

Ubuntu and basic Linux command part 1

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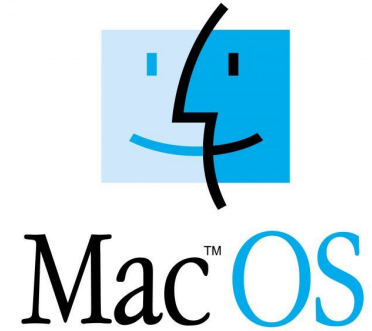
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Contents

1. Introduction: Ubuntu, file systems, some terms.
2. Some basic Linux commands work with files and directories.
 - Change working directory.
 - List content.
 - Create.
 - Remove.
 - Copy.
 - Move.

1. Introduction

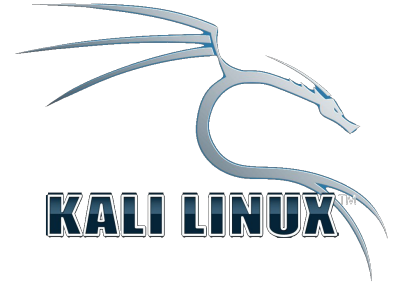
Some popular Operating Systems



Distributions of linux (OS)



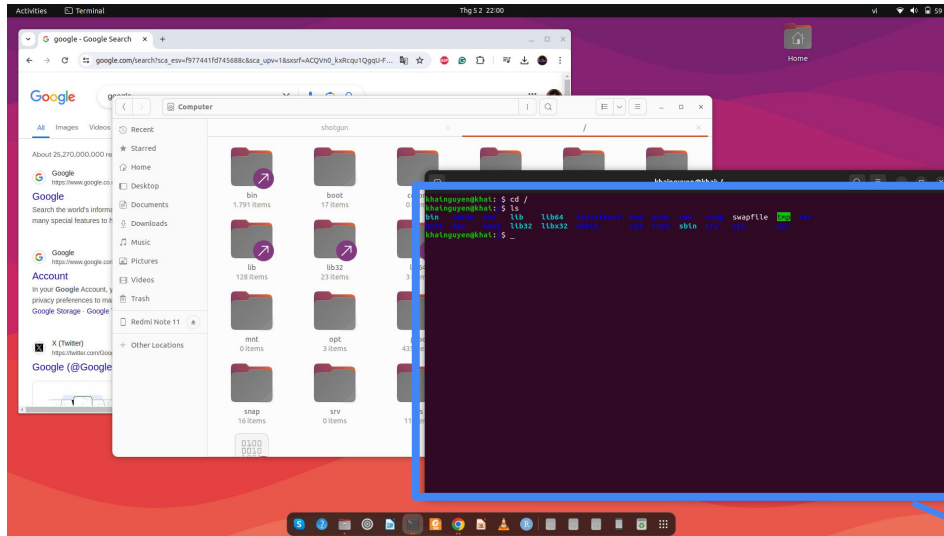
Ubuntu OS has the most users



Why linux in bioinformatics?

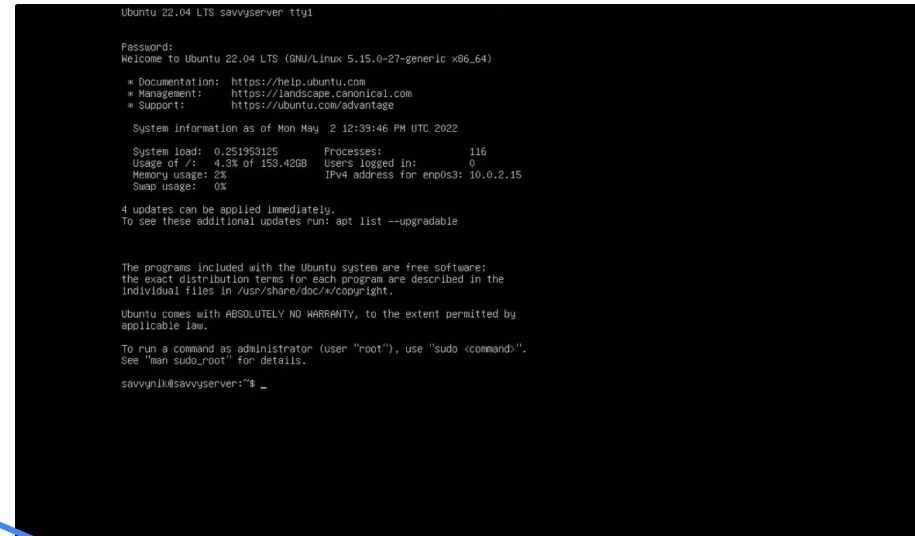
1. Linux is an open-source operating system.
 - Allows users to customize their systems according to their specific needs.
 - It is free.
2. Linux is the most commonly used operating system in High-Performance Computing (HPC). HPC unlocks primary challenges in bioinformatics:
 - Data processing limits.
 - Slow analysis times.
 - Impact on research progress.
3. Most bioinformatics tools and applications are designed to be run on Linux-based operating systems.

interact with the software/package



graphic user interface - GUI
(mouse + keyboard)

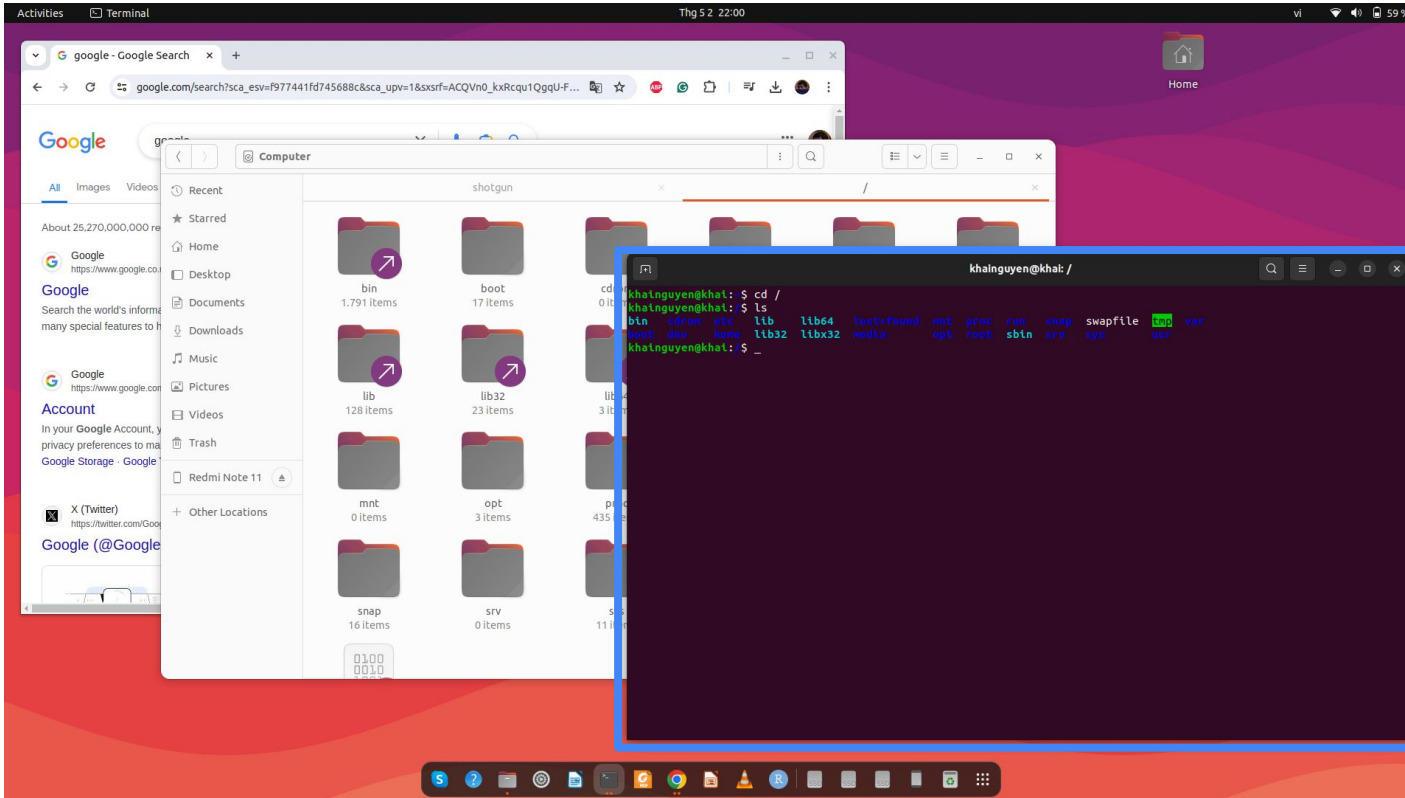
also called



command line interface - CLI
(keyboard)

