

# NASA Homework 2

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## 1. 那傢伙竟然敢無視窗

1. pacman -S ntfs-3g to install ntfs util for creating ntfs.
2. mkfs.ntfs /dev/vdi2 to creat ntfs on vdi2 . \
3. lsblk -f to find the UUID of the new file system.
4. Edit fstab and add an entry for /dev/vdi2 .

### Screenshots:

```
[root@archlinux balu]# lsblk; df -hT
NAME          MAJ:MIN RM  SIZE RO TYPE MOUNTPOINTS
fd0            2:0    1   4K  0 disk
sda            8:0    0  32G  0 disk
└─sda1         8:1    0 200M  0 part /boot
└─sda2         8:2    0 31.8G  0 part /
sr0            11:0   1 1024M  0 rom
zram0          253:0   0  983M  0 disk [SWAP]
vda            254:0   0   1G  0 disk
└─vda1         254:1   0 1022M  0 part
  └─nasahw2--main-course 252:0   0 500M  0 lvm  /home/balu/course
vdb            254:16   0   1G  0 disk
└─vdb1         254:17   0 1022M  0 part
vdc            254:32   0   2G  0 disk
└─vdc1         254:33   0   2G  0 part
vdd            254:48   0   16G 0 disk
└─vdd1         254:49   0   16G 0 part
vde            254:64   0   512M 0 disk
└─vde1         254:65   0   510M 0 part
  └─nasahw2--secondary-videos 252:1   0 508M 0 lvm  /home/balu/videos
vdf            254:80   0   7G  0 disk
└─vdf1         254:81   0   2G  0 part
└─vdf2         254:82   0   2G  0 part
└─vdf3         254:83   0   2G  0 part
vdg            254:96   0   7G  0 disk
└─vdg1         254:97   0   2G  0 part
└─vdg2         254:98   0   2G  0 part
└─vdg3         254:99   0   2G  0 part
vdh            254:112   0   7G  0 disk
└─vdh1         254:113   0   2G  0 part
└─vdh2         254:114   0   2G  0 part
└─vdh3         254:115   0   2G  0 part
vdi            254:128   0   6G  0 disk
└─vdi1         254:129   0   2G  0 part
└─vdi2         254:130   0   4G  0 part
Filesystem      Type  Size  Used Avail Use% Mounted on
dev            devtmpfs 976M    0  976M  0% /dev
run            tmpfs   984M  740K  983M  1% /run
/dev/sda2      tmpfs   32G  3.3G  27G 11% /
tmpfs          tmpfs   984M    0  984M  0% /dev/shm
tmpfs          tmpfs   1.0M    0  1.0M  0% /run/credentials/systemd-journald.service
tmpfs          tmpfs   1.0M    0  1.0M  0% /run/credentials/systemd-resolved.service
tmpfs          tmpfs   1.0M    0  1.0M  0% /run/credentials/systemd-networkd.service
tmpfs          tmpfs   984M    0  984M  0% /tmp
/dev/sda1      vfat   197M   69M 129M 35% /boot
/dev/mapper/nasahw2--main-course ext4  459M  4.5M 425M 2% /home/balu/course
/dev/mapper/nasahw2--secondary-videos ext4  466M  66M 371M 16% /home/balu/videos
tmpfs          tmpfs   1.0M    0  1.0M  0% /run/credentials/getty@tty1.service
tmpfs          tmpfs   197M  4.0K 197M  1% /run/user/1000
```

```
[root@archlinux balu]# cat /etc/fstab
# Static information about the filesystems.
# See fstab(5) for details.

# <file system> <dir> <type> <options> <dump> <pass>
# /dev/sda2
UUID=d1daff5a-54da-43b8-a88e-83fa4e94a0b1      /          ext4      rw,relatime  0 1

# /dev/sda1
UUID=711C-6167        /boot        vfat      rw,relatime,fmask=0022,dmask=0022,codepage=437,iocharset=ascii,shortname=mixed,utf8,errors=remount-ro  0 2

/dev/nasahw2-main/course    /home/balu/course    ext4      defaults      0 2
/dev/nasahw2-secondary/videos /home/balu/videos  ext4      defaults      0 2

# /dev/vdi2
UUID=787E092F613C3A29   /mnt/myusb       ntfs      defaults      0 2
```

### Reference:

[https://wiki.archlinux.org/title/File\\_systems](https://wiki.archlinux.org/title/File_systems)

<https://wiki.archlinux.org/title/NTFS>

## 2. 因為要換到新的 SWAP

1. mkswap --size 4G --file /newswap to make a swap file.
2. swapon /newswap to activate.

