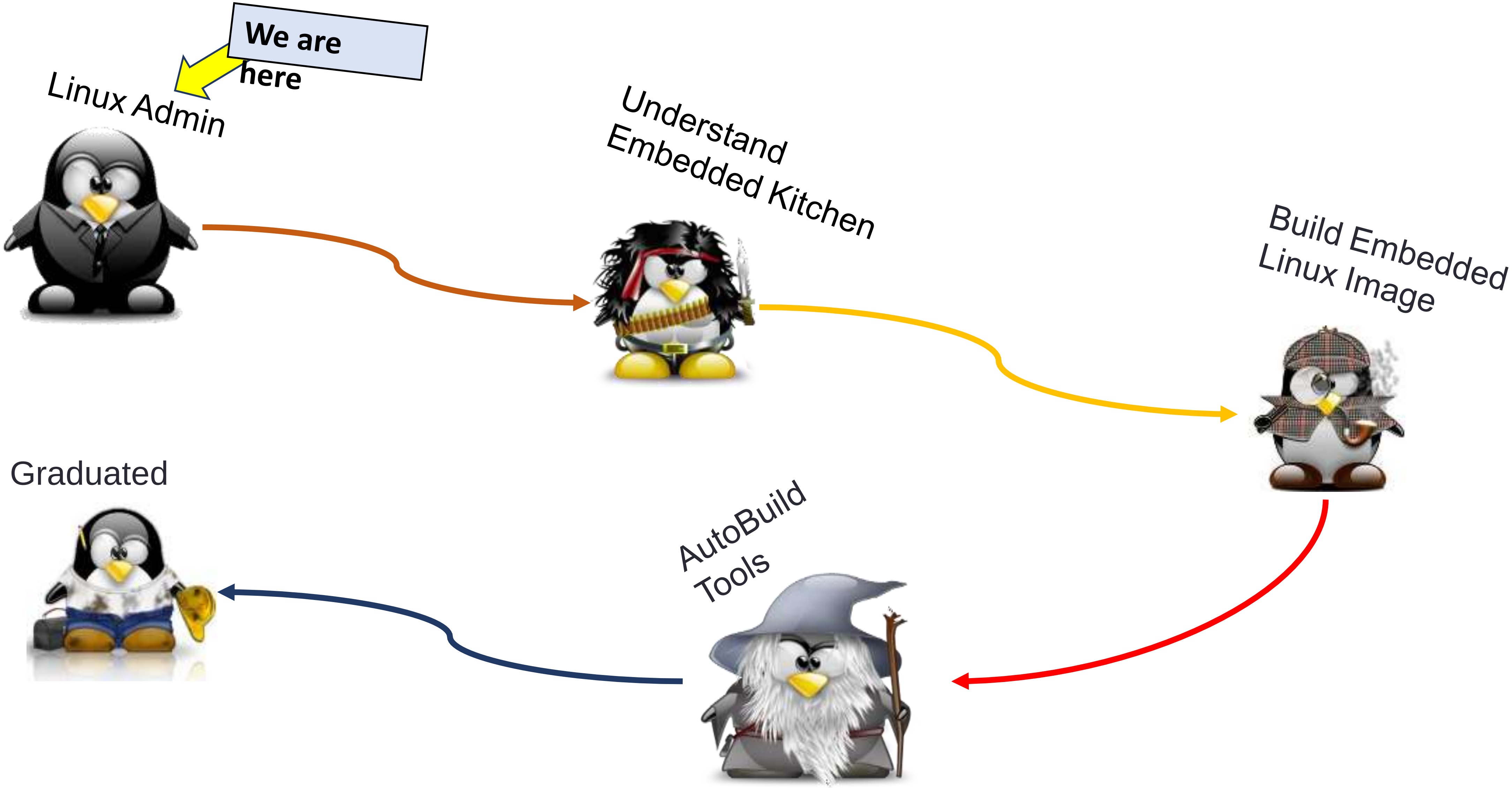
Linux Admin [Day 1]

By Fady Khalil

COURSE MAP



We are here

Linux Admin

Understand Embedded Kitchen

Build Embedded Linux Image

AutoBuild Tools

Graduated

Agenda

- Open Source Licenses
- Linux History
- Linux Components
- Linux System Structure
- Root Filesystem Hierarchy Standard (FHS)
- Introduction to the command line
- Getting Help (man pages)
- Browsing and exploring filesystem.
- Creating files and directories.
- Copying and moving files
- Removing Files and Directories

Open Source Licenses

Open Source Licenses

- Open source licenses are legal and binding contracts between the author and the user of a software component, declaring that the software can be used in commercial applications under specified conditions.