Ubuntu desktop: GUI + CLI
Ubuntu server: only CLI

Terminal



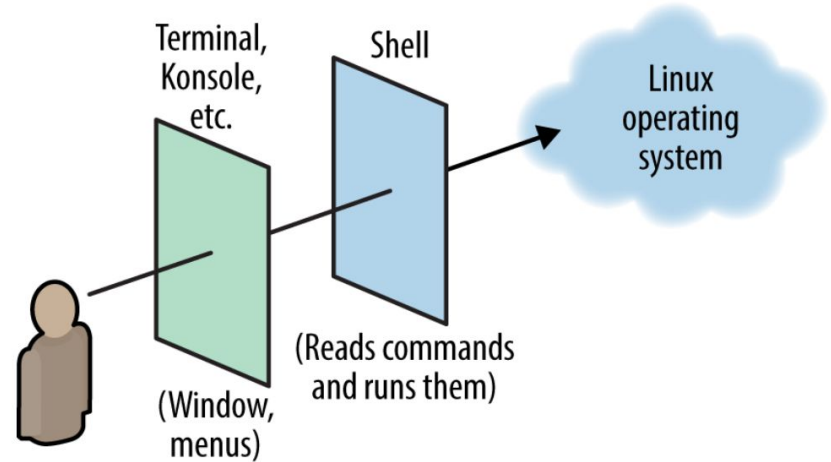
Terminal window
is where you
type commands

Open:
Ctrl + Alt + T keys
on the keyboard

Ubuntu desktop

What is Shell?

- A shell is a special user program that provides an interface for the user to use operating system services.
- Terminal is where we interact with the shell through commands.
- Several types of Shell:
 - + Bourne Shell (sh)
 - + C Shell (csh)
 - + **Bourne Again Shell (bash)**: most popular
 - + Z Shell (zsh)



(Daniel J. Barrett, Linux pocket guide)

Some ways to get the Terminal

easy to
install

1.

macOS: How to open Terminal:

<https://support.apple.com/en-vn/guide/terminal/apd5265185d-f365-44cb-8b09-71a064a42125/mac>

Windows 10/11: Install Ubuntu on Windows Subsystem for Linux (WSL): Recommended for beginners

<https://canonical-ubuntu-wsl.readthedocs-hosted.com/en/latest/guides/install-ubuntu-wsl2/>

2. Install Ubuntu on virtual machine (VM):

Windows: Install Ubuntu on VirtualBox: <https://www.youtube.com/watch?v=ngJQPt-xEeo>

macOS: Install Ubuntu on VirtualBox: https://www.youtube.com/watch?v=b_tOialCSXE

3. Install Ubuntu on physical computer: Best for long term use

Delete Windows & install Ubuntu: https://www.youtube.com/watch?v=oZcvqfWf_ps&t=100s

If you don't want to delete windows:

or a) Dual boot: Ubuntu and Windows on the same hard drive:

<https://www.youtube.com/watch?v=GXxTxBPKecQ&t=229s>

or b) Dual boot: Ubuntu and Windows on the separate hard drive:

(Ubuntu on hard drive 1, Windows on hard drive 2)

