Expanding VirtualBox Linux Partition Size

Practical Class 4-b

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- **Increasing disk size**
- **Two options to increase partition size:**
  - GUI: **GParted**
  - CLI: **Parted**

Why do we need to expand partition size?

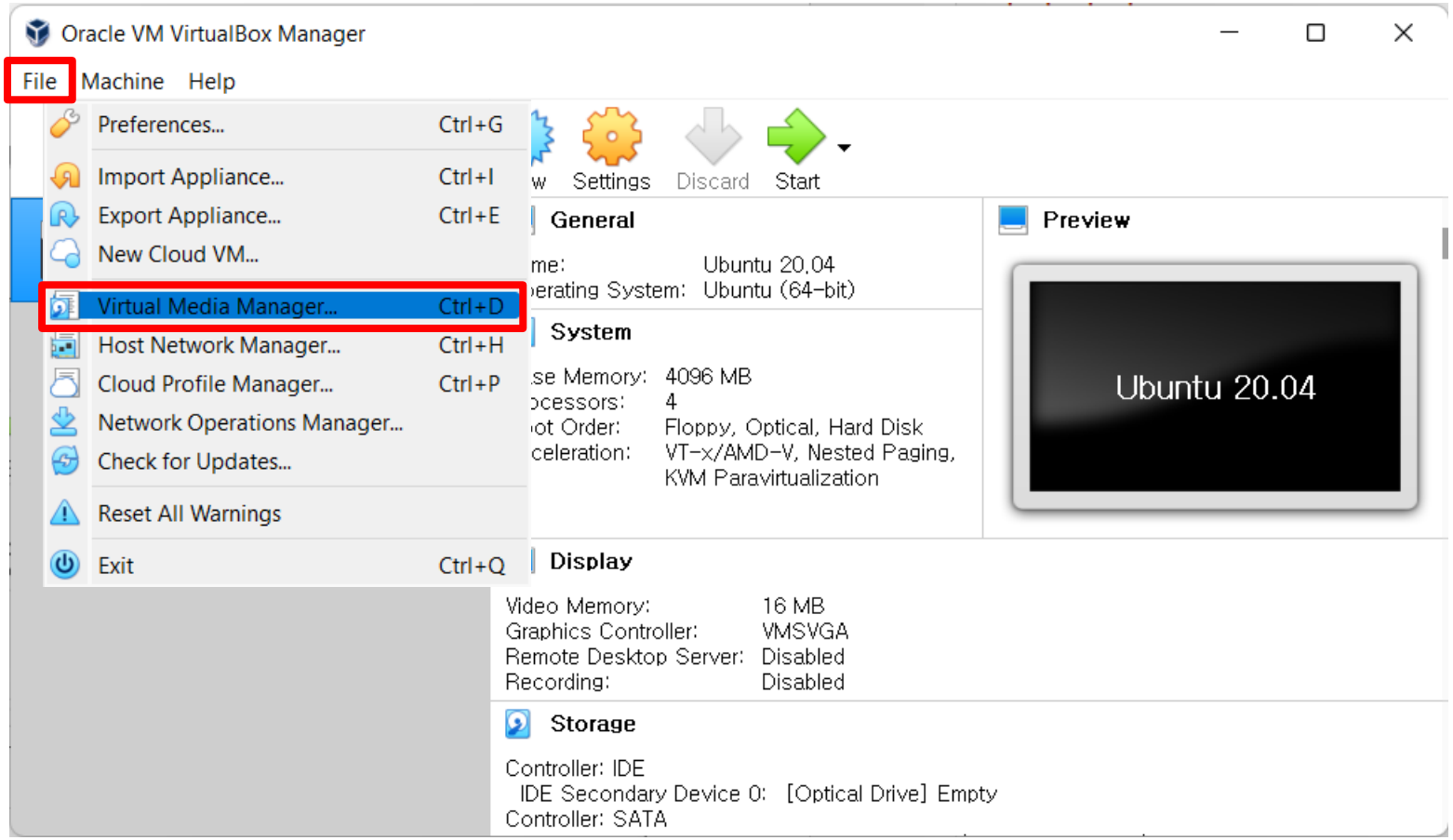
- **Building Linux Kernel in Ubuntu 20.04 desktop needs at least 40GB of free space**
  - We recommend expanding partition size to **more than 40GB**, because you may want to install various applications on this machine
  - For enough free space, we recommend virtual disk size to be **50GB or more**

