Linux Kung Fu

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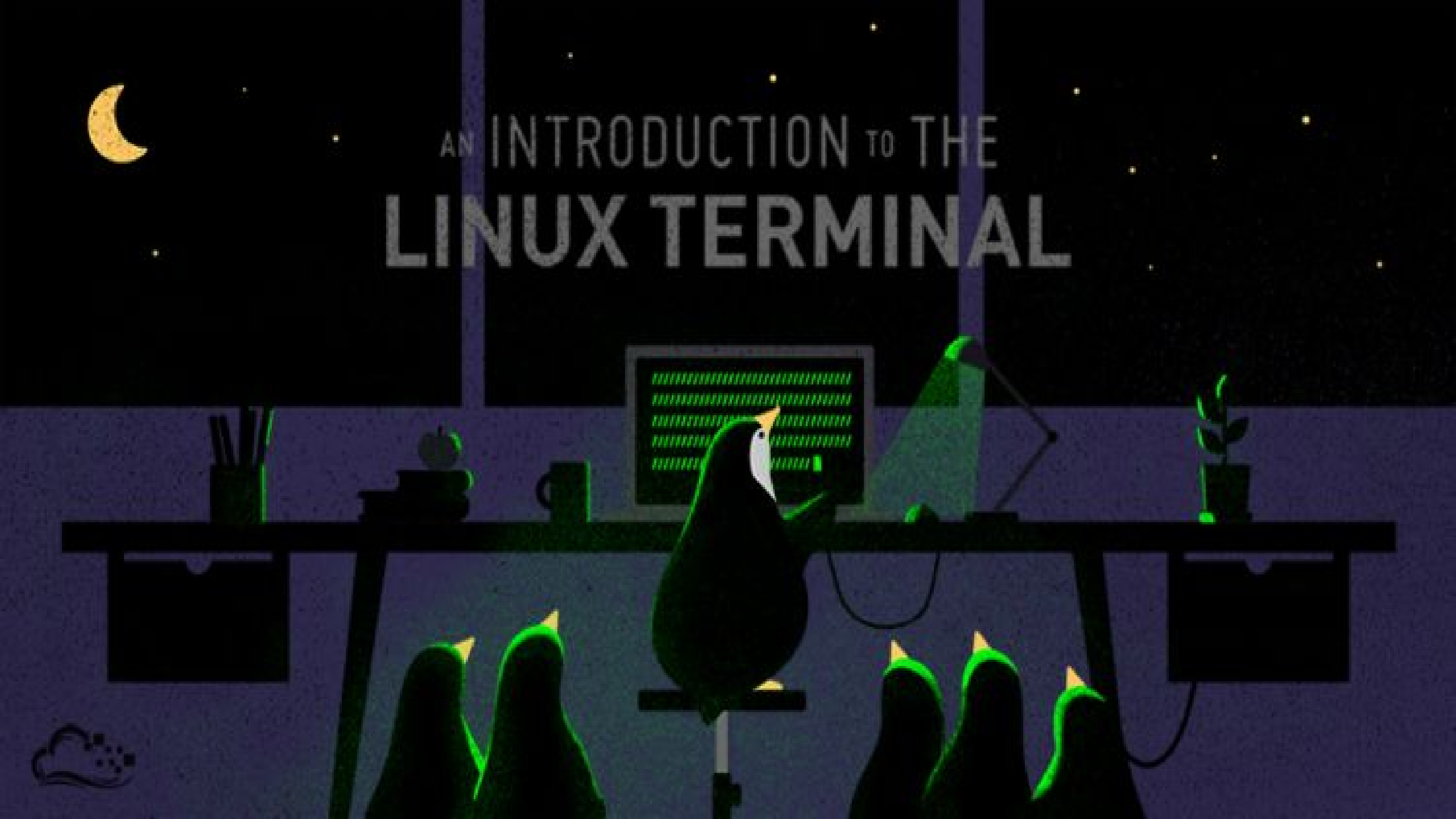
GOTO: https://apps.ubnetdef.org/

What is Linux?

- Linux generally refers to a group of Unix-like free and open source operating system distributions built around the Linux kernel
- A typical Linux distribution comprises a Linux kernel, GNU tool and libraries, additional software, documentation and desktop environment
- Some might use their own package managers

Over 500 distributions!