<https://www.youtube.com/watch?v=KX85vZ3ANV>

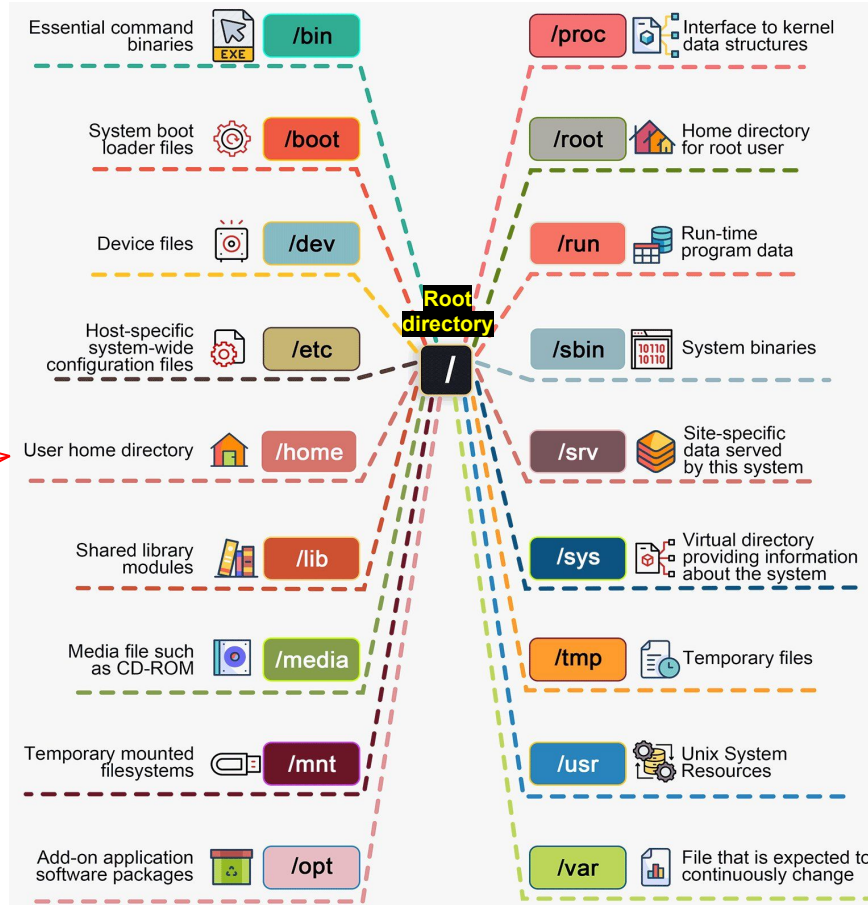
Recommended method b) if you want dual-boot.

Warning: backup your data before install!!!

More reference: https://www.youtube.com/watch?v=oZcvqfWf_ps&t=100s

a bit
difficult
to install

Linux file systems

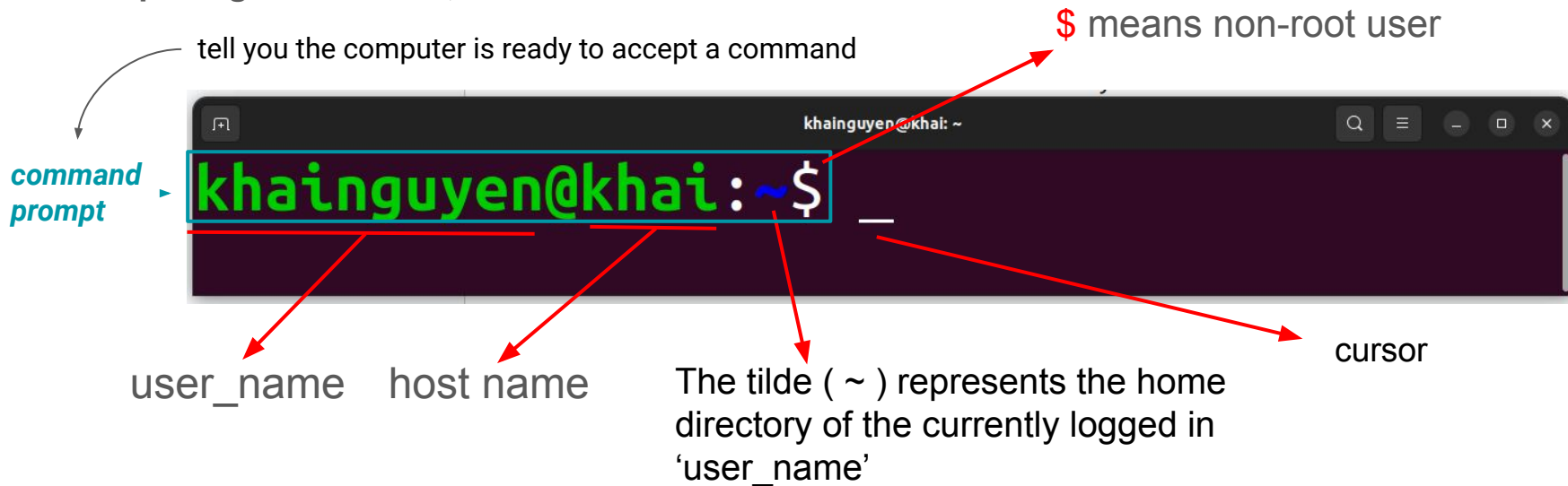


user_name directory (or folder):

