



Linux For Embedded Systems

For Arabs

Course 102: Understanding Linux

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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
.dmrcc     Pictures
.dmrcc     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)

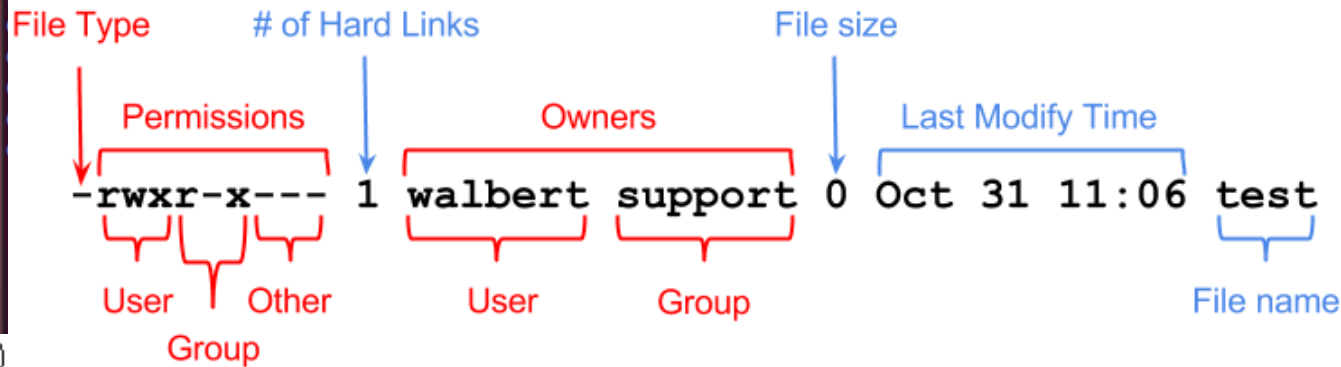
```
robb@ubuntu: ~  
robb@ubuntu:~$ ls -l  
total 40  
drwxr-xr-x 2 robb robb 4096 2011-10-04 22:25 Desktop  
drwxr-xr-x 3 robb robb 4096 2011-05-14 15:57 Documents  
drwxr-xr-x 3 robb robb 4096 2011-10-03 19:34 Downloads  
-rw-r--r-- 1 robb robb 179 2011-05-12 09:11 examples.desktop  
drwxr-xr-x 4 robb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

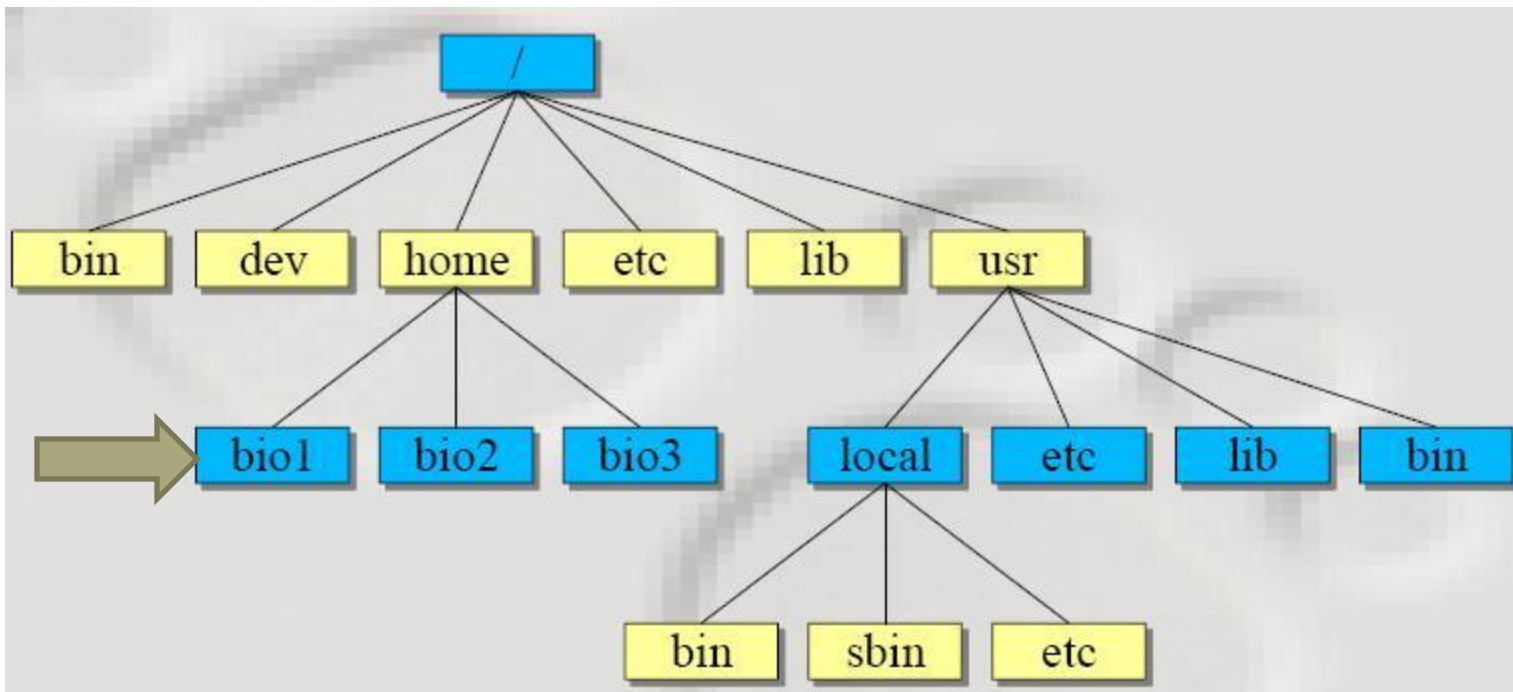
\$ pwd (Display Current Directory)

```
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]



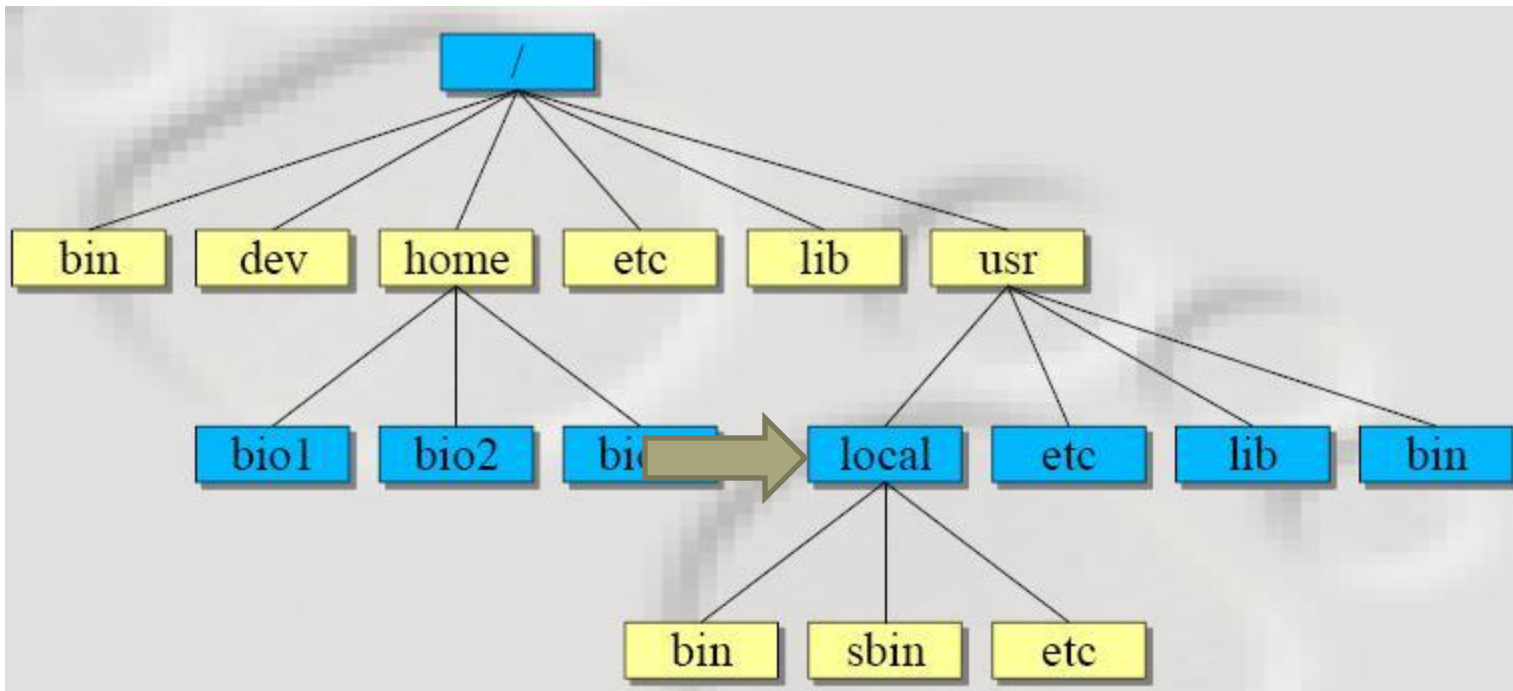
\$ pwd

/home/bio1/

Moving Around (cd Command)



\$ cd [destination]

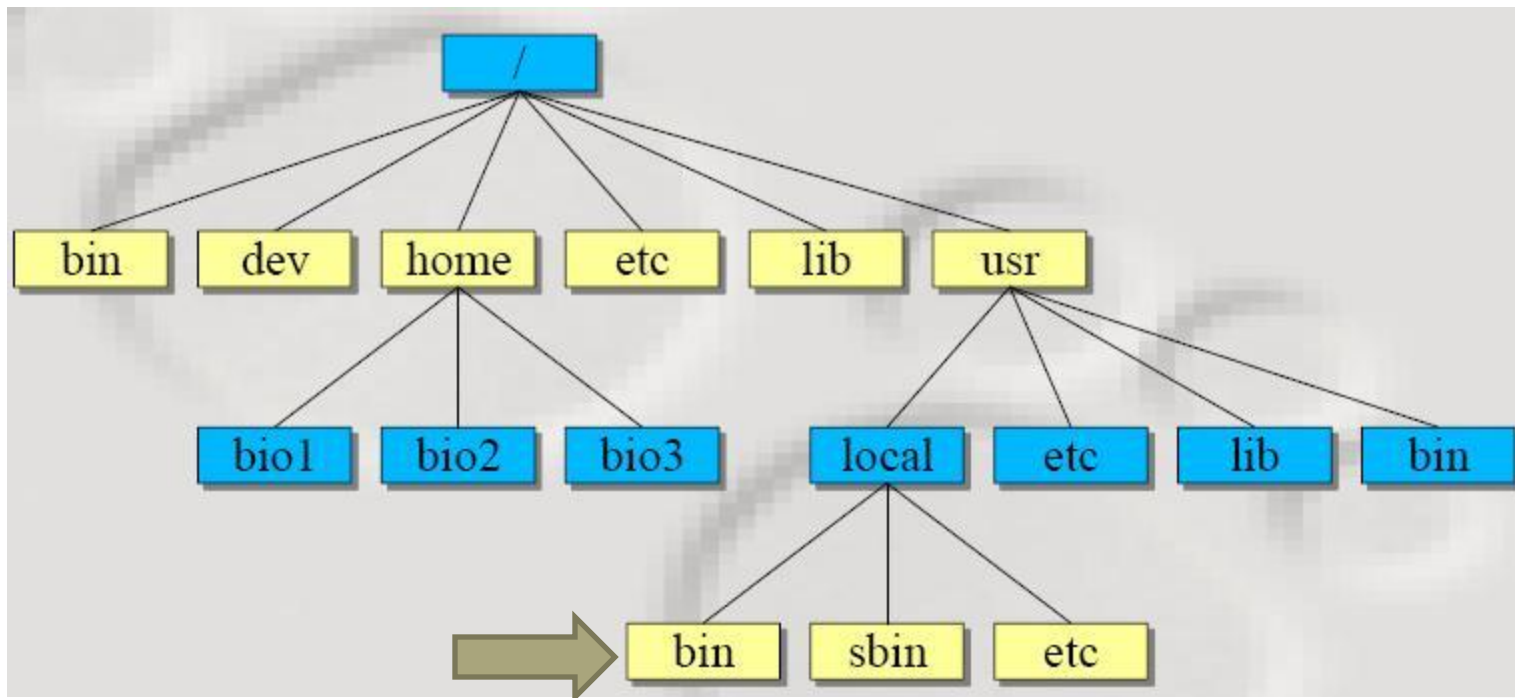


\$ cd /usr/local

Moving Around (cd Command)