### Screenshots:

```
[root@archlinux /]# free -h
              total        used        free      shared  buff/cache   available
Mem:      1.9Gi      199Mi      1.8Gi      4.1Mi      71Mi     1.7Gi
Swap:     5.0Gi      8.0Mi      5.0Gi
```

### Reference:

<https://wiki.archlinux.org/title/Swap>

### 3. 為資料創造新的棲身之處

1. lvresize -L 1G nasahw2-main/course to resize lv.
2. resize2fs /dev/nasahw2-main/course to expand the file system.

#### Screenshots:

lsblk; df -hT						
NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINTS
fd0	2:0	1	4K	0	disk	
sda	8:0	0	32G	0	disk	
└─sda1	8:1	0	200M	0	part	/boot
└─sda2	8:2	0	31.8G	0	part	/
sr0	11:0	1	1024M	0	rom	
zram0	253:0	0	983M	0	disk [SWAP]	
vda	254:0	0	1G	0	disk	
└─vda1	254:1	0	1022M	0	part	
└─nasahw2--main-course	252:0	0	1G	0	lvm	/home/balu/course
vdb	254:16	0	1G	0	disk	
└─vdb1	254:17	0	1022M	0	part	
└─nasahw2--main-course	252:0	0	1G	0	lvm	/home/balu/course
vdc	254:32	0	2G	0	disk	
└─vdc1	254:33	0	2G	0	part	
vdd	254:48	0	16G	0	disk	
└─vdd1	254:49	0	16G	0	part	
vde	254:64	0	512M	0	disk	
└─vde1	254:65	0	510M	0	part	
└─nasahw2--secondary-videos	252:1	0	508M	0	lvm	/home/balu/videos
vdf	254:80	0	7G	0	disk	
└─vdf1	254:81	0	2G	0	part	
└─vdf2	254:82	0	2G	0	part	
└─vdf3	254:83	0	2G	0	part	
vdg	254:96	0	7G	0	disk	
└─vgd1	254:97	0	2G	0	part	
└─vgd2	254:98	0	2G	0	part	
└─vgd3	254:99	0	2G	0	part	
vdh	254:112	0	7G	0	disk	
└─vh1	254:113	0	2G	0	part	
└─vh2	254:114	0	2G	0	part	
└─vh3	254:115	0	2G	0	part	
vdi	254:128	0	6G	0	disk	
└─vdi1	254:129	0	2G	0	part	
└─vdi2	254:130	0	4G	0	part	
Filesystem						
	Type	Size	Used	Avail	Use%	Mounted on
dev	devtmpfs	976M	0	976M	0%	/dev
run	tmpfs	984M	740K	983M	1%	/run
/dev/sda2	ext4	32G	7.3G	23G	25%	/
tmpfs	tmpfs	984M	0	984M	0%	/dev/shm
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/systemd-journald.service
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/systemd-resolved.service
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/systemd-networkd.service
tmpfs	tmpfs	984M	0	984M	0%	/tmp
/dev/sda1	vfat	197M	69M	129M	35%	/boot
/dev/mapper/nasahw2--main-course	ext4	950M	4.5M	896M	1%	/home/balu/course
/dev/mapper/nasahw2--secondary-videos	ext4	466M	66M	371M	16%	/home/balu/videos
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/getty@tty1.service
tmpfs	tmpfs	197M	4.0K	197M	1%	/run/user/1000

#### Reference:

<https://wiki.archlinux.org/title/LVM>

## 4. 我有拜託妳別把我的作業告訴其他人了吧

1. lvcreate -L 800M nasahw2-main -n homework to create lv.
2. cryptsetup luksFormat /dev/nasahw2-main/homework --key-file /home/balu/lvm\_key to initialize LUKS with a key file.
3. cryptsetup open /dev/nasahw2-main/homework homework --key-file=/home/balu/lvm\_key to open the LUKS device.
4. mkfs.ext4 /dev/mapper/homework to make file system.
5. lsblk -f to get UUID.
6. Edit /etc/crypttab and add an entry:  

```
homework    UUID=bf8e6be1-b71f-4587-9d96-4e1188285a3d    /home/balu/lvm_key    luks
```
7. Edit /etc/fstab and add an entry:  

```
UUID=7e016873-6d79-415f-8715-b555933f21bb    /home/balu/homework ext4    defaults 0 2
```
8. reboot to test.

