ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 3: LESSON 1

ADVANCED FILE MANAGEMENT

LESSON 1 TOPICS

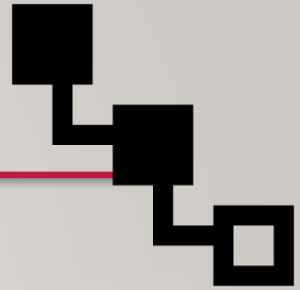
File Pathname Types

- Absolute File Pathnames
- Relative File Pathnames
- Relative-to-home File Pathnames
- Demonstration

Perform Week 3 Tutorial

- Investigation 1

FILE PATHNAME TYPES



Purpose of File Pathnames

As previously mentioned, a **pathname** is a **fully-specified location** of a unique filename within a file system. The concept of a pathname relates to every operating system including:
Unix, **Linux**, **MS-DOS**, **MS-Windows**, **Apple-Macintosh**, etc.

Last week, we used a pathname from our home directory to create and manipulate directories and text files. There are different **types of pathnames** that we can use to access a directory or text file.

For Example:

/home/userid/uli101/cars.txt (absolute pathname)
samples/cars.txt (relative pathname)
~/cars.txt (relative-to-home pathname)

These types of file pathnames can make it more **efficient** (i.e. **less keystrokes** for users to type)

FILE PATHNAME TYPES

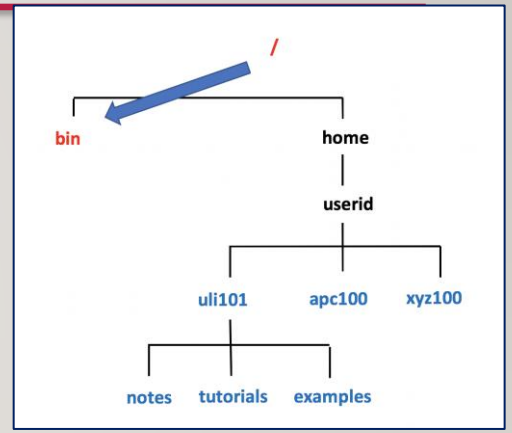
Absolute Pathnames

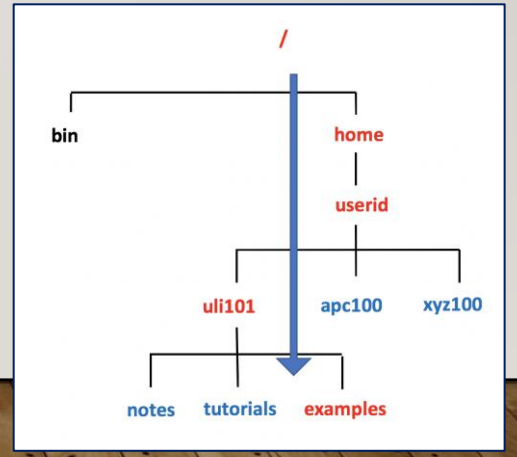
An **absolute pathname** is a path to a file or directory always beginning from the **root directory (i.e. /)**.

This type of pathname is referred to as **absolute** because the pathname always begins ABSOLUTELY from the **root directory** regardless of your current directory location.

In other words, this type of pathname requires that you always provide the **FULL** pathname starting with the root directory.

Remember the Rhyme: *"If it is ABSOLUTE, it begins with ROOT!"*



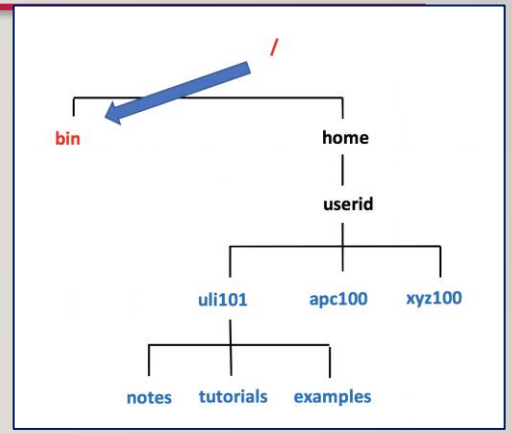


FILE PATHNAME TYPES

Absolute Pathnames

Advantages of using Absolute Pathnames:

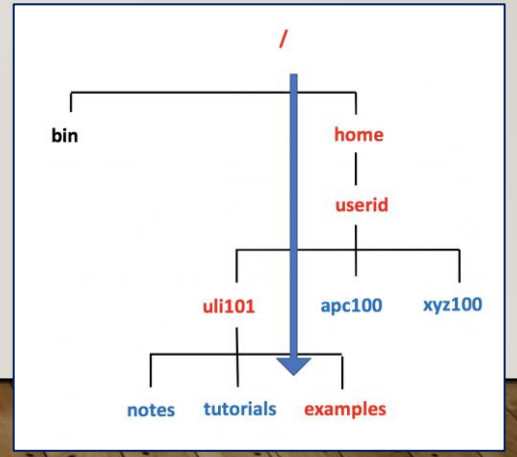
- Useful if you do NOT know your current directory location
- Helps you to understand the FULL layout of pathname



Examples:

/bin

/home/userid/uli101/examples



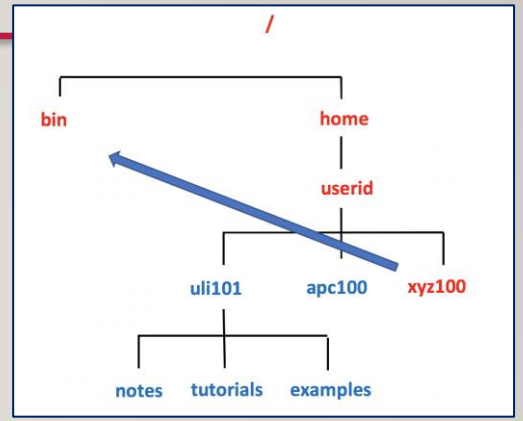
FILE PATHNAME TYPES

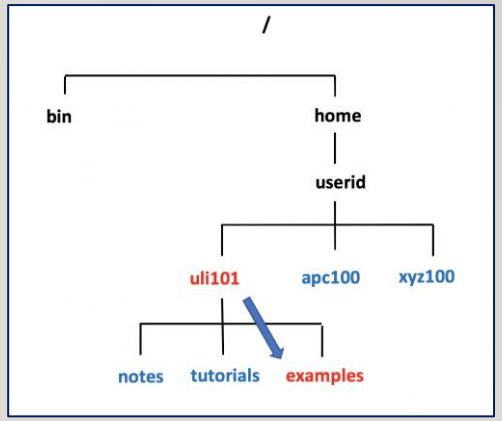
Relative Pathnames

A **relative pathname** is a path to a file or directory that begins from your **current** directory.

This is called a *relative pathname* because it is used to locate a specific file **RELATIVE** to your **current directory**.

NOTE: In order to use relative pathnames, it is absolutely necessary that you know the **location** of your **current directory**!



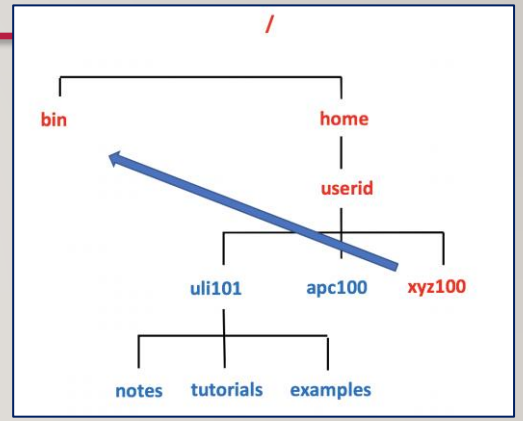


FILE PATHNAME TYPES

Relative Pathnames

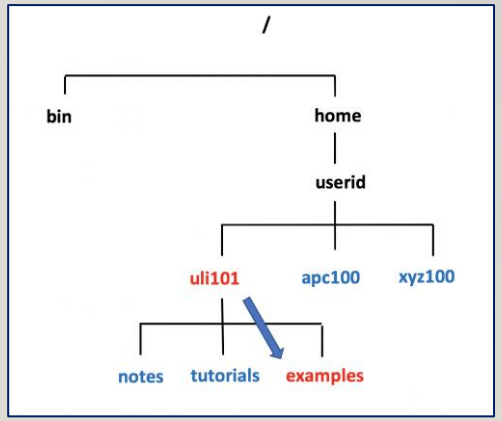
Relative Pathname Symbols:

- A period "." represents the **current** directory
- Two periods ".." represents the **parent** directory (i.e. one directory level up)



Advantages of using Relative Pathnames:

- Possibly a shorter pathname (less typing)



Examples:

```
../../../bin
examples
./examples
```

FILE PATHNAME TYPES

Relative-to-home Pathnames

A **relative-to-home pathname** begins with the
tilde character (i.e. ~) to represent the current user's **home** directory.

The **tilde** character **~** stores the path of the current user's home directory
(i.e. **`~ = /home/current-user-id`**).

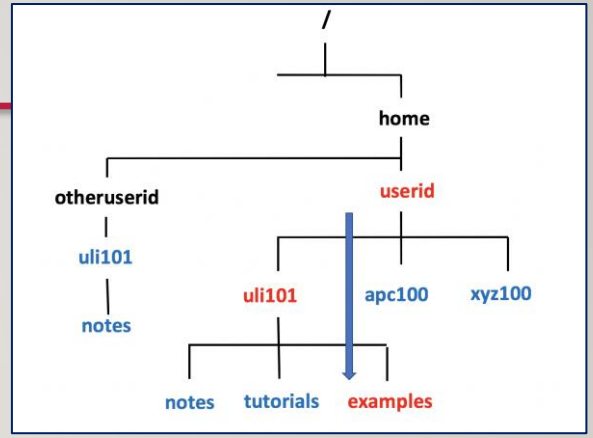
Advantages of using Relative-to-Home Pathnames:

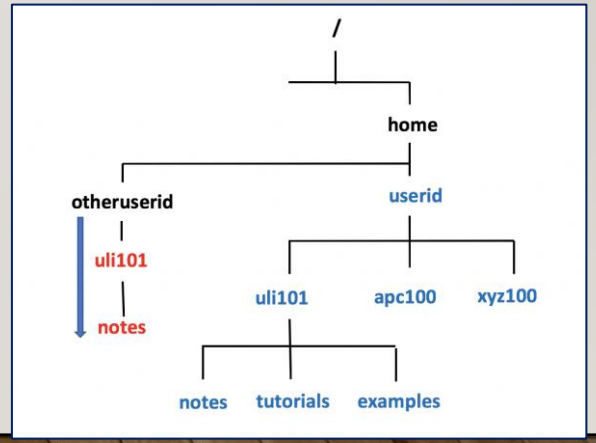
- Possibly a shorter pathname (less typing)

You can place a **username** IMMEDIATELY **after** the tilde character to
represent another user's home directory (for example: **`~jane = /home/jane`**)

Examples:

```
~/uli101/examples
~/uli101/notes
~murray.saul/uli101/notes
```





FILE PATHNAME TYPES

Instructor Demonstration

Your instructor will now demonstrate how to issue Unix / Linux commands using absolute, relative and relative-to-home pathnames for directory / file management:

- Creating / Removing Directories
- Moving Files / Directories
- Copying Files / Directories
- Listing Directory Contents
- Removing Regular Files

HANDS-ON TIME / HOMEWORK

Getting Practice

To get practice to help perform **assignment #1**, perform online
Tutorial3: Advanced File Management / Quoting Special Characters
(**ctrl-click** to open link):

- INVESTIGATION 1: ABSOLUTE / RELATIVE / RELATIVE-TO-HOME PATHNAMES
- LINUX PRACTICE QUESTIONS (Questions 1 – 8)

Work on your **online Assignment #1**:

- Perform **section 3: Directory Management** and
  Section 4: Practice Commands to Create a Directory Structure

ULI101: INTRODUCTION TO UNIX / LINUX AND THE INTERNET

WEEK 3: LESSON 2

FILENAME EXPANSION
QUOTING SPECIAL CHARACTERS

LESSON 1 TOPICS

File Name Expansion

- Purpose
- Special characters for Filename Expansion: `*` , `?` , `[ ]` , `[! ]`
- Demonstration