\$ cd [destination]



\$ cd /usr/local/bin

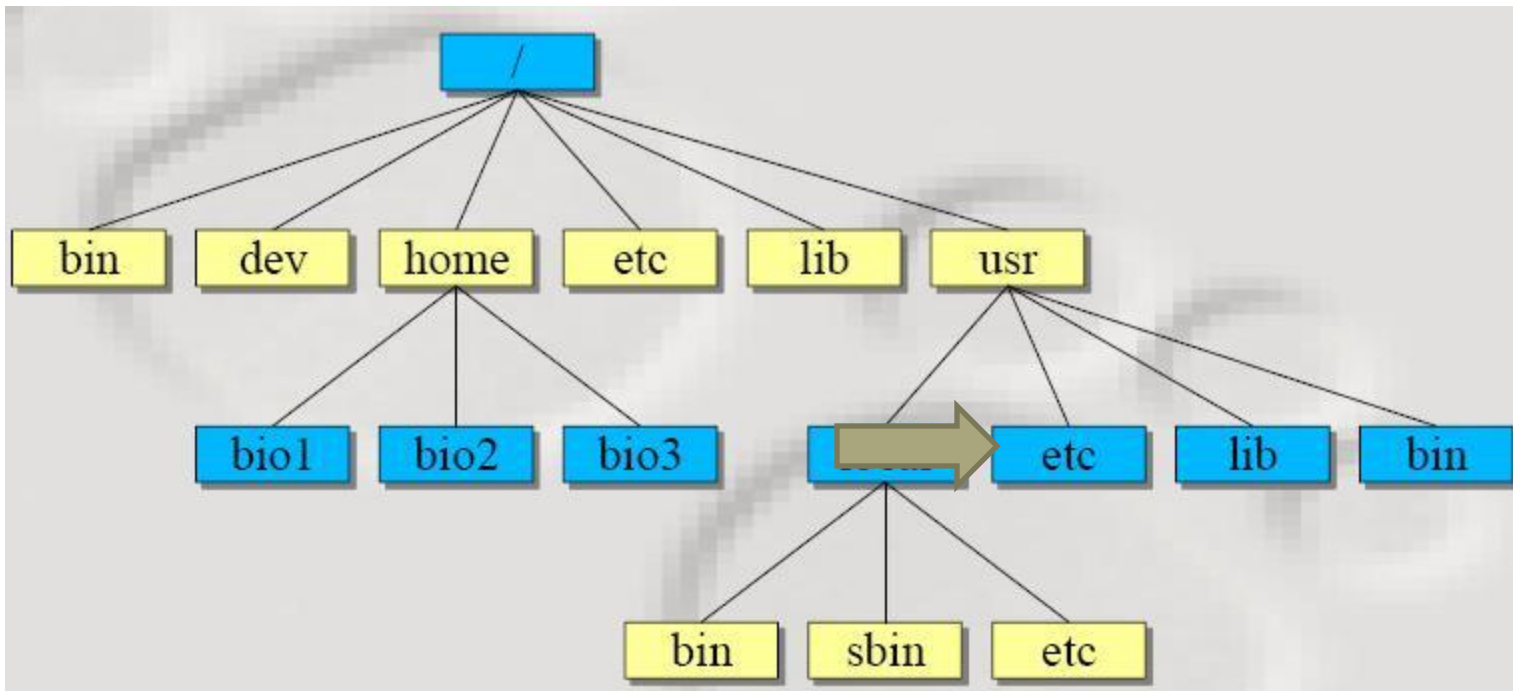
\$ cd ./bin

\$ cd bin

Moving Around (cd Command)



\$ cd [destination]



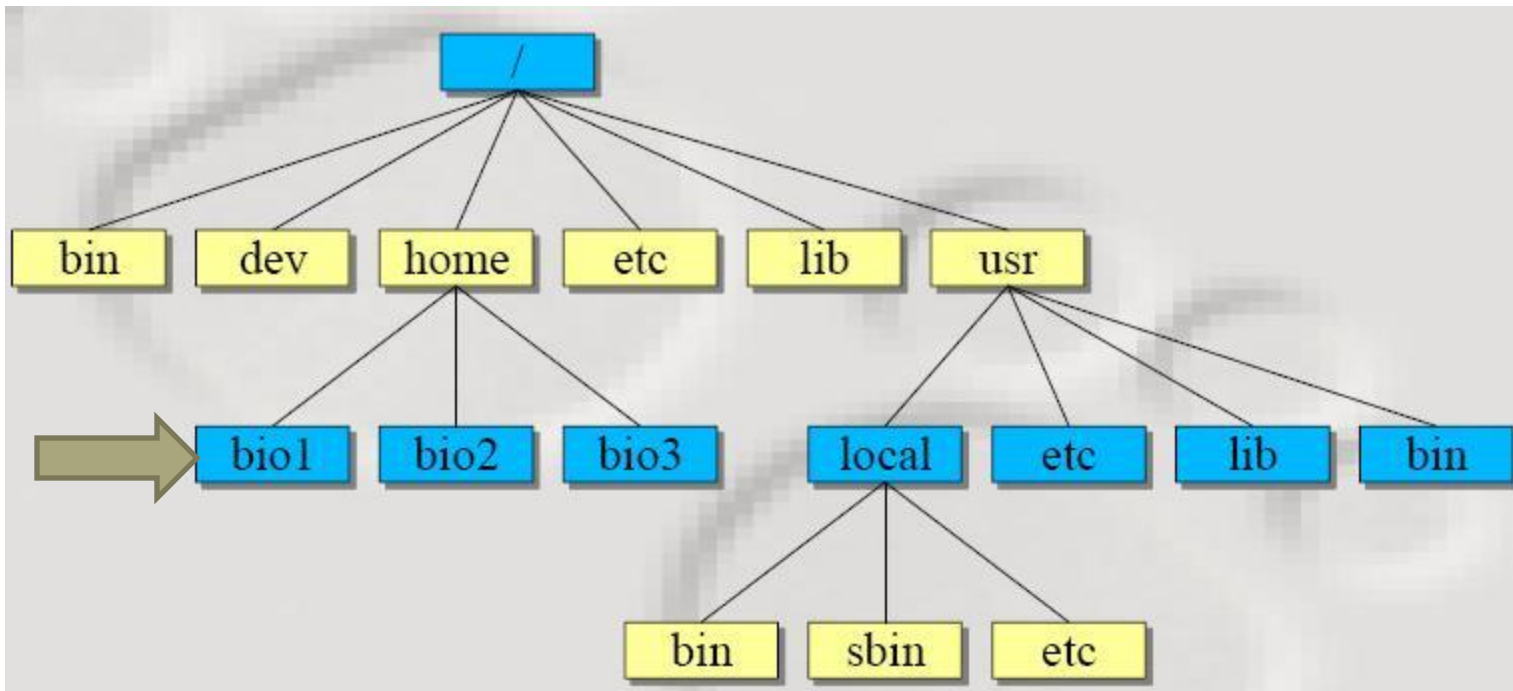
\$ cd /usr/etc

\$ cd ../../etc

Moving Around (cd Command)



\$ cd [destination]



\$ cd ~

\$ cd

Moving Around (cd Command)



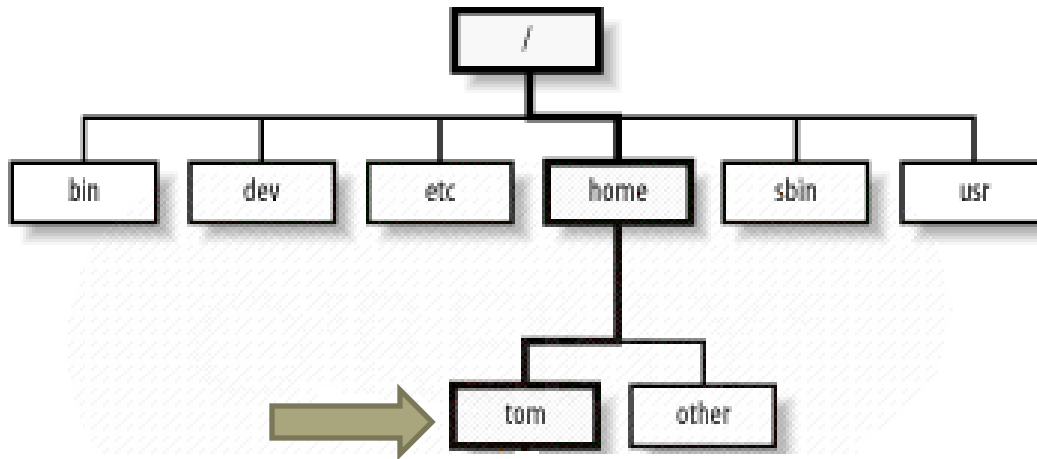
\$ cd [destination]

- \$ 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)



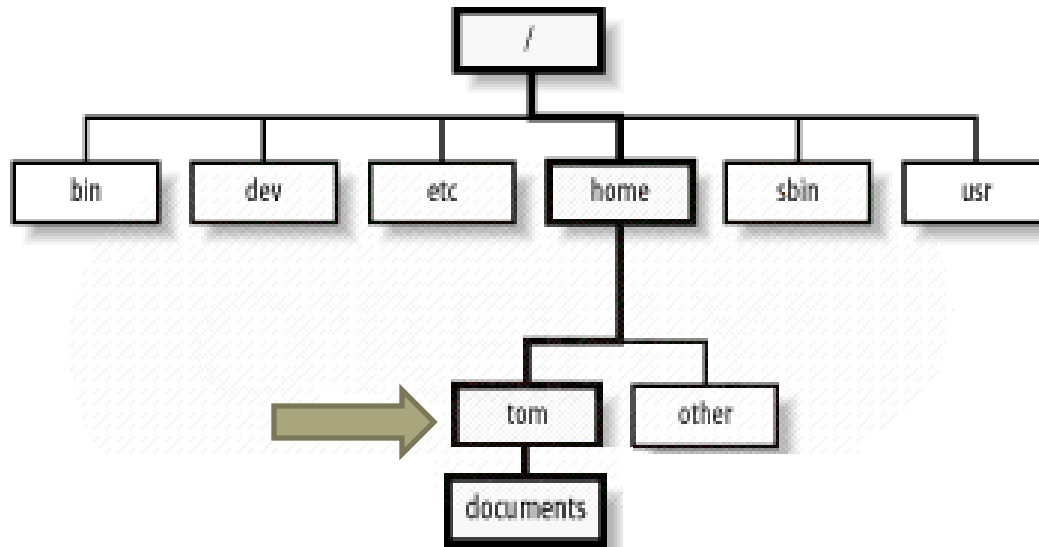
\$ mkdir <new directory name with path>



Making New Directories (mkdir Command)