- The license is what turns code into an open source component. Without an open source license, the software component is unusable by others, even if it has been publicly posted on GitHub.

Open Source Licenses - Types

- Open source licenses can be divided into two main categories:

  copyleft and permissive:

  - **Copyleft:**
    - Anyone creating derived versions has to agree they will license the new version the same way as the original.
    - You can create derivative work but you must distribute source code to end users.
    - Examples: GPL and LGPL.

  - **Permissive**:
    - Guarantees the freedom to use, modify, and redistribute, while also permitting proprietary derivative works.
    - Permissive open source licenses, lovingly referred to as “Anything Goes”, place minimal restrictions on how others can use open source components.
    - Examples: BSD and MIT.

Linux History

Linux History

The Unix operating system was developed by **Ken Thompson** and **Dennis Ritchie** of AT&T Bell Laboratories in 1969 and first released in 1970

Linux History – Cont’d

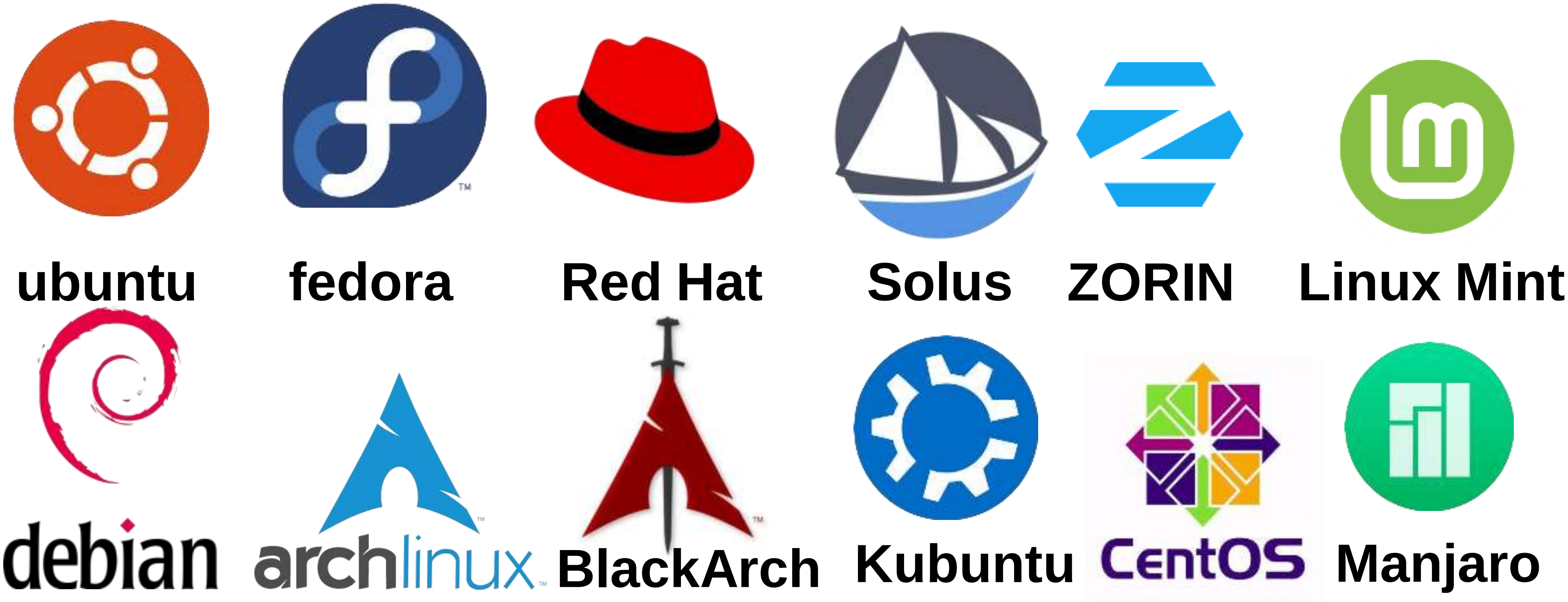
In 1983, Richard Stallman started the GNU project with the goal of creating a free UNIX-Like operating system.