AN INTRODUCTION TO THE
LINUX TERMINAL

Terminal, Command Line, and Shell

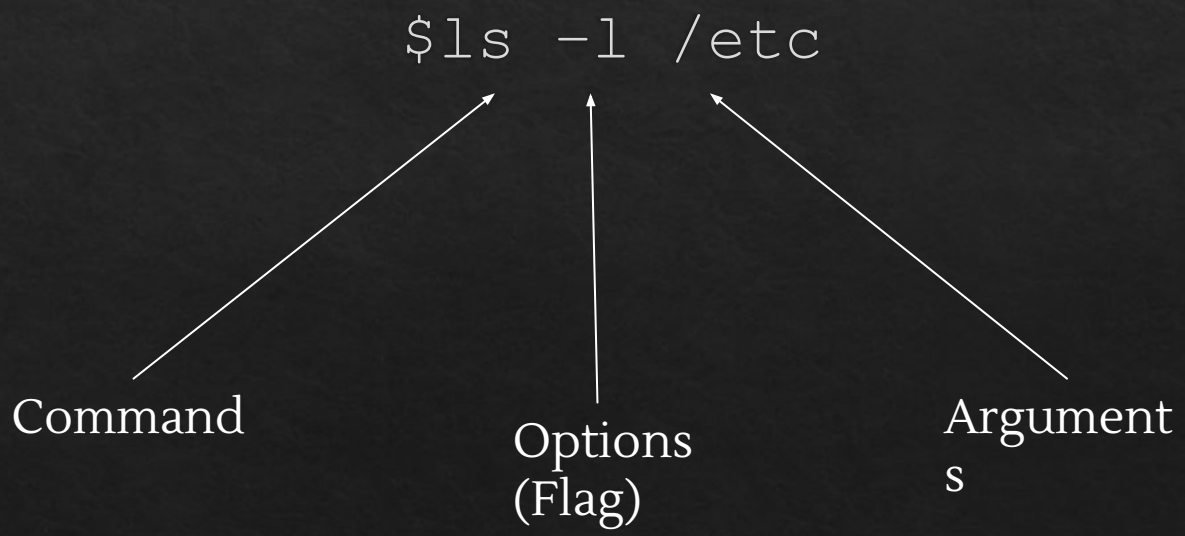
- To simply put it the terminal is the text input/output environment.
- The command line is an interface where the user types the command and presses the enter key to execute the command
- The shell is the primary interface that interprets the commands that get entered in.
- Most Linux distributions have Bash as their shell, but others exist as well.

The Terminal

- `you@ubnetdef:~$`
  -Username: you
  -Host name: ubnetdef
  -Current working directory: ~
  -Superuser: No($)
- `root@universe:/etc/init.d#`
  -Username: root
  -Host name: universe
  -Current working directory: /etc/init.d
  -Superuser: Yes (#)

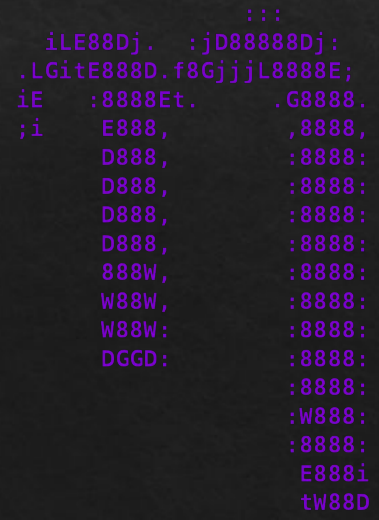
Format of Commands

- To execute a command, type its name and arguments at the commands line
- Usually commands follow this format



Editing files in the terminal

- In order to manipulate files from the terminal you need a command line editor.
- Popular Editors
  - Nano
  - Vi/Vim
  - Emacs



Working With Directories and Files

$ pwd

- The pwd (print working directory) command displays the name of the current working directory
- It tells you where you currently are in the file system
- `$rossvent@ubnetdef:~$ pwd`
  - `/home/rossvent`

$echo

- Echo allows a user to repeat, or “echo” text to standard output
- `$rossvent@ubnetdef:~$ echo Hello World`

  `Hello World`
- Useful for scripting
- Can also be redirected
- `$rossvent@ubnetdef:~$ echo “Appending to file” > redirect.txt`

$ls

- The ls command lists files and directories within the current working directory

  `-$ls`
- It can also list contents with a specified path

  `-$ls /etc`
- To include hidden entries

  `-$ls -a`
- To display more information

  `-$ls -l`
- You can even sort the list!