\$ mkdir <new directory name with path>



\$ mkdir documents

\$ mkdir ./documents

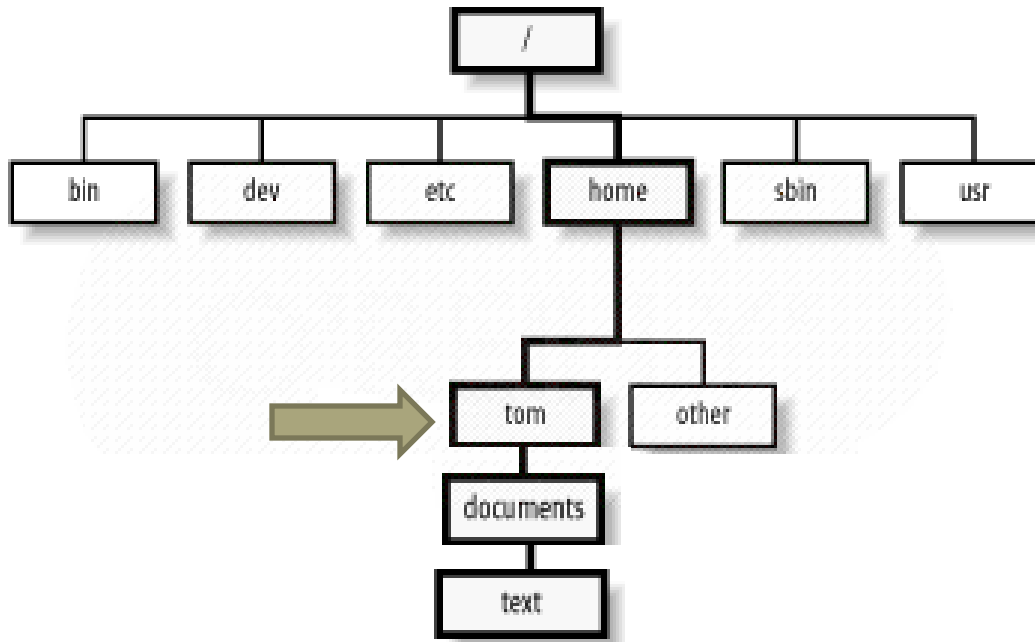
\$ mkdir /home/tom/documents

\$ mkdir ~/documents

Making New Directories (mkdir Command)



\$ mkdir <new directory name with path>

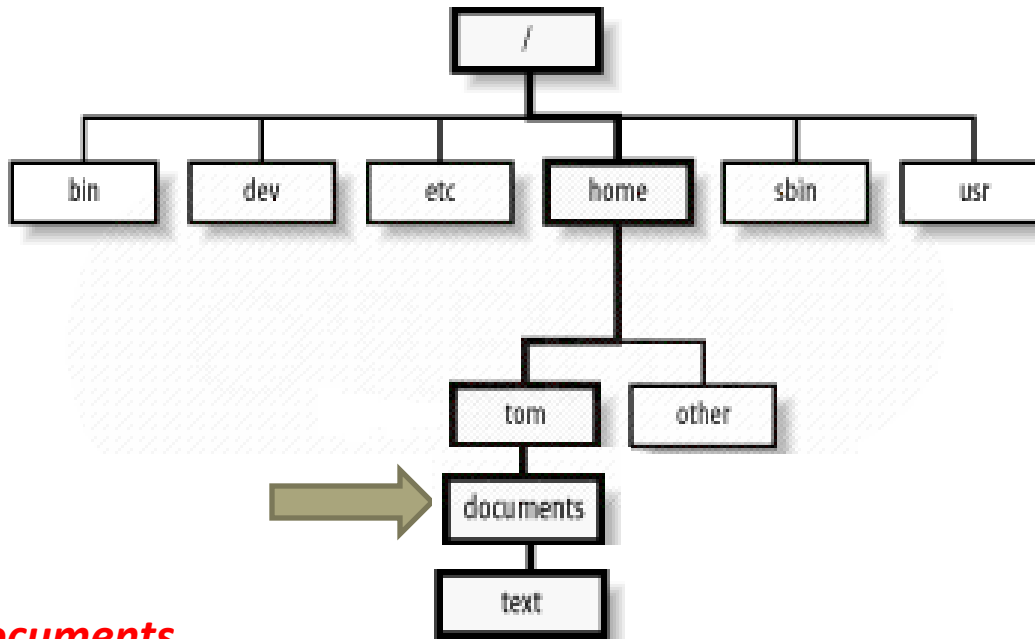


\$ mkdir documents/text

Making New Directories (mkdir Command)



\$ mkdir <new directory name with path>

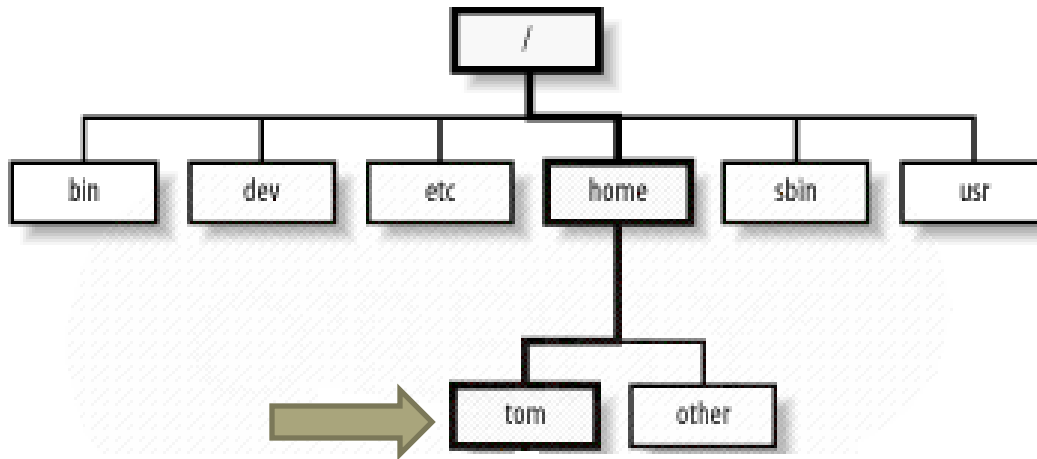


\$ cd documents
\$ mkdir text

Making New Directories (mkdir Command)



\$ mkdir <new directory name with path>

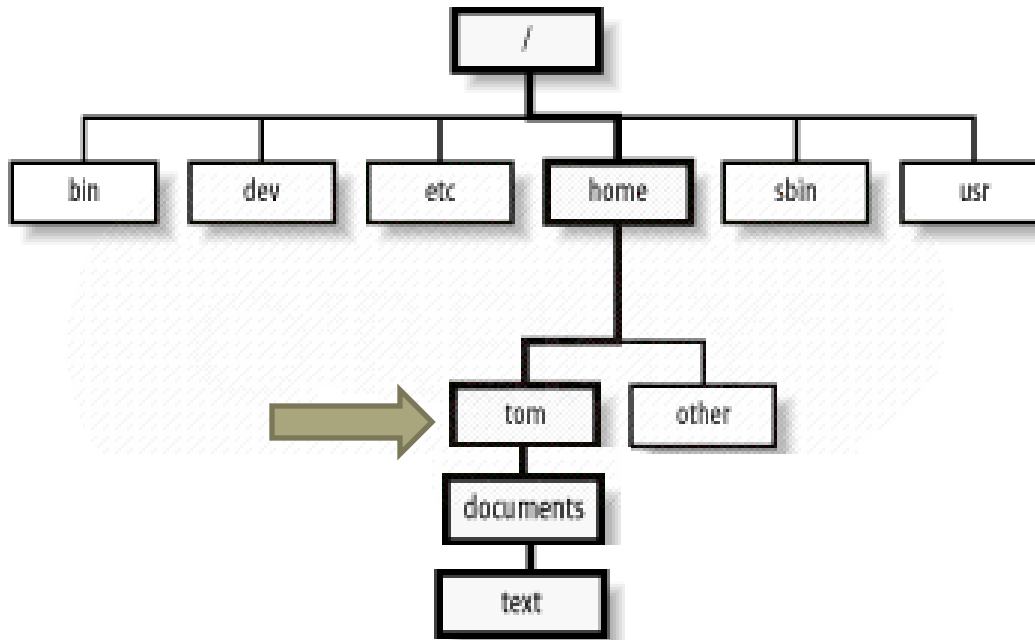


\$ mkdir documents/text **X**

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)

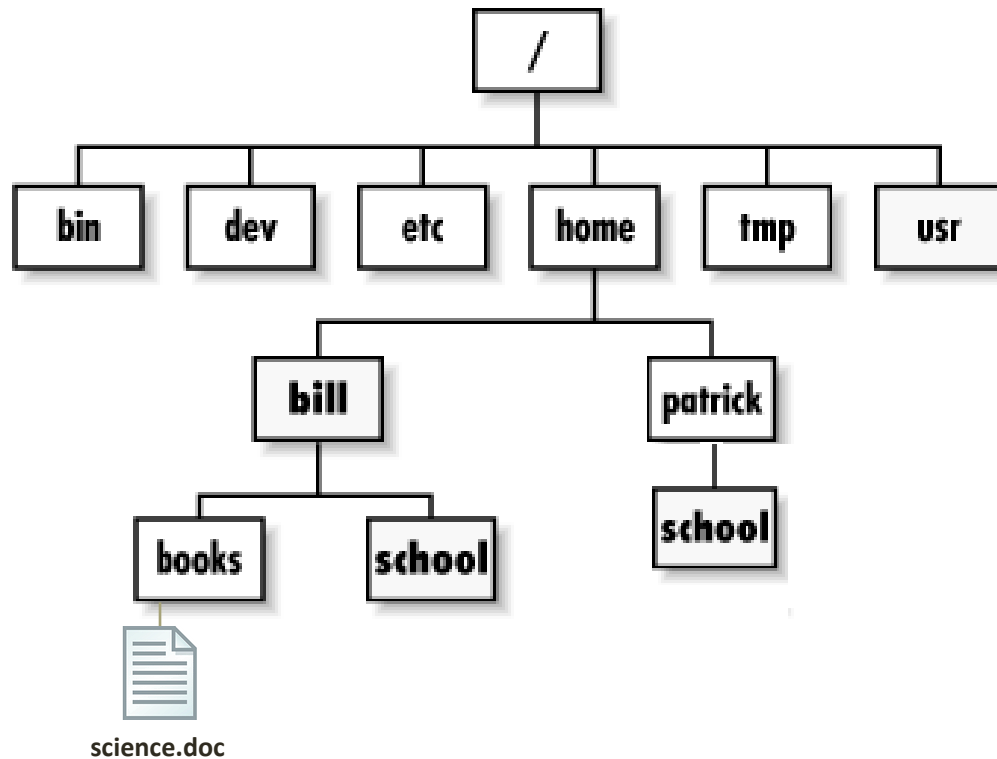
\$ mkdir ../projects/project1 (relative path)

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

Copying Files & Directories (cp Commands)



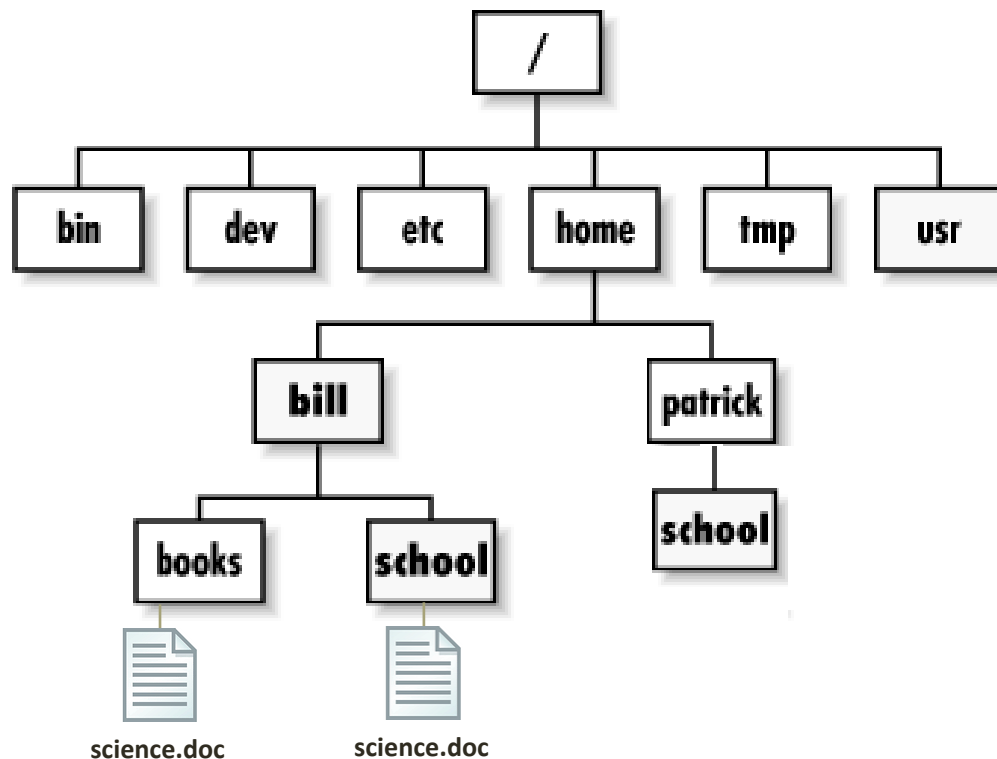
\$ cp <existing file or dir> <new filename & destination>



