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

```
sara@sara-VirtualBox:~$ 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, 0.16254 s, 126 MB/s
```

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

```
sara@sara-VirtualBox:~$ sudo losetup -f
[sudo] password for sara:
/dev/loop18
sara@sara-VirtualBox:~$ sudo losetup /dev/loop18 /tmp/disk.img
```

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

```
sara@sara-VirtualBox:~$ sudo fdisk /dev/loop18

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 0x2af583e7.

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 (2048-39999, default 2048):
Last sector, +/-sectors or +/-size{K,M,G,T,P} (2048-39999, default 39999):

Created a new partition 1 of type 'Linux' and of size 18.5 MiB.
```

4. **format the new partition using mkfs.ext4 command**

```
sara@sara-VirtualBox:~$ sudo mkfs.ext4 /tmp/disk.img
mke2fs 1.46.5 (30-Dec-2021)
Discarding device blocks: done
Creating filesystem with 5000 4k blocks and 5008 inodes

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

5. **mount the formatted partition into /mnt directory**

```
sara@sara-VirtualBox:~$ sudo mount /dev/loop18 /mnt
sara@sara-VirtualBox:~$ ls /mnt
lost+found
```

6. **create some files inside the mounted /mnt directory**

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

7. **unmount /mnt directory using umount command**

```
sara@sara-VirtualBox:~$ sudo umount  /mnt
```

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

```
sara@sara-VirtualBox:~$ 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 205 not upgraded.
Need to get 490 kB of archives.
After this operation, 2,128 kB of additional disk space will be used.
```

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

(Using gparted /dev/loop18 command)