Lab4 Objectives:

1. using `dd` command create empty file with size of 20MB (hint: count 40000, bs=512)
    - command:
        - dd if=/dev/zero of=/tmp/disk.img bs=512 count=40000
    - screen shot:

```
mariam@mariam-VirtualBox:~/Desktop$ 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, 0.810994 s, 25.3 MB/s
```

2. attach the file as loop device using `losetup` command (hint: use `losetup -f` to allocate free device)
    - commands:
        - sudo losetup -f
        - sudo losetup /dev/loop1 /tmp/disk.img
    - screen shot:

```
mariam@mariam-VirtualBox:~/Desktop$ sudo losetup -f
[sudo] password for mariam:
/dev/loop1
mariam@mariam-VirtualBox:~/Desktop$ sudo losetup /dev/loop1 /tmp/disk.img
```

3. using `fdisk` command, create new partition into the loop device (`fdisk /dev/loop<??>` where <??> is the device number)
    - commands:
        - sudo fdisk /dev/loop1
    - screen shot:

```
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 0xee6081d8.

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 (2048-39999, 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

   - commands:
     - sudo mkfs.ext4 /tmp/disk.img
   - screen shot:

```
mariam@mariam-VirtualBox:~/Desktop$ 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

   - commands:
     - sudo mount /dev/loop1 /mnt
     - $ ls /mnt
   - screen shot:

```
mariam@mariam-VirtualBox:~/Desktop$ sudo mount /dev/loop1 /mnt
mariam@mariam-VirtualBox:~/Desktop$ ls /mnt
lost+found
```

6. create some files inside the mounted /mnt directory

   - commands:
     - sudo touch /mnt/lab5.txt
     - sudo touch /mnt/sysAdmin.txt
     - sudo touch /mnt/file.txt
     - ls /mnt
   - screen shot:

```
mariam@mariam-VirtualBox:~/Desktop$ sudo touch /mnt/lab5.txt
mariam@mariam-VirtualBox:~/Desktop$ sudo touch /mnt/sysAdmin.txt
mariam@mariam-VirtualBox:~/Desktop$ sudo touch /mnt/file.txt
mariam@mariam-VirtualBox:~/Desktop$ ls /mnt
file.txt  lab5.txt  lost+found  sysAdmin.txt
```

7. unmount `/mnt` directory using `umount` command
    - commands:
        - sudo umount /mnt
        - $ ls /mnt
    - screen shot:

```
mariam@mariam-VirtualBox:~/Desktop$ sudo umount /mnt
mariam@mariam-VirtualBox:~/Desktop$ ls /mnt
```

8. using `apt` command, search and install `gparted` program
    - commands:
        - sudo apt install gparted

9. navigate and use gparted to detect the the new partition.
    - commands:
        - gparted /dev/loop1
    - screen shot: