

- using `dd` command create empty file with size of 20MB (hint: count 40000, bs=512)

```
weam@weam-VirtualBox:/mnt$ dd if=/dev/zero of=/tmp/disk.img bs=512 count=40000
40000+0 records in
40000+0 records out
20480000 bytes (20 MB, 20 MiB) copied, 0.184137 s, 111 MB/s
```

- attach the file as loop device using `losetup` command (hint: use `losetup -f` to allocate free device)

```
weam@weam-VirtualBox:/mnt$ sudo losetup -f
/dev/loop2
weam@weam-VirtualBox:/mnt$ sudo losetup /dev/loop2 /tmp/disk.img
weam@weam-VirtualBox:/mnt$ losetup -l |grep 2
```

/dev/loop1	0	0	1	1	/var/lib/snapd/snaps/core20_1587.snap	0	512
/dev/loop8	0	0	1	1	/var/lib/snapd/snaps/snap-store_582.snap	0	512
/dev/loop6	0	0	1	1	/var/lib/snapd/snaps/gnome-3-38-2004_112.snap	0	512
/dev/loop13	0	0	1	1	/var/lib/snapd/snaps/snapd-desktop-integration_49.snap	0	512
/dev/loop4	0	0	1	1	/var/lib/snapd/snaps/firefox_2356.snap	0	512
/dev/loop11	0	0	1	1	/var/lib/snapd/snaps/snapd_18357.snap	0	512
/dev/loop2	0	0	0	0	/tmp/disk.img	0	512
/dev/loop0	0	0	1	1	/var/lib/snapd/snaps/bare_5.snap	0	512
/dev/loop9	0	0	1	1	/var/lib/snapd/snaps/snap-store_638.snap	0	512
/dev/loop7	0	0	1	1	/var/lib/snapd/snaps/gtk-common-themes_1535.snap	0	512
/dev/loop14	0	0	1	1	/var/lib/snapd/snaps/firefox_2391.snap	0	512
/dev/loop5	0	0	1	1	/var/lib/snapd/snaps/gnome-3-38-2004_119.snap	0	512
/dev/loop12	0	0	1	1	/var/lib/snapd/snaps/snapd-desktop-integration_14.snap	0	512
/dev/loop3	0	0	1	1	/var/lib/snapd/snaps/core20_1822.snap	0	512
/dev/loop10	0	0	1	1	/var/lib/snapd/snaps/snapd_17950.snap	0	512

```
weam@weam-VirtualBox:/mnt$
```

- using `fdisk` command, create new partition into the loop device (`fdisk /dev/loop<??>` where `<??>` is the device number)

```
weam@weam-VirtualBox:/mnt$ sudo fdisk /dev/loop2

Welcome to fdisk (util-linux 2.37.2).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0xba24e0a1.

Command (m for help): m

Help:

DOS (MBR)
Disk /dev/loop2: 19.53 MiB, 20480000 bytes, 40000 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0xba24e0a1

Device      Boot Start    End Sectors  Size Id Type
dev/loop2p1      2048 39999   37952 18.5M 83 Linux
```

- format the new partition using `mkfs.ext4` command

```

mkfs.ext4: Permission denied while trying to determine filesystem size
weam@weam-VirtualBox:/mnt$ sudo mkfs.ext4 /dev/loop2p1
mke2fs 1.46.5 (30-Dec-2021)
Discarding device blocks: done
Creating filesystem with 4744 4k blocks and 4752 inodes

Allocating group tables: done
Writing inode tables: done
Creating journal (1024 blocks): done
Writing superblocks and filesystem accounting information: done

```

- mount the formatted partition into /mnt directory

```
weam@weam-VirtualBox:/mnt$ sudo mount /dev/loop2p1 /mnt
```

- create some files inside the mounted /mnt directory

```

lost+found
weam@weam-VirtualBox:/mnt$ sudo touch /mnt/file2.txt
weam@weam-VirtualBox:/mnt$ ls /mnt
file2.txt  lost+found
weam@weam-VirtualBox:/mnt$ sudo touch /mnt/file3.txt
weam@weam-VirtualBox:/mnt$ ls /mnt
file2.txt  file3.txt  lost+found