- **Those who already have enough space more than 50GB can skip these steps**

[1] https://git-scm.com/about/staging-area

Increasing disk size

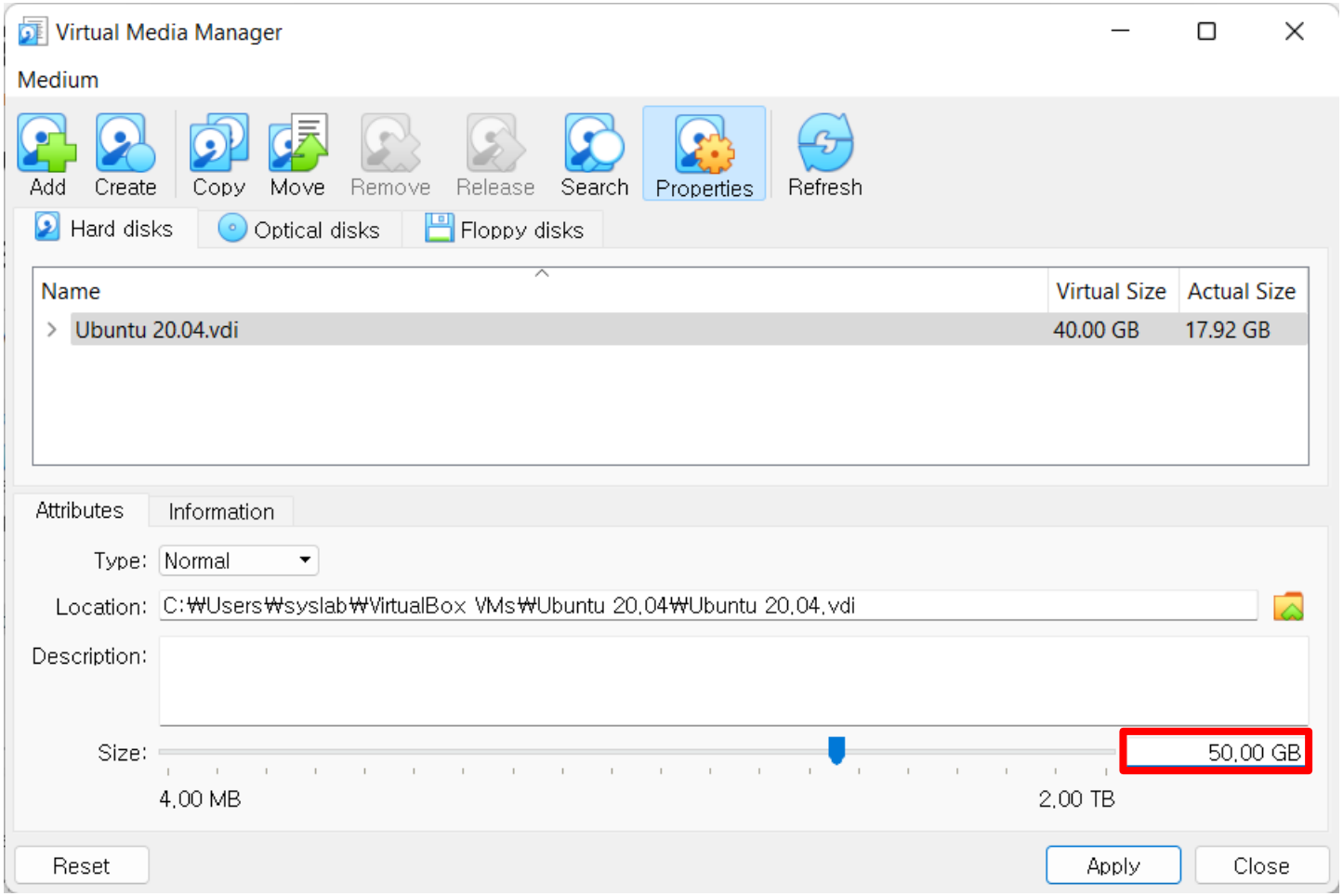
- Before we proceed, make sure your machine is turned off
- File → Virtual Media Manager