- ★ GNU based on GPL

In 1991, Linus Torvalds created Linux kernel. Based on same license of GNU (GPL)

In 1992, Linux and GNU developers worked to integrate GNU components with Linux to make a fully functional of **free operating system**.

Linux distributions



ubuntu fedora Red Hat Solus ZORIN Linux Mint

debian archlinux BlackArch Kubuntu CentOS Manjaro

Linux Components

Linux Components

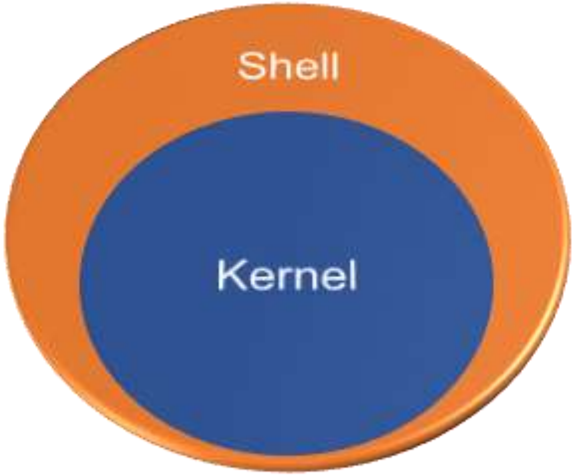
Kernel

- **I**s the core of the operating system.
- **C**ontains components like device drivers
- **I**t loads into RAM when the machine boots and stays resident in RAM until the machine power off.
- **I**t scheduler all the process.

Linux Components

Shell

- **P**rovides an interface by which the user can communicate with the kernel.
- **“B**ash” is the most commonly used shell on linux
- **T**he shell parses commands entered by the user and translates them into logical segments to be executed by the kernel or other utilities.

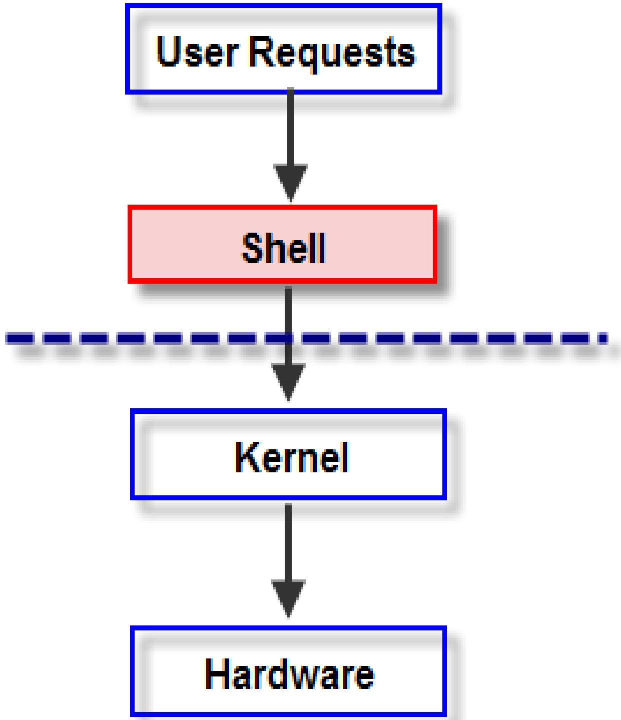


Linux Shell

- It’s a command line interpreter.
- The shell program interprets user commands, which are either directly entered by the user, or which can be read from a file called the shell script.
- Apart from passing commands to the kernel, the main task of a shell is providing a user environment, which can be configured individually using shell resource configuration files.

