ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 2: LESSON 1

UNIX & LINUX FILE MANAGEMENT CONCEPTS
MANAGING DIRECTORIES

LESSON 1 TOPICS

Unix / Linux File Management Concepts

- Purpose of Directories
- Directory Pathnames / Tree Diagrams
- Filename Rules

Managing Directories

- Creating / Viewing Contents of / Manipulating / Removing Directories:
  `mkdir -p`, `rmdir`, `rm -r -i`, `ls -l -d -R` , `tree`, `cp -R`, `mv`
- Demonstration

Homework

- Perform **Tutorial 2: Unix / Linux File Management (Investigation 1)**
  Perform LINUX PRACTICE QUESTIONS (1 – 8)

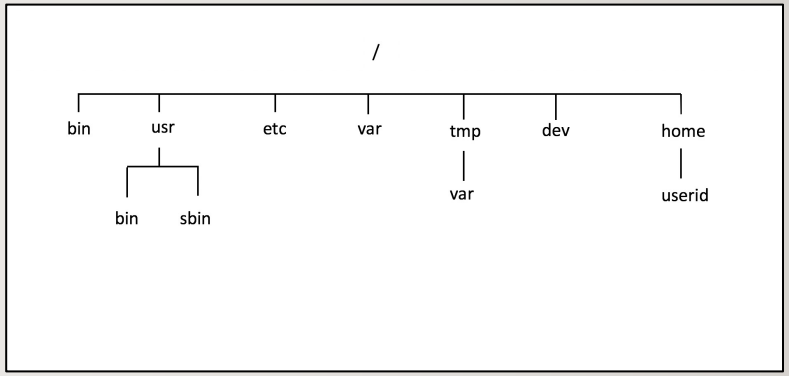
LINUX FILE MANAGEMENT CONCEPTS

Purpose of Unix / Linux Directories

To better **organize** files (eg. text, images, documents, spreadsheets, programs) within your Matrix account, they should be stored in **directories**.

To further organize <u>many</u> files, directories may contain **sub-directories**.

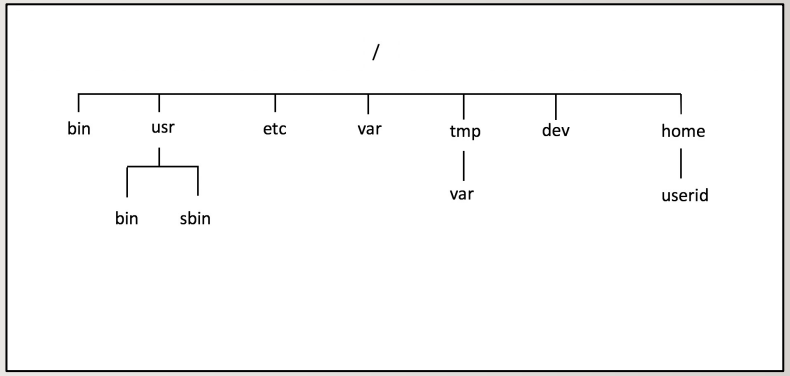
Learning how to issue Linux commands for **navigating** and **manipulating** directory and files within the the Linux filesystem are **essential skills** for Linux users and Linux system administrators (i.e. *sysadmins*).



LINUX FILE MANAGEMENT CONCEPTS

Purpose of Unix / Linux Directories

The Unix/Linux file system is **hierarchical**, like other operating systems such as **Windows**, **macOS**, etc. In Unix / Linux (as opposed to Windows), there are no drive letters such as **C:**, or **D:**

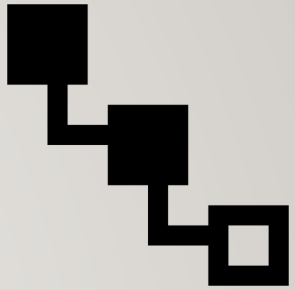


All files and directories appear under a single ancestor directory called the "**root directory**".