Increasing disk size

❖ In the Virtual Media Manager

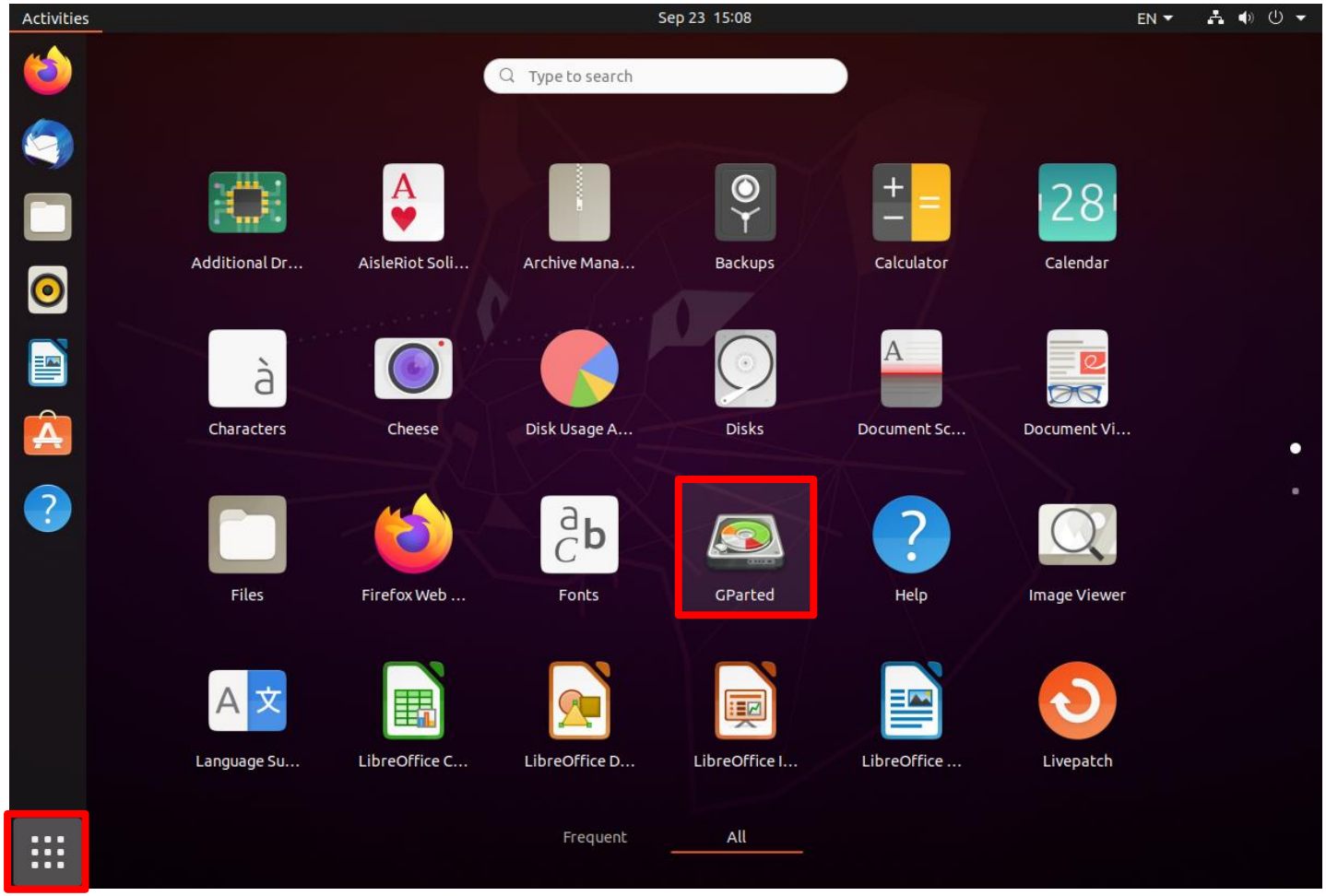
- Increase virtual disk size more than **50GB** (**at least 40GB**)



Increasing partition size (GUI)

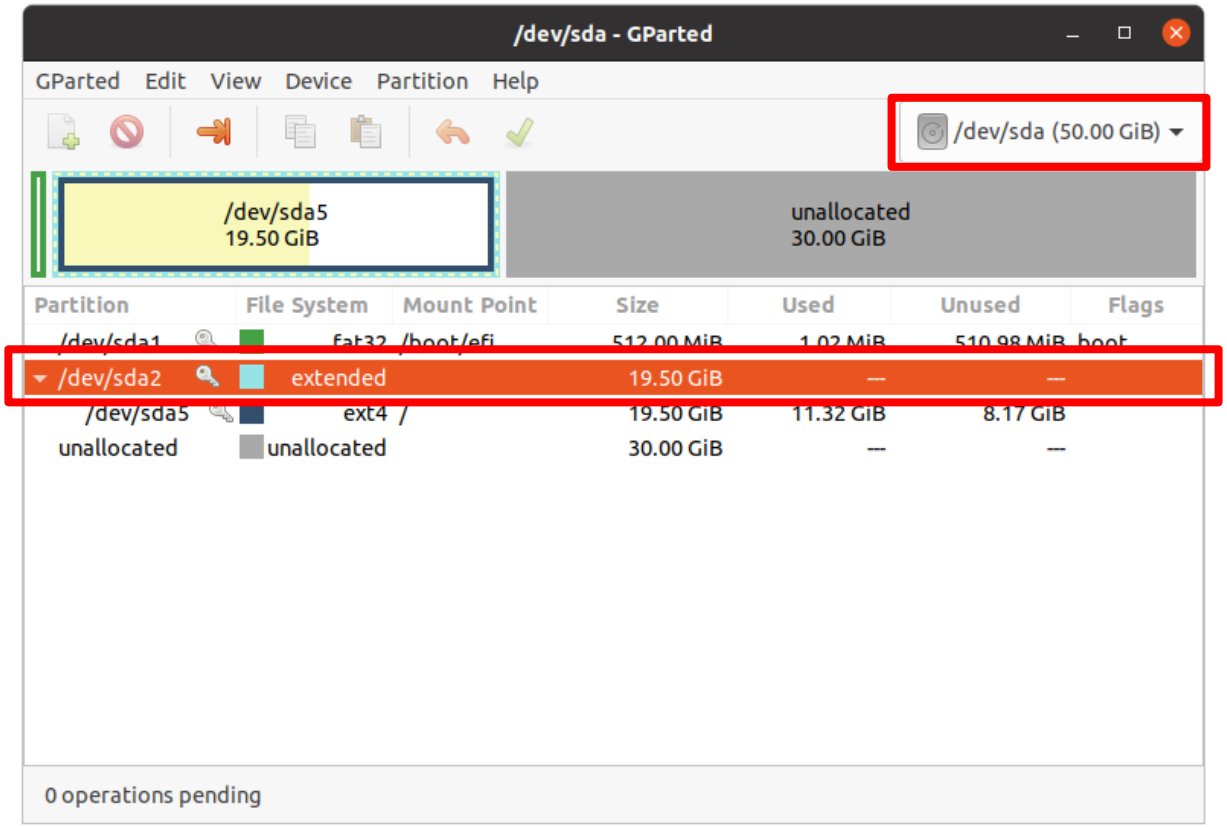
- Boot into Linux, install and launch GParted

```
$ sudo apt install gparted
```



