Lecture 5
Linux create users

The main commands to create users

1. Useradd : to create new user
2. Passwd : to add the password
3. Usermod: to add user into group
4. Userdel: to delete user

Sudo useradd user-name
Create user without create file in directory “home”

To check there are not files in home for new user type

“Ls /home “

To show the current users

TO create user with files in home type
“useradd –m –s /bin/bash username”

Then check that by ls /home

To create password type

“Passwd username”

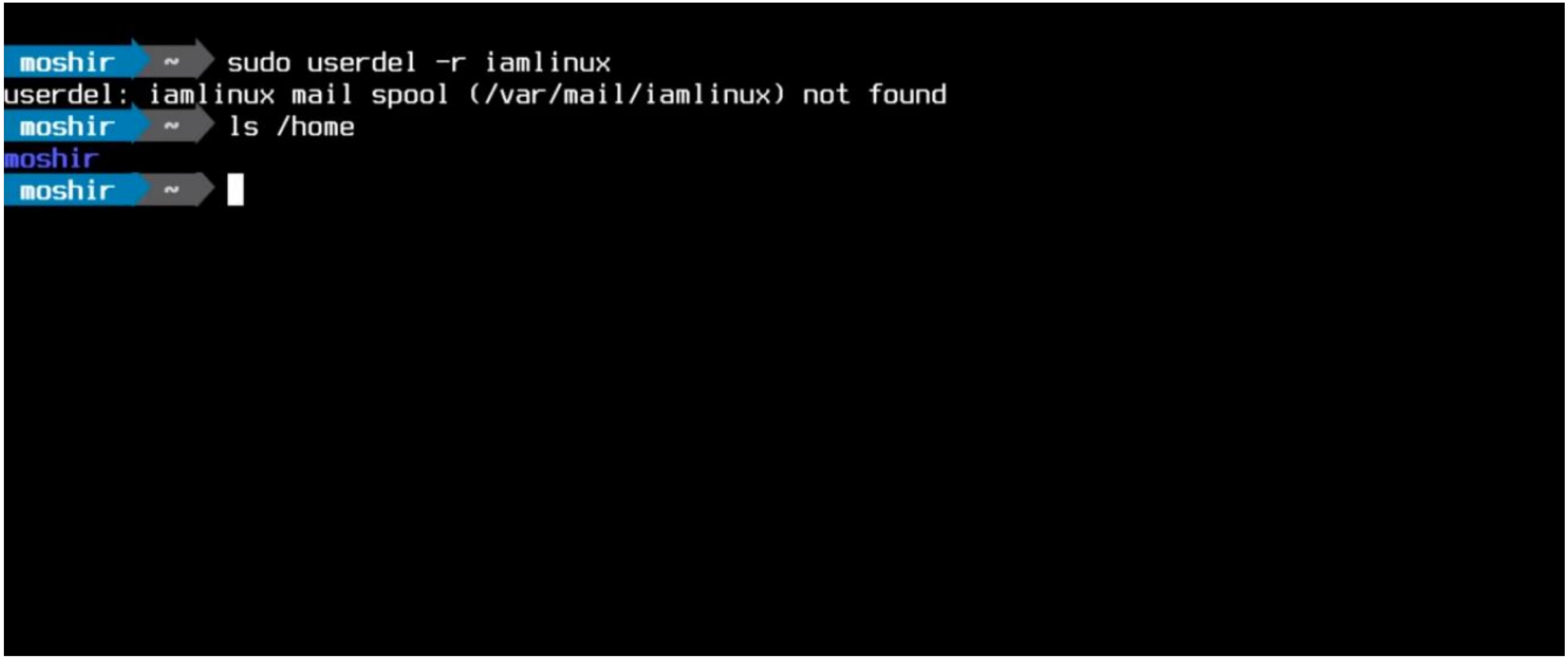
To know the information about users “/cat /etc/passwd”

To delete user type “userdel username”

That doesn’t delete user’s file in /home

To delete user with all files type

”userdel –r username”

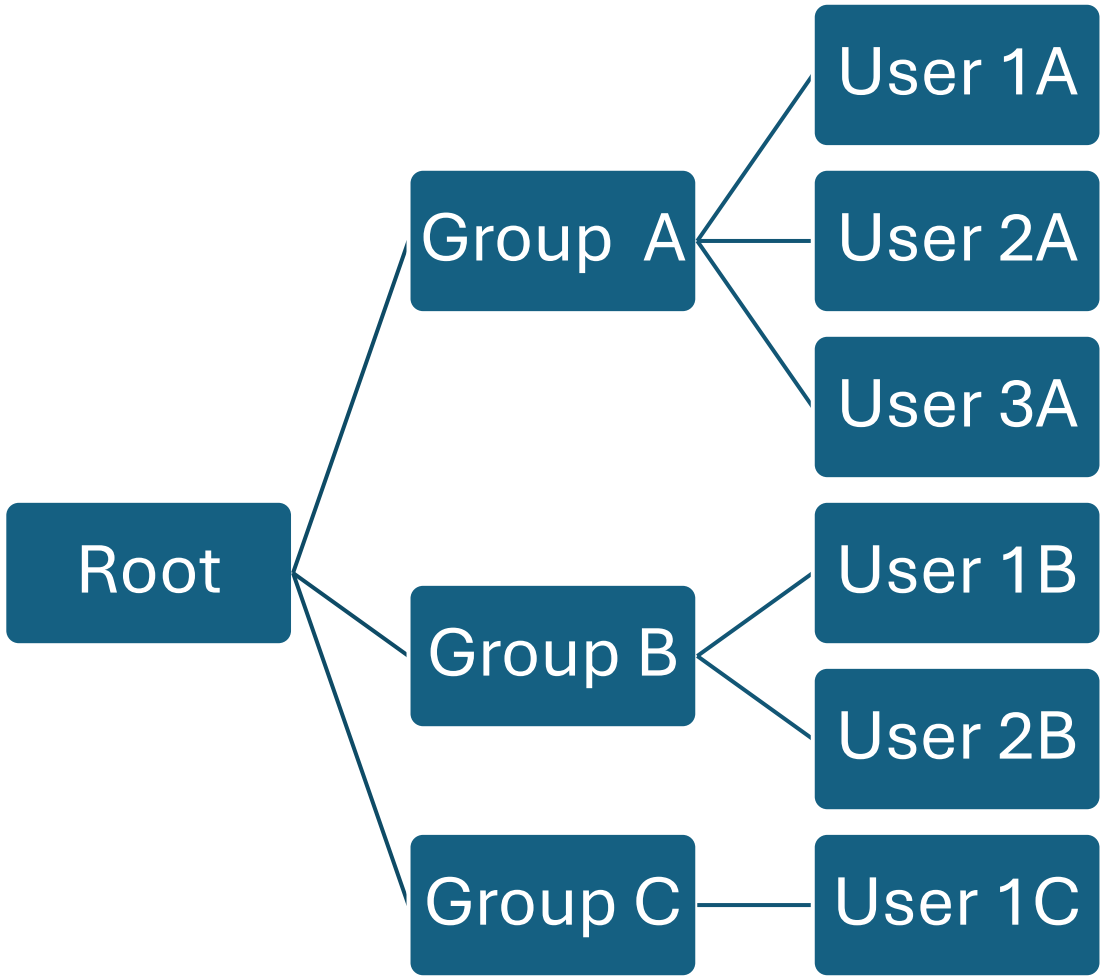


- create user without file : Sudo useradd user name
- To check for creating file or note: Ls /home
- create user with file : useradd –m –s /bin/bash username
- To check for creating file or note: Ls /home
- To create password: Passwd username
- To know information about password: /cat /etc/passwd
- To delete user without delete its file:userdel username
- To check: Ls /home
- To delete user without delete its file: “userdel –r username
- To check: Ls /home

Groups

Create groups of users to control the permissions

In the first root has 2 users
1. Owner account
2. Root account (administrator)



Managing the groups

1. Groupadd → to create new group
2. Groupdel→ to delete the group

The files contain the information about groups are in cat/etc/group

Add new group

“groupadd groupname”

To delete group use “groupdel groupname”

To insert user to group (اضف مستخدم بداخل مجموعه فياخد كل صلاحيات المجموعه)

```
[moshir@Cool-Nerd ~]$ sudo usermod -aG group user
```

- To create group: groupadd groupname
- To delete group: groupdel groupname
- To add user into group: Usermod –aG groupname username

To list all groups of certain user type “groups username”

لمعرفة المجموعات التي مشترك بها المستخدم الواحد

```
[moshir@Cool-Nerd ~]$ groups moshir
wheel lp sys network power project21 moshir
[moshir@Cool-Nerd ~]$
```

To use the following command

“gpasswd –d username groupndelete user form certain group ame”

To check list the files of group “cat /etc/group”

- To list all groups of certain user type “groups username”