In the Linux (Unix) OS, the "**root directory**" / is the starting directory, and other "*child directories*", "**grandchild directories**", etc. can be created as required. The hierarchical structure resembles an "*upside-down tree*". There is actually a command called **tree** that displays a "**directory tree diagram**"!

```
tree linux
linux
└── uli101
    ├── notes
    ├── practice
    └── samples
```

LINUX FILE MANAGEMENT CONCEPTS



Directory Pathnames

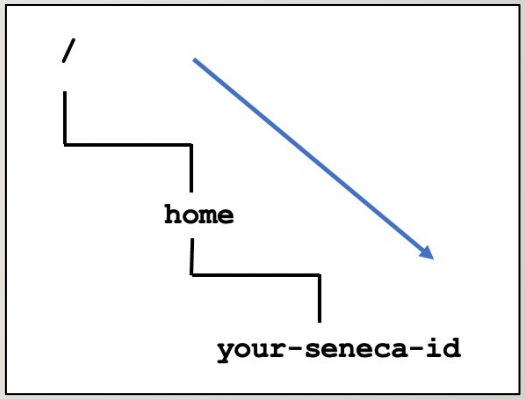
*A **pathname** is used to specify the **location** of a file within the file system.*

*A pathname **points** to a file system location by **following the directory tree hierarchy** expressed in a string of characters in which path components, separated by a delimiting character, represent each directory.*

*The **delimiting character** is most commonly the slash character ("/").*

Example:

`/home/your-seneca-id`



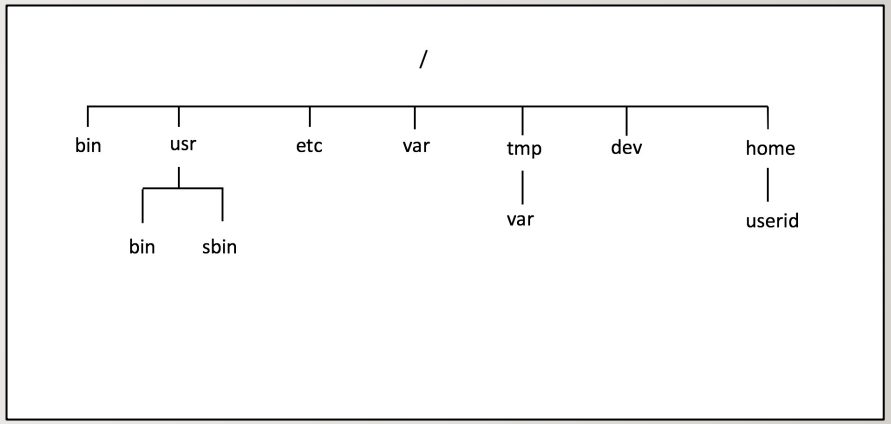
Reference: https://en.wikipedia.org/wiki/Path_(computing)

LINUX FILE MANAGEMENT CONCEPTS

Common Unix / Linux Directories

Below are several common Unix / Linux Directories and their purpose:

Directory Pathname	Purpose
/	Root directory (ancestor to all directories)
/home	Used to store users' home directories
/home/username	A **specific** User's Home Directory
/bin , /usr/bin	Common system binaries (commands)
/usr/sbin	Common utilities for system administration
/etc	System administration files (eg. passwd)
/var	Dynamic files (log and mail files)
/tmp , /var/tmp	Temporary files for programs
/dev	Device driver files (terminals, printers, etc.)



LINUX FILE MANAGEMENT CONCEPTS

Directory File Naming Rules

Before learning to **create** directories, it is important to understand what represents an appropriate directory filename. Here are some **rules**:

Unix / Linux File Naming Rules
✓ Unix/Linux characters are **case sensitive** (e.g. always use lowercase letters)
✓ Adopt a **consistent directory naming scheme** (this will help you to better navigate within your directory structure)
✓ Make your directory names **meaningful** (short but descriptive)
✓ **Avoid using spaces** for directory names (consider **periods**, **hyphens**, and **underscores** instead)
✓ **Avoid non-alphanumeric characters**, as they may have a special meaning to the system that will make your work more difficult when changing to directories, etc.

