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

```
ubuntu@ubuntu:~$ dd if=/dev/zero of=/tmp/disk.img bs=512 count=400000
400000+0 records in
400000+0 records out
204800000 bytes (205 MB, 195 MiB) copied, 1.96861 s, 104 MB/s
```

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

```
ubuntu@ubuntu:~$ sudo losetup -f
/dev/loop10
ubuntu@ubuntu:~$ sudo losetup /dev/loop10 /tmp/disk.img
```

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

```
ubuntu@ubuntu:~$ sudo fdisk /dev/loop10

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 0x49f9d4a4.

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): 1
First sector (2048-399999, default 2048): 2048
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-399999, default 399999): 39
9999

Created a new partition 1 of type 'Linux' and of size 194.3 MiB.

Command (m for help):
```

4. format the new partition using mkfs.ext4 command

```
ubuntu@ubuntu:~$ sudo mkfs.ext4 /tmp/disk.img
mke2fs 1.46.5 (30-Dec-2021)
Found a dos partition table in /tmp/disk.img
Proceed anyway? (y,N) y
Discarding device blocks: done
Creating filesystem with 50000 4k blocks and 50016 inodes
Filesystem UUID: 269193fe-302b-43ad-8686-ab955bac8a8c
Superblock backups stored on blocks:
        32768

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done
```

5. mount the formatted partition into /mnt directory

```
ubuntu@ubuntu:~$ sudo mount /dev/loop10 /mnt
ubuntu@ubuntu:~$ ls mnt
ls: cannot access 'mnt': No such file or directory
ubuntu@ubuntu:~$ sudo mount /dev/loop10 /mnt
mount: /mnt: /dev/loop10 already mounted on /mnt.
ubuntu@ubuntu:~$ ls /mnt
lost+found
```

6. create some files inside the mounted /mnt directory

```
ubuntu@ubuntu:~$ sudo touch /mnt/text1.txt
ubuntu@ubuntu:~$ sudo touch /mnt/text2.txt
ubuntu@ubuntu:~$ ls /mnt
lost+found  text1.txt  text2.txt
ubuntu@ubuntu:~$
```

7. unmount /mnt directory using umount command

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

8. using `apt` command, search and install `gparted` program

```
ubuntu@ubuntu:~$ sudo apt install gparted
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gparted is already the newest version (1.3.1-1ubuntu1).
0 upgraded, 0 newly installed, 0 to remove and 417 not upgraded.
ubuntu@ubuntu:~$
```

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

gparted /dev/loop18