OS Lab
Session 2: File System

AUT – CEIT

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File System

What is File System?

In computing, a file system or file system is used to control how data is **stored** and **retrieved**. Without a file system, information placed in a storage medium would be **one large body of data** with no way to tell where one piece of information stops and the next begins. By separating the data into pieces and giving each piece a name, the information is easily **isolated** and **identified**.

Aspects of File Systems

- Space management
- Filenames
- Directories
- Metadata
- File system as an abstract user interface (procfs)
- Utilities
- Restricting and permitting access
- Maintaining integrity

Kinds of File System

There are many different kinds of file systems. Each one has different **structure** and **logic**, properties of **speed**, **flexibility**, **security**, **size** and more, e.g. :

- Disk file systems
- Tape file systems
- Optical discs
- Flash file systems
- Shared disk file systems (e.g. SAN)
- And more...

Disk File Systems

- ## File Allocation Table (Marc McDonald-1977)

  – fat, fat12, fat16, fat32

- ## Extended file system (Rémy Card-1992)

  – ext, ext2 (1993), ext3, ext4

- ## New Technology File System (Tom Miller-1980)

Linux Important Directories

Linux Important Directories

- /bin

  - Binaries (executables). Basic system programs and utilities (such as bash).

- /usr/bin

  - More system binaries.

- /usr/local/bin

  - Miscellaneous binaries local to the particular machine.

- /sbin

  - System binaries. Basic system administrative programs and utilities (such as fsck).

- /usr/sbin

  - More system administrative programs and utilities.

Linux Important Directories

- /etc

    - Et cetera. Systemwide configuration scripts.

- /etc/rc.d

    - Boot scripts, on Red Hat and derivative distributions of Linux.

- /usr/share/doc

    - Documentation for installed packages.

- /usr/man

    - The systemwide manpages.

- /dev

    - Device directory. Entries (but not mount points) for physical and virtual devices.

Linux Important Directories

- /proc
  - Process directory. Contains information and statistics about running processes and kernel parameters.

- /sys
  - Systemwide device directory. Contains information and statistics about device and device names. This is added to Linux with the 2.6.X kernels.

- /mnt
  - Mount. Directory for mounting hard drive partitions,

- /media
  - In newer Linux distros, the preferred mount point for I/O devices, such as CD/DVD drives or USB flash drives.

- /var
  - Variable (changeable) system files. This is a catchall "scratchpad" directory for data generated while a Linux/UNIX machine is running.

Linux Important Directories

- /var/log

  - Systemwide log files.

- /lib

  - Systemwide library files.

- /usr/lib

  - More systemwide library files.

- /tmp

  - System temporary files.

- /boot

  - System boot directory. The kernel, module links, system map, and boot manager reside here.

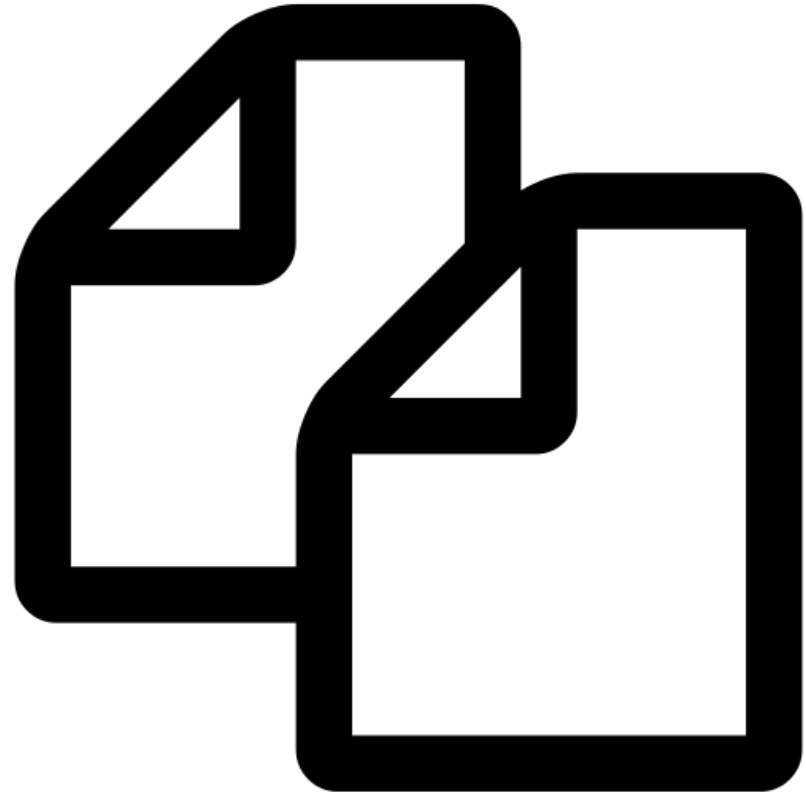# Working with files and directories in Linux

Learn the command line!

https://www.codecademy.com/learn/learn-the-command-line

Help

- Mostly used: --help
- man
- info

?

Files

- touch
- find
- whereis
- which
- tar

Directories

- ls
- cd
- pwd
- mkdir
- rmdir
- ln
- mv
- cp

Text Files

- cat
- more
- less
- head
- tail
- file
- grep
- wc

Text editors in Linux

Text editors

- Graphical
  - Text Editor
  - Geany
  - Sublime
  - much more…

- Command Line
  - vim (https://vim.rtorr.com)
  - emacs
  - nano

Permissions

Permissions

- users
- groups
- permissions
- sudo
- chmod
- chgrp
- chown
- lsattr
- chattr

Mount storage

What is Mounting in Linux

- Unix systems have a **single directory tree**.
    - All accessible storage must have an associated location in this single directory tree. This is unlike Windows where (in the most common syntax for file paths) there is one directory tree per storage component (drive)

- Mounting is the act of **associating a storage device to a particular location** in the directory tree.

Mount

- mount
- umount
- /etc/fstab