Types of Shells:

- Bourne **SH**ell (sh)
- **C SH**ell (csh)
- **K**orn **SH**ell (ksh)
- **B**ourne **A**gain **SH**ell (bash)

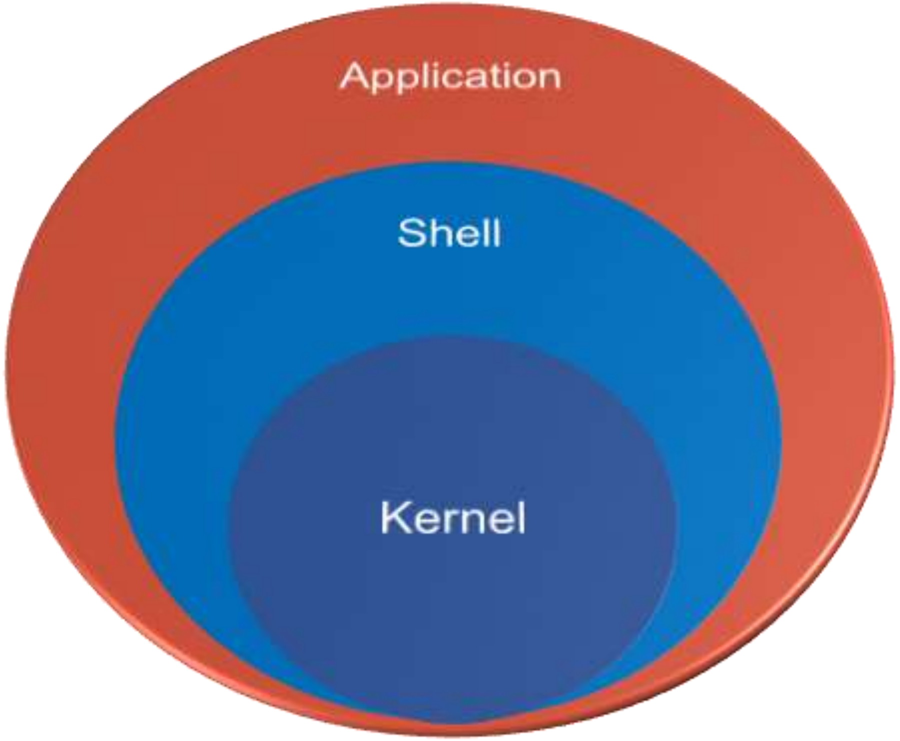


- For the used and supported shells in your system type:
  - echo $SHELL
  - cat /etc/shells

Linux Components

Terminal

- Gives the shell a place to accept typed command and to display their result.



Console vs Terminal

The **console** is a special sort of terminal. It is used by administrators only. Each computer has only one console. There's not much difference in appearance between standard terminal and the console, but console can do somethings that standard terminals can not do. For example, if the operating system failed to boot up, there would be error message displayed on the console, but not on other terminals.

Terminal is a device to interact with your computer system. It is composed of display, keyboard and sometime mouse. Types of terminal:

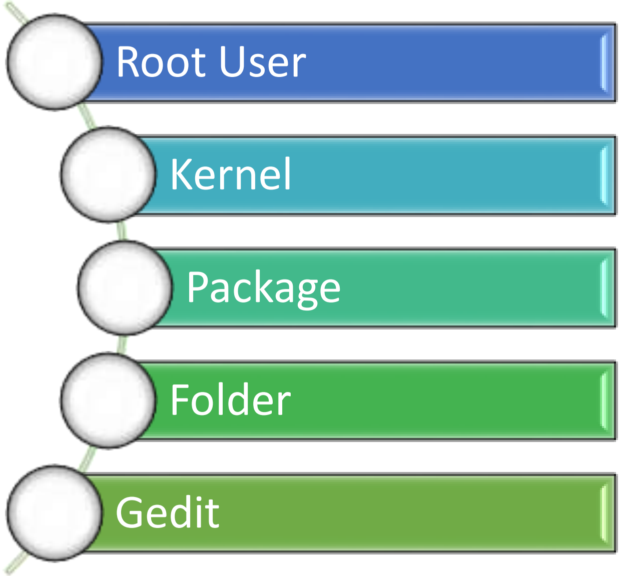
- "TTY" (which stands for teletypewrite)
- "PTY" (which stands for pseudo terminal).

