Intro to Linux

1.1.1 - File System Hierarchy

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File System Hierarchy

Among the many Linux distributions, there are standard file systems that have a similar layout

- Maintained by the Linux Foundation
- All start the ~~the~~ root (/) directory

```
ubuntu@ip-10-15-86-128:/$ ls
bin   dev   home  lib32  libx32      media  opt   root  sbin  srv  tmp  var
boot  etc   lib   lib64  lost+found  mnt    proc  run   snap  sys  usr
```

List of Directories – Part 1

- The **/boot** (read as root, boot) directory contains all the files required for the system's boot process
  - Includes the kernel of the system, RAM images, bootloader configuration files, etc.

- The **/proc** directory contains information about processes, hardware configuration, and kernel parameters
  - E.g. /proc/info provides information about the system's CPU

- The **/sys** directory holds information about the kernel parameters and device attributes
  - E.g. /sys/gpio can manipulate the GPIO pins on embedded systems

List of Directories – Part 2

- The **/var** directory contains all the files that change while the system is being used
  - Mainly used for storing variable data that is generated by services and applications
  - Logs are stored in /var/log
  - Cached data is stored in /var/cache
- The **/usr** directory contains data and resources about system users
  - /usr/bin contains commands, executables, utilities, and applications
  - /usr/share contains fonts, images, documentations, etc

List of Directories – Part 3

- The **/lib** directory contains libraries for the system typically needed for the early stages of the boot process
  - o Occasionally split in /lib32 and /lib 64 for 32-bit and 64-bit libraries, respectively
- The **/dev** directory contains device files that provide access to hardware devices on the system
  - o /dev/sda typically represents the first hard drive (or first partition)
  - o /dev/ttyS0 is usually a serial port
  - o /dev/null and /dev/zero are used for input/output

List of Directories – Part 4

- The **/etc** directory contains configuration files and shell scripts for the system
  - /etc/fstab is the file system table
- The **/opt** directory holds optional/add-on software packages
  - Allows for easy management and helps prevent conflicts with system files
- The **/bin** directory contains the essential executable files for the system to function
  - Contains the fundamental commands for the system to function including `ls`, `cp`, `mv`, etc.

List of Directories – Part 5

- The **/sbin** directory is reserved for system administrators and contained essential system binaries
  - Commands included within this directory are fdisk, reboot, and ifconfig
- The **/home** directory is where system users home directories are located
  - /home/student would be the home directory for a user, student
- The **/root** directory is the home directory for the superuser/root account
  - Contains config files, scripts, etc.

List of Directories – Part 6

- The **/media** directory is used as a mount point for removable media devices such as USB drives, external hard drives, optical discs, etc.

- The **/mnt** directory is a general-purpose mount point used for temporarily mounting filesystems or devices
  - /mnt can be used for any kind of mount operation

- The **/tmp** directory is a location for storing temporary files and directories
  - May be deleted by the system during reboots or to free up disk space