Copying Files & Directories (cp Commands)



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



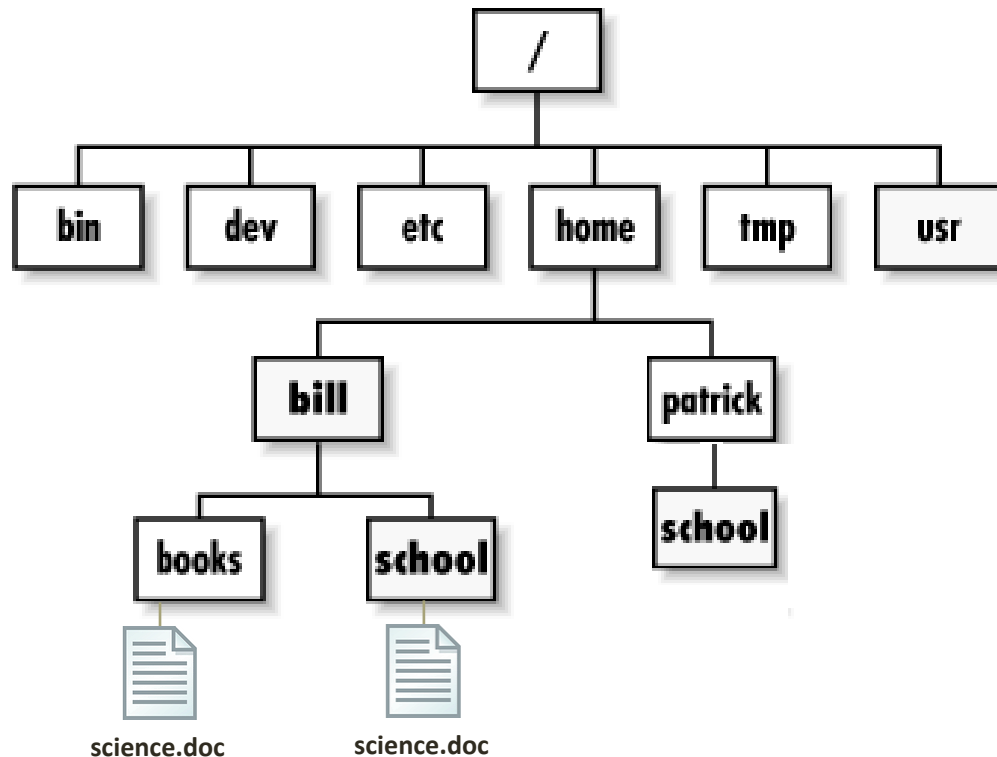
\$ cp ~/books/science.doc ~/school/science.doc

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

Copying Files & Directories (cp Commands)



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

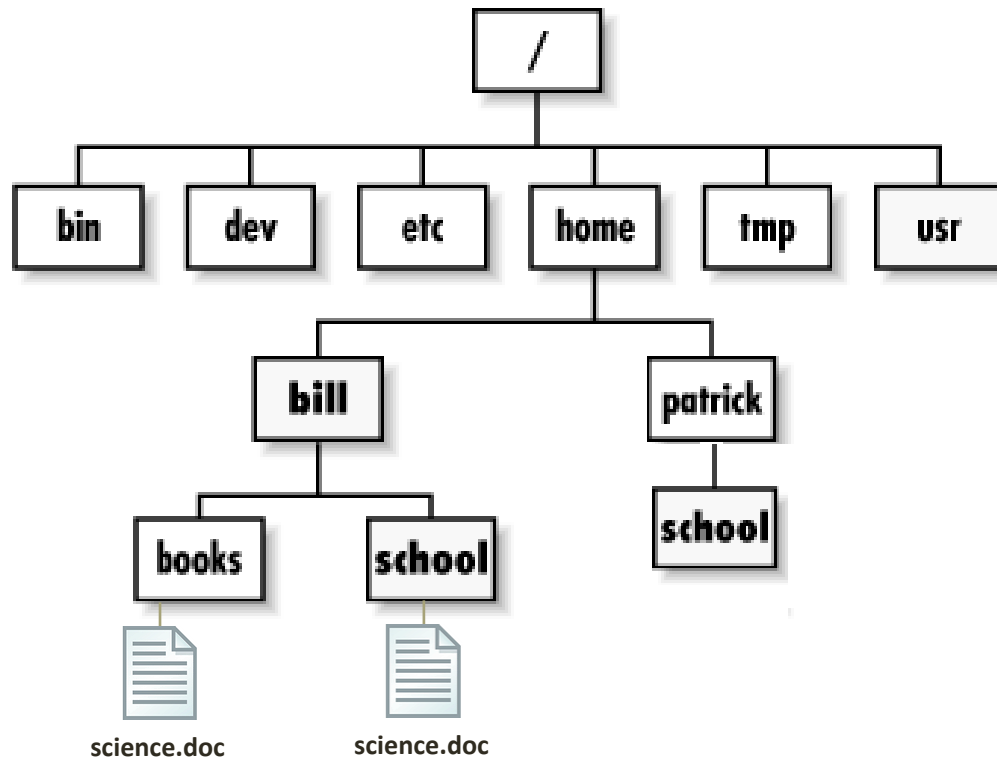


\$ cp /home/bill/school /home/patrick/ 

Copying Files & Directories (cp Commands)



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



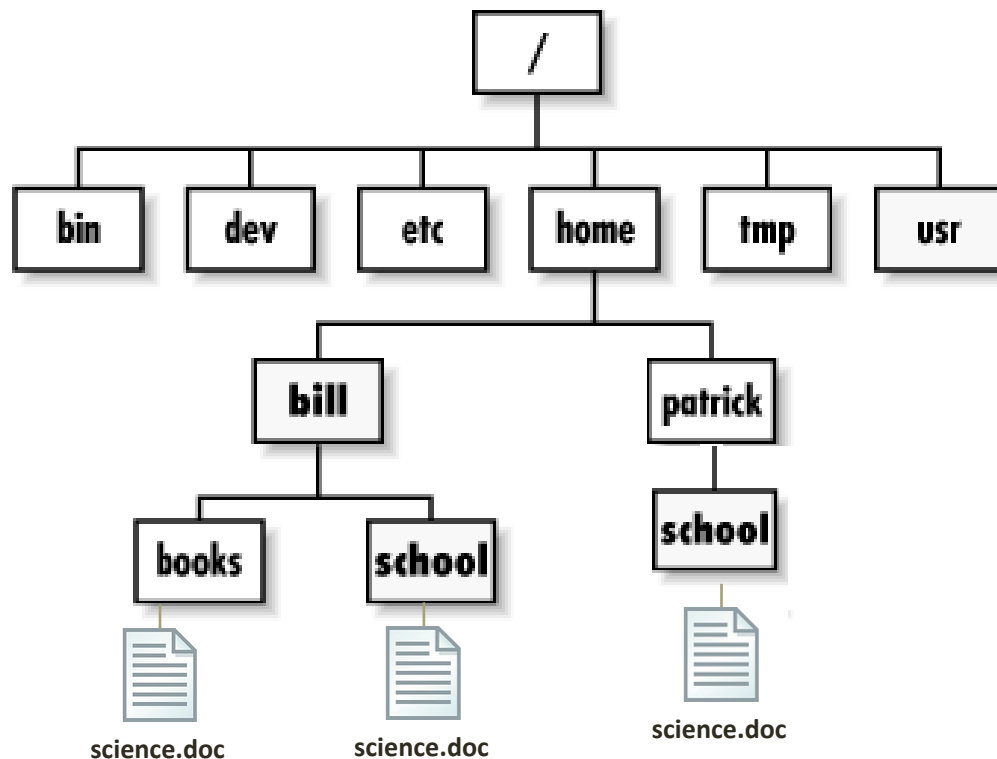
\$ sudo cp /home/bill/school /home/patrick/



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)

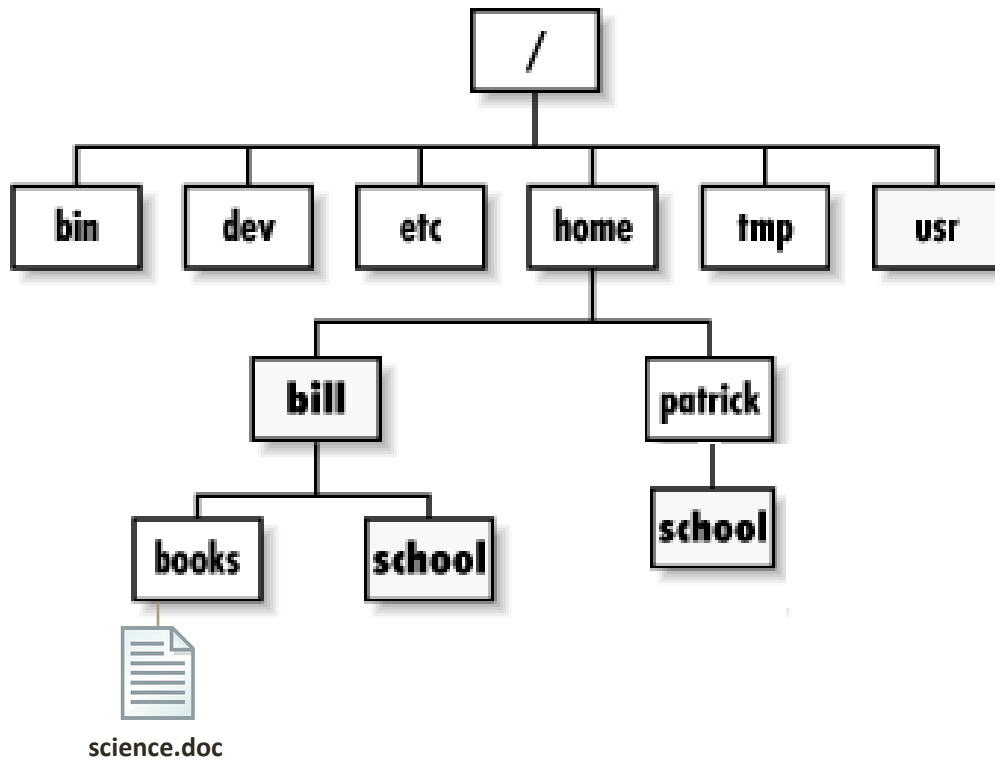
\$ cp -r folder1 ../projects/folder2 (copy the folder with new name)

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

Moving/Renaming Files & Directories (mv Command)