Increasing partition size (GUI)

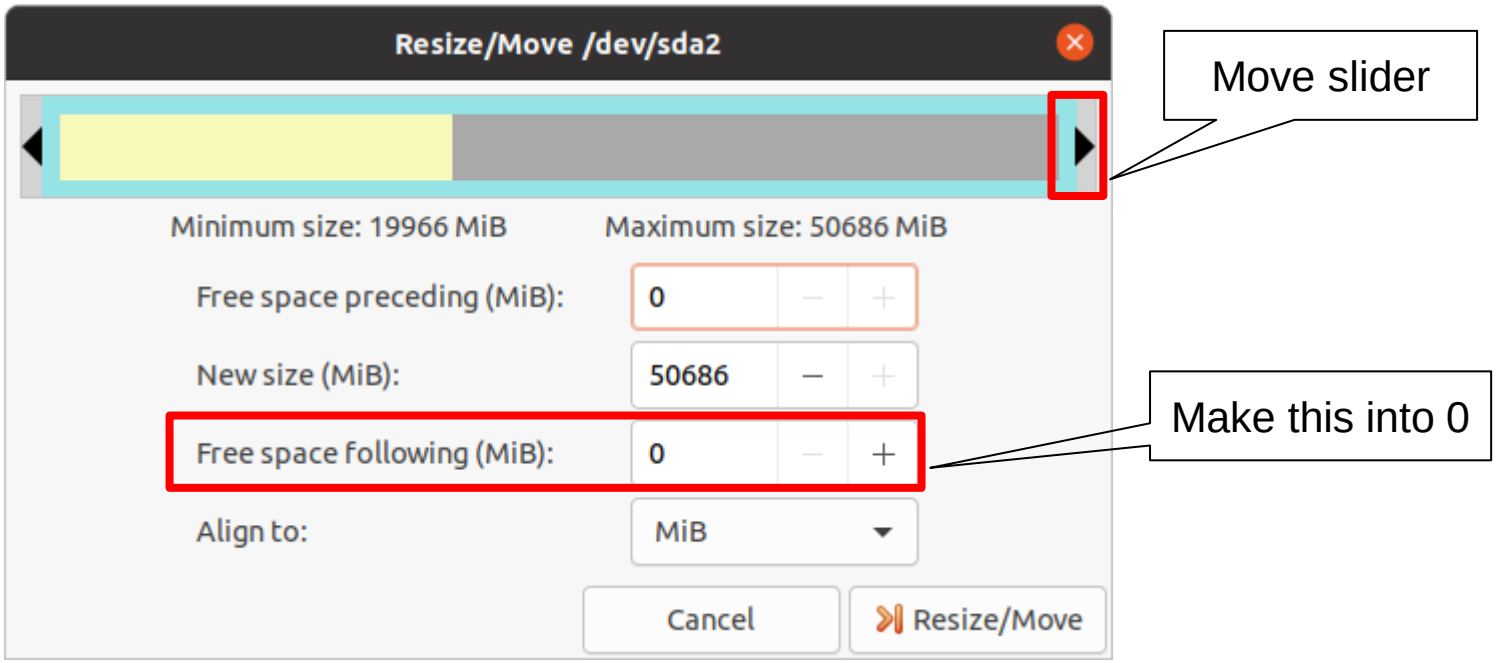
- **Select your Linux drive** (In this case, `/dev/sda`)
- **If you have an extended partition, you have to increase this container partition first.** (In this case, `/dev/sda2`)
  1. Right click
  2. Resize/Move