Quoting Special Characters

- Purpose
- Backslash \ , Single Quotes ‘’, Double Quotes “”
- Demonstration

Perform Week 3 Tutorial

- INVESTIGATIONS 2 and 3
- LINUX PRACTICE QUESTIONS (Questions 9 – 13)

Complete Assignment 1 (remaining parts **3**, **4**, **5** and **6**)

FILENAME EXPANSION

Filename Expansion

This command displayed below is **inefficient**: it requires a LOT of typing and requires that the user know all the filenames within the current directory.

```
ls a.txt b.txt c.txt 1.txt 2.txt 3.txt abc.txt work.txt
a.txt b.txt c.txt 1.txt 2.txt 3.txt abc.txt work.txt
```

Filename expansion is the use of **special characters** to allow the shell to **match** files that share the **same characteristics** to help save the user save time when issuing Unix / Linux file management commands.

You can use a special character to indicate to the Bash shell to match all files that end with the extension ".txt":

```
ls *.txt
a.txt b.txt c.txt 1.txt 2.txt 3.txt abc.txt
```

FILENAME EXPANSION

Common File Expansion Symbols

Filename Expansion Symbol	Purpose
*	Asterisk (*) to represent **0 or more characters**
?	Question mark (?) to represent **exactly one character (any character)**
[ ]	Square brackets ([ ]) to represent and match for the **character enclosed within the square brackets**. It represents ONLY ONE character: it's like a **Question Mark (?)** but with **conditions or restrictions**
[!]	Square brackets containing an exclamation mark immediately after the open square bracket ([!]) to represent and match and **OPPOSITE** character for the character enclosed within the square brackets.

FILENAME EXPANSION

How Does File Expansion Work? (Process of "Globbing")

File Globbing *is a feature provided by the UNIX/Linux shell to represent multiple filenames by using special characters called wildcards with a single file name. A wildcard is essentially a symbol which may be used to substitute for one or more characters. Therefore, we can use wildcards for generating the appropriate combination of file names as per our requirement.*