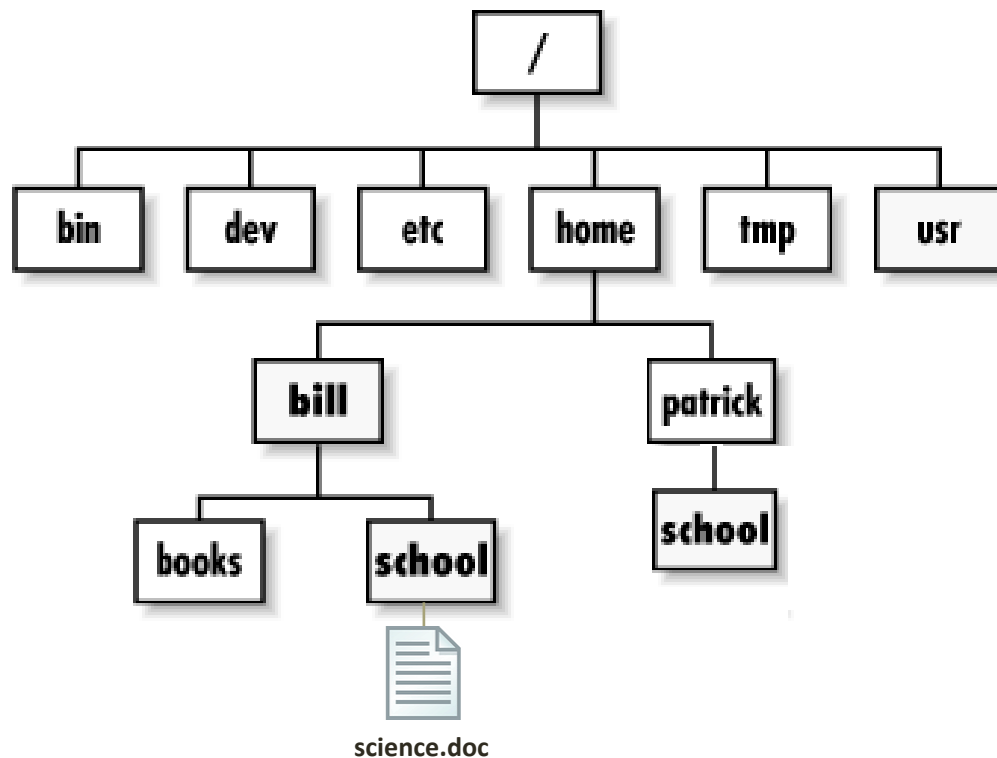
\$ mv <existing file or dir> <new filename & destination>



Moving/Renaming Files & Directories (mv Command)



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



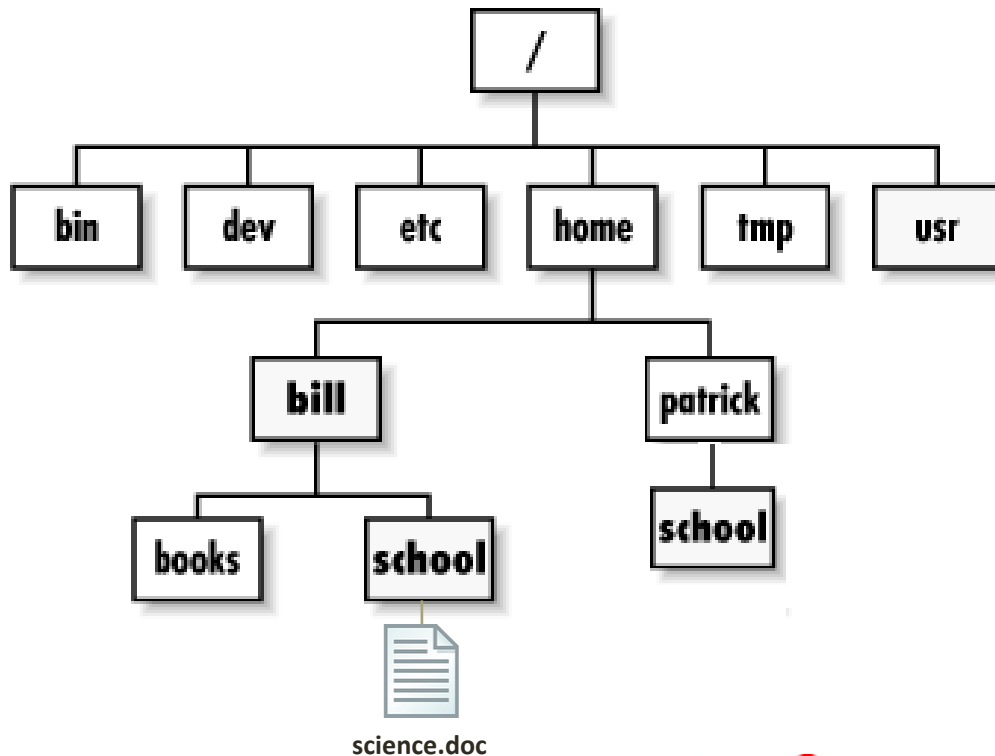
\$ mv ~/books/science.doc ~/school/science.doc

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

Moving/Renaming Files & Directories (mv Command)



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



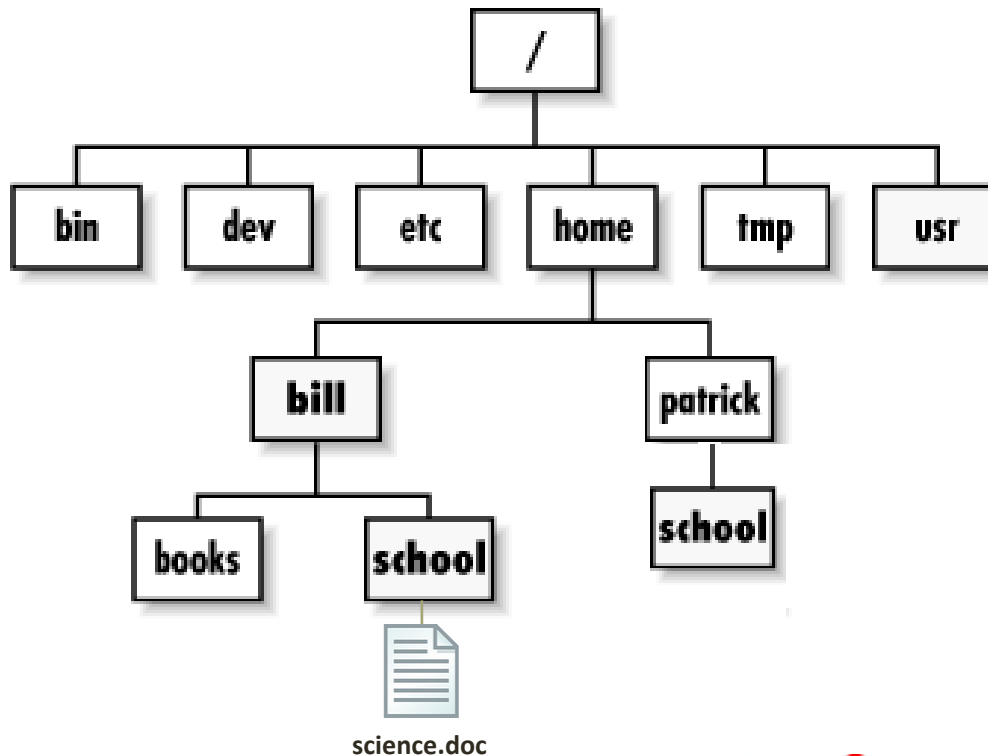
\$ mv /home/bill/school /home/patrick/



Moving/Renaming Files & Directories (mv Command)



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



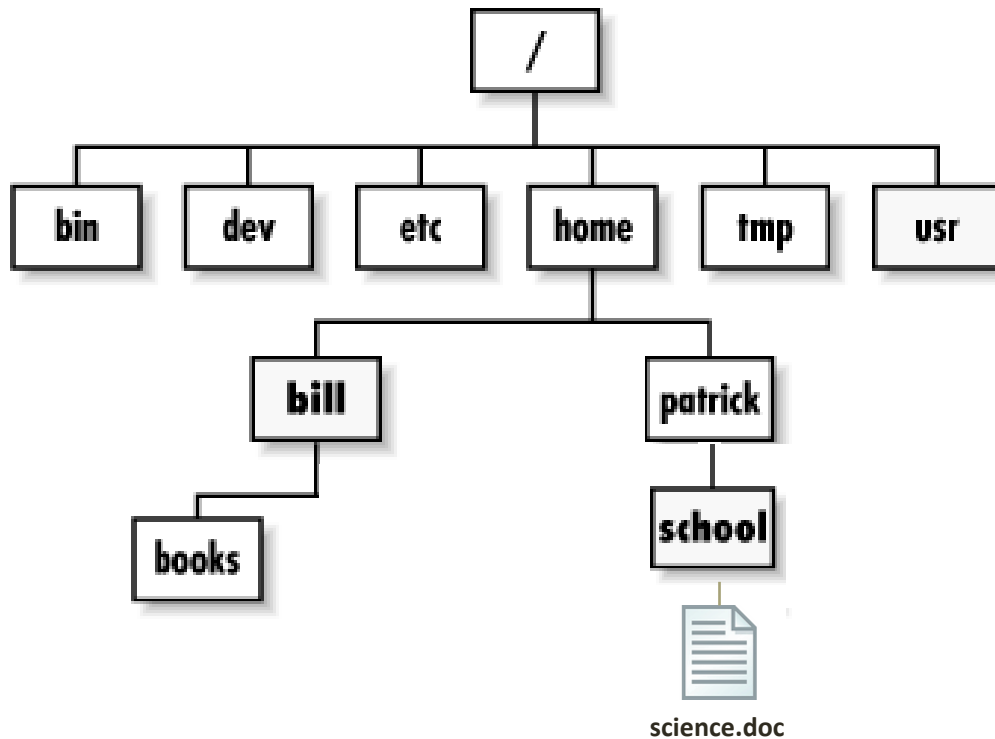
\$ sudo mv /home/bill/shool /home/patrick/



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)

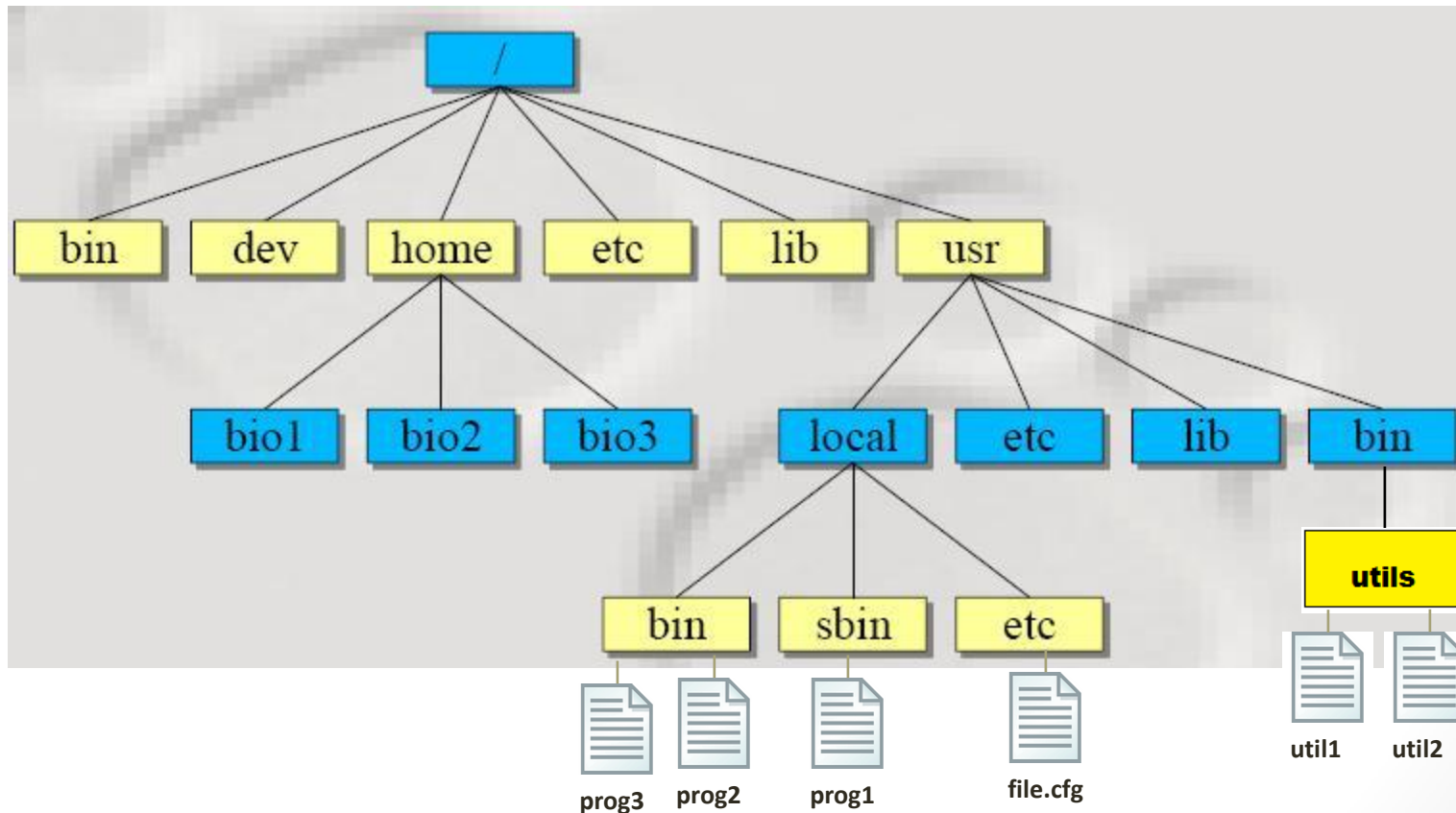
\$ mv -r folder1 ../projects/folder2

(move with new name)