```

- unmount /mnt directory using umount command

```

weam@weam-VirtualBox:/mnt$ sudo umount /mnt
weam@weam-VirtualBox:/mnt$ ls /mnt
file1

```

- using `apt` command, search and install `gparted` program

```

file2.txt  file3.txt  lost+found
weam@weam-VirtualBox:/mnt$ apt search gparted
Sorting... Done
Full Text Search... Done
gparted/jammy 1.3.1-1ubuntu1 amd64
  GNOME partition editor

gparted-common/jammy,jammy 1.3.1-1ubuntu1 all
  GNOME partition editor -- common data

partitionmanager/jammy 21.12.3-0ubuntu1 amd64
  file, disk and partition management for KDE

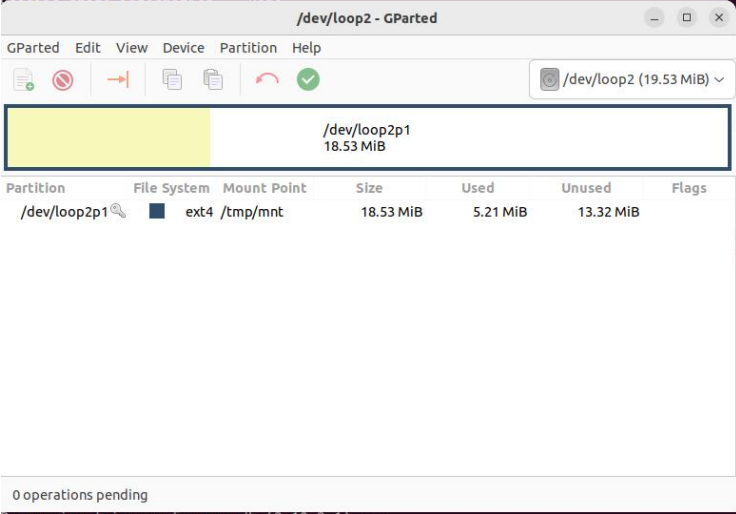
weam@weam-VirtualBox:/mnt$ sudo apt install gparted
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  systemd-hwe-hwdb
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  gparted-common
Suggested packages:
  dmraid gpart jfsutils kpartx mtools reiser4progs reiserfsprogs udftools xfsprogs exfatprogs
The following NEW packages will be installed:
  gparted gparted-common
0 upgraded, 2 newly installed, 0 to remove and 204 not upgraded.
Need to get 490 kB of archives.
After this operation, 2,128 kB of additional disk space will be used.
Do you want to continue? [Y/n]
Get:1 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 gparted-common all 1.3.1-1ubuntu1 [71.9 kB]
Get:2 http://eg.archive.ubuntu.com/ubuntu jammy/main amd64 gparted amd64 1.3.1-1ubuntu1 [418 kB]
Fetched 490 kB in 2s (282 kB/s)
Selecting previously unselected package gparted-common.
(Reading database ... 197390 files and directories currently installed.)
Preparing to unpack .../gparted-common_1.3.1-1ubuntu1_all.deb ...
Unpacking gparted-common (1.3.1-1ubuntu1) ...
Selecting previously unselected package gparted.
Preparing to unpack .../gparted_1.3.1-1ubuntu1_amd64.deb ...
Unpacking gparted (1.3.1-1ubuntu1) ...
Setting up gparted-common (1.3.1-1ubuntu1) ...
Setting up gparted (1.3.1-1ubuntu1) ...
Processing triggers for mailcap (3.70+nmuiubuntu1) ...
Processing triggers for desktop-file-utils (0.26-1ubuntu3) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu3) ...
Processing triggers for man-db (2.10.2-1) ...

weam@weam-VirtualBox:/mnt$

```

- navigate and use gparted to detect the the new partition.

```
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```



Partition	File System	Mount Point	Size	Used	Unused	Flags
/dev/loop2p1	ext4	/tmp/mnt	18.53 MiB	5.21 MiB	13.32 MiB	

```
0 operations pending
Processing triggers for man-db (2.10.2-1) ...

weam@weam-VirtualBox:/mnt$ sudo gparted /dev/loop2
GParted 1.3.1
configuration --enable-libparted-dmraid --enable-online-resize
libparted 3.4
```

```
atprogs
buntu1 [71.9 kB]
1 [418 kB]
```