Right-click to resize

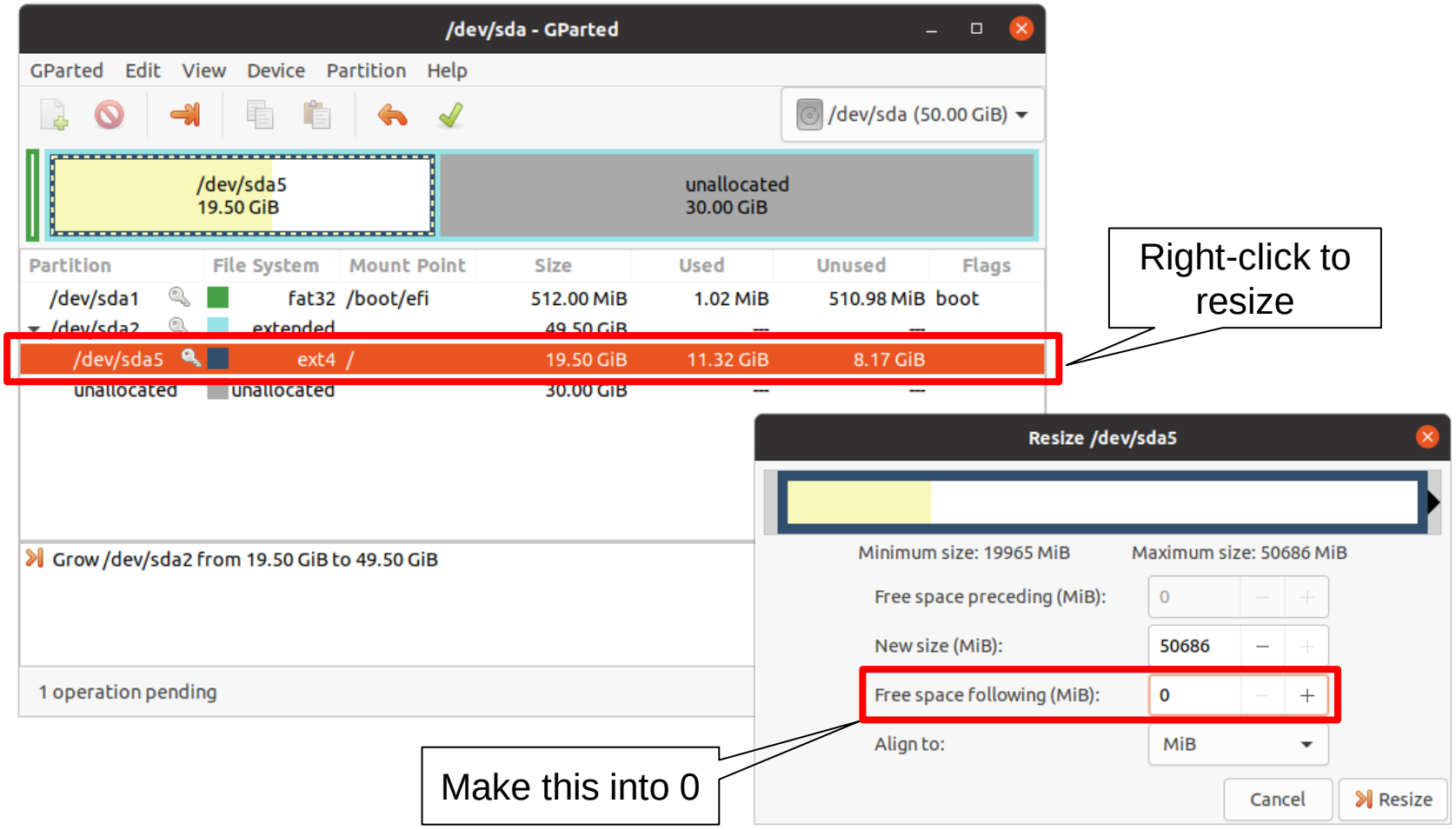
Increasing partition size (GUI)

- **Move the slider to fit the free space**
  - You can also make **Free space following (MiB)** as 0



