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

```
vboxuser@ubuntu:~$ dd if=/dev/zero of=/tmp/disk.img bs=512 count=4000
4000+0 records in
4000+0 records out
2048000 bytes (2.0 MB, 2.0 MiB) copied, 0.0393597 s, 52.0 MB/s
vboxuser@ubuntu:~$
```

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

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

```
vboxuser@ubuntu:~$ losetup -f
/dev/loop2
vboxuser@ubuntu:~$ sudo losetup -p /dev/loop2 /temp/disk.img
[sudo] password for vboxuser:
Sorry, try again.
[sudo] password for vboxuser:
losetup: invalid option -- 'p'
Try 'losetup --help' for more information.
vboxuser@ubuntu:~$ sudo losetup -P /dev/loop2 /temp/disk.img
losetup: /temp/disk.img: failed to set up loop device: No such file or director
y
vboxuser@ubuntu:~$ sudo losetup -P /dev/loop2 /tmp/disk.img
vboxuser@ubuntu:~$ 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 0xc81938ac.

Command (m for help):
```

```
vboxuser@ubuntu:~$ sudo losetup -p /dev/loop2 /temp/disk.img
[sudo] password for vboxuser:
Sorry, try again.
[sudo] password for vboxuser:
losetup: invalid option -- 'p'
Try 'losetup --help' for more information.
vboxuser@ubuntu:~$ sudo losetup -P /dev/loop2 /temp/disk.img
losetup: /temp/disk.img: failed to set up loop device: No such file or director
y
vboxuser@ubuntu:~$ sudo losetup -P /dev/loop2 /tmp/disk.img
vboxuser@ubuntu:~$ 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 0xc81938ac.

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p): P
Partition number (1-4, default 1):
First sector (1-3999, default 1):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (1-3999, default 3999):

Created a new partition 1 of type 'Linux' and of size 2 MiB.
```

4-format the new partition using mkfs.ext4 command

```
vboxuser@ubuntu:~$ sudo mkfs.ext4 /tmp/disk.img
[sudo] password for vboxuser:
mke2fs 1.46.5 (30-Dec-2021)
Found a dos partition table in /tmp/disk.img
Proceed anyway? (y,N) y

Filesystem too small for a journal
Discarding device blocks: done
Creating filesystem with 500 4k blocks and 256 inodes

Allocating group tables: done
Writing inode tables: done
Writing superblocks and filesystem accounting information: done
```

5-mount the formatted partition into /mnt directory

```
vboxuser@ubuntu:~$ sudo mount /dev/loop2 /mnt
vboxuser@ubuntu:~$ ls /mnt
Lost+found
vboxuser@ubuntu:~$
```

6-create some files inside the mounted /mnt directory

```
vboxuser@ubuntu:~$ sudo touch /mnt/esraa1.txt
vboxuser@ubuntu:~$ sudo touch /mnt/esraa2.txt
vboxuser@ubuntu:~$ sudo touch /mnt/esraa3.txt
vboxuser@ubuntu:~$ ls /mnt
esraa1.txt   esraa2.txt   esraa3.txt   lost+found
vboxuser@ubuntu:~$
```
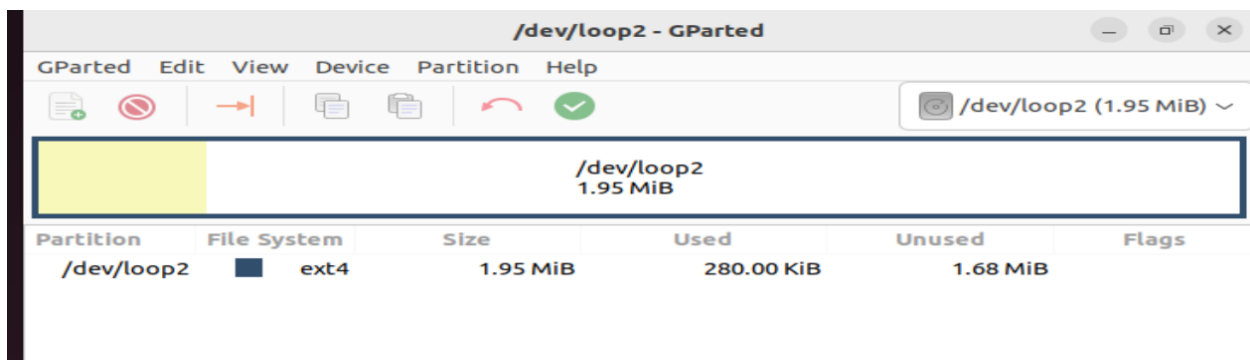
7-unmount /mnt directory using umount command

```
vboxuser@ubuntu:~$ sudo umount /mnt
vboxuser@ubuntu:~$
vboxuser@ubuntu:~$
vboxuser@ubuntu:~$
```

8-using `apt` command, search and install

```
vboxuser@ubuntu:~$ 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 186 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] Y
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 3s (186 kB/s)
Selecting previously unselected package gparted-common.
(Reading database ... 233352 files and directories currently installed.)
```

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


```
vboxuser@ubuntu:~$ gparted /dev/loop2
GParted 1.3.1
configuration --enable-libparted-dmraid --enable-online-resize
libparted 3.4
vboxuser@ubuntu:~$
```