لمعرفة المجموعات التي مشترك بها المستخدم الواحد

- To delete user form certain group use the following command

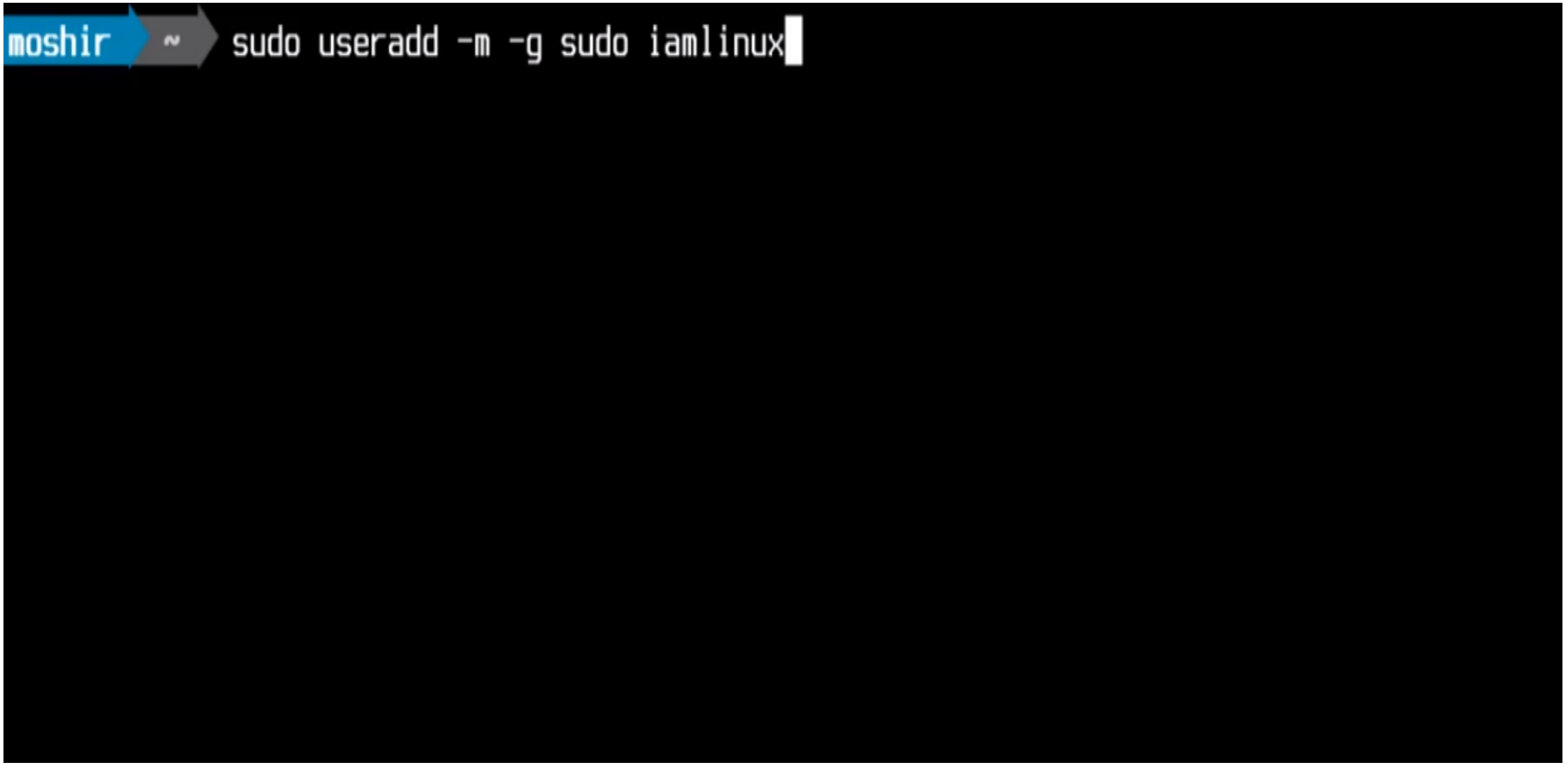
“gpasswd –d username groupname”

- To check list the files of group “cat /etc/group”

To add user and add user to group without create file in home

“useradd –g usergroup username”

To add user and add user to group with create file in home



Complete by correct answer

1. To check create user in files .....
2. To remove user from group .....
3. To create new group .....
4. To add password for user .....
5. To create user and add user into group with create file.....
6. To delete user .....
7. To list all groups for user .....

Example

The download folder contains 3 files cap1, drop and shell

Type the commands to achieve the following

1. Add execute permission for user file: cap1 .....
   `chmod U+x cap1 ...`
2. Delete permission write for group file: drop .....
   `chmod g-W drop ...`
3. Add read permission for users, groups and others file:
   shell `chmod ugo+r shell`

File permissions cont.

Absolute mode:

We use octal (base eight) values represented like this:

Letter	Permission	Value
R	read	4
W	write	2
X	execute	1
-	none	0

For each column, User, Group or Other you can set values from 0 to 7. Here is what each means:

0= **---** 1= **--x** 2= **-w-** 3= **-wx**

4= **r--** 5= **r-x** 6= **rw-** 7= **rwx**

0= `---`

1= `--x`

2= `-w-`

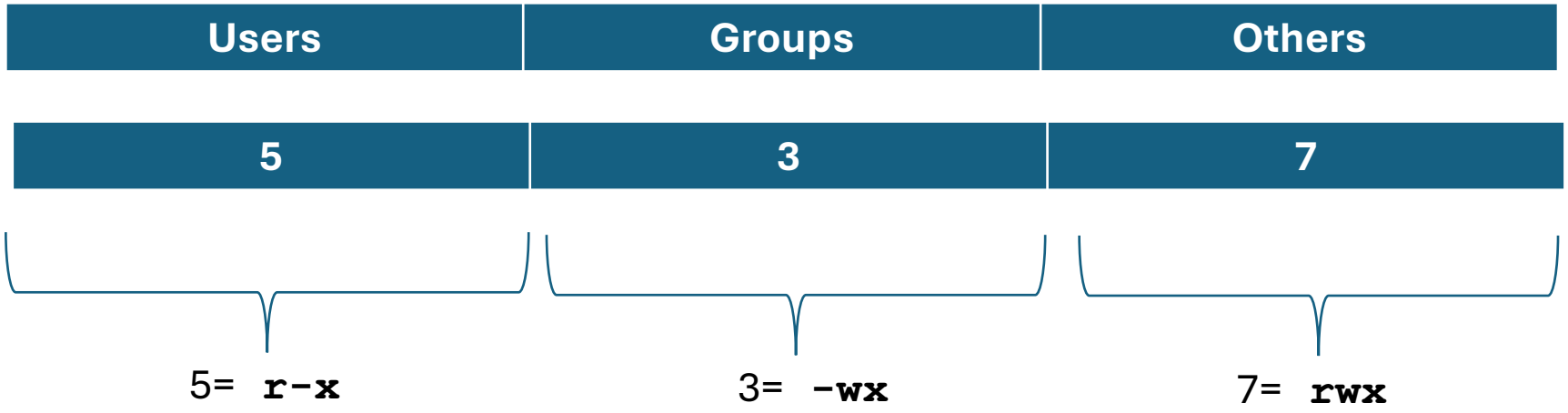
3= `-wx`

4= `r--`

5= `r-x`

6= `rw-`

7= `rwx`



File permissions cont.

Numeric mode cont:

Example index.html file with typical permission values:

```
$ chmod 755 index.html
$ ls -l index.html
-rwxr-xr-x  1 root  wheel  0 May 24 06:20 index.html

$ chmod 644 index.html
$ ls -l index.html
-rw-r--r--  1 root  wheel  0 May 24 06:20 index.html
```

Example
The download folder contains file cap1
Type the commands (symbolic mode) to achieve the following

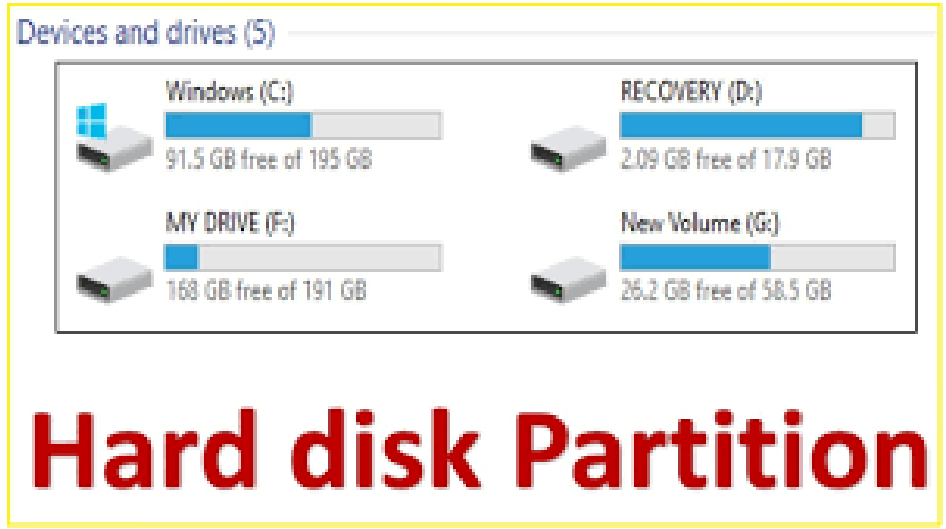
1. Add execute permission for user file: cap1 .....
2. Add write permission for others file: cap1 .....
3. Delete permission write, execute for group file: cap1 .....
4. Add read permission for users, groups and others file: cap1
   .....

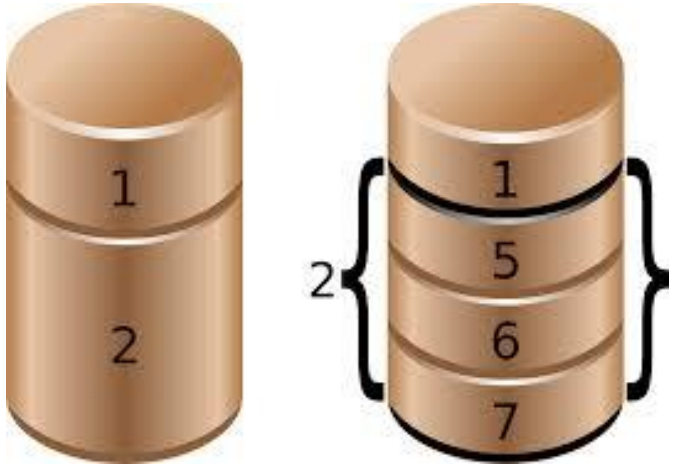
Lecture 7

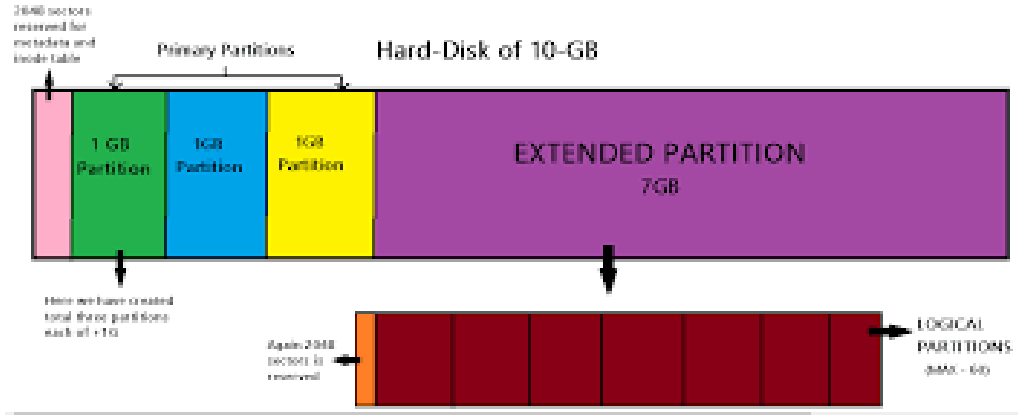
CREATE PARTITIONS

Hard disk partitions

- **Disk Partitioning** is **the** process of dividing a **disk** into one or more logical areas, often known as **partitions**, on which **the** user can work separately