Removing files and Directories (rm Command)



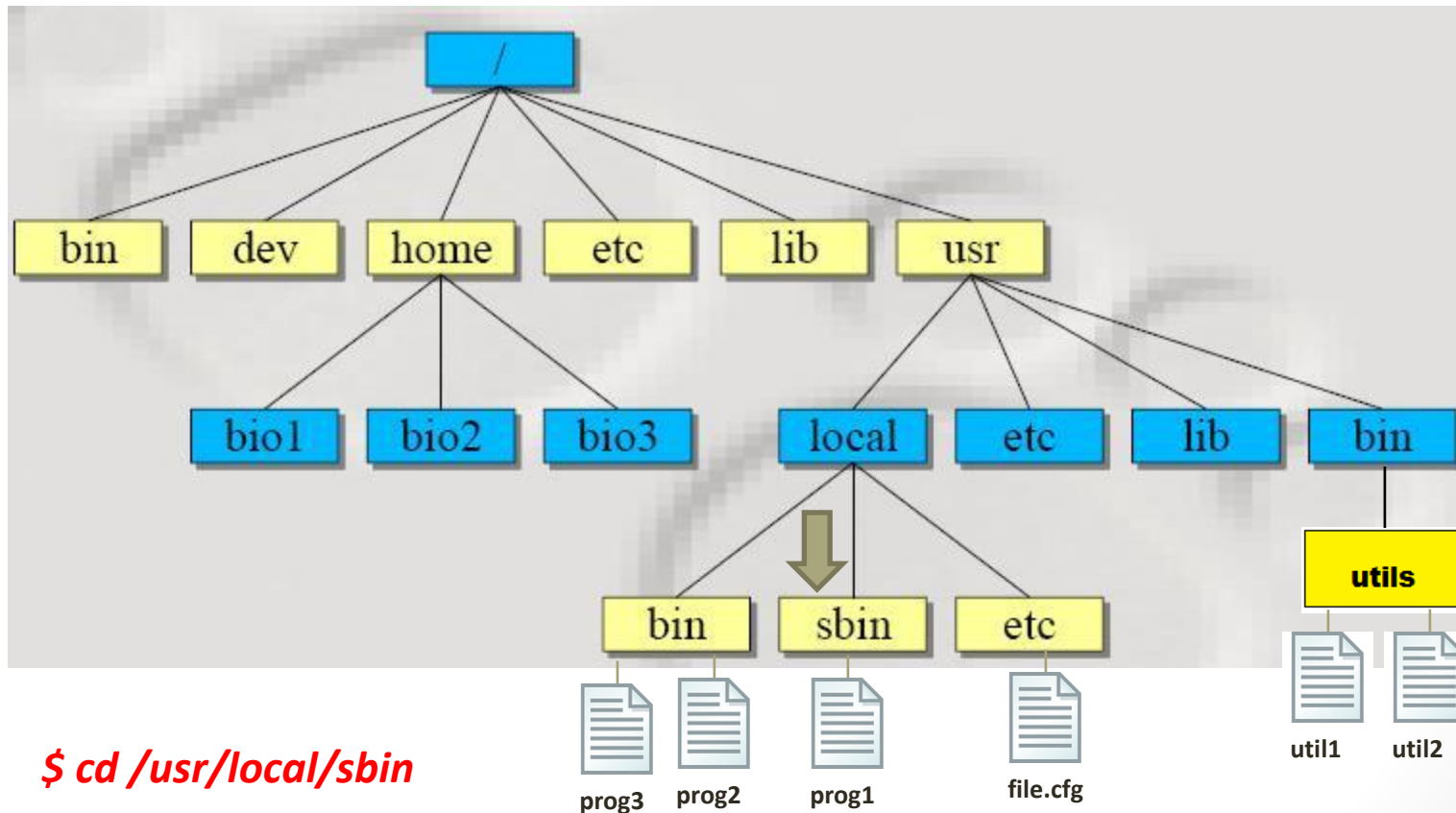
\$ rm [options] <file or dir list>



Removing files and Directories (rm Command)



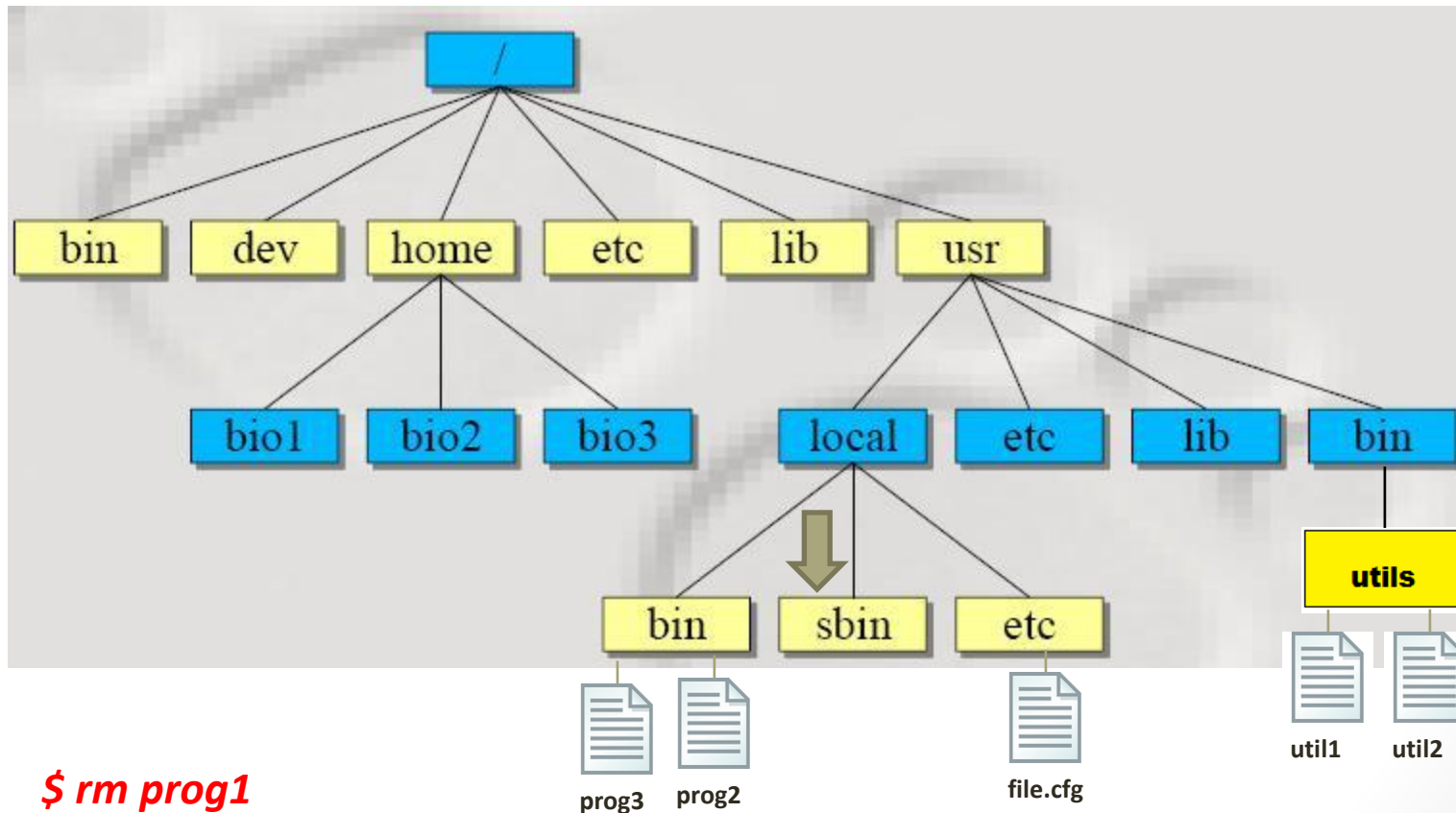
\$ rm [options] <file or dir list>



Removing files and Directories (rm Command)



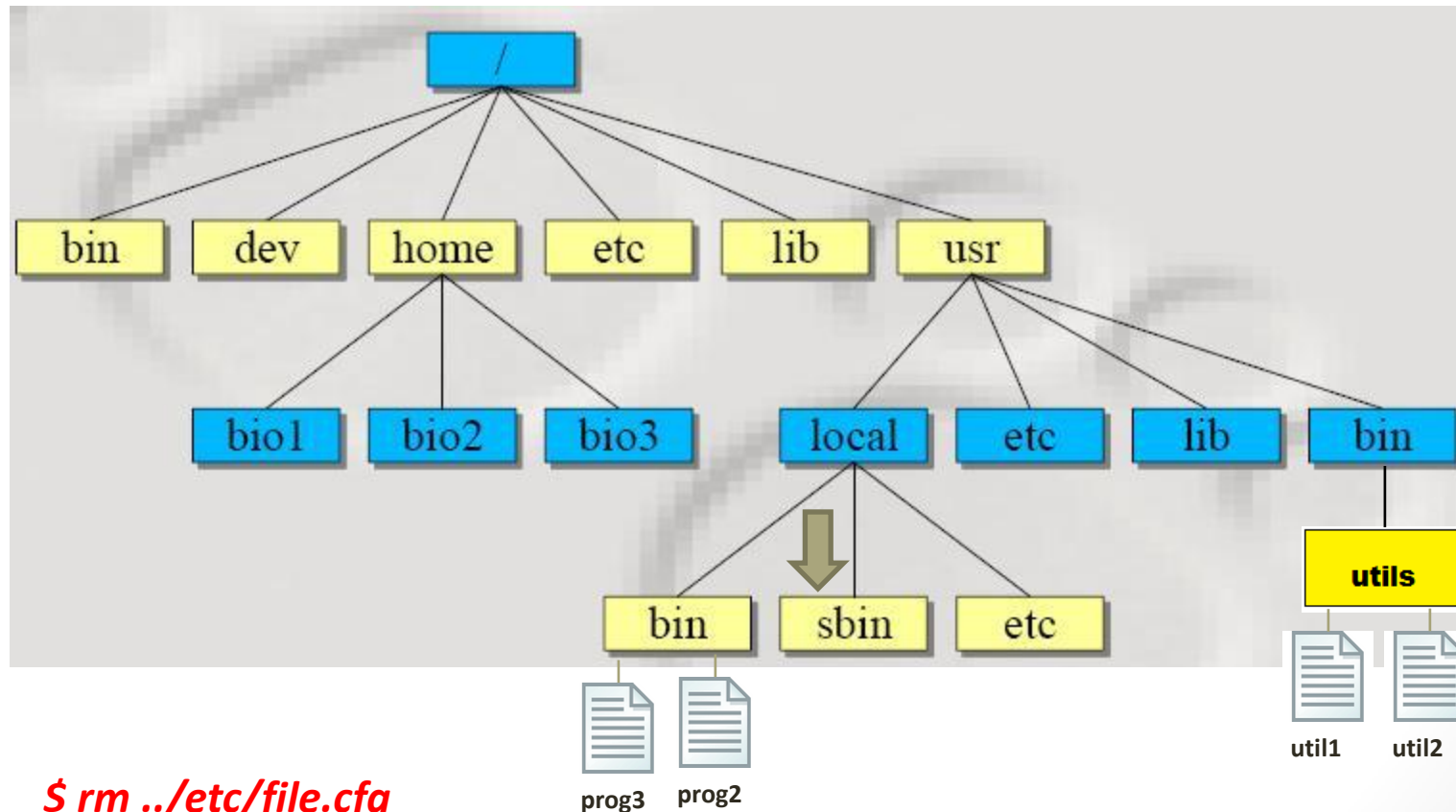
\$ rm [options] <file or dir list>



Removing files and Directories (rm Command)



