Scientific and Techincal Computing: SMR3821

Introduction to Linux shell environment.

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CLI tools and File operations

Linux Command Line - File Operations

echo: display lines of text or string

grep: match string pattern in text

paste: join content of files(horizontally)

cut: cut out sections of a line of text

file: file information

find: find files matching

xargs: parse as argument

tar: de(archive) and (un)compress files

Linux - Shell Tools: echo

echo

ECHO is a command-line tool used for displaying lines of text or string which are passed as arguments on the command line.

Mostly Used to output status text to the screen or a file

Linux - Echo Practice

Structure
echo [options] string

Eg.   : Dump 'Hello Bash' to screen

Example
$ echo 'Hello World'

Outcome
'Hello World'

Linux - Echo Practice

Structure

Options

1. Options
   - **e :** Allows you to change format of text
   - **n :** Removes preceding newline
2. Escape
   - **a :** For audible alert
   - **b :** backspaces character just before the slash
   - **c :** truncates everything after the slash.
   - **n :** Adds a new-line character
   - **t :** adds a tab character to the output

Linux - Echo Practice

Structure
echo [options] string
Options

```
un@mn:~$ echo -e "Hello World"
```
```
Hello World!
```

```
un@mn:~$ echo -n "Hello World"
```
```
Hello World!un@mn:~$
```

```
un@mn:~$ echo -e "It is\b red"
```
```
It i  red
```

```
un@mn:~$ echo -e "It is red\n"
```
```
It is  red
```

Linux - Shell Toosl: Echo Practice, Redirec to file

>: Output Redirect to new file   >>: Output Redirect and append to file

Redirect the output of an echo command
echo [options] 'string' > nameOfFile
Eg.

```
1  ~ $ echo "Logfile for Today 27/10/2022" > log.txt
```

```
1  ~ $ ls
```

log.txt should be found with other files that may be present in pwd.

```
1  ~ $ log.txt
```

To add some more data to **log.txt**
echo [options] 'string' » **log.txt**

```
1  echo -e "#By Captain Jack Sparrow\n" >> log.txt
```

To verify the content of file **log.txt**
cat <file-name>

```
1  ~ $ cat log.txt
```

File should contain:

```
1  #Logfile for Today 27/10/2022
2  #By Captain Jack Sparrow
```

Linux - Shell Tools: grep

grep

GREP is a command-line utility for searching plain-text data sets for lines matching a regular expression.

- Line matching and extraction
- Supports Regular Expressions
- Support inverse matching (-v)
- Supports piping

Linux - Grep Practice

Structure

grep [options] pattern-being-sort [files]

Eg. : Find lines containing text 'Williams' in the file addresses.txt

Example

$ grep Williams addresses.txt

Outcome

Steve Williams
Elizabeth Williams
John Williams
John Williamson

Linux - Grep Practice

Structure

grep [options] pattern-being-sort [files]

Options

- **w :** match exact words
- **n :** provide lines of occurrence
- **i :** case-insensitive pattern
- **r :** recursive search and match

- **c :** count
- **A :** Lines After context
- **B :** Lines Before context
- **C :** Lines Before & After context

Linux - Shell Tools: CUT

cut

CUT is a command-line utility for cutting out sections of string of text.

Cuts out certain section of line from files

cut out byte positions, characters or fields.

Structure

cut [options]... [FILES] ...

- **b :** Extract by bytes   - **f :** Extract by fields
- **c :** Extract by Character

Linux - Shell Tools: CUT Example -b

Steve Williams
Elizabeth Williams
John Williams
John Williamson

Example

$ cut -b 1,2,3 williamsfam.txt

Outcome

Ste
Eli
Joh
Joh

Linux - Shell Tools: CUT Example -c

williamsfam.txt

Steve Williams
Elizabeth Williams
John Williams
John Williamson

Example

$ cut -c 2,4 williamsfam.txt

Outcome

tv
lz
on
on

NB: -b and -c can give the same results when dealing with characters.

Linux - Shell Tools: CUT Example -f

cut [options]... [FILES] ...

-f option
-f option uses a tab space as the default delimiter.
The delimiter is denoted by -d and can be changed

Example
$ cut -d " " -f 1 williamsfam.txt

Outcome
Steve
Elizabeth
John
John

Linux - Shell Tools: paste

paste

PASTE is a command-line utility joining files horizontally (parallel merging) by outputting lines consisting of lines from each file specified.

Merges files using tab as delimiter

Structure

paste [options]... [FILES] ...

- **-d :** Delimiter
- **-s :** sequential merging

Linux - Shell Tools: PASTE Example

```
1 ~ $ cat firstnames.txt
```

Checking content of lastnames.txt

```
1 ~ $ cat lastnames.txt
```

```
1 Jack
2 Alice
3 Fred
4 Kwame
```

```
1 Ford
2 Reynolds
3 Russo
4 Mensah
```

Example

$ paste firstnames.txt lastnames.txt > fullnames.txt

Outcome into file fullnames.txt

Jack Ford
Alice Reynolds
Fred Russo
Kwame Mensah

Linux Command Line - Practical tools

Finding files

$ find . -type f | xargs grep elliot

Linux Command Line - Access Control

chown:: Change ownership of files

chmod: Change permission on files

setuid: Share ownership on files

sticky bit: Share write access on a directory

Linux - Shell Tools & Programs

End of Basic Shell Tools & Programs

End of talk

Thank you ...