### Screenshots:

```
[root@archlinux balu]# lsblk; df -hT
NAME          MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINTS
fd0            2:0    1   4K  0 disk
sda            8:0    0  32G  0 disk
└─sda1         8:1    0 200M  0 part  /boot
└─sda2         8:2    0 31.8G  0 part  /
sr0           11:0    1 1024M  0 rom
zram0          253:0   0  983M  0 disk  [SWAP]
vda           254:0    0   1G  0 disk
└─vda1         254:1   0 1022M  0 part
  └─nasahw2--main-course 252:0    0   1G  0 lvm   /home/balu/course
vdb           254:16   0   1G  0 disk
└─vdb1         254:17   0 1022M  0 part
  └─nasahw2--main-course 252:0    0   1G  0 lvm   /home/balu/course
  └─nasahw2--main-homework 252:2    0 800M  0 lvm
    └─homework        252:3    0 784M  0 crypt /home/balu/homework
vdc           254:32   0   2G  0 disk
└─vdc1         254:33   0   2G  0 part
vdd           254:48   0  16G  0 disk
└─vdd1         254:49   0  16G  0 part
vde           254:64   0  512M  0 disk
└─vde1         254:65   0 510M  0 part
  └─nasahw2--secondary-videos 252:1    0 508M  0 lvm   /home/balu/videos
vdf           254:80   0   7G  0 disk
└─vdf1         254:81   0   2G  0 part
└─vdf2         254:82   0   2G  0 part
└─vdf3         254:83   0   2G  0 part
vgd           254:96   0   7G  0 disk
└─vgd1         254:97   0   2G  0 part
└─vgd2         254:98   0   2G  0 part
└─vgd3         254:99   0   2G  0 part
vdh           254:112  0   7G  0 disk
└─vdh1         254:113  0   2G  0 part
└─vdh2         254:114  0   2G  0 part
└─vdh3         254:115  0   2G  0 part
vdi           254:128  0   6G  0 disk
└─vdi1         254:129  0   2G  0 part
└─vdi2         254:130  0   4G  0 part  /mnt/myusb
Filesystem      Type  Size  Used Avail Use% Mo
united on
dev            devtmpfs 976M   0  976M  0% /dev
run            tmpfs   984M 764K 983M  1% /run
/dev/sda2       ext4   32G 7.3G 23G 25% /
tmpfs          tmpfs   984M   0  984M  0% /dev/shm
```

tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/systemd-journald.service
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/systemd-resolved.service
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/systemd-networkd.service
/dev/vdi2	fuseblk	984M	0	984M	0%	/tmp
/dev/sda1	vfat	197M	69M	129M	35%	/boot
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/systemd-cryptsetup@homework.service
/dev/mapper/nasahw2--main-course	ext4	950M	4.5M	896M	1%	/home/balu/course
/dev/mapper/nasahw2--secondary-videos	ext4	466M	66M	371M	16%	/home/balu/videos
/dev/mapper/homework	ext4	755M	220K	700M	1%	/home/balu/homework
tmpfs	tmpfs	1.0M	0	1.0M	0%	/run/credentials/getty@tty1.service
tmpfs	tmpfs	197M	4.0K	197M	1%	/run/user/1000

## Reference:

<https://wiki.archlinux.org/title/LVM>

[https://wiki.archlinux.org/title/Dm-crypt/Encrypting\\_an\\_entire\\_system](https://wiki.archlinux.org/title/Dm-crypt/Encrypting_an_entire_system)

[https://wiki.archlinux.org/title/Dm-crypt/Device\\_encryption](https://wiki.archlinux.org/title/Dm-crypt/Device_encryption)

<https://man7.org/linux/man-pages/man5/crypttab.5.html>

## 5. 快照真的好難喔

1. vgextend nasahw2-main /dev/vdc1 to add /dev/vdc1 to volume group nasahw2-main .
2. lvcreate --size 1G --snapshot --name backup /dev/nasahw2-main/course and  
mount -m /dev/nasahw2-main/backup /mnt/backup to create a snapshot lv for course , and mount it on /mnt/backup .
3. tar --zstd -cf backup.tar.zst /mnt/backup to create tar archive.
4. umount /mnt/backup and lvremove nasahw2-main/backup to unmount lv and remove it.

