CSCI 211
UNIX Lab

Advanced Unix Commands (2)

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Today's Focus

- Symbolic links

- Count characters/words/lines

- Background process

- Directory/file comparison

- Sort file content

- Show unique lines

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Symbolic Links

- A symbolic link is a special type of file that contains a reference to another file or directory

- To create one:

```
ln -s TARGET LINK_NAME
```

- Example

```
$ cd /tmp
$ ln -s /tmp/one/two three
$ ls -l /tmp/three
lrwxrwxrwx 1 user group 12 Jul 22 10:02 /tmp/three -> /tmp/one/two
```

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Count Characters/Words/Lines

- Count the number of lines, words, and characters in files
  - Show the number of characters only

    `wc -c FILE`

  - Show the number of words only

    `wc -w FILE`

  - Show the number of lines only

    `wc -l FILE`

  - Show all three numbers (output: # line, # word, # char)

    `wc FILE`

  - Read from the standard input

    `wc` **or** `wc -`

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Background Process

- Processes usually run in foreground
  - Before it exits, you cannot enter another command.
- To run a process in background
  - Syntax

    ```
    command &
    ```

  - Example

    ```
    tar xjf huge.tar.bz2 &
    ```

- How to check if a background process is still running, and terminate it if necessary?

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Directory Comparison

- Syntax

  ```
  diff [-r] dir1 dir2
  ```

- No output if there is no difference

- Otherwise shows the difference

```
lij@optiplex755:~/temp> diff 211 510
Only in 510: hs3
Common subdirectories: 211/hw1 and 510/hw1
Only in 510: hw1.raw
Common subdirectories: 211/hw2 and 510/hw2
Only in 510: hw3.raw
Only in 510: hw4
Only in 510: hw4.raw
Only in 510: hw5
Only in 510: proj
```

File Comparison

- Similar usage

```
lij@optiplex755:~/temp> cat f1
line 1
line 2
line 3
lij@optiplex755:~/temp> cat f2
line 1
Line 2
line 3
line 4
lij@optiplex755:~/temp> diff f1 f2
2c2                          Change 2nd line in f1 to match f2
< line 2
---
> Line 2
3a4                          Add a line after 3rd line in f1 to match f2
> line 4
lij@optiplex755:~/temp> diff f2 f1
2c2
< Line 2
---
> line 2
4d3                          Delete the 4th line in f1 to match f2
< line 4
lij@optiplex755:~/temp>
```

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Sort File Content

- Fields start with a space or specified delimiter in files
  - Four fields:

        abc def: 012 234

        uvw xyz: 456 789

- Sort the whole line

      sort filename

- Sort the 3rd field (start with 1)

      sort -k 3 filename

- Sort the first then the 3rd field

      sort -k 1,3 filename

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Sort File Content (cont'd)

- Example file

  ```
  abc def: 012 234
  uvw xyz: 456 789
  ```

- Sort numerically

  ```
  sort -n filename
  sort -k 3n filename
  ```

- Sort case-insensitive

  ```
  sort -f filename
  sort -k 3f filename
  ```

- Specify delimiter

  ```
  sort -t: filename
  ```

- Ignore leading spaces in fields

  ```
  sort -b filename
  sort -k 3b filename
  ```

- Start at specified characters in fields

  ```
  sort -f filename
  sort -k 3.2 filename
  ```

- Sort in reverse order

  ```
  sort -r filename
  sort -k 3r filename
  ```

Note: sort (and other commands) many work a little differently on different systems

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Show Unique Lines

- Displays a file, removing all but one copy of successive repeated lines

- Usage:

    ```
    uniq [flag] file
    ```

- Some flags:

    -c Causes uniq to precede each line with the number of occurrences of the line in the input file

    -d Displays only lines that are repeated

    -u Displays only lines that are not repeated

- Combine with sort to ensure all displayed lines are unique

    ```
    sort file | uniq
    ```

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