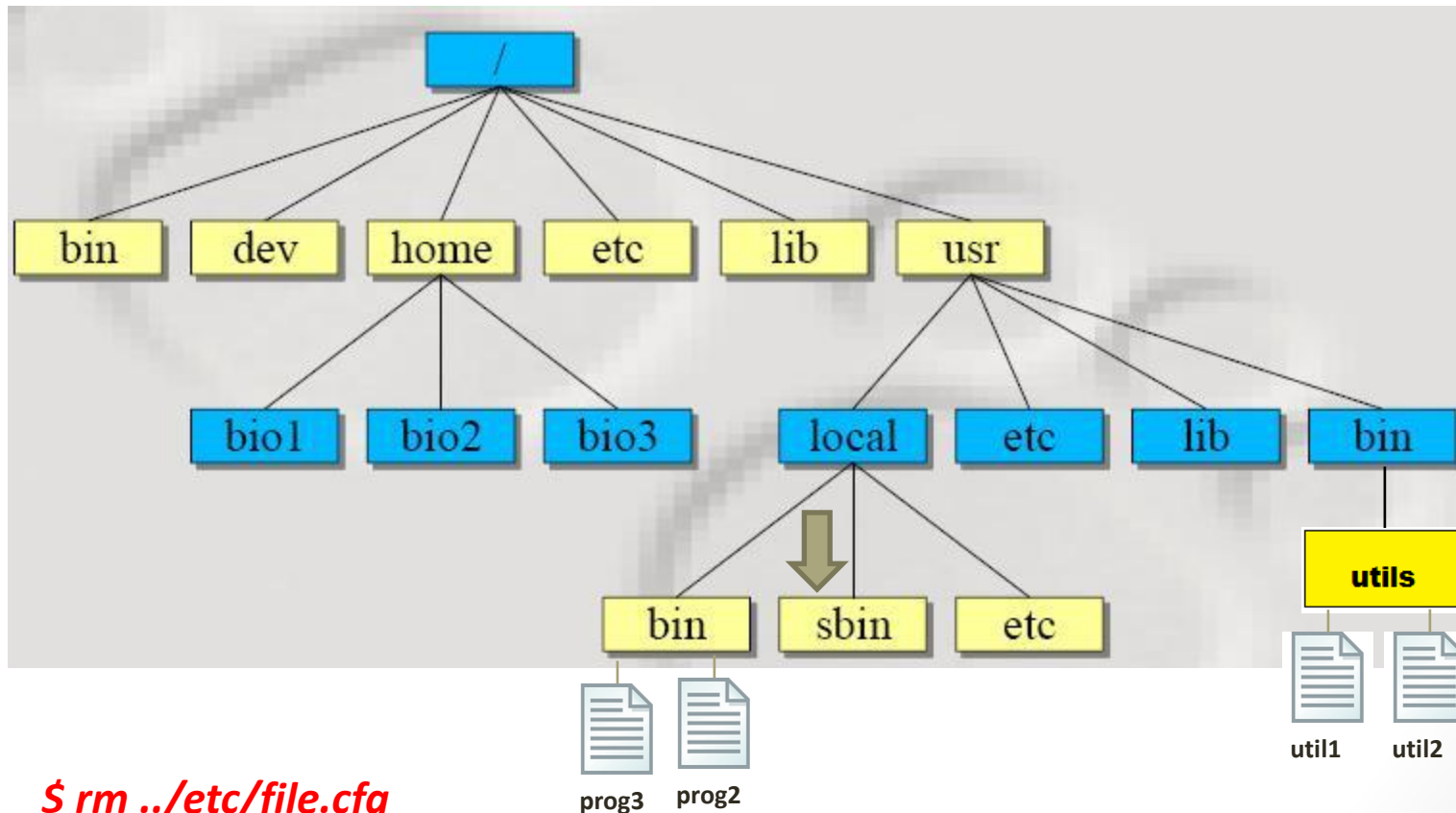
**\$ rm [options] <file or dir list>**



# Removing files and Directories (rm Command)



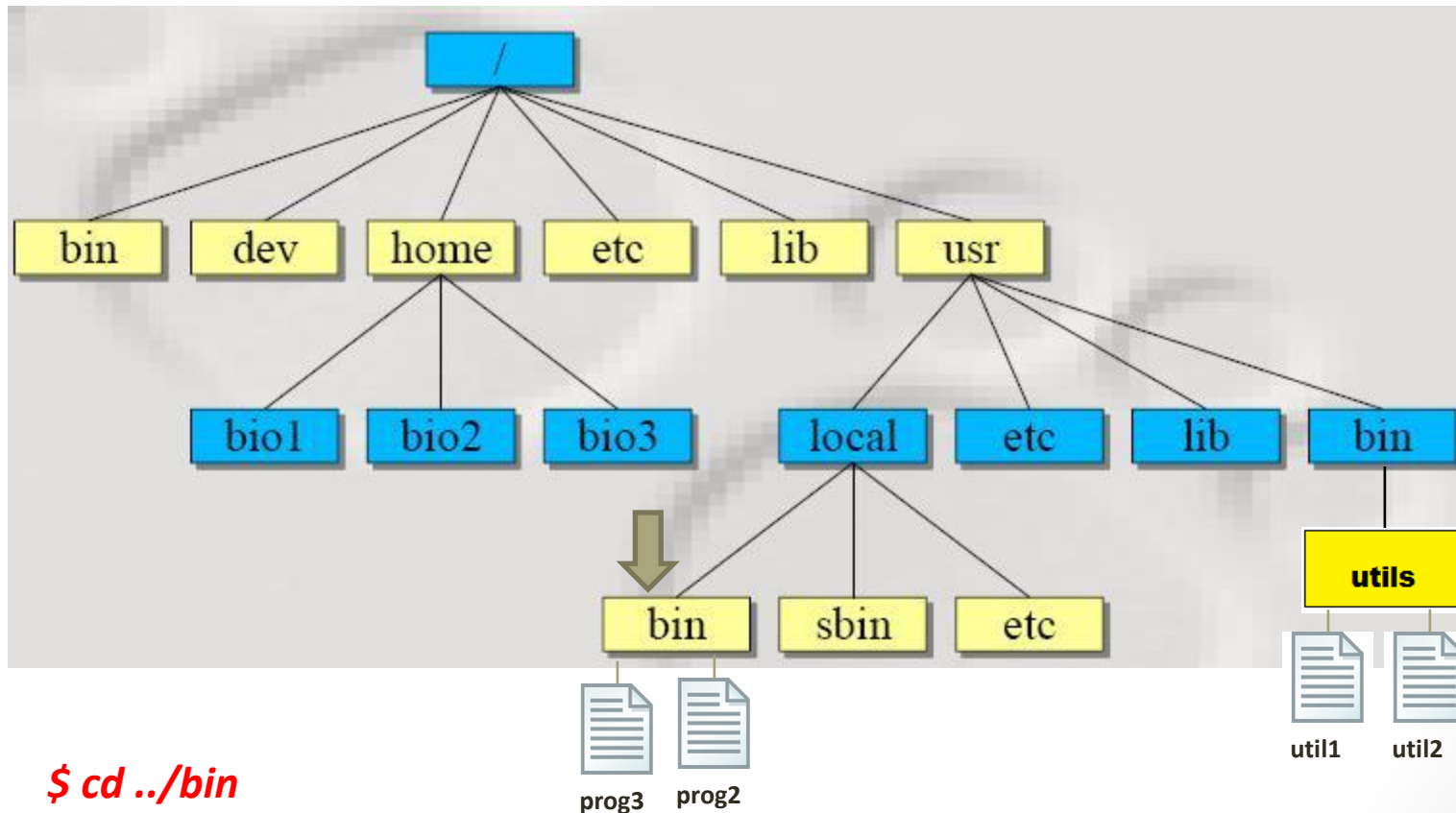
**\$ rm [options] <file or dir list>**



# Removing files