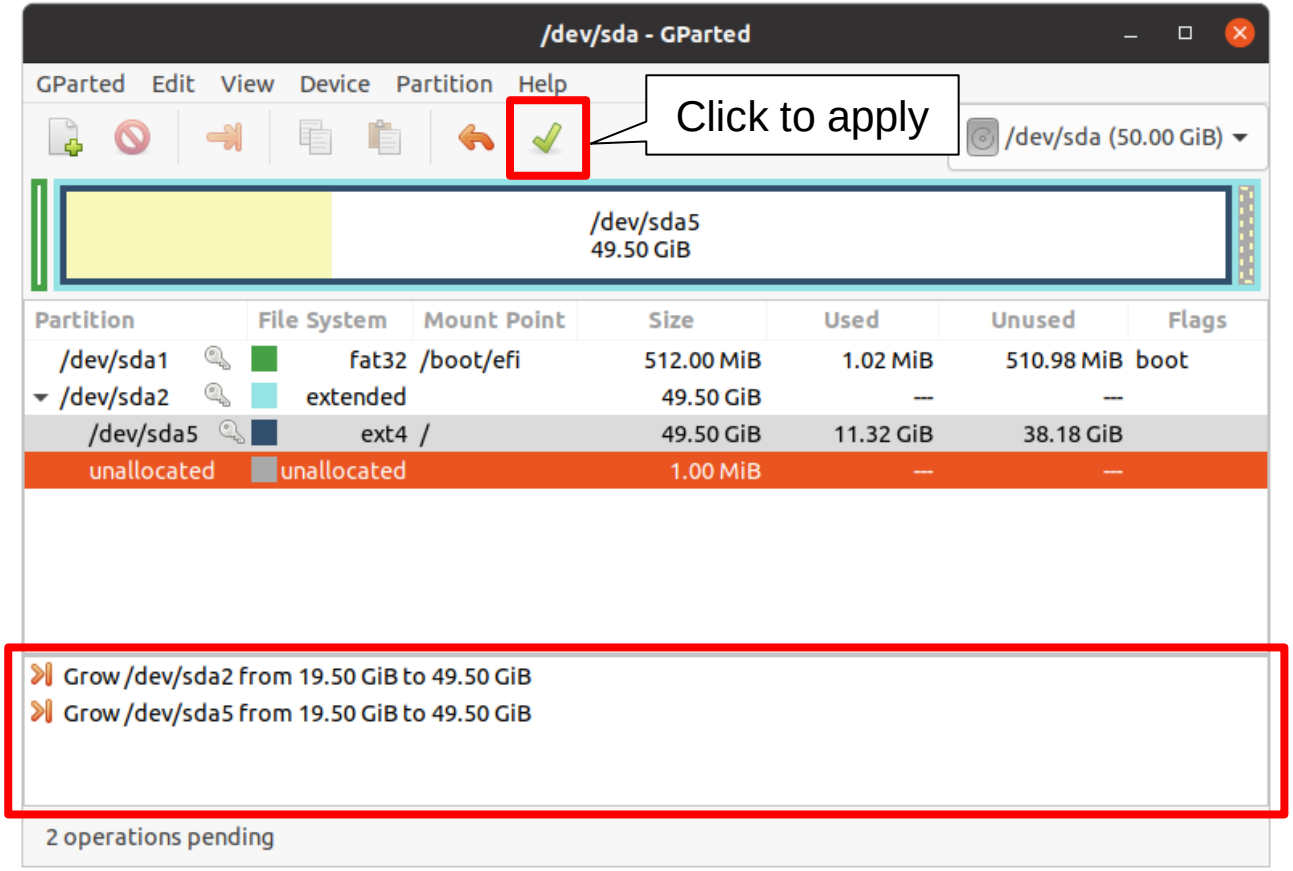
Increasing partition size (GUI)