## Screenshots:

```
[root@archlinux balu]# lsblk
NAME          MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINTS
fd0            2:0    1   4K  0 disk
sda            8:0    0 32G  0 disk
└─sda1         8:1    0 200M 0 part  /boot
  └─sda2         8:2    0 31.8G 0 part  /
sr0            11:0   1 1024M 0 rom
zram0          253:0   0 983M 0 disk [SWAP]
vda            254:0   0   1G  0 disk
└─vda1         254:1   0 1022M 0 part
  └─nasahw2--main-course-real 252:4   0   1G  0 lvm
    ├─nasahw2--main-course    252:0   0   1G  0 lvm  /home/balu/course
    └─nasahw2--main-backup    252:6   0   1G  0 lvm  /mnt/backup
vdb            254:16  0   16  0 disk
└─vdb1         254:17  0 1022M 0 part
  ├─nasahw2--main-homework  252:2   0 800M 0 lvm
    └─homework              252:3   0 784M 0 crypt /home/balu/homework
  └─nasahw2--main-course-real 252:4   0   1G  0 lvm
    ├─nasahw2--main-course    252:0   0   1G  0 lvm  /home/balu/course
    └─nasahw2--main-backup    252:6   0   1G  0 lvm  /mnt/backup
vdc            254:32  0   2G  0 disk
└─vdc1         254:33  0   2G  0 part
  └─nasahw2--main-backup-cow 252:5   0   1G  0 lvm
    └─nasahw2--main-backup    252:6   0   1G  0 lvm  /mnt/backup
vdd            254:48  0   16G 0 disk
└─vdd1         254:49  0   16G 0 part
vde            254:64  0   512M 0 disk
└─vde1         254:65  0   510M 0 part
  └─nasahw2--secondary-videos 252:1   0 508M 0 lvm  /home/balu/videos
vdf            254:80  0    7G 0 disk
└─vdf1         254:81  0    2G 0 part
```

```

vdf1          254:81  0   2G  0 part
└─vdf2          254:82  0   2G  0 part
└─vdf3          254:83  0   2G  0 part
vgd           254:96  0   7G  0 disk
├─vgd1          254:97  0   2G  0 part
├─vgd2          254:98  0   2G  0 part
└─vgd3          254:99  0   2G  0 part
vdh           254:112 0   7G  0 disk
├─vdh1          254:113 0   2G  0 part
├─vdh2          254:114 0   2G  0 part
└─vdh3          254:115 0   2G  0 part
vdi           254:128 0   6G  0 disk
├─vdi1          254:129 0   2G  0 part
└─vdi2          254:130 0   4G  0 part  /mnt/myusb

```

```

[root@archlinux balu]# lsblk; df -hT
NAME                MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINTS
fd0                  2:0    1   4K  0 disk
sda                  8:0    0  32G  0 disk
└─sda1              8:1    0 200M  0 part  /boot
└─sda2              8:2    0 31.8G  0 part  /
sr0                 11:0   1 1024M  0 rom
zram0              253:0   0  983M  0 disk  [SWAP]
vda                  254:0   0   1G  0 disk
└─vda1              254:1   0 1022M  0 part
  └─nasahw2--main-course 252:0   0   1G  0 lvm   /home/balu/course
vdb                  254:16  0   1G  0 disk
└─vdb1              254:17  0 1022M  0 part
  └─nasahw2--main-course 252:0   0   1G  0 lvm   /home/balu/course
  └─nasahw2--main-homework 252:2   0  800M  0 lvm
    └─homework          252:3   0 784M  0 crypt  /home/balu/homework
vdc                  254:32  0   2G  0 disk
└─vdc1              254:33  0   2G  0 part
vdd                  254:48  0   16G 0 disk
└─vdd1              254:49  0   16G 0 part
vde                  254:64  0   512M 0 disk
└─vde1              254:65  0   510M 0 part
  └─nasahw2--secondary-videos 252:1   0 508M 0 lvm   /home/balu/videos
vdf                  254:80  0   7G  0 disk
└─vdf1              254:81  0   2G  0 part
└─vdf2              254:82  0   2G  0 part
└─vdf3              254:83  0   2G  0 part
vgd                  254:96  0   7G  0 disk
├─vgd1              254:97  0   2G  0 part
├─vgd2              254:98  0   2G  0 part
└─vgd3              254:99  0   2G  0 part
vdh                  254:112 0   7G  0 disk
├─vdh1              254:113 0   2G  0 part
├─vdh2              254:114 0   2G  0 part
└─vdh3              254:115 0   2G  0 part
vdi                  254:128 0   6G  0 disk
├─vdi1              254:129 0   2G  0 part
└─vdi2              254:130 0   4G  0 part  /mnt/myusb
Filesystem            Type  Size  Used Avail Use% Mounted on
dev                 devtmpfs 976M   0  976M  0%  /dev
run                 tmpfs   984M  772K 983M  1%  /run
/dev/sda2           tmpfs   32G   7.3G 23G  25%  /
tmpfs               tmpfs   984M   0  984M  0%  /dev/shm
tmpfs               tmpfs   1.0M   0  1.0M  0%  /run/credentials/systemd-journald.service
tmpfs               tmpfs   1.0M   0  1.0M  0%  /run/credentials/systemd-resolved.service
tmpfs               tmpfs   1.0M   0  1.0M  0%  /run/credentials/systemd-networkd.service
tmpfs               tmpfs   984M   0  984M  0%  /tmp
/dev/vdi2           fuseblk 4.0G   22M 4.0G  1%  /mnt/myusb
/dev/sda1           vfat    197M  69M 129M 35%  /boot
tmpfs               tmpfs   1.0M   0  1.0M  0%  /run/credentials/systemd-cryptsetup@homework.service
/dev/mapper/nasahw2--main-course ext4   950M  4.5M 896M  1%  /home/balu/course
/dev/mapper/nasahw2--secondary-videos ext4   466M  66M 371M 16%  /home/balu/videos
/dev/mapper/homework      ext4   755M  220K 700M  1%  /home/balu/homework
tmpfs               tmpfs   1.0M   0  1.0M  0%  /run/credentials/getty@tty1.service
tmpfs               tmpfs   197M  4.0K 197M  1%  /run/user/1000

