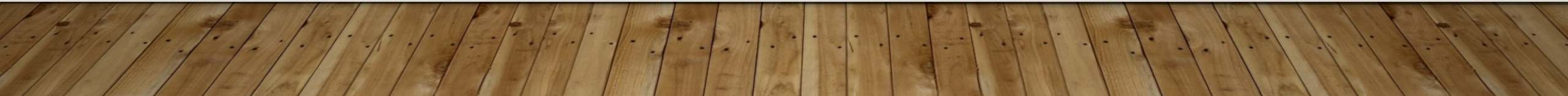


ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 2: LESSON 1

UNIX & LINUX FILE MANAGEMENT CONCEPTS MANAGING DIRECTORIES

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LESSON I 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 I)**
Perform LINUX PRACTICE QUESTIONS (1 – 8)

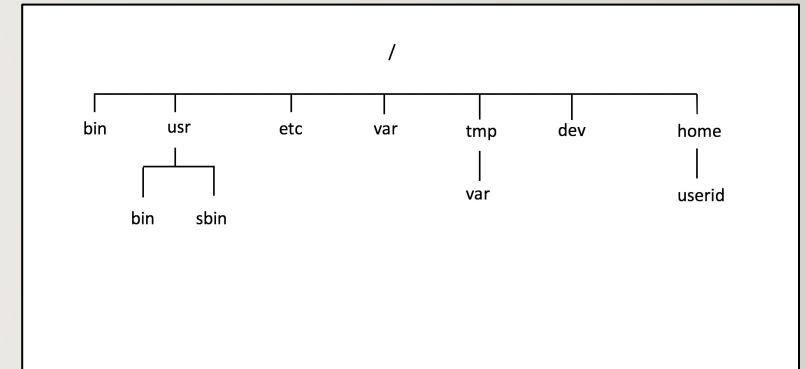
LINUX FILE MANAGEMENT CONCEPTS

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 many 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*).



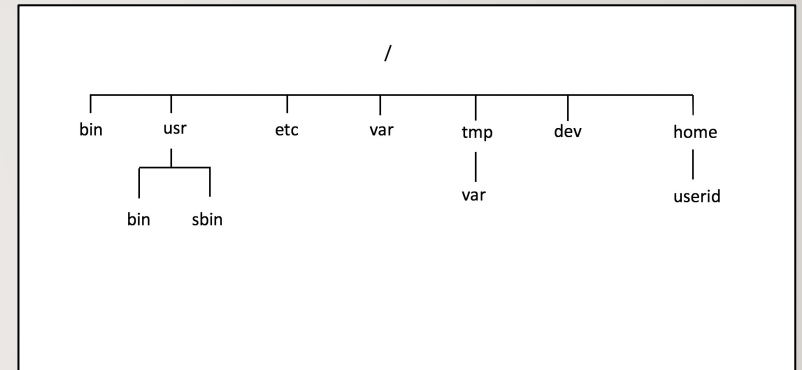
LINUX FILE MANAGEMENT CONCEPTS

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

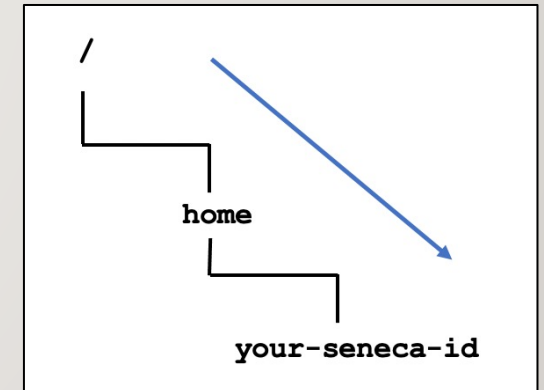
A **pathname** is used to specify the **location** of a file within the file system.

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`



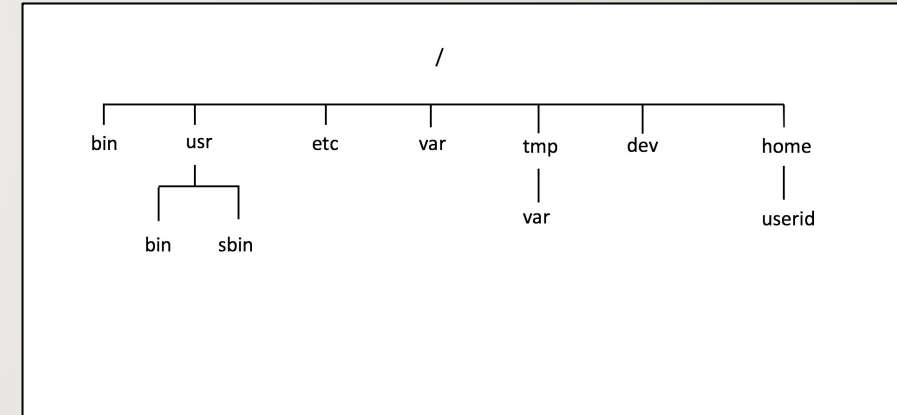
Reference: [https://en.wikipedia.org/wiki/Path_\(computing\)](https://en.wikipedia.org/wiki/Path_(computing))

LINUX FILE MANAGEMENT CONCEPTS

Common Unix / Linux Directories

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

Directory Pathame	Purpose
/	Root directory (ancestor to all directories)
/home	Used to store users' home directories
/home/username	A <u>specific</u> 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 Pathame	Purpose
<code>mkdir -p</code>	Creates a directory. The -p option creates parent directories then directory pathnames specified.
<code>rmdir</code>	Removes <u>empty</u> directories.
<code>rm -r -i</code>	Removes files, but when used with -r option, will remove <u>non-empty</u> directories and their contents. The -i option is used to prompt user to confirm deletion of directory contents
<code>ls -l -d -R , tree</code>	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.
<code>cp -R</code>	Copies directory and its contents (recursive) to a different directory
<code>mv</code>	Moves directory and its contents to a different directory

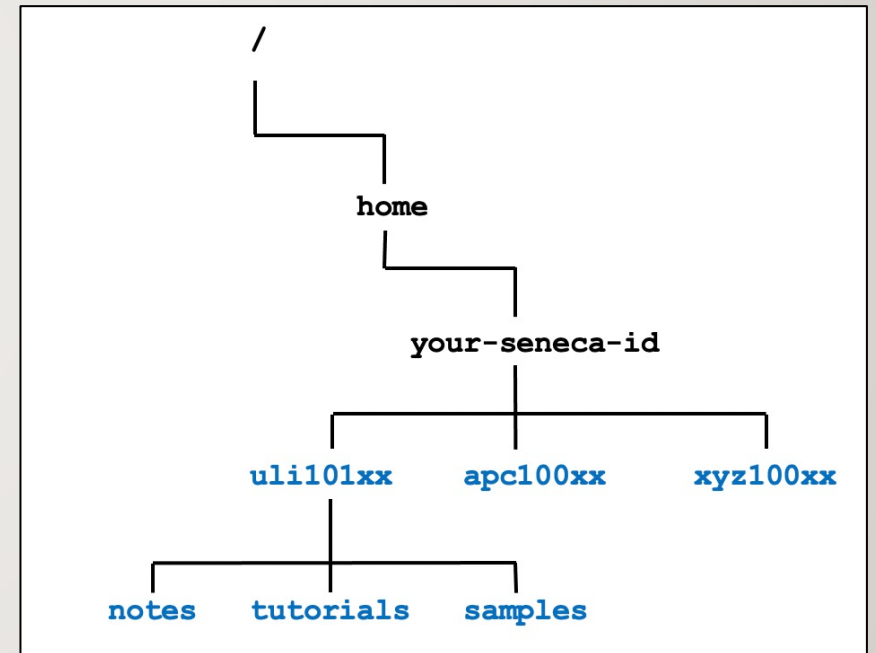
MANAGING DIRECTORIES



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
```

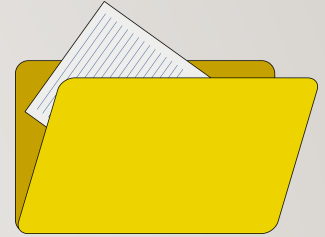
```
crw-rw-rw- 1 root root 1, 3 Dec 2 07:25 /dev/null
```

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)