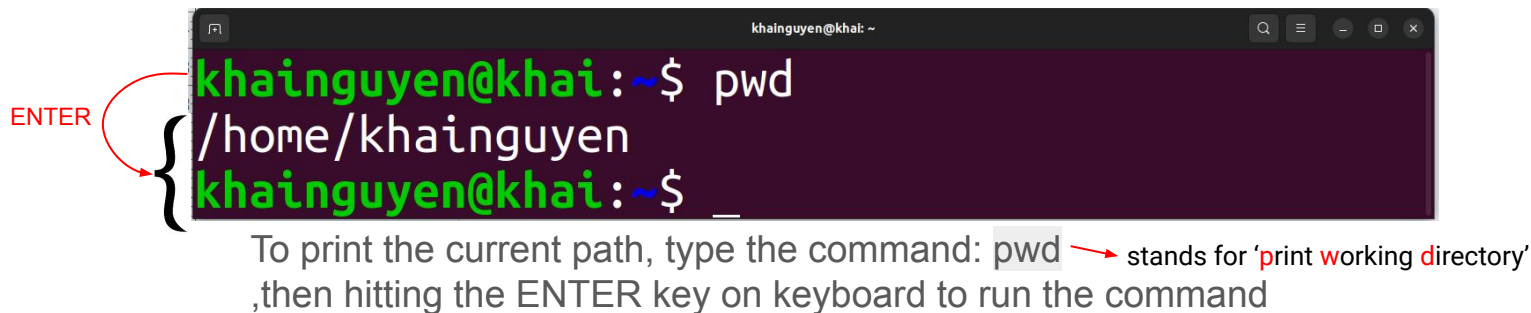
`/home/khainguyen/`
`/home/vanA/`
`/home/vanB/`

The root directory is a special directory that contains all of the other files and directories on the computer. The root directory is specified as a `/` at the beginning of a path

When opening the terminal, **default:**



This case, user_name is **khainguyen**, so the path is: /home/khainguyen



A basic command, could be:

Example: `ls` command

The command line will be read **from left to right** by the shell once press ENTER



A terminal window with a dark background. The prompt is 'khainguyen@khai: ~\$'. The command 'ls -l /var/' is entered. A red arrow above the command points from left to right. Below the command, blue brackets group the spaces, and red arrows point from labels to these groups.

```
khainguyen@khai: ~$ ls -l /var/
```

command
(must have)

a space

option/flag
(optional)
hyphen-prefixed
characters

a space

parameter
(optional)

How do I know what options a command has?

man command_name

Example: `ls` command

```
khainguyen@khai:~$ man ls
```

```
khainguyen@khai: ~
LS(1)                                User Commands                                LS(1)

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILES (the current directory by default).
    Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

    Mandatory arguments to long options are mandatory for short options too.

    -a, --all                do not ignore entries starting with .
    -A, --almost-all        do not list implied . and ..
    --author                 with -l, print the author of each file
    -b, --escape             print C-style escapes for nongraphic characters
    --block-size=SIZE        with -l, scale sizes by SIZE when printing them;
                             e.g., '--block-size=M'; see SIZE format below
    -B, --ignore-backups    do not list implied entries ending with ~
    -c                       with -lt: sort by, and show, ctime (time of last
                             modification of file status information);
                             with -l: show ctime and sort by name;
                             otherwise: sort by ctime, newest first
    -C                       list entries by columns
    --color[=WHEN]           colorize the output; WHEN can be 'always' (default
                             if omitted), 'auto', or 'never'; more info below
    -d, --directory         list directories themselves, not their contents
    -D, --dired              generate output designed for Emacs' dired mode

Manual page ls(1) line 1 (press h for help or q to quit)
```

Press q key on keyboard to exit

command_name --help

```
khainguyen@khai:~$ ls --help
```

```
khainguyen@khai:~$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILES (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.
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```