

CS-344 - Unix Operating System Fundamentals

Lecture 7
grep & sed

Based on slides created by
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the course

“grep”

- ❑ To search through several files
 - `grep pattern file1 file2`
 - `grep pattern file*`
- ❑ To list only the filename that match
 - `grep -l pattern files`
- ❑ To count the number of matches
 - `grep -c pattern files`
- ❑ To search all files in a directory tree
 - `grep -r pattern directory` (not on Solaris)
- ❑ To match complete lines
 - `grep -n -x 'pattern' files` (not on Solaris)
- ❑ To search for patterns starting with -
 - `grep -n -e -pattern files` (not on Solaris)

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Using metacharacters with grep I

- ❑ To select lines with a pattern at the beginning of the line
 - `grep '^pattern' files`
- ❑ To select lines with a pattern at the end of the line
 - `grep 'pattern$' files`
- ❑ To select lines that match alternative characters
 - `grep '[abc]pattern[xyz]' files`

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Using metacharacters with grep II

- ❑ To match any single character use the metacharacter "."
 - `grep '.' files`
 - `grep '^...$' files`
- ❑ To locate a word explicitly
 - `grep -w word files`
 - `grep '\<word\>' files`
- ❑ To locate a range of characters
 - `grep '[A-Z0-9a-z]' files`
 - `grep '^ [A-Z][0-9][a-z]' files`
 - `grep '^ [^a-z]' files`

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Using metacharacters with grep III

- ❑ To search for character repetitions
 - `grep 'a*' files` (zero or more a characters)
- ❑ To locate lines that contain any sequence of characters
 - `grep 'a.*b' files` (a followed by zero or more characters, followed by b)
- ❑ All these different options can be combined to form a complex expression
 - `grep '^ [^0-9][0-9][A-Z]*$' files` (look for lines that start with not a digit, followed by a digit, zero or more uppercase letters, and ends with end-of-line)

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Fast grep - fgrep

- ❑ Searches for a string instead of searching for a pattern that matches an expression
- ❑ Uses a fast and compact algorithm
- ❑ No metacharacter expansion is performed
- ❑ We can obtain the functionality of fgrep with grep by using the *-F* option
- ❑ fgrep also accepts multiple patterns by reading a file with different patterns
 - *fgrep -f patternsfile files*

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Extended grep – egrep

- ❑ Uses full regular expressions to match the patterns (could be slower than grep)
 - *egrep '^a|b\$' files* (starts with a OR ends with b)
 - *egrep -f patternsfile files*
- ❑ To specify one or more of a previous character
 - *egrep 'ab+' files* (one or more b)
 - *egrep 'ab*' files* (zero or more b)
- ❑ To specify optional character use ?
 - *egrep 'a?b' files* (zero or one between a and b)
- ❑ To specify number of character to match
 - *egrep 'a{3}b' files* (three a's followed by a b)

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Using “sed” I

- ❑ To quit after matching a specified line number
sed '20 q' filename (first 20 lines are printed)
 - ❑ To quit after the first matching of a given pattern
sed '/pattern/ q' filename
 - ❑ To delete specific lines
sed '1,10 d' filename (lines 1-10 are not displayed)
 - ❑ To delete lines that match a pattern
sed '/pattern/ d' filename
- Examples:**
- *sed '/xyz/ d' filename*
 - *sed '3,/abc/ d' filename*

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Using “sed” II

- Regular expressions can also be used as patterns for quit and delete
 - `sed '/^[A-Z].*[0-9]$/ q' filename`
 - `sed '/^$/ d' filename`
- To replace the first instance of a specified pattern


```
sed 's/abc/ABC/' filename
```
- To replace multiple instances of a specified pattern


```
sed 's/abc/ABC/g' filename
```

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Using “sed” III

- To suppress output from sed use `-n` option
 - `sed -n '/pattern/ = ' filename` (only the first matching line number is displayed)
 - `sed -n '3,6 p' filename` (print lines 3 through 6, without `-n` option all lines will be printed once while lines 3-6 will be printed twice)
 - `sed -n '1,15 s/abc/ABC/ p' filename` (the first line between 1 and 15 that matches the pattern will be printed) [Linux Only]
- To print lines at intervals
 - `sed -n '1~2 p' filename` (starting with line 1 output every other line)
 - `sed -n '2~3 p' filename` (starting with line 2 output every third line)

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Using “sed” IV

- To print lines that do not match use `!p`
 - `sed -n '/^[0-9]/ !p' filename` (don't print lines starting with a number)
 - `sed -n '/^$/ !p' filename` (don't print blank lines)
- Complex substitution using contextual addresses [Linux Only]
 - `sed -n '/pattern1/ s/pattern2/replace/g p' file`
 - `sed -n '/[1-5]/ s/abc/ABC/g p' filename`
 - `sed -n '5,/abc/ s/xyz/XYZ/' filename`

Address 1 Address 2

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Reading and Writing Files from sed

- To read in a file at a specified location
 - `sed '5 r inputfile' filename` (insert inputfile after line 5 in file "filename")
 - `sed '/abc/ r inputfile' filename` (after each line that contains "abc" insert the file "inputfile")
- To write specific lines to another file
 - `sed '1,10 w outfile' filename` (write lines 1-10 from file "filename" to the file "outfile")
 - `sed '/^[a-zA-Z]/ w outfile' filename` (write lines that start with a character to the file "outfile")

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Passing Multiple Instructions to sed

- To pass multiple instructions to sed on the command line use `-e` option
 - `sed -e 's/abc/ABC/' -e 's/xyx/XYZ/' filename`
 - `sed -e '/^[a-z]/ p' -e 's/[0-9]/XXX/g' p' file`
- We can also include the different instructions in a separate file and specify this commands file as input to sed with `-f` option
 - `sed -f optscript filename`

```
$ cat > optscript
s/root/ROOT/g
s/bin/vcsh/bin/vcsh/g
$ cat /etc/passwd | sed -f optscript
```

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Insert/Append Text with sed

- To insert text before a specified line use
 - `sed '5 i some text' filename`
 - `sed '/abc/i some text' filename`
- To insert text after a specified line use
 - `sed '5 a some text' filename`
 - `sed '/abc/a some text' filename`
- When using a script file as input to sed, the script file should have


```
/abc/i
Text To Be Inserted Before The Line
/abc/a
Text To Be Appended After The Line
```

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