```

**Reference:**

<https://wiki.archlinux.org/title/LVM>

<https://www.cyberciti.biz/faq/how-to-tar-a-file-in-linux-using-command-line/>

<https://man7.org/linux/man-pages/man1/tar.1.html>

## 6. 好老舊喔

1. vgextend nasahw2-secondary /dev/vdd1 to add /dev/vdd1 to nasahw2-secondary .
2. pvmove /dev/vde1 to move the data from /dev/vde1
3. vgreduce nasahw2-secondary /dev/vde1 to remove /dev/vde1 from nasahw2-secondary .

**Screenshots:**

```
[root@archlinux balu]# pvs
```

PV	VG	Fmt	Attr	PSize	PFree
/dev/vda1	nasahw2-main	lvm2	a--	1020.00m	0
/dev/vdb1	nasahw2-main	lvm2	a--	1020.00m	216.00m
/dev/vdc1	nasahw2-main	lvm2	a--	<2.00g	<2.00g
/dev/vdd1	nasahw2-secondary	lvm2	a--	<16.00g	15.50g
/dev/vde1		lvm2	---	510.00m	510.00m

```
[root@archlinux balu]# vgs
```

VG	#PV	#LV	#SN	Attr	VSize	VFree
nasahw2-main	3	2	0	wz--n-	<3.99g	<2.21g
nasahw2-secondary	1	1	0	wz--n-	<16.00g	15.50g

**Reference:**

<https://wiki.archlinux.org/title/LVM>

## 7. 我看還是再來合一次吧

1. umount /home/balu/videos to unmount the lv on nasahw2-secondary .
2. vgchange -a n nasahw2-secondary to deactivate vg.
3. vgmerge nasahw2-main nasahw2-secondary to merge nasahw2-secondary into nasahw2-main .
4. Modify fstab, change the line:

```
/dev/nasahw2-secondary/videos /home/balu/videos ext4 defaults 0 2 to
/dev/nasahw2-main/videos /home/balu/videos ext4 defaults 0 2
```