Reference: https://www.linuxnix.com/10-file-globbing-examples-linux-unix/

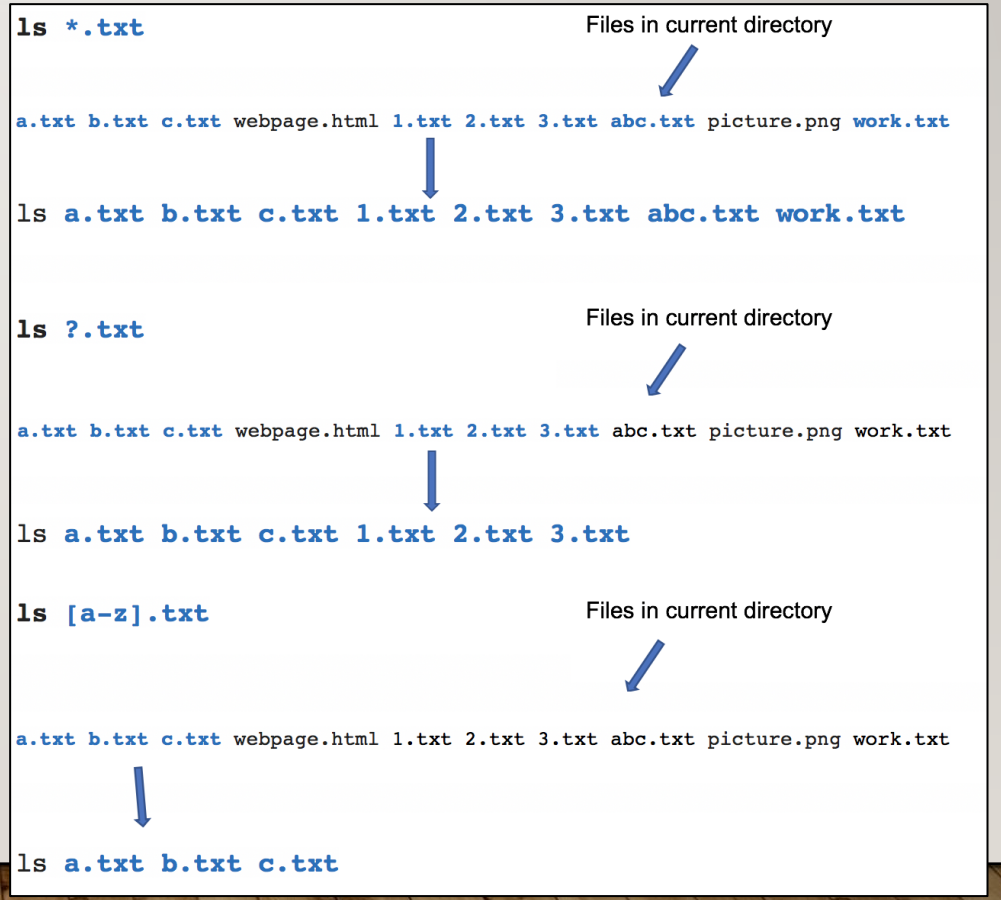
FILENAME EXPANSION

How Does this Work? (Globbing)

As shown in the diagram on the right, when the **ls** command is issued with a filename expansion symbol (like *), the Bash shell **searches** for all files in the current directory that match files that end with the extension **".txt**".

The shell replaces ***.txt** with all the files that end with the extension **.txt** in the current directory and runs that command.

You do not see that happen in the shell…
it is a process that occurs "behind the scenes".
Instead, you only see the results of the command.



FILENAME EXPANSION

Instructor Demonstration

Your instructor will now demonstrate how to issue Unix / Linux commands using various **filename expansion symbols** for file management:

- Creating / Removing Directories
- Moving Files / Directories
- Copying Files / Directories
- Listing Directory Contents
- Removing Regular Files

COMMAND HISTORY

Command History:

- The `~/.bash_history` file stores recently executed command lines.

  There are several techniques using the `~/.bash_history` file to run previously-issued commands..

Examples:

- `<up>` or `<down>` move to **previous** or **next** command in Bash shell prompt
- `fc -l` display last **16** commands
- `history | more` display all stored commands
- `!#` **re-executes** command by command number (obtained from *history* command)
- `!abc` **re-executes** last command beginning with string "*abc*"

QUOTING SPECIAL CHARACTERS

“ ”

Quoting Special Characters

As discussed in the above section, there are some special characters that the shell uses to perform an operation; for example, the filename expansion symbols: *, ?, [ ] or [!]

There is a method to instruct the Linux shell to ignore that special character and use only as **regular text**.

There are **3 methods** to make those special characters **act like text characters** (referred to "**quoting**" special characters).
These methods are displayed in the next slide.

QUOTING SPECIAL CHARACTERS

Quoting Special Characters (Methods)

The most common filename expansion symbols are displayed below:

Quoting Method	Example
Place the character \ before a special character (works for ALL special characters)	`echo \*`
Contain Special character within single **quotes** ' ' (work for ALL special characters)	`echo '* hello *'`
Contain special characters within **double-quotes** " " **NOTE:** Double quotes works for most special characters, but not all special characters (such as **$variable-name** - variables are discussed later in this course)	`echo "* hello *"`

QUOTING SPECIAL CHARACTERS

Instructor Demonstration

Your instructor will now demonstrate how to issue Unix / Linux commands **quoting special characters**, their **uses** and their **consequences**:

- Displaying Text
- Creating / Removing Directories
- Listing Directory Contents
- Removing Regular Files

HANDS-ON TIME / HOMEWORK

Getting Practice

To get practice to help perform **assignment #1**, perform the online tutorial **Tutorial3: Unix / Linux File Management** (**ctrl-click** to open link):

- INVESTIGATION 2: FILENAME EXPANSION
- INVESTIGATION 3: QUOTING SPECIAL CHARACTERS
- LINUX PRACTICE QUESTIONS (Questions 9 – 13)

Complete your **online Assignment #1**:

- Perform **section 5: Create a Directory Structure** and **Section 6: Practice Specifying Path Names**
- Make certain you have correctly **completed** your online assignment 1!