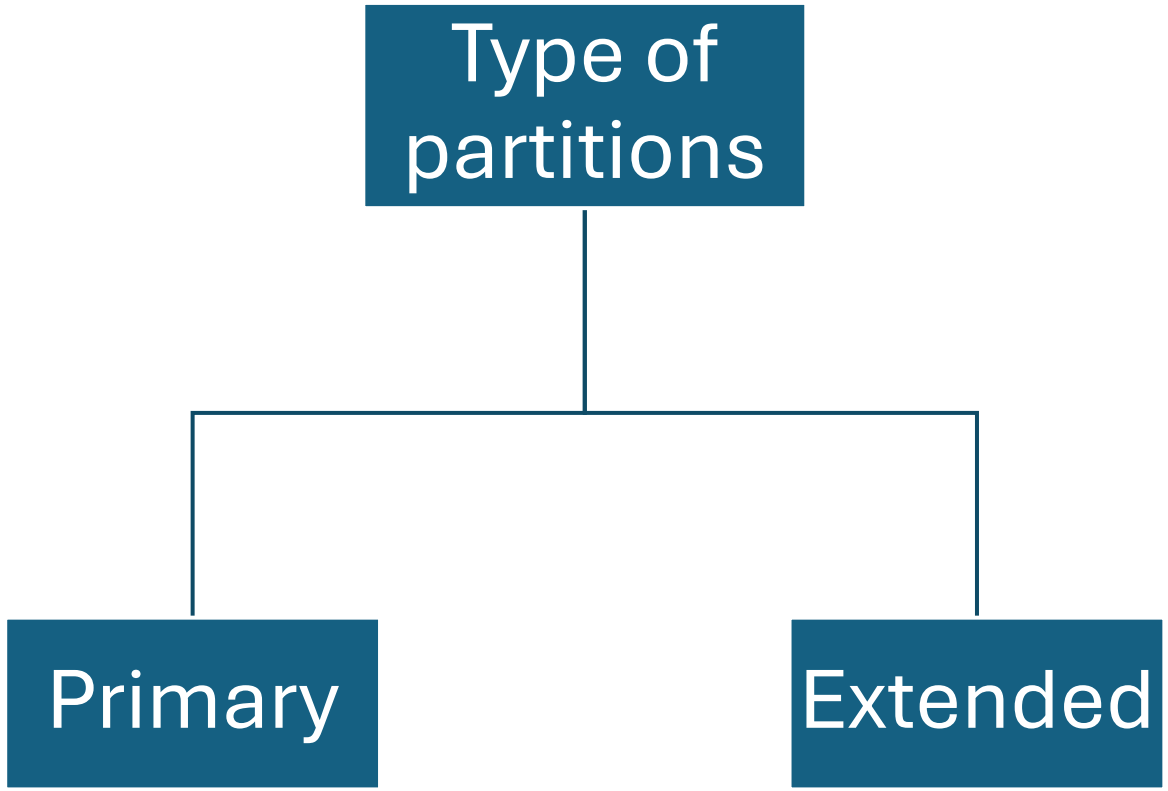
Hard disk partitions

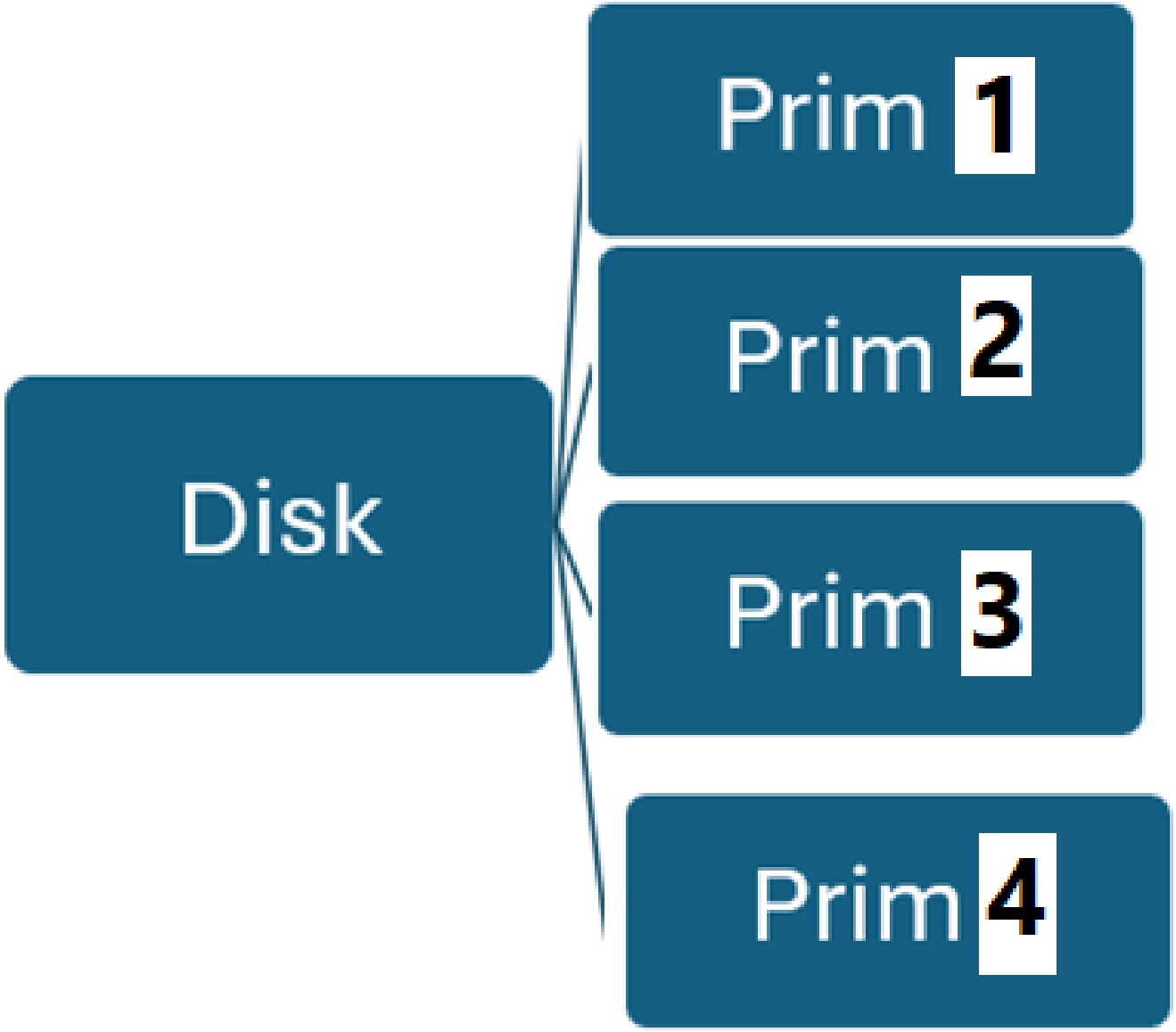
There are two types of hard disk

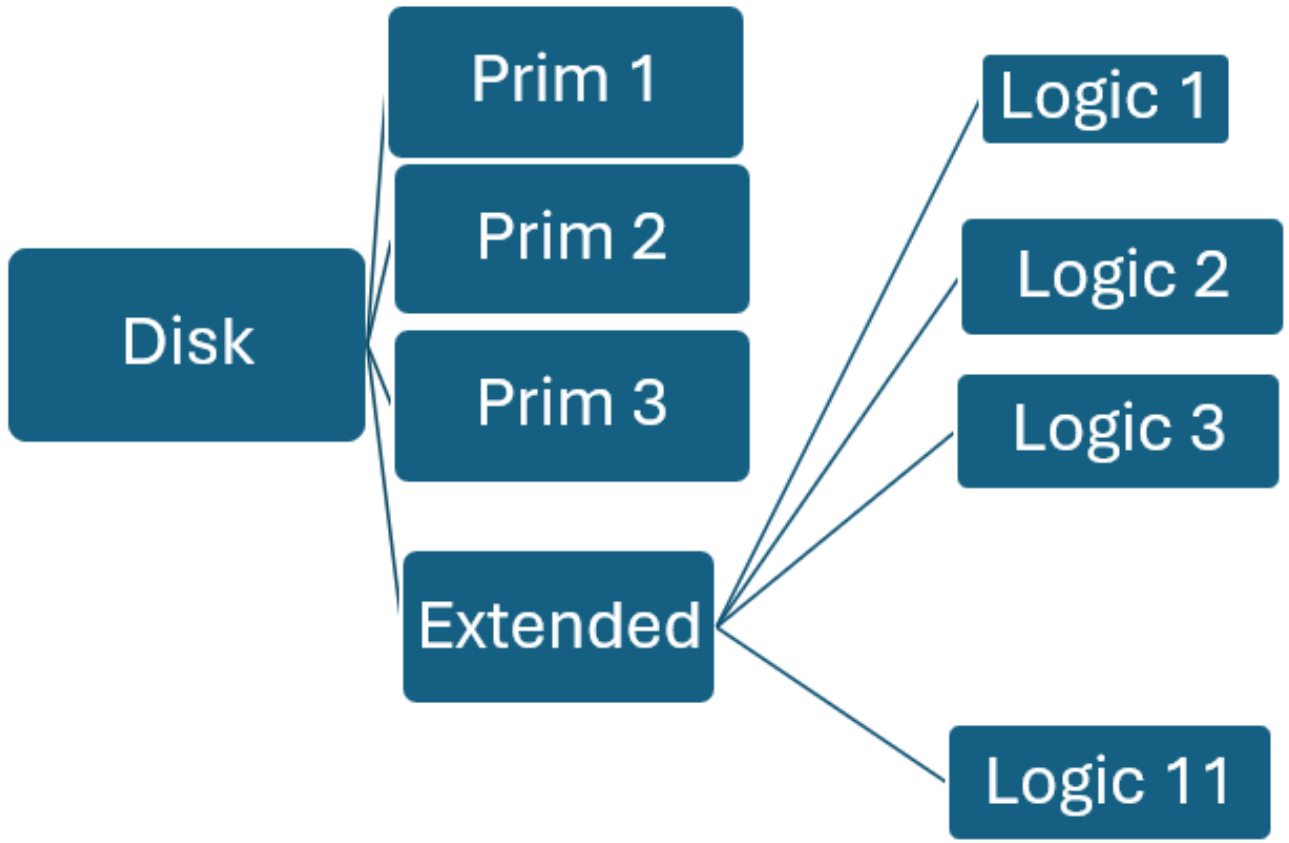
1. HDD (hard disk drive)
2. SSD (solid state drive)