### Screenshots:

```
[root@archlinux balu]# vgs
  VG          #PV #LV #SN Attr   VSize   VFree
nasahw2-main    4    3    0 wz--n- 19.98g <17.71g
```

```
[root@archlinux balu]# lvs
  LV      VG          Attr       LSize   Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
course   nasahw2-main -wi-ao----  1.00g
homework nasahw2-main -wi-ao---- 800.00m
videos    nasahw2-main -wi----- 508.00m
```

```
[root@archlinux balu]# cat /etc/fstab
# Static information about the filesystems.
# See fstab(5) for details.

# <file system> <dir> <type> <options> <dump> <pass>
# /dev/sda2
UUID=d1daff5a-54da-43b8-a88e-83fa4e94a0b1      /           ext4        rw,relatime     0  1

# /dev/sda1
UUID=711C-6167        /boot        vfat        rw,relatime,fmask=0022,dmask=0022,codepage=437,i
ocharset=ascii,shortname=mixed,utf8,errors=remount-ro    0  2

/dev/nasahw2-main/course      /home/balu/course      ext4        defaults      0  2
/dev/nasahw2-main/videos      /home/balu/videos      ext4        defaults      0  2

# /dev/vdi2
UUID=787E092F613C3A29    /mnt/myusb      ntfs        defaults      0  2

# /dev/nasahw2-main/homework
UUID=7e016873-6d79-415f-8715-b555933f21bb      /home/balu/homework      ext4        defaults 0  2
```

### Reference:

[https://docs.redhat.com/en/documentation/red\\_hat\\_enterprise\\_linux/6/html/](https://docs.redhat.com/en/documentation/red_hat_enterprise_linux/6/html/)

[logical\\_volume\\_manager\\_administration/vg\\_combine#VG\\_combine](#)

[https://docs.redhat.com/en/documentation/red\\_hat\\_enterprise\\_linux/4/html/cluster\\_logical\\_volume\\_manager/vg\\_activate#VG\\_activate](https://docs.redhat.com/en/documentation/red_hat_enterprise_linux/4/html/cluster_logical_volume_manager/vg_activate#VG_activate)

## 8.等一下，妳還沒回答我

1. zfs does not support growing and shrinking while unmounted, whereas btrfs supports both while unmounted.

**Reference:**

[https://en.wikipedia.org/wiki/Comparison\\_of\\_file\\_systems#Features](https://en.wikipedia.org/wiki/Comparison_of_file_systems#Features)

2. FUSE as the name implies, is a filesystem implemented in userspace, with a kernel module that only acts as a bridge between the userspace code and other kernel interfaces.

Advantages:

Faster development and distribution, as it is not integrated to the kernel.

Disadvantages:

Less robust, for example, since the filesystem is implemented as processes, there is a chance that it is accidentally killed.

**References:**

[https://en.wikipedia.org/wiki/Filesystem\\_in\\_Userspace](https://en.wikipedia.org/wiki/Filesystem_in_Userspace)

<https://www.linuxtoday.com/blog/user-space-file-systems/>

3. MBR: Master Boot Record, GPT: GUID Partition Table

i. MBR has a maximum partition size of 2TB whereas GPT supports up to 64ZiB (depending on sector size).

ii. MBR only supports 4 partitions whereas GPT supports at least 128 partitions.

**References:**

[https://en.wikipedia.org/wiki/Master\\_boot\\_record](https://en.wikipedia.org/wiki/Master_boot_record)

[https://en.wikipedia.org/wiki/GUID\\_Partition\\_Table](https://en.wikipedia.org/wiki/GUID_Partition_Table)

4. By SI & IEC definition,  $1\text{MB} = 1000^2 \text{ bytes}$ ,  $\text{MiB} = 1024^2 \text{ bytes}$ .

For a 4096 byte file, with `ls -l`, we see that it is 4096 bytes, but with `ls -lh`, it is 4.0K, thus the K means KiB, and `ls -lh` uses binary prefixes by default.

**Reference:**

<https://en.wikipedia.org/wiki/Megabyte>

5. i. RAID 0:

RAID 0 does striping, which increases read/write throughput, but it does not provide mirroring or parity, thus losing 1 drive would typically mean all data are lost.

ii. RAID 1:

RAID 1 does mirroring, which decreases write throughput, but since all data are mirrored, as long as one drive is functional, no data is lost. RAID 1 does not provide parities or striping.

iii. RAID 5:

RAID 5 does striping with distributed parities, parities are distributed among the drives, such that if one drive fails, data can still be rebuilt, if more than one fails, data would be lost.

iv. RAID 10:

Also known as RAID 1+0, is a RAID 0 of RAID 1s, meaning it does striping on mirrors.

**Reference:**

<https://en.wikipedia.org/wiki/RAID>

[https://en.wikipedia.org/wiki/Standard\\_RAID\\_levels](https://en.wikipedia.org/wiki/Standard_RAID_levels)

[https://en.wikipedia.org/wiki/Nested\\_RAID\\_levels#RAID\\_10](https://en.wikipedia.org/wiki/Nested_RAID_levels#RAID_10)