Exploring Ubuntu GUI

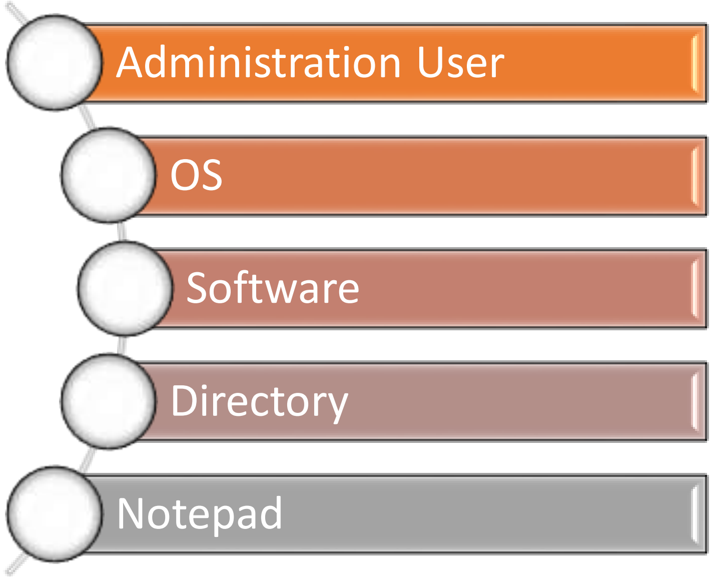
ubuntu

VS

Windows



- Root User
- Kernel
- Package
- Folder
- Gedit



- Administration User
- OS
- Software
- Directory
- Notepad

Linux System Structure

Linux System Structure

- BootLoader (grub, uboot, vivi)
- Kernel (www.kernel.org)
- Filesystem (FHS)
  - init process
  - shell (bash & ash & sh)
  - Services manager
  - Scripts & Environment variables
  - Linux commands
  - Applications (user apps, GUI, …)

Linux System Principles

- Everything is a file (including hardware).
- Consists of small, single-purpose programs.
- Ability to chain programs together to perform complex tasks.
- Users usually avoids user interfaces.
- Configuration data stored as text.

Root Filesystem Hierarchy Standard (FHS)