  `-$ls -S`

$cd

- Changes the current directory in Linux.

```
$cd /var/log
```

- Goes to the root directory regardless of location (Absolute path)

```
$cd /
```

Goes to the parent of the current working directory

```
$cd ..
```

Goes to home directory

```
$cd ~
```

Can navigate to folders relative to current working directory

$cat

- Displays the contents of a file or files on the terminal

```
$cat /etc/motd
```

- cat can also conCATenate or “glue together” two or more files

```
$cat file1 file2 file3
```

- Can also be redirected to a new file.

```
$cat file1 file2 file3 > bigfile
```

- Also appended to a file!

```
$cat file4 >> bigfile
```

$more

- Allows you to display output in the terminal one page at a time
- When the text passed to it is too large to fit one screen it pages it. You can scroll down through files but not back up!

$less

- Actually more useful that the more command!
- Written by a man who was fed up with more's inability to scroll backwards
- Supports any type of file that supports scrolling
- Can customize to open any type of file

$mkdir

- The command is used to make a new directory

```
$mkdir name_of_directory
```

- Can also make all directories leading up to the target directory if needed

```
$mkdir -p /tmp/a/b/c
```

$rm

- The rm command removes files or directories
- To remove a file:

```
$rm file.txt
```

- To remove any directory including all the files inside

```
$rm -rf deleteme/
```

- To remove an empty directory

```
$ rmdir empty_dir
```

- **Be very careful using the rm command,** as it doesn't prompt you to confirm deletion.

  And NEVER type `rm -rf/`

$ man

- The man command is used to format and display the man pages or the manual
- Provides extensive documentation about specified command

```
$man ls
$man man
```

Processes

$ps

- The ps (process status) command is used to provide information about the currently running processes. Each processes has a unique identification numbers (PID)

```
$ps
```

- The aux option provides a more detailed list of processes.

```
$ps aux
```

$top

- Similar to ps, but is interactive and updates every second
- A similar utuility, htop, provides a similar function, but usually needs to be installed first

$kill

- Asks a process to shut down nicely

```
$ kill <pid>
```

- If it is being unresponsive, the kernel can decide to take matters into his own hands

```
$kill -9 <pid>
$kill -KILL <pid>
$kill -SIGKILL <pid>
```

Services

- In Linux, services are applications or processes that run in the background
- They are sometimes referred to as daemons

Services

- There are two main ways to control services
  - System V (older)
  - systemd (newer)
- SystemV

```
#service <name> <start | stop | restart | reload | status>
#service apache status
```

- systemd

```
#systemctl <start | stop | restart | reload | status> <name>
#systemctl reload nginx
```

User Management

- Linux is a multi-user operating system in that it allows multiple users on different computers or terminals to access a single system.

Users and Groups

- Create a user account

  ```
  #adduser <username>
  ```

- Create a group

  ```
  #addgroup <groupname>
  ```

- Add a user to a group

  ```
  #usermod –G <groupname> -a <username>
  ```

Users and Groups

- See all groups a user is in:

```
$groups
```

```
$groups <username>
```

- See more information about a user:

```
$ id
```

```
$ id <username>
```

- See the following files:

```
$less /etc/passwd
```

```
$less /etc/groups
```

$passwd

- The passwd command allows changing the passwords of user accounts
- Changing user passwords:

```
$passwd
#passwd <username>
```

- Locking and unlocking user accounts:

```
#passwd -l <username>
#passwd -u <username>
```

- The passwords are stored as hashes in the file /etc/shadow

$su

- The su command allows you to switch user
- If no username is specified, the superuser account (root) will be used by default

$sudo

- Allows permitted users to execute a command as the superuser (i.e “superuser do”) or another user (if specified)
- Configured in the file /etc/sudoers (can be edited with the visudo command)

```
#visudo
```

Networking

$ifconfig

- The ifconfig command can be used to view or configure network interfaces
- View all interfaces:

```
$ ifconfig
```

- View specific interface:

```
$ ifconfig <interface-name>
```

- Bring an interface online or offline (respectively):

```
# ifconfig <interface-name> <up | down>
```

$ping

- The ping command sends an ICMP ECHO_REQUEST to network hosts.
- Pinging IP addresses is usually a simple way to check if your internet connection is working

```
$ ping 8.8.8.8
```

Package Managing

- Package managers can help with automating common tasks such as installing, upgrading, and uninstalling programs or packages.
- Examples:

- apt (Advanced Packaging Tool)
- aptitude
- dpkg
- yum
- dnf

$apt

- Update the local package index:

```
# apt update
```

- Upgrade a package

```
# apt upgrade <package-name>
```

- Upgrade all packages:

```
# apt upgrade
```

$apt

- Install a package

  ```
  #apt install <package-name>
  ```

- Uninstall a package (leave configuration)

  ```
  #apt uninstall <package-name>
  ```

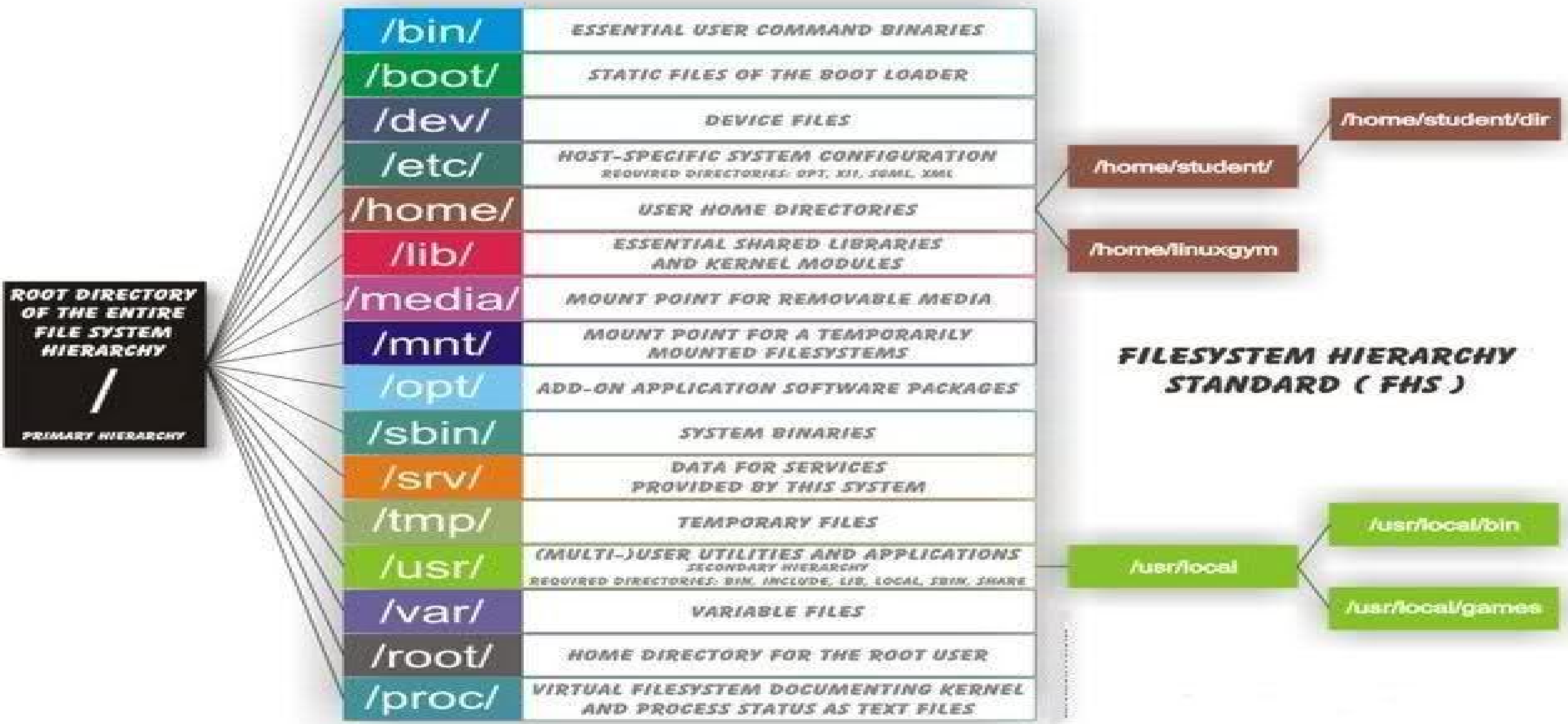
- Uninstall a package (remove configuration)

  ```
  #apt purge <package-name>
  ```

- Uninstall unneeded dependencies:

  ```
  #apt autoremove
  ```

Directory Structure



Useful tips and tricks

- Pressing the up arrow recalls the previous command
- Pressing tab while typing a command can sometimes help to autocomplete a command's name or a file/directory path
- If you need to stop a currently-running command, use Ctrl+C
- Typing "!!" in the terminal will re-run the last command
- If you accidentally print the contents of a binary file to the terminal, it may affect the terminal display. The "reset" command can be used to resolve that issue.