HDD	SDD
Best for long term storage	Best for low latency applications
Uses mechanical parts like spinning disks	Uses flash memory cells without moving parts
Low cost	High cost
Massive capacity	Great for rapid boot times and fast file access

Types of partitions : primary and Extended



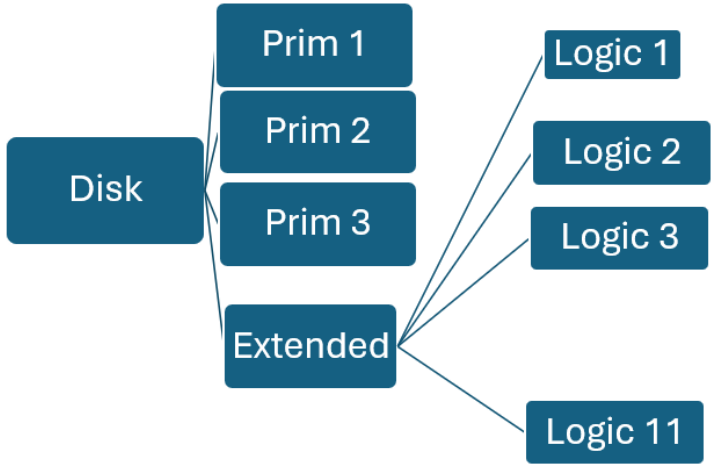

Disk
Prim 1
Prim 2
Prim 3
Prim 4


Disk
Prim 1
Prim 2
Prim 3
Extended
Logic 1
Logic 2
Logic 3
Logic 11

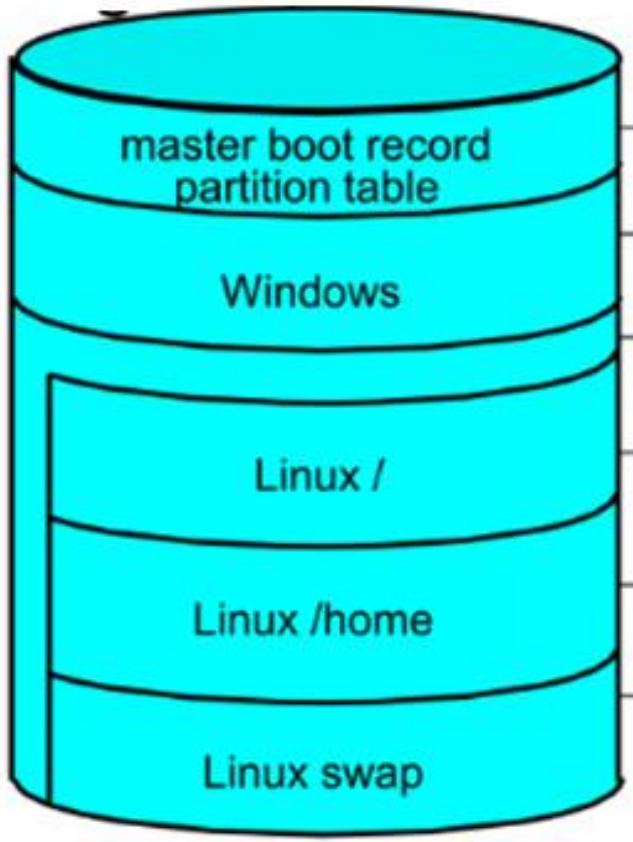
Hard disk partitions

1. Hard disks can be partitioned (or divided)
2. There are maximum number of partitions is four partitions.
3. If we want **more t**han four partitions, we can use extended partition.

(it is mean divide one of primary partition to number of extended partitions 59 for IDE and 11 for SCSI)



Example for partition the disk



sda: The first sector of the disk contains the MBR and Partition Table

sda1: First primary partition holds a Windows filesystem

sda2: Second primary partition is an extended partition and holds three logical partitions

sda5: First logical partition holds a Linux filesystem that will be mounted as /

sda6: Second logical partition holds a Linux filesystem that will be mounted as /home

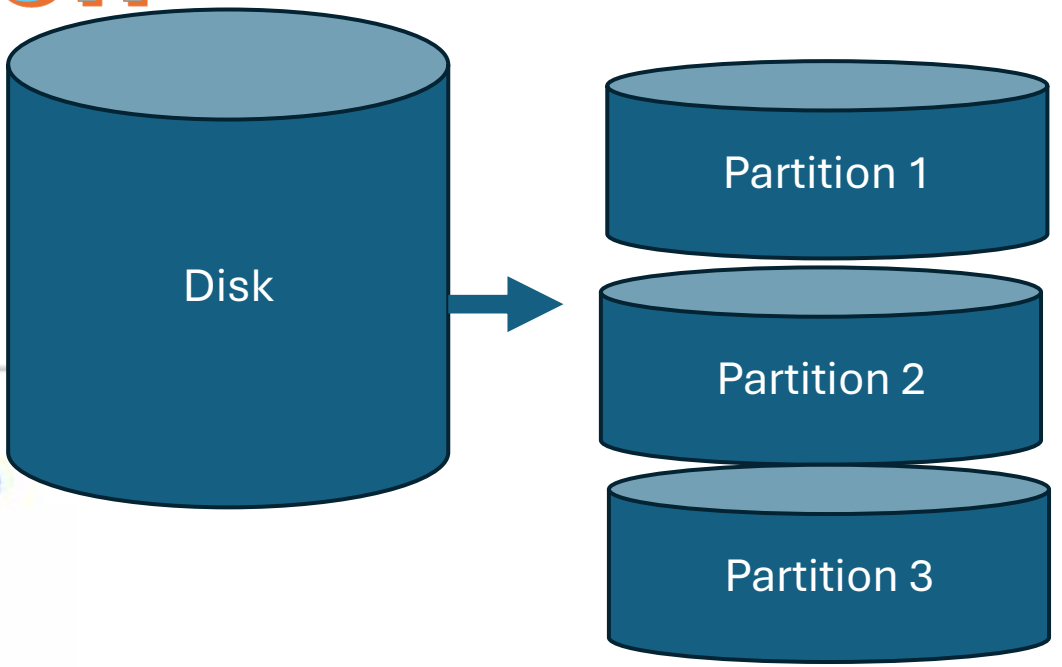
sda7: Third logical partition holds a Linux swap space

The method to make the partitions

Steps for creating and using partitions in linux

- Step 1: creating partition (divide the disk into logical parts each part called partition)
- Step2: formatting partition
- Step3: mounting partition

Step 1: Create partition



Partitioning tools

- **`fdisk`**
  - Virtually every PC OS comes with a tool **`fdisk`** to create partitions for that OS
    - Linux, Windows, and so forth
- **`parted`**
  - GPLed Linux program, available at www.gnu.org
  - Can create/resize/move/delete partitions
- GParted, QTParted
  - GUI utilities that use GNU Parted
  - Can create/resize/move/delete partitions
- Disk Druid and others
  - Partitioning program integrated in Linux install program

•***Fdisk***

- Used in CLI

1. Fdisk –l → List partition table

Partition table contains

- sda (sda1, sda2,sda3), sdb ,sdc, ……..

- Where:

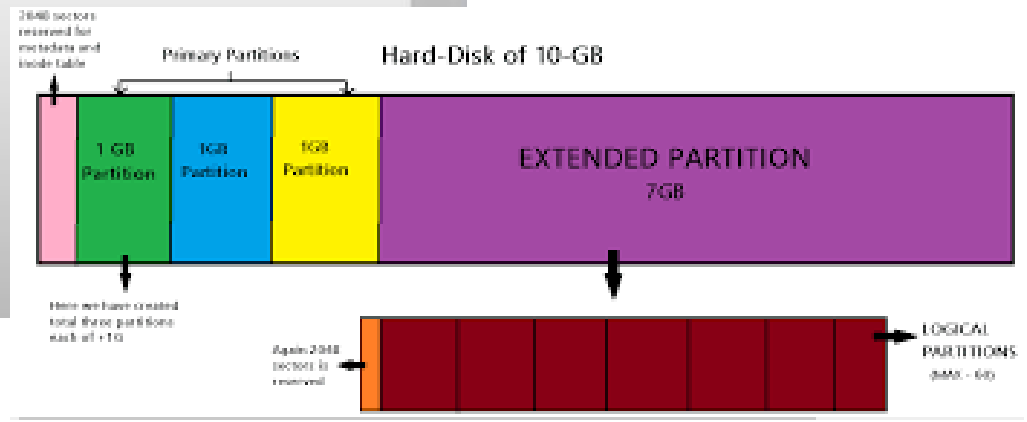
sda, sdb, sdc are disks

sda1,sda2 are partitions in disc sda

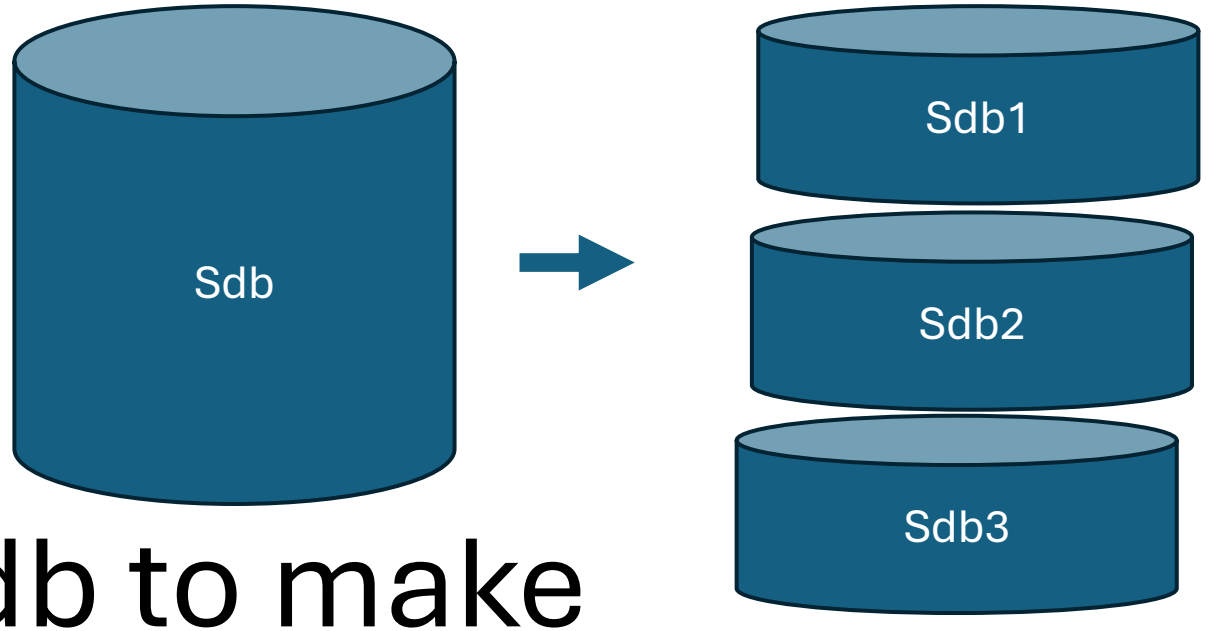
هذا الامر لاستعراض
جدول ال
partitions

```
root@localhost:~
File  Edit  View  Search  Terminal  Help
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00038d45

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *           1        1306    10484736   83  Linux
/dev/sda2            1306        1959     5242880   82  Linux swap / Solaris

Disk /dev/sdb: 8589 MB, 8589934592 bytes
255 heads, 63 sectors/track, 1044 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

Disk /dev/sdb doesn't contain a valid partition table

Disk /dev/sdc: 8589 MB, 8589934592 bytes
255 heads, 63 sectors/track, 1044 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000eedf4
```

اظهر هناك مجموعه من disks
Sda, sdb, sdc

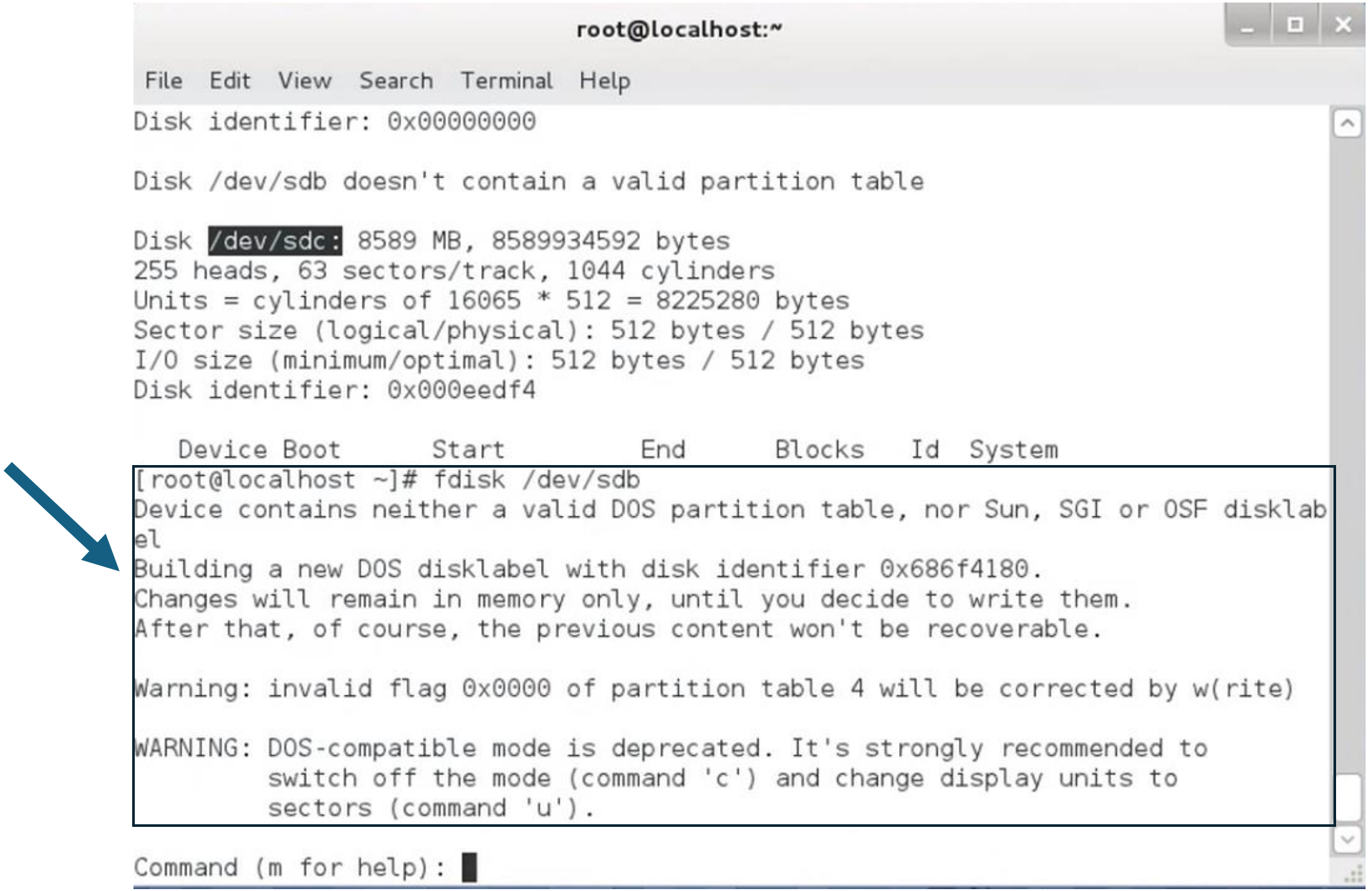


2. Fdisk /dev/sdb

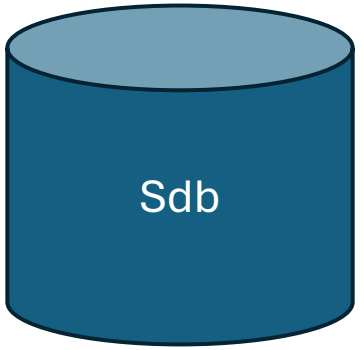


To enter into disk sdb to make partitions

```
[root@localhost ~]# fdisk /dev/sdb
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklab
el
Building a new DOS disklabel with disk identifier 0x686f4180.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.

Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)

WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
         switch off the mode (command 'c') and change display units to
         sectors (command 'u').
```


root@localhost:~
File Edit View Search Terminal Help
Disk identifier: 0x00000000
Disk /dev/sdb doesn't contain a valid partition table
Disk /dev/sdc: 8589 MB, 8589934592 bytes
255 heads, 63 sectors/track, 1044 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000eedf4
Device Boot Start End Blocks Id System
[root@localhost ~]# fdisk /dev/sdb
Device contains neither a valid DOS partition table, nor Sun, SGI or OSF disklabel
Building a new DOS disklabel with disk identifier 0x686f4180.
Changes will remain in memory only, until you decide to write them.
After that, of course, the previous content won't be recoverable.
Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)
WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
switch off the mode (command 'c') and change display units to
sectors (command 'u').
Command (m for help):