and Directories (rm Command)



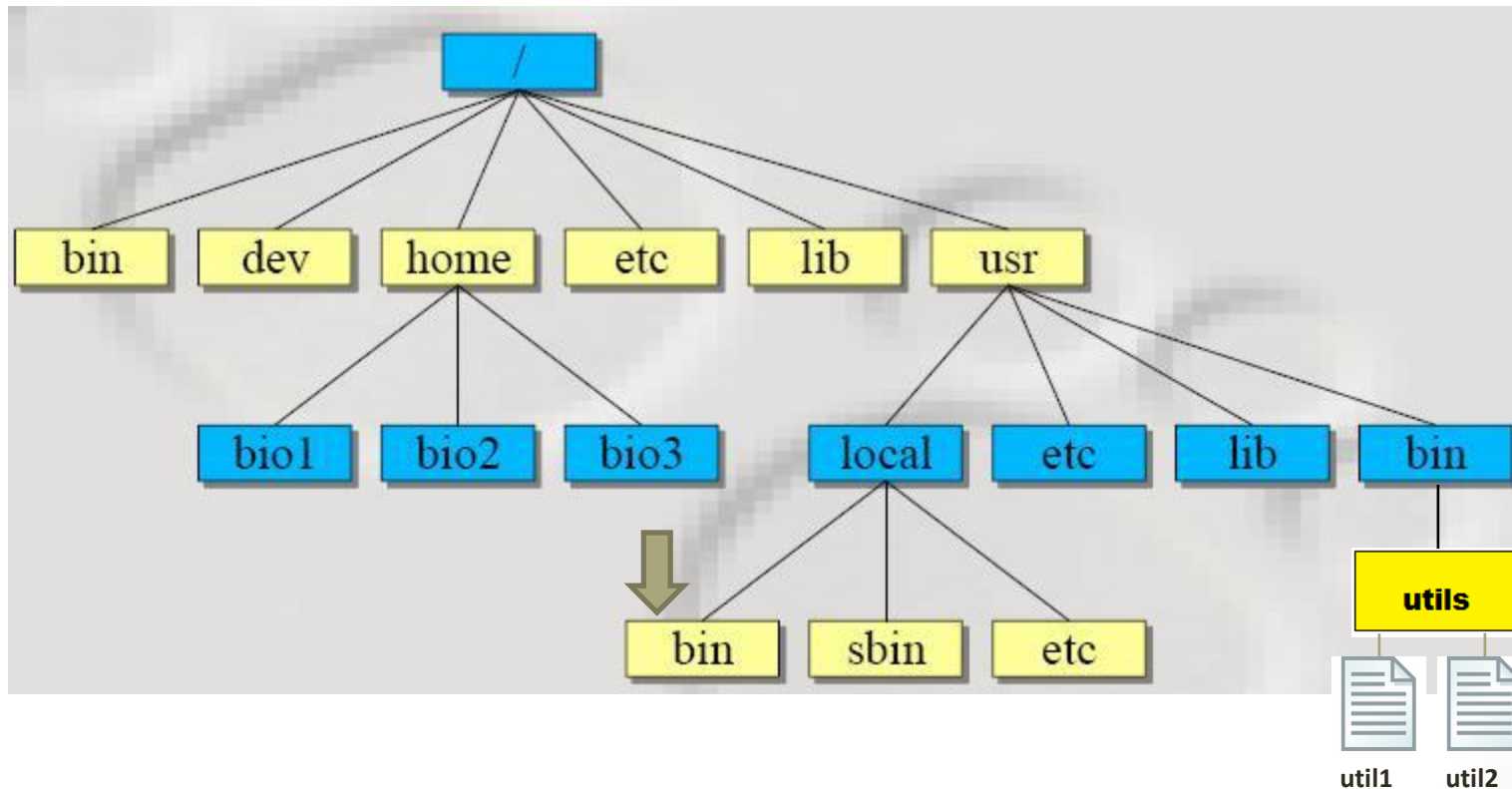
**\$ rm [options] <file or dir list>**



# Removing files and Directories (rm Command)



**\$ rm [options] <file or dir list>**



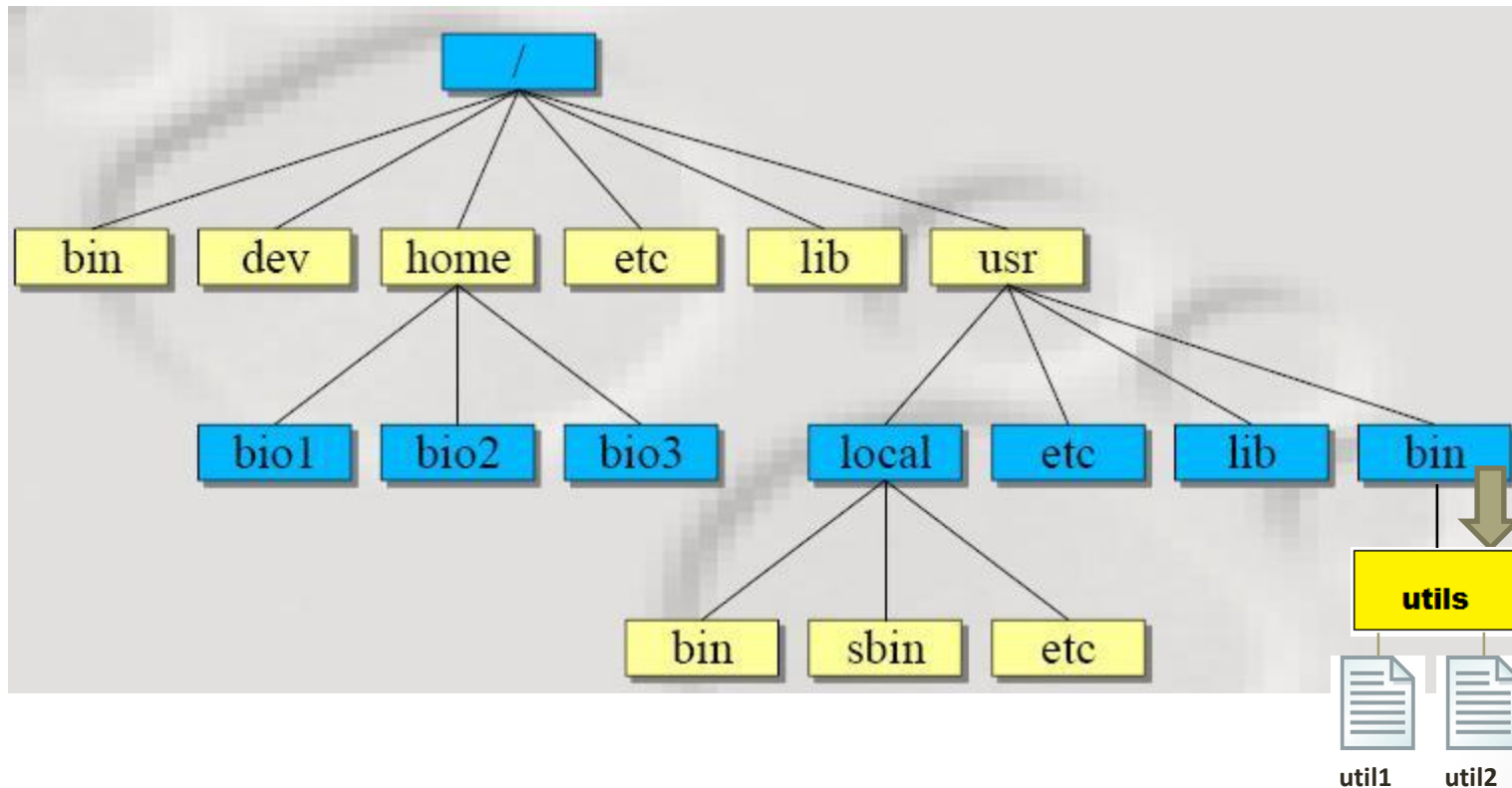