MANAGING DIRECTORIES

Managing Directories

Below are some common Unix / Linux commands to manage Directories:

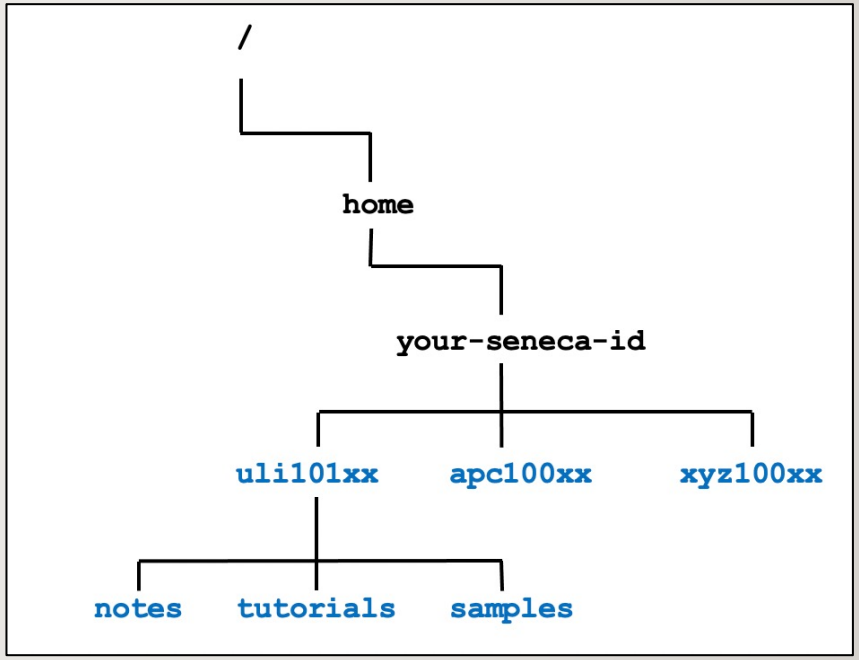
Directory Pathname	Purpose
`mkdir -p`	Creates a directory. The **-p** option creates parent directories then directory pathnames specified.
`rmdir`	Removes empty directories.
`rm -r -i`	Removes files, but when used with **-r** option, will remove non-empty directories and their contents. The **-i** option is used to prompt user to confirm deletion of directory contents
`ls -l -d –R , tree`	List directory contents. Useful to verify if directory was created. The **-d** option lists the directory itself (not contents) The **-R** option displays directories and subdirectory contents. The tree command displays diagram of directory structure.
`cp -R`	Copies directory and its contents (recursive) to a different directory
`mv`	Moves directory and its contents to a different directory

MANAGING DIRECTORIES

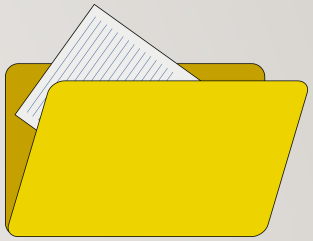
Managing Directories Demonstration

Your instructor will demonstrate how to manage directories by issuing Unix / Linux commands:

- Create directory structure as shown in diagram to the right
- View / Verify created directories
- Copy directories
- Move directories
- Remove empty directories
- Remove non-empty directories



MANAGING DIRECTORIES



Determine Type of File

When issuing the **`ls`** command to view the contents of a directory, the **`-l`** option can be used to help determine file type.

```
ls -l
drwxr-xr-x 2 murray.saul users 6 Jan 11 09:42 documents
-rw-r--r-- 1 murray.saul users 0 Jan 11 09:42 file.txt
crw-rw-rw- 1 root root 1, 3 Dec  2 07:25 /dev/null
```

The first character on the **left** of the output indicates the type of file:

`d:` directory file

`-:` regular file

`b` or **`c:`** device file

MANAGING DIRECTORIES

Hidden Files

A file is hidden if its name starts with a period "." This can hide both regular files and directory files.

Why make files hidden?

- To clean up directories
- To hide backups
- To protect important files from accidental deletion

If you issued the **`ls`** command without arguments, hidden files do NOT appear.

The **`ls`** command with the **`-a`** option will show all files including hidden and non-hidden. Current and Parent directories (. and ..) are displayed.

The **`ls`** command with the **`-A`** option will show all files including hidden and non-hidden. Current and Parent directories (. and ..) are NOT displayed.

HOMEWORK

Getting Practice

Perform the online tutorial **Tutorial 2: Unix / Linux File Management (Due: Friday Week 3 @ midnight for a 2% grade)**:

- INVESTIGATION 1: MANAGING DIRECTORIES
- LINUX PRACTICE QUESTIONS (Questions 1 – 8)