Different commands inside window such as

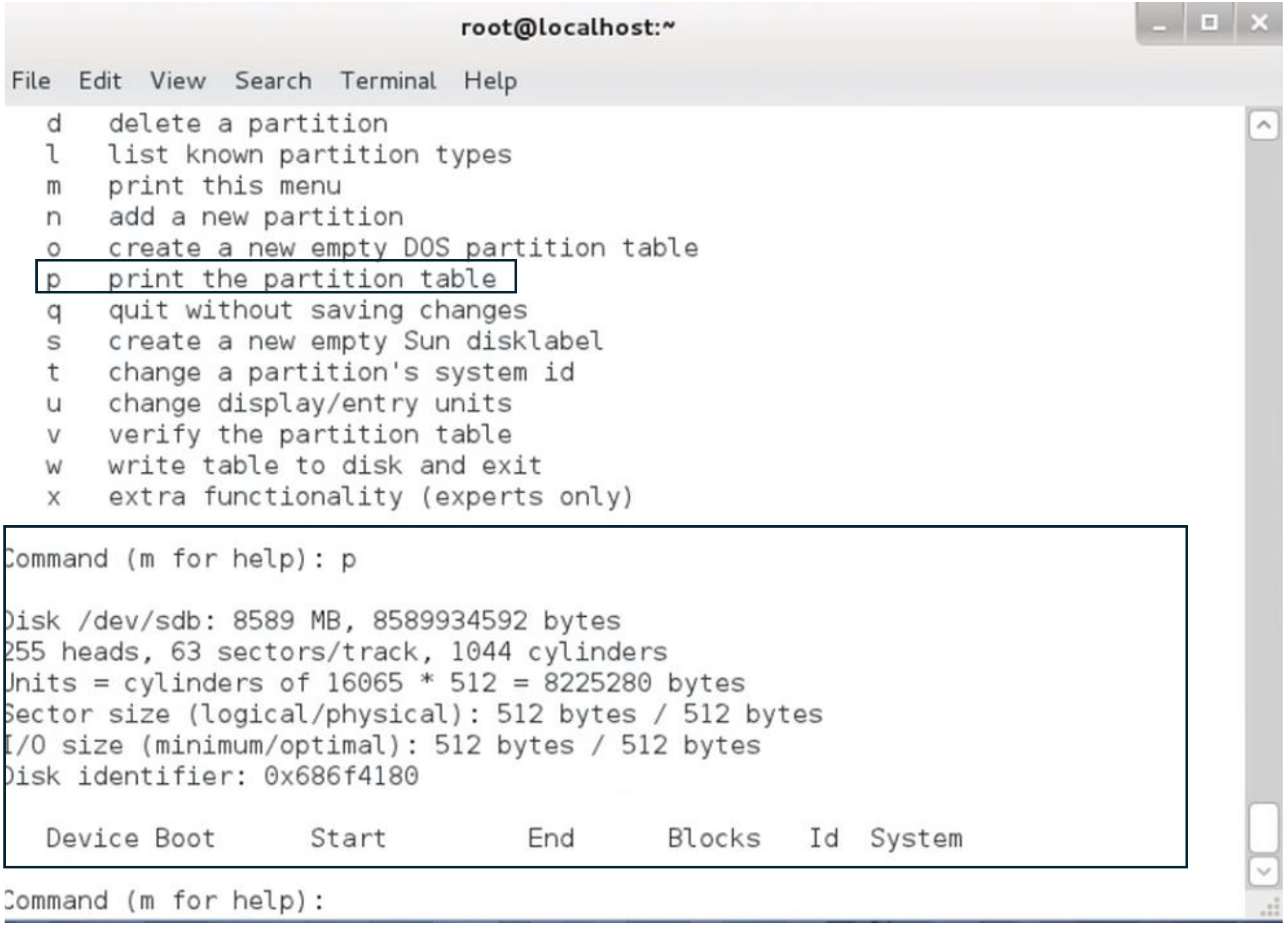


- m→ help
- List all commands can be used in this window to make partitions in sdb disk


root@localhost:~
File Edit View Search Terminal Help
Warning: invalid flag 0x0000 of partition table 4 will be corrected by w(rite)
WARNING: DOS-compatible mode is deprecated. It's strongly recommended to
switch off the mode (command 'c') and change display units to
sectors (command 'u').
Command (m for help): m
Command action
a toggle a bootable flag
b edit bsd disklabel
c toggle the dos compatibility flag
d delete a partition
l list known partition types
m print this menu
n add a new partition
o create a new empty DOS partition table
p print the partition table
q quit without saving changes
s create a new empty Sun disklabel
t change a partition's system id
u change display/entry units
v verify the partition table
w write table to disk and exit
x extra functionality (experts only)
Command (m for help):
ضغط m ,
يعرض كل الاوامر المتاحة
داخل الdisk

- p → print partition table

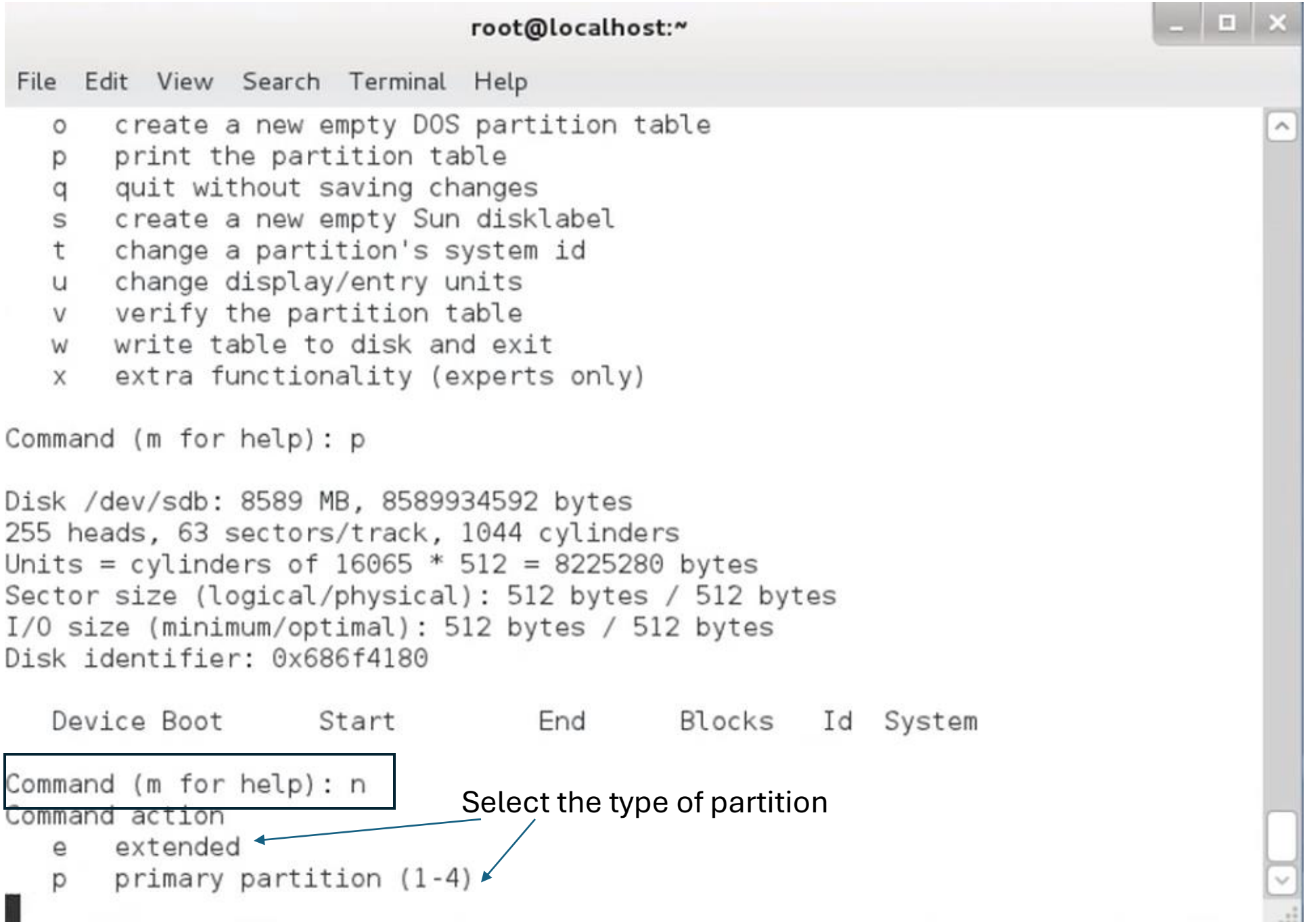
لاستعراض جدول
ال partitions بداخل
ال sdb
وجدنا انه لا يوجد اي
partitions


root@localhost:~
File Edit View Search Terminal Help
d delete a partition
l list known partition types
m print this menu
n add a new partition
o create a new empty DOS partition table
p print the partition table
q quit without saving changes
s create a new empty Sun disklabel
t change a partition's system id
u change display/entry units
v verify the partition table
w write table to disk and exit
x extra functionality (experts only)
Command (m for help): p
Disk /dev/sdb: 8589 MB, 8589934592 bytes
255 heads, 63 sectors/track, 1044 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x686f4180
Device Boot Start End Blocks Id System
Command (m for help):

- n→ add a new partition

لانشاء partition جديد
حرف n
يعطيني خيارات اما اختار
Primary
extended

عند اختيار حرف p ده معناهه ان الاختيار هو
primary
Partition number دليل علي رقمه علي الديسك
سؤال انه يكون في الاول اضغط enter
سؤال المساحة اكتب 2GB
او 2048M

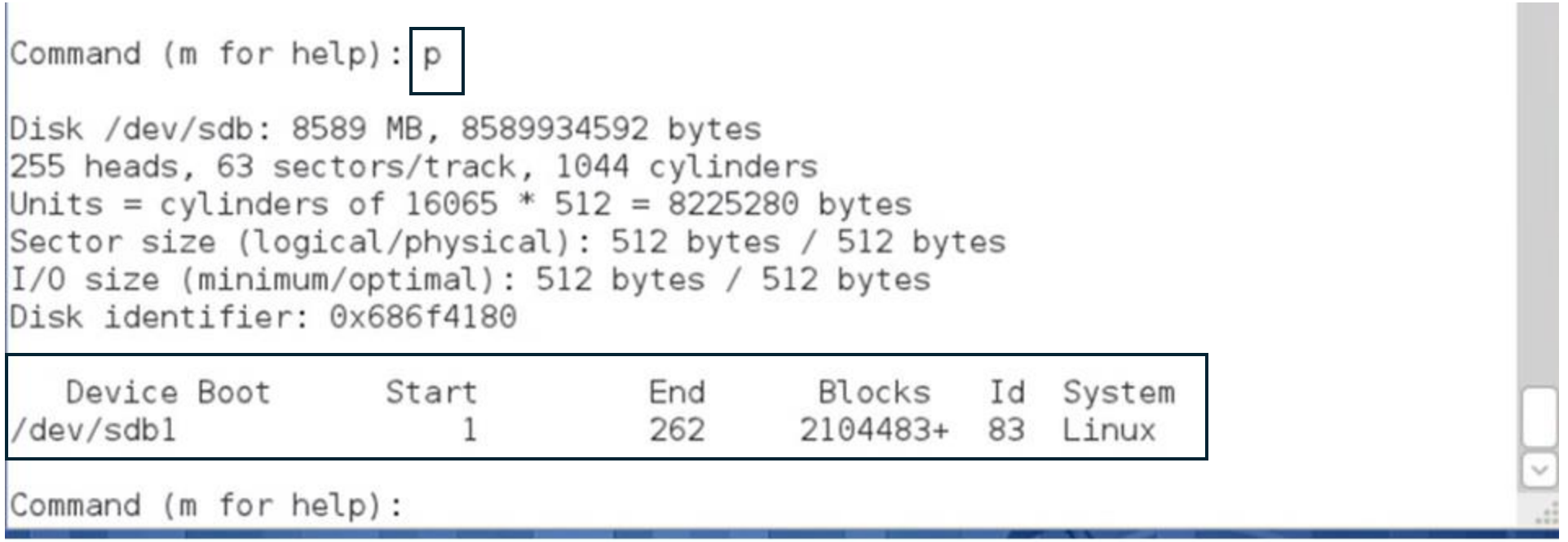

root@localhost:~
File Edit View Search Terminal Help
o create a new empty DOS partition table
p print the partition table
q quit without saving changes
s create a new empty Sun disklabel
t change a partition's system id
u change display/entry units
v verify the partition table
w write table to disk and exit
x extra functionality (experts only)
Command (m for help): p
Disk /dev/sdb: 8589 MB, 8589934592 bytes
255 heads, 63 sectors/track, 1044 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x686f4180
Device Boot Start End Blocks Id System
Command (m for help): n
Command action
e extended
p primary partition (1-4)
Select the type of partition