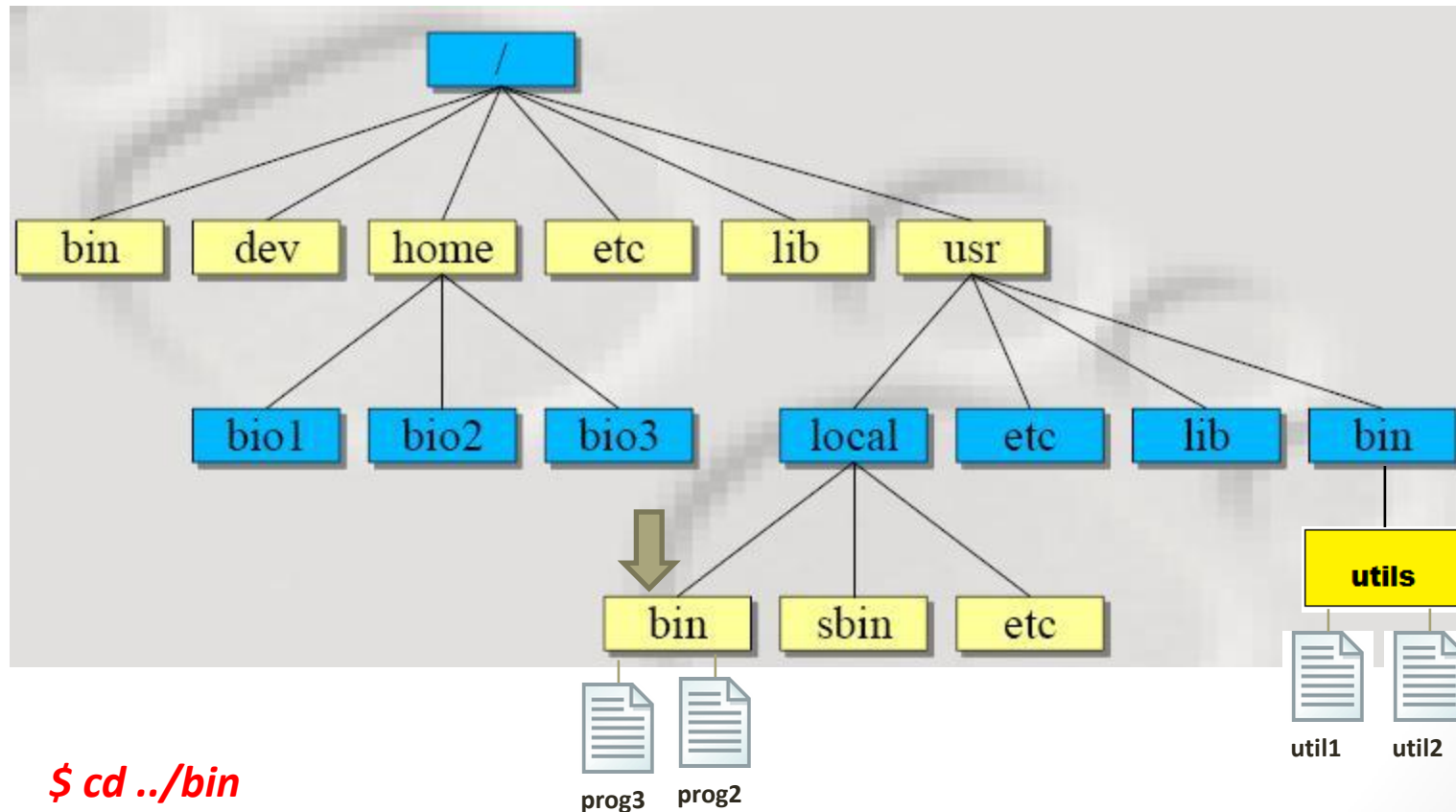
\$ rm [options] <file or dir list>



Removing files and Directories (rm Command)



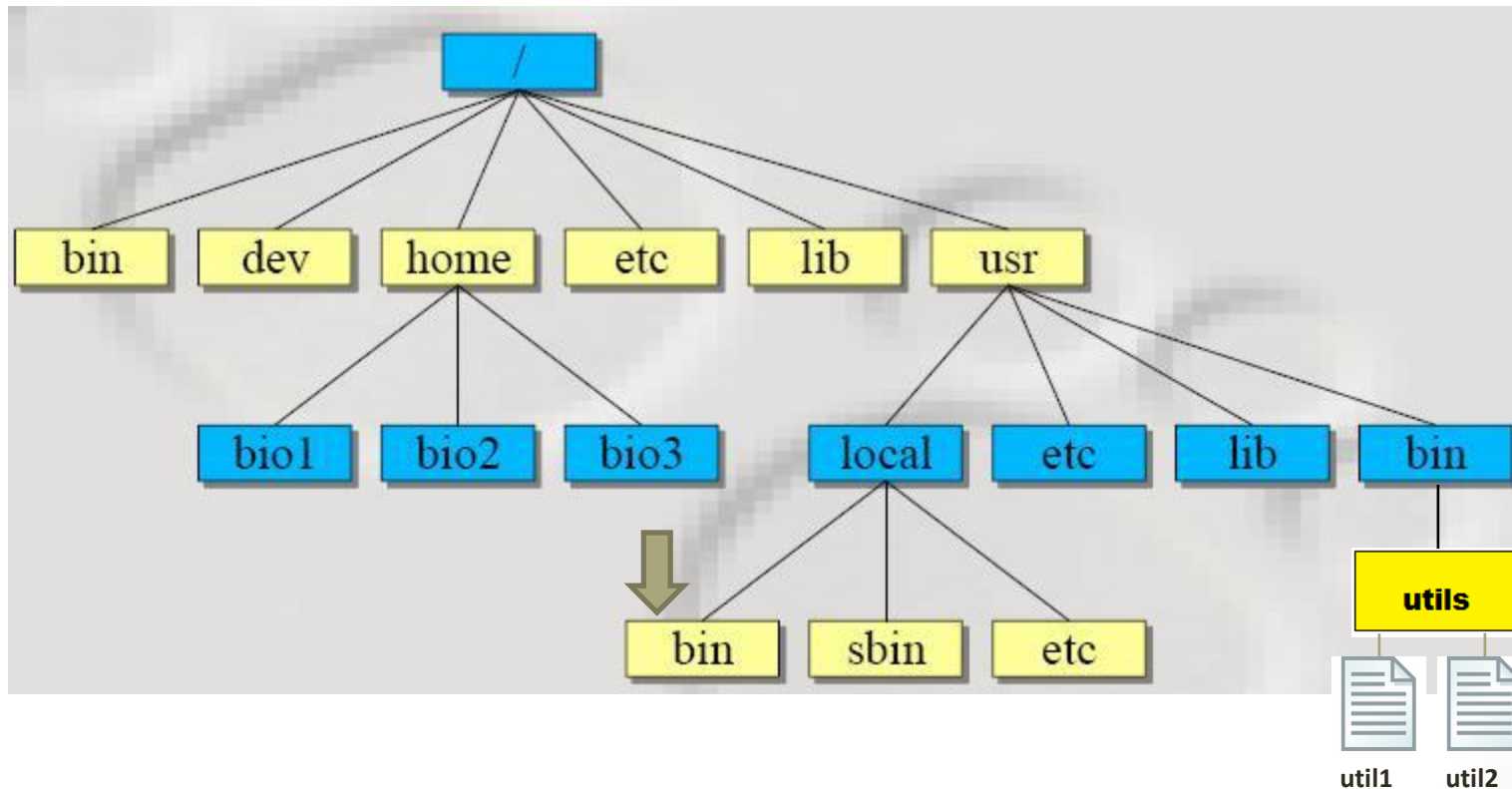
\$ rm [options] <file or dir list>



Removing files and Directories (rm Command)



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

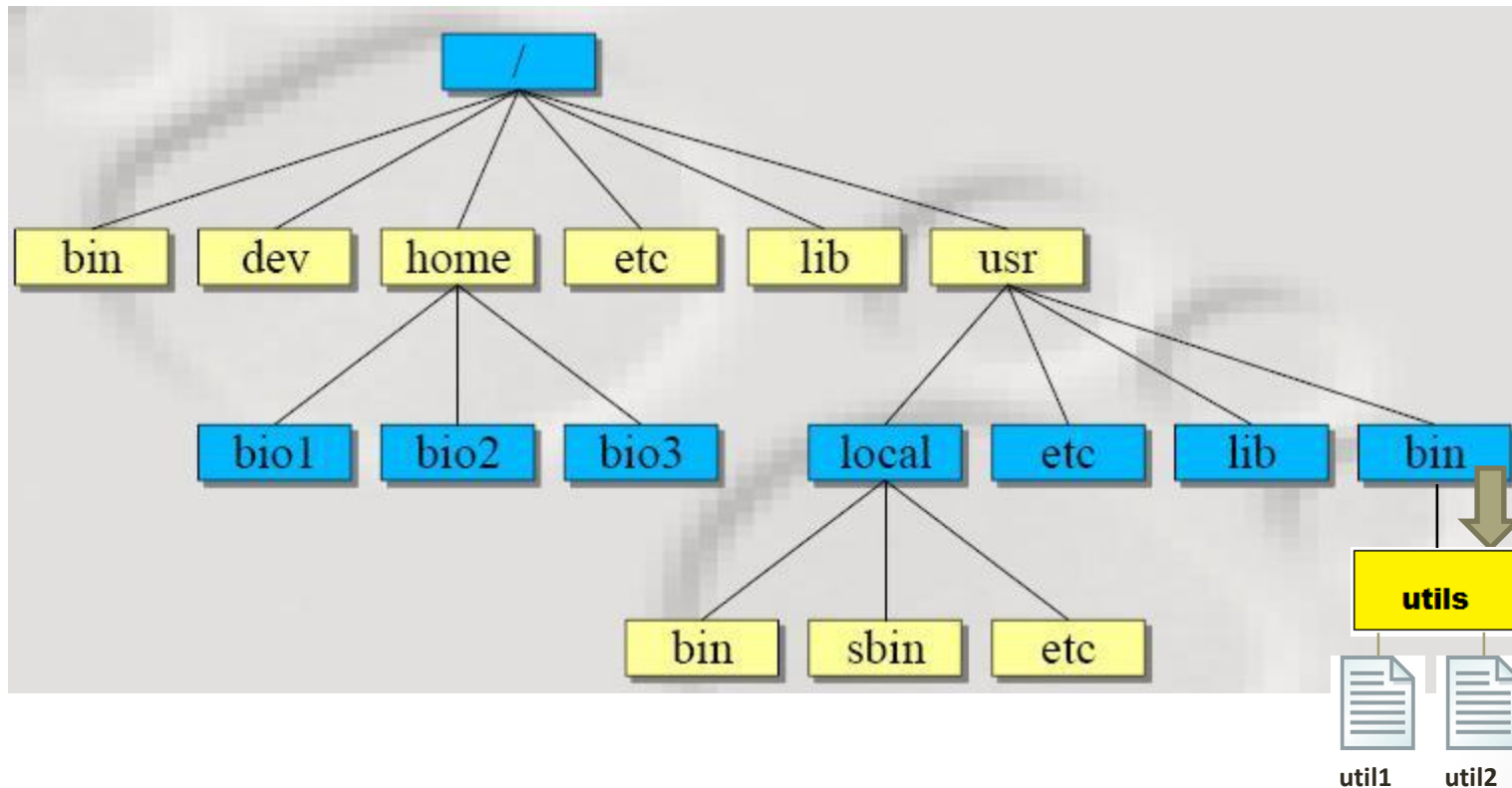


\$ rm prog3 prog2

Removing files and Directories (rm Command)