FileSystem

Think of Filesystem as **Building**

Directory is a **room** in the **building**

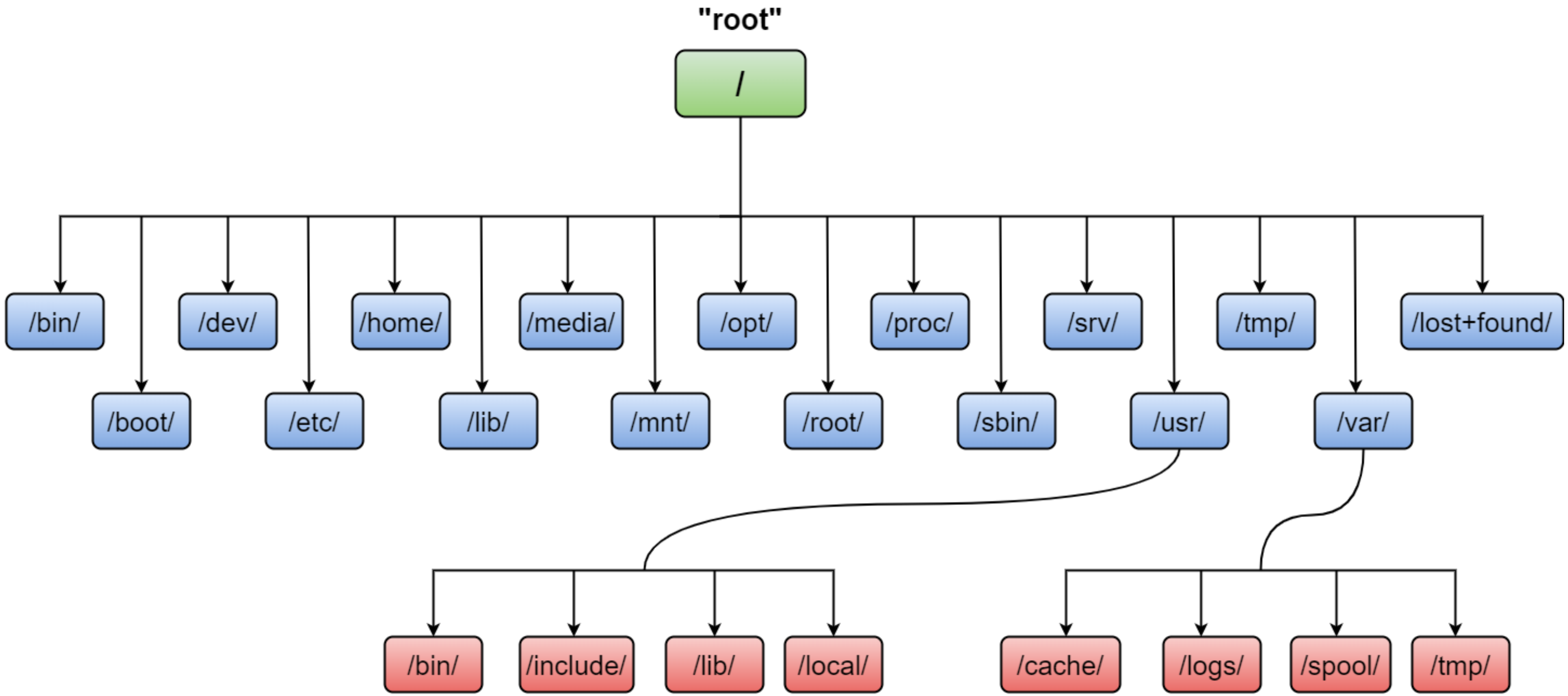
File is a **desk** in the **room**

The current working directory is the **room** you are.

To find current directory you are type the following command

```
pwd
```

FileSystem Hierarchy Standard



FileSystem Hierarchy Standard

/	root directory
/bin	commands & executable files
/sbin	system commands & executable files
/boot	kernel & bootloader
/dev	hardware device files (nodes)
/etc	configuration files and startup scripts
/home	users home directories
/root	root home directory
/lib	shared library files
/media	mount points for storage media
/opt	third parity applications
/proc	virtual process files
/usr	other users applications & libraries
/var	files that change a lot

Introduction to the command line

Command Line

- Command syntax

```
command [option(s)] [parameter(s)]
command -(one character option)
command --(full word option)
```

  - Boldface is used for as-is text
  - Arguments or option-arguments enclosed in the '[' and ']' notation are optional and can be omitted.
  - Arguments separated by the '|' vertical bar notation are mutually-exclusive.
  - Ellipses ("...") are used to denote that one or more occurrences of an option or operand are allowed.

Getting Help (man pages)

Getting Help

Help commands

`man command`

System-wide documentation system that provides short reference manuals (pages) for individual commands, API functions, concepts, configuration file syntax, file formats and is organized in sections (1 for user commands, 2 for system calls...). That's the traditional Unix documentation system.

`info command`

Another documentation system originating in the GNU project

`help command`

Built-in command in the bash shell (and that shell only) that documents some of the built-in
commands and keywords of that shell. That's an internal documentation system of that shell.

Getting Help – Cont’d

- **Command type**
- `type`

  Display information about command type

- **Search the manual page names and descriptions**

```
man -k pattern
apropos pattern
```

Browsing and Exploring Filesystem

Browsing and Exploring Filesystem

Change Directory

cd	Dir-name	Go to directory
cd	-	Go to previous
cd	.	Go to current
cd	..	Go to up
pwd		Print current directory

List files in current directory

Ls	-l	Long list
Ls	-lh	Long list, human read
Ls	Another path	List another folder
Ls	-a	List all hidden

Creating files and directories

Creating files and directories

Creating new file

touch	File name	Create file
touch	File1 file2 file3	Create multiple file

Creating new directory

mkdir	Dir-name	Create directory

Copying and moving files

Copying and moving files

copy files and directories		
cp	source destination	Copy file
cp –R	source destination	Copy directory
cp –a	source destination	Preserve with contents
cp –i	source destination	Prevent from overwrite

Move & rename files & directories		
mv	source destination	Move file to another directory **This command can be use as well to rename the file**

Removing files and directories

Removing files and directories

Remove file		
rmdir	**Empty_directory**	Remove empty dir
rm	**File**	Remove file
rm -r	**Directory**	Remove directory

Thank You