عند اختيار حرف p ده معناهه ان الاختيار هو
primary
Partition number دليل علي رقمه علي الديسك
سؤال انه يكون في الاول اضغط enter
سؤال المساحة اكتب 2GB
او 2048M

- p → print partition table

لاستعراض جدول ال partitions بداخل ال
sdb
وجدنا انه يوجد partition sdb1

الان يجب استعراض الجدول من خلال امر p
نجد عندها تم انشاء ال partition
يجب الضغط علي **W** للحفظ



To save the change in the disk

1. Type W to save change
2. Type partprobe /dev /sdb to get kernel read the changes

الضغط علي حرف pلاظهار
الجدول الان يحتوي علي sdb1
الضغط علي W للحفظ
كتابة partprobe
لجعل ال kernel تعيد قراءة ال
partition table
بالتغيرات الجديدة

```
Command (m for help): p

Disk /dev/sdb: 8589 MB, 8589934592 bytes
255 heads, 63 sectors/track, 1044 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x686f4180

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1               1         262     2104483+  83  Linux

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@localhost ~]# partprobe /dev/sdb
sdb   sdb1
```

Step 2: Format the Partition

- Once a partition has been created with the **parted** or **fdisk** command, format it before using it.
- Format the partition by running the following command:
- **mkfs -t ext4 /dev/sdb1**

Step 3: Mount the Partition

- To begin interacting with the disk, create a **mount point** and **mount the partition** to it.
- 1. **Create a mount point** by running the following command:
- ((mkdir -p /mt/sdb1))
- After that, **mount the partition** by entering:
- ((sudo mount -t auto /dev/sbd1 /mt/sdb1))
- The terminal does not print out an output if the commands are executed successfully.
- 3. **Verify** if partition is mounted by using
- ((**df hT**))

Sheet

1. First step to create partition sdb using

a. Fdisk –l b. Fdisk /dev/sdb c. Fdisk /dev d. all the above

2. The second step for make partition

a. Create b. format c. mount d. none

3. To close the window of create partition type

a. n b. p c. q d. m

4. If we want to rapid boot time and file access use

a. HDD b. SSD

5. We can divide the disk into ..... primary partitions

a. 3 b. 4 c.5 d.6

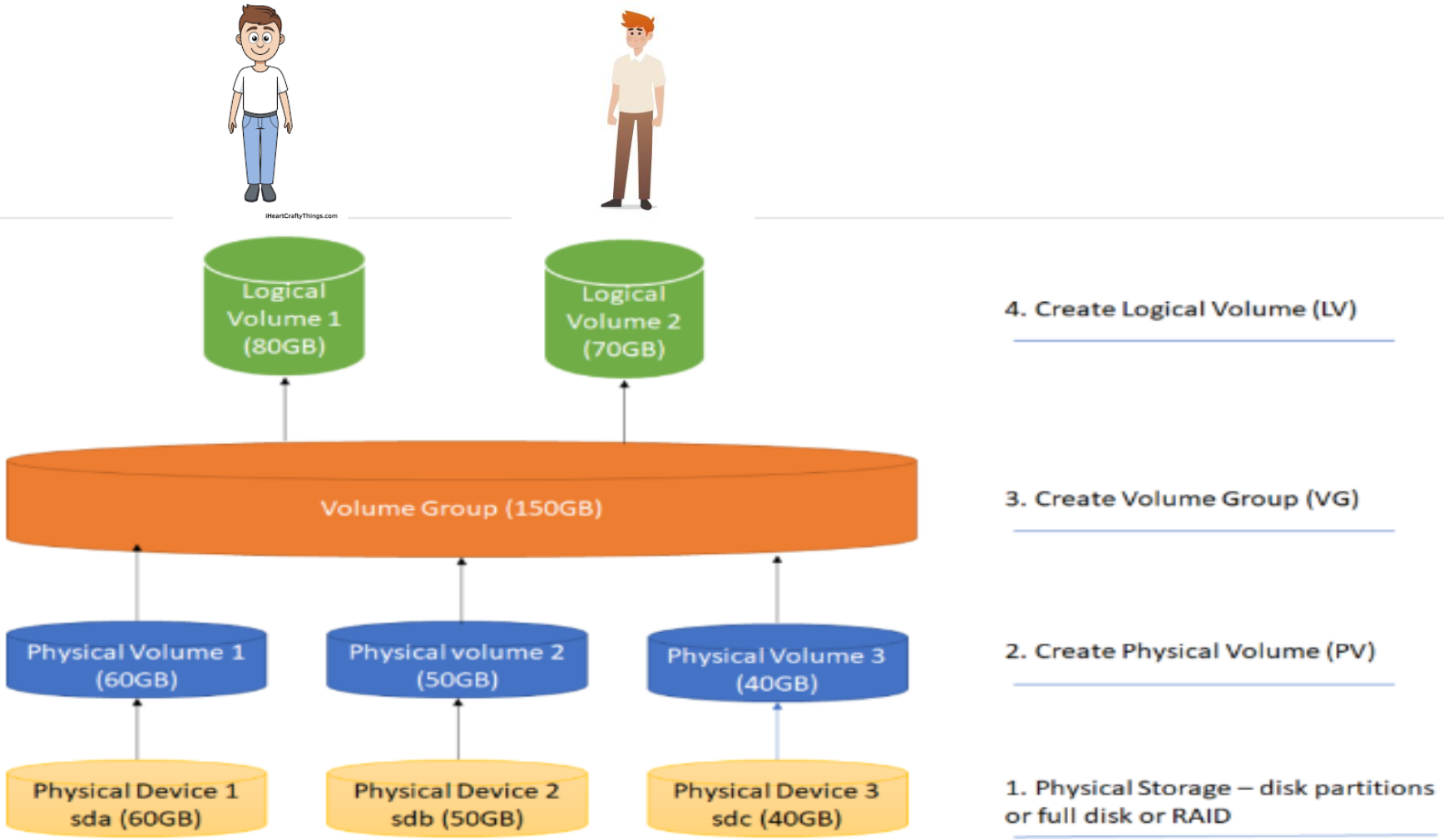
FHS & LVM in LINUX

Logical Volume Management (LVM)

- We convert the physical disks into Physical Volumes (PV) of the same sizes,
- Combine them to form one Volume Group (VG) (60+50+40=150Gb) and finally, break this VG into two Logical Volumes (LV) of 80Gb and 70Gb.

Logical Volume Management in Linux

- Method to manage disk space.
- ***For example***:
  1. you have three disks: 60Gb, 50Gb and 40Gb
  2. you want to allocate 80Gb and 70Gb of space to two users U1 and U2 respectively.
  3. problem, there is no single unit of either size available.
  4. Solution, Logical Volume Management.


Logical Volume 1 (80GB)
Logical Volume 2 (70GB)
Volume Group (150GB)
Physical Volume 1 (60GB)
Physical volume 2 (50GB)
Physical Volume 3 (40GB)
Physical Device 1 sda (60GB)
Physical Device 2 sdb (50GB)
Physical Device 3 sdc (40GB)
4. Create Logical Volume (LV)
3. Create Volume Group (VG)
2. Create Physical Volume (PV)
1. Physical Storage – disk partitions or full disk or RAID

Steps to create LVG in Linux

pv... => Physical Volumes commands
vg... => Volume Group commands
lv... => Logical Volumes commands
lvm... => Genetal LVM commands

- **How to create an LVM Logical Volume:**

1. Create physical volume or volumes from the existing hard drives.
2. Create a Volume group and add the physical volumes to it.
3. Create a Logical Volume from the Volume Group.
4. Format the Logical Volume as required — xfs, ext4 etc.
5. Finally, mount the new filesystem.

-

CREATION

1)**gdisk/fdisk [device]** and create as many partitions as needed
(don't forget the type to be "Linux LVM"
2)Label your new partitions as PV **pvcreate partition1 partition2 …** or go straight to create a VG.
3)Create a Volume Group with **vgcreate name partition1,2,3…**
4)Create Logical Volumes with **lvcreate -n name -l/L size vgname**
5)**mkfs -t type lvname** your new LVs
6)**mount /fstab** !