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

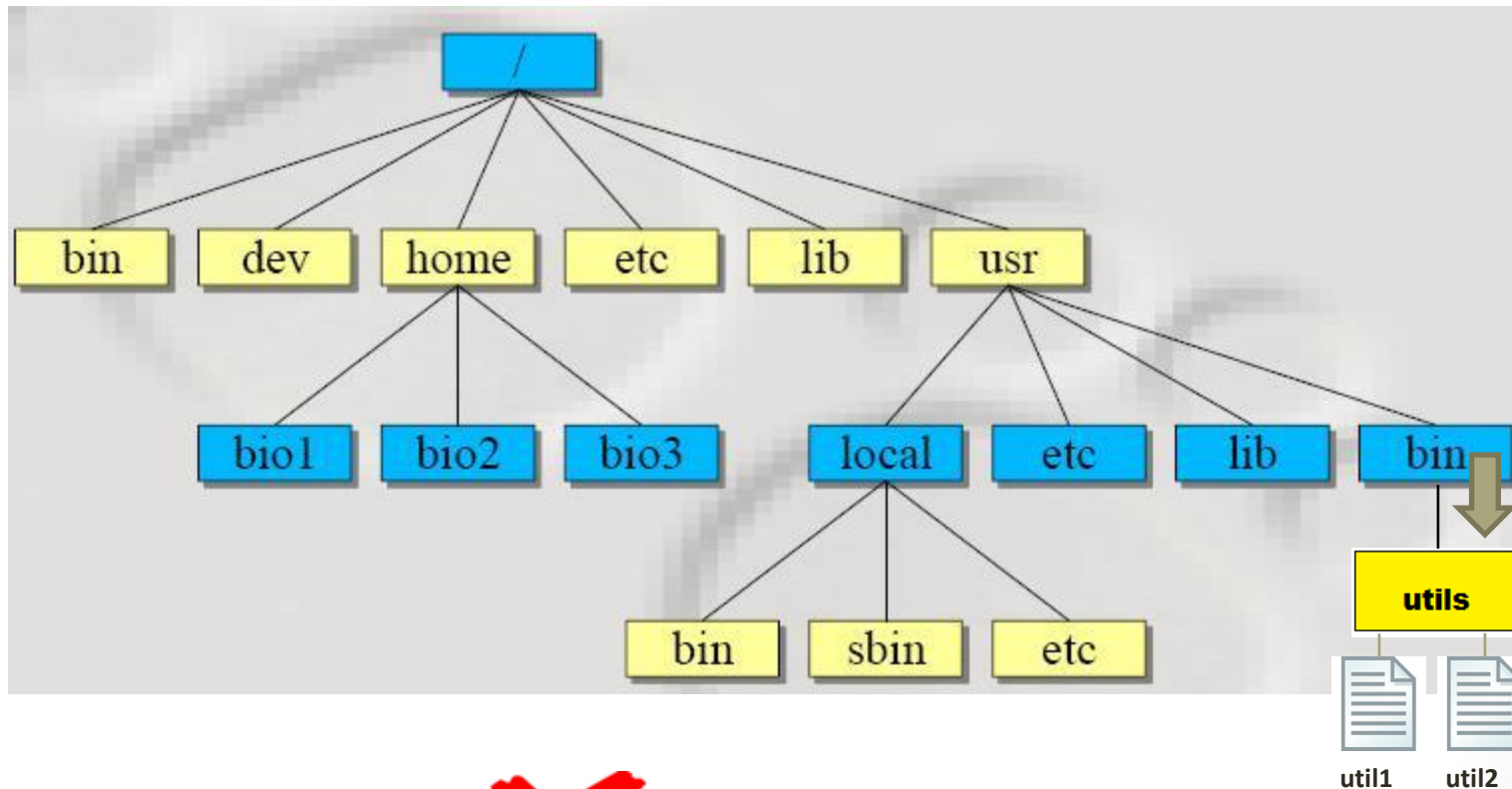


\$ cd /usr/bin/utils

Removing files and Directories (rm Command)



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



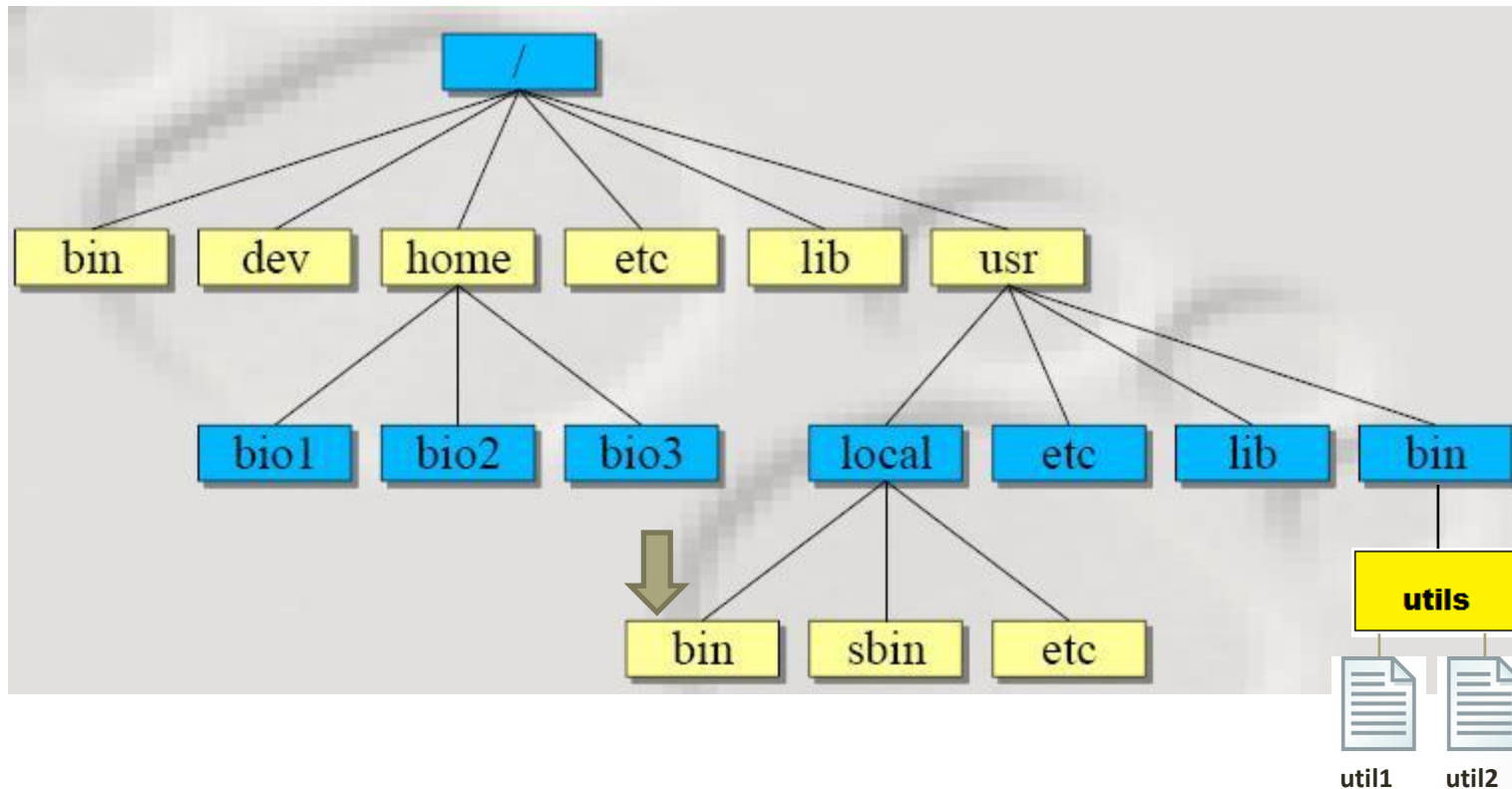
\$ rm -r /usr/bin/utils



Removing files and Directories (rm Command)



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

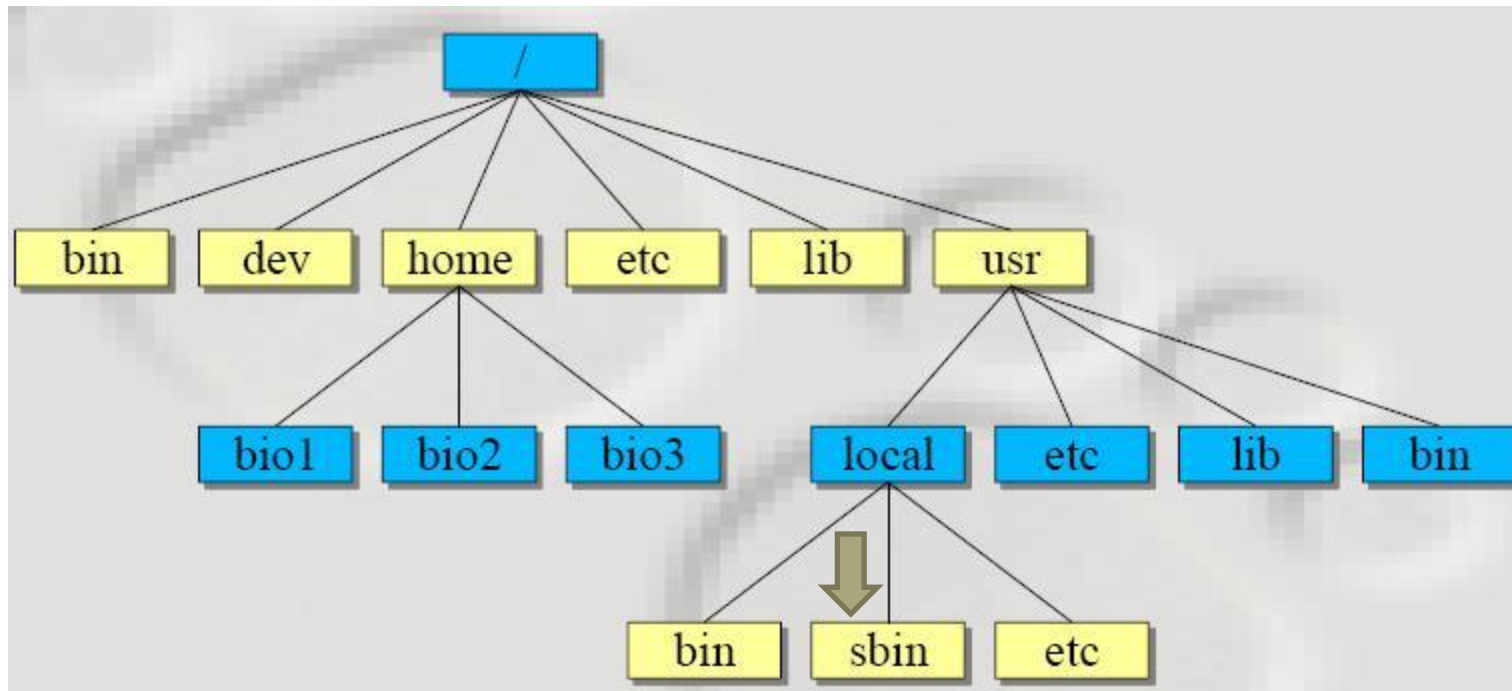


\$ cd -

Removing files and Directories (rm Command)



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



\$ rm -r /usr/bin/Utils

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>