- Do the same with your root partition



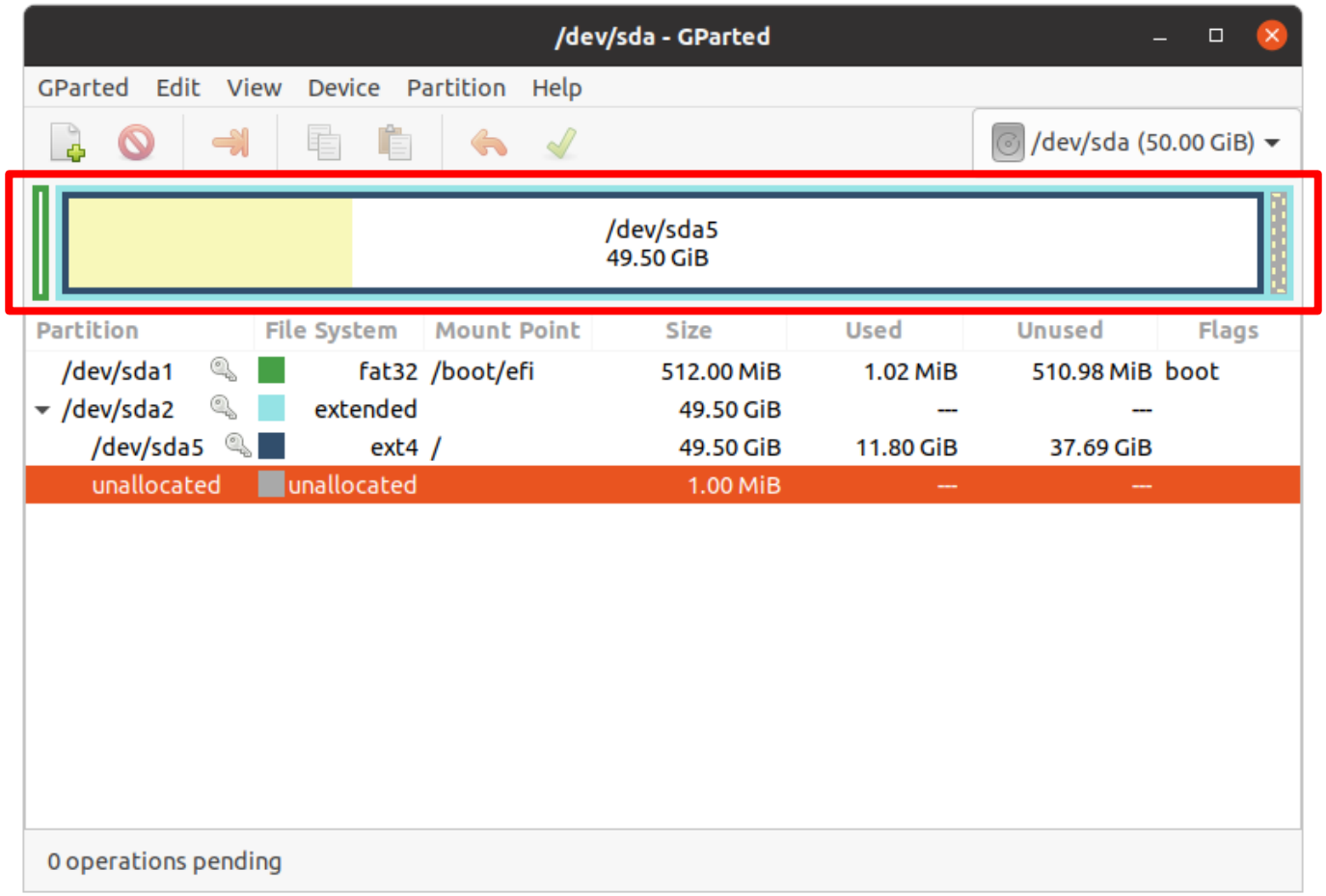
Increasing partition size (GUI)

- Check pending operations to apply
- Click Apply All Operations
  - This cannot be undone



Increasing partition size (GUI)

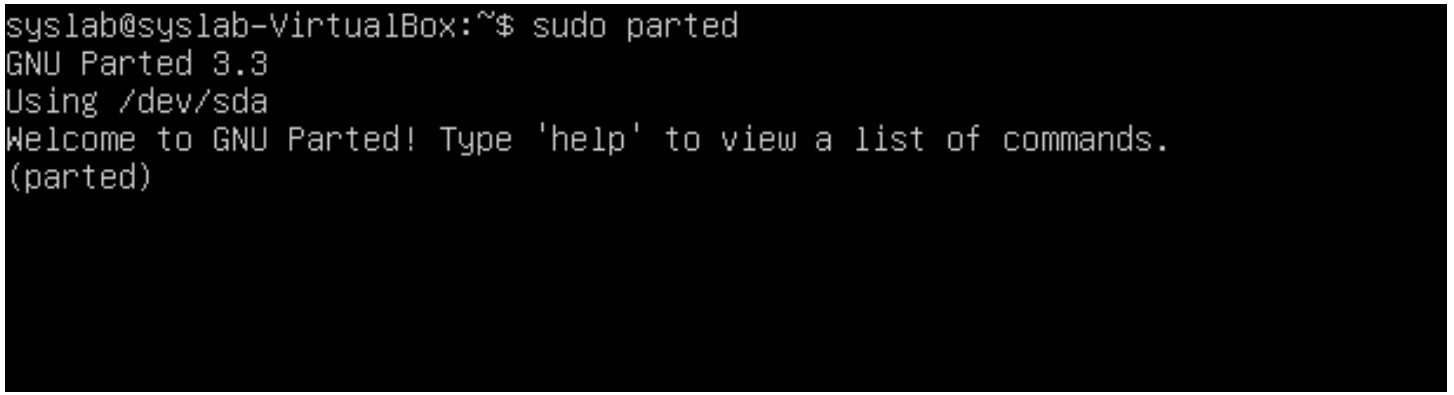
- Finally you can now use all the free space in your disk



Increasing partition size (CLI)

- **Boot into Linux, install and launch Parted**

```
$ sudo apt install parted
$ sudo parted
```



Increasing partition size (CLI)