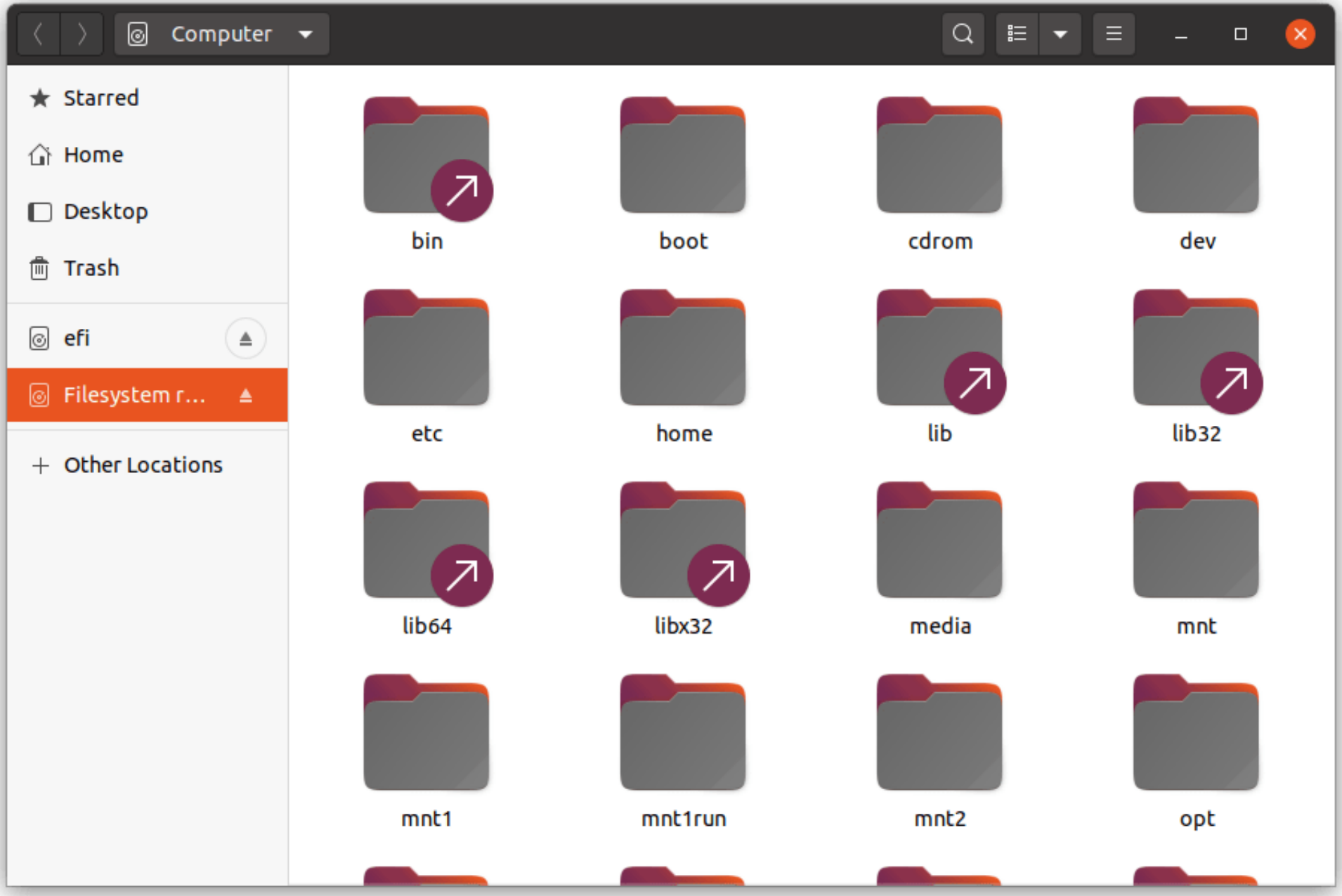
DELETION

lv/vg/pvremove

File system Hierarchy Standard (FHS)

File system Hierarchy Standard (FHS)

- The Linux filesystem is the foundation of any Linux-based operating system. It dictates how files are stored, organized, and accessed. Understanding this system is important for any engineer, as it influences everything from system performance to security and deployment processes.


Computer
Starred
Home
Desktop
Trash
efi
Filesystem r...
Other Locations
bin
boot
cdrom
dev
etc
home
lib
lib32
lib64
libx32
media
mnt
mnt1
mnt1run
mnt2
opt

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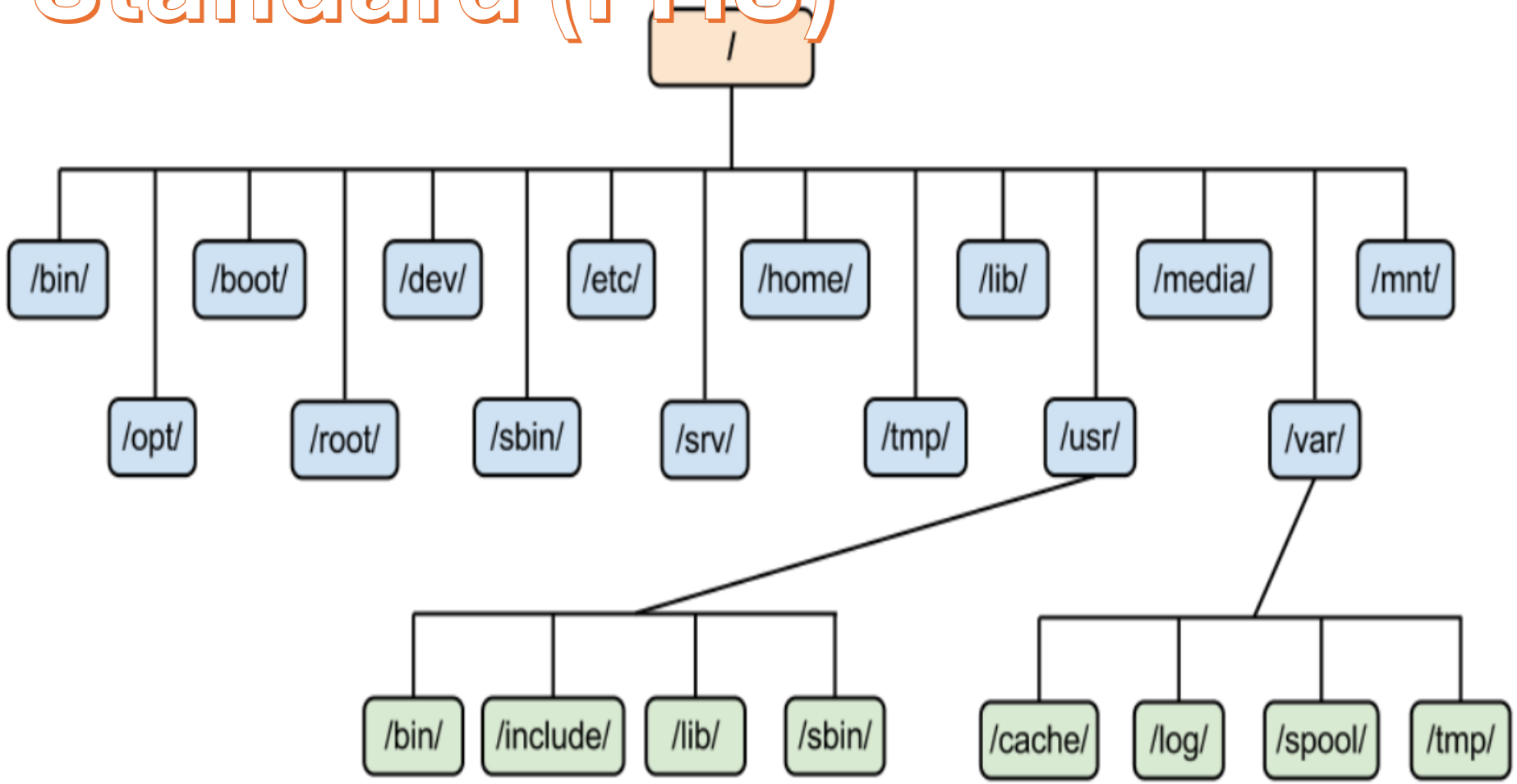

Notice that the topmost directory in the structure is the / directory, also called theroot directory.

- The root directory are a series of subdirectories.
- Specifications for how these directories are to be named are contained in the File system Hierarchy Standard (FHS)

/bin

- Bin or binary.
- This directory contains executable files ملفات تنفيذية necessary to manage and run the Linux system, including shells (such as bash) and file system management utilities such as cp and rm.
- يحتوي علي ملفات تنفيذية او برامج يحتاجها النظام بشكل اساسي في ال single user mode
- ده mode ادخل عليه لما عاوز اعمل upgarde او اعمل تصليحات في النظام

/sbin

- System binary or Sbin for administrators
- This directory contains important system management and administration files,

such as fdisk, fsck, ifconfig, init, mkfs, shutdown, and halt.

/lib

- This directory contains code libraries used by programs in /bin and /sbin. Your kernel modules are also stored in the module's subdirectory of /lib.

/boot

- This directory contains your bootloader files, which are required to boot your kernel Linux system.

/dev

- Devices or dev
- This directory contains special files that are get kernel to interact with devices or hardware
- Solid state drives: (SCSI)
- Such as sda ,(sda1,sda2 is the partitions for it), Sdb,sdc,.....
- Hard disk drives (IDE or SATA):
- Had, hdb, hdc,.....

/etc

- **Editable Text Configuration**
- This directory contains text-based configuration files used by the system as well as services running on the system. You can edit these files with a text editor to customize how Linux behaves as (apt used to install new packages).
- تحتوي علي ملفات الاعدادت التي تطبق علي كل مستخدمي توزيعة

/home

- This directory contains subdirectories that serve

→as home directories for each user account on your Linux system.

→Each home user contains files as (desktop, download, music, picture, public, templets,....)

/media

- This directory is used by some Linux distributions (such as SUSE Linux) to mount external devices.

/mnt

- This directory is used by some Linux distributions (such as Fedora or Red Hat) to mount external devices

/opt

- optional
- This directory contains files for some programs you install on the system
- Store files to install optional packages in the server.

/proc

- Contains sudo folders which represents the number of process in the kernel each file contains all information about the process.
- volatile
- ملفات غير حقيقية
- و غير مكتوبة بشكل فعلي و لكنها تحتوي علي مجموعه ملفات بها ارقام هذه الارقام عبارة عن ال

process number (رقم العملية الي شغال علي الجهاز)

/srv

Contain service information

- This directory contains subdirectories where services running on the system (such as ftp ssh for web server) save their files.

/sys

- This system directory contains information about the hardware in your system
- Volatile, store its contents in RAM and once shutdown the computer all contents of /sys are deleted.

/tmp

- This directory contains temporary files created by you or by the system.

/usr

- This directory contains programs or application files. In fact, most of the application files used on your system are saved in a subdirectory of /usr.

/var

- Variables
- تحتوي علي الملفات التي حجمها تتغير مع الوقت log files
- This directory contains a variety of variable data, including your system
- log files for programs
- Spool files for printers
- Mail box
- www files for webserver