***\$ rm prog3 prog2***



# Removing files and Directories (rm Command)



**\$ rm [options] <file or dir list>**



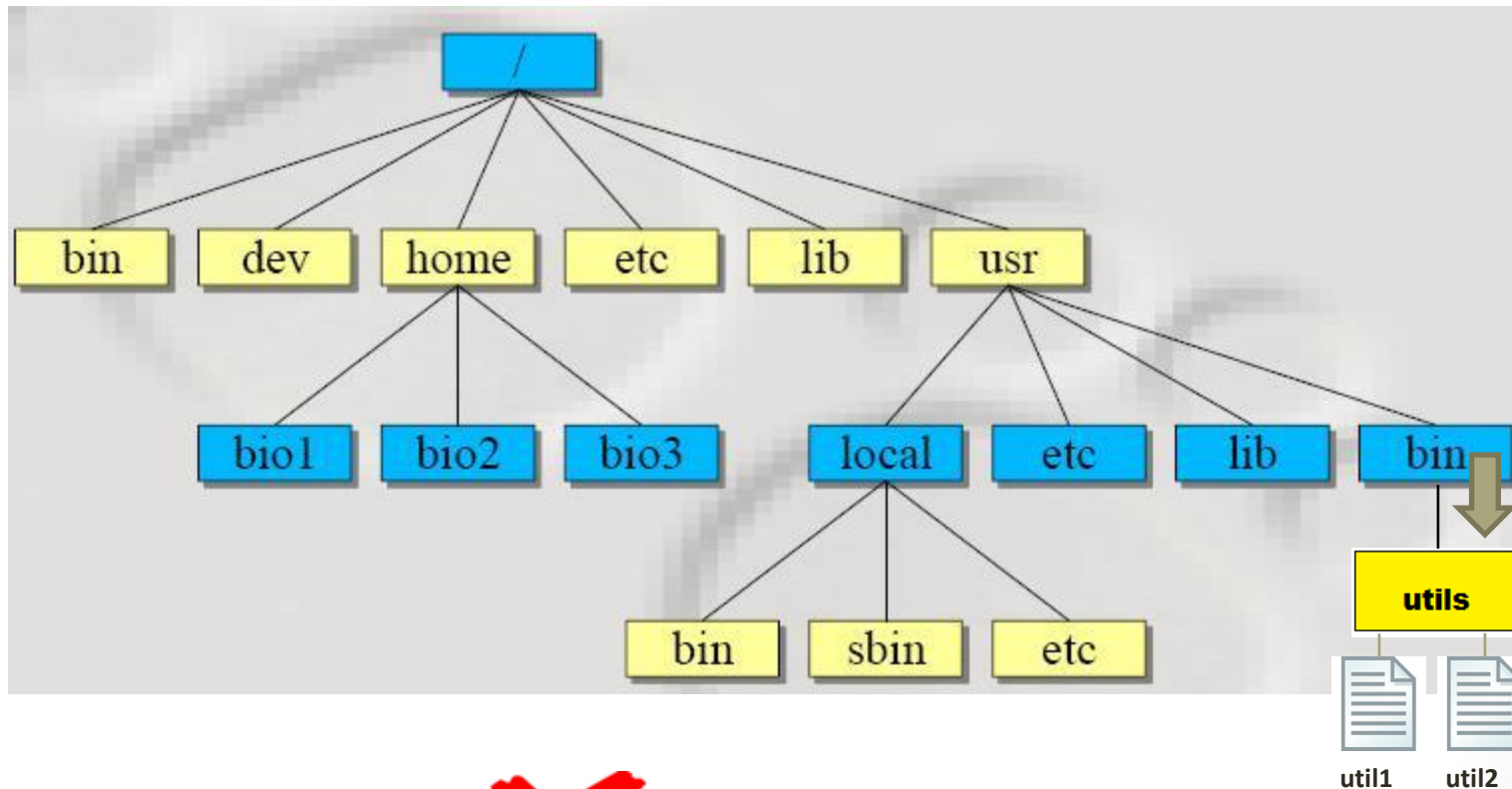
***\$ cd /usr/bin/utils***



# Removing files and Directories (rm Command)



**\$ rm [options] <file or dir list>**



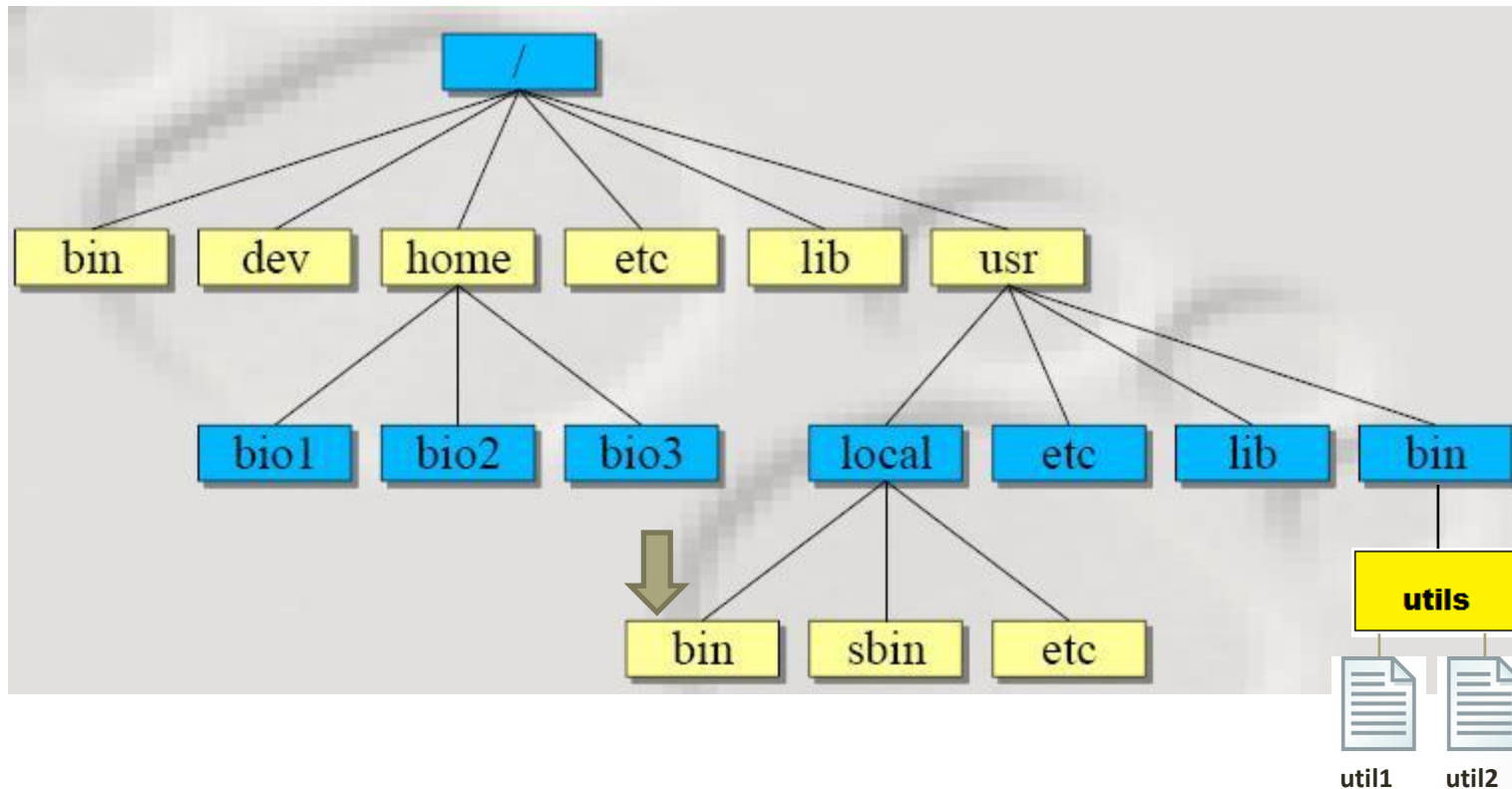
***\$ rm -r /usr/bin/utils***



# Removing files and Directories (rm Command)



**\$ rm [options] <file or dir list>**

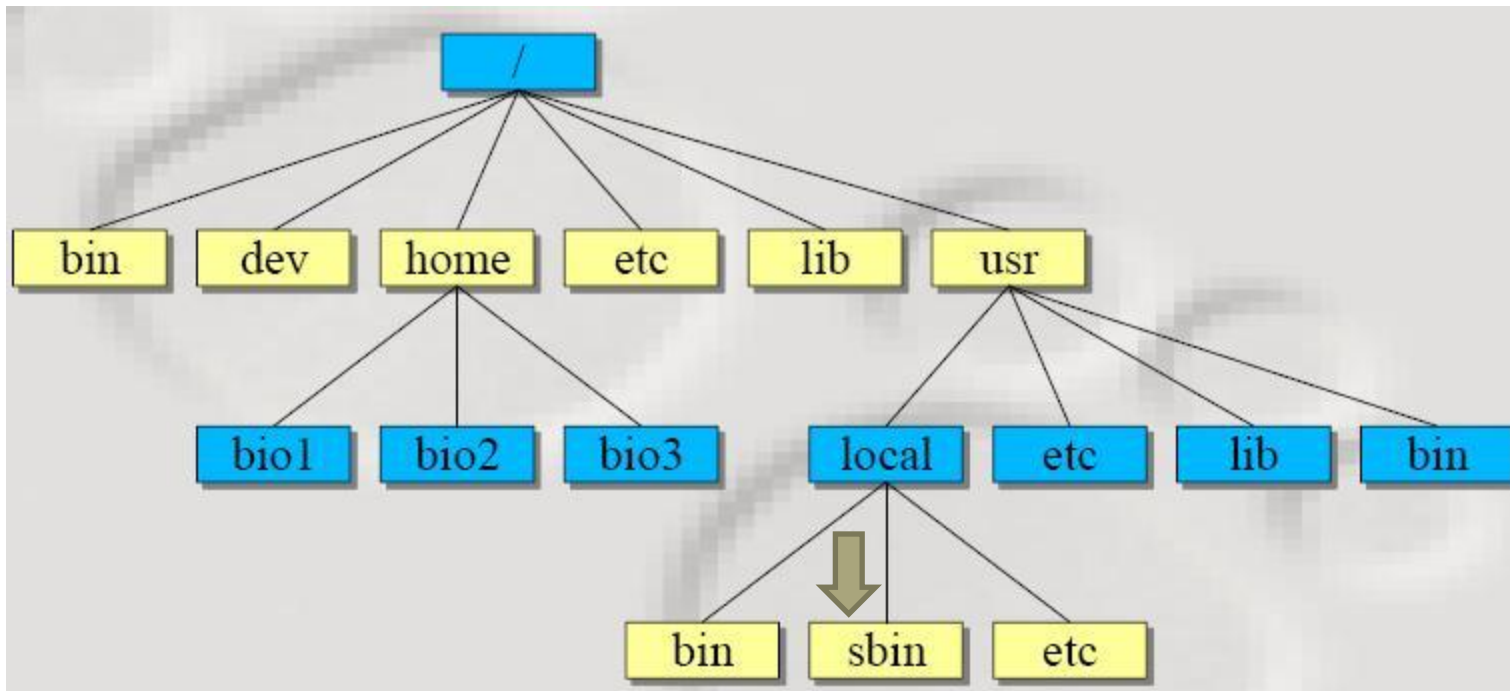


**\$ cd -**

# Removing files and Directories (rm Command)



**\$ rm [options] <file or dir list>**



***\$ rm -r /usr/bin/utls***

# Removing files and Directories (rm Command)



**\$ rm [options] <file or dir list>**

***\$ rm file1 file2*** (remove file1 and file2)

***\$ rm -r ../projects/folder1*** (remove the folder with its content)

***\$ rm -i file1 file2*** (interactive, ask me before you remove)

***\$ rm -f ../projects/folder1*** (force, force remove)

- Note
  - To remove directories you need always to use '-r'
  - You can not remove your current directory (or any of its parents)



# Linux 4

## Embedded Systems

<http://Linux4EmbeddedSystems.com>