- Use `print list` to view all the partitions in your machine

```
syslab@syslab-VirtualBox:~$ sudo parted
GNU Parted 3.3
Using /dev/sda
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) print list
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 53.7GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start   End     Size    Type      File system  Flags
 1      1049kB  538MB   537MB   primary   fat32        boot
 2      539MB   21.5GB  20.9GB  extended
 5      539MB   21.5GB  20.9GB  logical   ext4


(parted)
```

Increasing partition size (CLI)

- `select` **your Linux drive** (In this case, `/dev/sda`)
- **Use** `print free` **to list all the free space**

```
(parted) select /dev/sda
Using /dev/sda
(parted) print free
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 53.7GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start   End     Size    Type      File system  Flags
        1024B   1049kB  1048kB            Free Space
 1      1049kB  538MB   537MB   primary   fat32        boot
        538MB   539MB   1048kB            Free Space
 2      539MB   21.5GB  20.9GB  extended
 5      539MB   21.5GB  20.9GB  logical   ext4
        21.5GB  21.5GB  1049kB            Free Space
        21.5GB  53.7GB  32.2GB            Free Space

(parted)
```

Increasing partition size (CLI)

- **If you have an extended partition, you have to increase this container partition first.** (In this case, `/dev/sda2`)
- Use **`resizepart`** to expand partition size

```
(parted) resizepart [<partition num>] [<end of new partition>]
```

```
(parted) resizepart
Partition number? 2
Warning: Partition /dev/sda2 is being used. Are you sure you want to continue?
Yes/No? Yes
End?  [21.5GB]? 100%
(parted) print free
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 53.7GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start   End     Size    Type      File system  Flags
        1024B   1049kB  1048kB            Free Space
 1      1049kB  538MB   537MB   primary   fat32        boot
        538MB   539MB   1048kB            Free Space
 2      539MB   53.7GB  53.1GB  extended
 5      539MB   21.5GB  20.9GB  logical   ext4
        21.5GB  53.7GB  32.2GB            Free Space

(parted) _
```

Increasing partition size (CLI)

- **Do the same with your root partition**
  - Check if partition is utilizing all the free space in your disk
  - Use **`quit`** to exit

```
(parted) resizepart
Partition number? 5
Warning: Partition /dev/sda5 is being used. Are you sure you want to continue?
Yes/No? Yes
End?  [21.5GB]? 100%
(parted) print free
Model: ATA VBOX HARDDISK (scsi)
Disk /dev/sda: 53.7GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start   End     Size    Type      File system  Flags
        1024B   1049kB  1048kB            Free Space
 1      1049kB  538MB   537MB   primary   fat32        boot
        538MB   539MB   1048kB            Free Space
 2      539MB   53.7GB  53.1GB  extended
 5      539MB   53.7GB  53.1GB  logical   ext4

(parted) _
```

Increasing partition size (CLI)

- **Perform resizing file system to fit into the partition**

```
$ sudo resize2fs /dev/<your root partition>
```

```
syslab@syslab-VirtualBox:~$ sudo resize2fs /dev/sda5
resize2fs 1.45.5 (07-Jan-2020)
Filesystem at /dev/sda5 is mounted on /; on-line resizing required
old_desc_blocks = 3, new_desc_blocks = 7
The filesystem on /dev/sda5 is now 12975616 (4k) blocks long.
```

Increasing partition size (CLI)

- **Finally you can now use all the free space in your disk**

```
syslab@syslab-VirtualBox:~$ sudo df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1.9G     0  1.9G   0% /dev
tmpfs           393M  1.3M  392M   1% /run
/dev/sda5        49G   12G   36G  24% /
tmpfs           2.0G     0  2.0G   0% /dev/shm
tmpfs           5.0M  4.0K  5.0M   1% /run/lock
tmpfs           2.0G     0  2.0G   0% /sys/fs/cgroup
/dev/loop0      128K  128K     0 100% /snap/bare/5
/dev/loop1       62M   62M     0 100% /snap/core20/1611
/dev/loop2      347M  347M     0 100% /snap/gnome-3-38-2004/115
/dev/loop3      249M  249M     0 100% /snap/gnome-3-38-2004/99
/dev/loop5       92M   92M     0 100% /snap/gtk-common-themes/1535
/dev/loop4       64M   64M     0 100% /snap/core20/1623
/dev/loop9       46M   46M     0 100% /snap/snap-store/592
/dev/loop7       46M   46M     0 100% /snap/snap-store/599
/dev/loop6       47M   47M     0 100% /snap/snapd/16292
/dev/loop8       66M   66M     0 100% /snap/gtk-common-themes/1519
/dev/loop10      48M   48M     0 100% /snap/snapd/16778
/dev/sda1       511M  4.0K  511M   1% /boot/efi
ubuntu          233G  154G   80G  66% /home/syslab/ubuntu
tmpfs           393M   12K  393M   1% /run/user/1000
tmpfs           393M   36K  393M   1% /run/user/125
syslab@syslab-VirtualBox:~$ _
```