

CEGEP VANIER COLLEGE

CENTRE FOR CONTINUING EDUCATION

Introduction to Linux

420-995-VA

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Lab Review 5

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Lab Review 5: Advanced File Processing

1. Review Lab 1, Lab 2, Lab 3, and Lab 4:

a) Using Linux Open SUSE Command Line, type the following commands:

```
cal, more, less, cat, man, who, whatis, pwd, passwd  
mkdir, cd, ls, rmdir, cp, rm, chmod  
mv, clear
```

b) Using Linux Open SUSE Command Line, type the following commands:

```
vi name of the file  
paste student1 student2 > student, cat student1 student2 > student  
cut -f 3 student  
sort -k 3 studentdata  
join -1 5 student faculty  
awk Program: for more advanced file processing, manipulate fields and records
```

c) Mastering Awk Program: Manipulate data files (fields and records) very efficiently, use variables, use arithmetic/logical operators, loops, and output data into a given format.

Three ways to execute **awk**:

- `awk 'BEGIN { print " This is a Hello World displayed with awk print line." }'`
- `awk '{ printf " %-8s\t %s\n", $2, $4}' student`
- Using *vi*, write the **awk** program into text file to be named *studrep* as shown in Figure 1.

```
awk 'BEGIN {  
    {print "\t\t Student at Vanier\n"}  
    {"date" | getline d}  
    {printf "\t %s\n", d}  
    {print "Student LName\t\t\t Student FName\n"}  
    {print "=====\n"}  
}  
{ printf " %-8s\t\t\t %s\n", $2, $3}' student
```

sh studrep

Figure 1

In order to execute *studrep*, type in the command line: **sh studrep**.

Create and Submit a Word file **Lab5LinuxYourName.doc** which contains a good sample of output screenshots for every Linux Command. For this purpose, students should capture the screen display and use Paint to cut/past and submit the appropriate windows (and not the entire screen display) displaying the output for each command.

2. Advanced File Processing

Two categories of File Processing:

- Selection commands

| Command | Purpose |
|------------------|---|
| cut -f 3 student | Selects columns (fields) |
| head | Selects lines from the beginning of a file |
| tail | Selects lines from the end of a file |
| grep | Selects lines or rows |
| uniq | Selects unique lines or rows |
| comm | Compares sorted files and shows difference |
| diff | Compares and select differences in two files |
| wc | Counts characters, words, or lines in a file. |

a) head and tail command:

| | |
|---|---|
| <pre>samir@linux-ces1:~/Review/Review5> head song1 Write this poem from the album Tacking Chances (Celine Dion): Never knowing if there's solid ground below, Or a hand to hold, Or hell to pay, What do you say, What do you say, I just wann start again, Maybe you could show me how to try, Maybe could take me in, Somewhere underneath your skin, What do you say to tacking chances... samir@linux-ces1:~/Review/Review5></pre> | <pre>samir@linux-ces1:~/Review/Review5> tail song1 What do you say to tacking chances... From a song (A world to believe in): I know that dreams we hold on to, Can just fade away, And I know that words can be wasted, With so much to say, And when I feel helpless, There's always a hope that shines through... samir@linux-ces1:~/Review/Review5> █</pre> |
|---|---|

Using Pipe Operator:

The pipe operator | redirects the output of first command to the input of the second command.

| |
|--|
| <pre>samir@linux-ces1:~/Review/Review5> ls -l /sbin more total 10432 -rwxr-x--- 1 root root 22324 2010-07-05 07:18 acpid -rwxr-xr-x 1 root root 1754 2010-07-05 17:29 activate_dm_linear -rwxr-xr-x 1 root root 39048 2010-07-05 08:14 adjtimex -rwxr-xr-x 1 root root 18540 2010-07-05 08:14 agetty -rwxr-xr-x 1 root root 746116 2010-07-05 15:33 apparmor_parser -rwxr-xr-x 1 root root 48896 2010-07-05 07:35 arp</pre> |
|--|

b) grep command: Finds and displays lines containing a particular search pattern.

| | |
|--|--|
| <pre>samir@linux-ces1:~/Review/Review5> grep say song1 What do you say, What do you say, What do you say to tacking chances... With so much to say, samir@linux-ces1:~/Review/Review5> █</pre> | <pre>samir@linux-ces1:~/Review/Review5> grep -r 'Lewis Sheila' /home/samir/Review /home/samir/Review/Review4/joinenrstusorted:5 MIS 301 B- Lewis Sheila SR 2 /home/samir/Review/Review4/joinenrstusorted:5 MIS 451 A+ Lewis Sheila SR 2 /home/samir/Review/Review4/joinenrstu:5 MIS 301 B- Lewis Sheila SR 2 /home/samir/Review/Review4/joinenrstu:5 MIS 451 A+ Lewis Sheila SR 2 /home/samir/Review/Review4/joinenrstufacsorted:2 5 MIS 301 B- Lewis Sheila SR eal</pre> |
|--|--|

- c) *uniq* command: Removes duplicate lines from a file.
Edit the following *product* file using *vi* editor.

| | |
|--|--|
| <pre>samir@linux-ces1:~/Review/Review5> cat product muffler muffler shocks alternator battery battery radiator radiator coil spark plugs coil</pre> | <pre>samir@linux-ces1:~/Review/Review5> uniq product muffler shocks alternator battery radiator coil spark plugs coil</pre> |
|--|--|

- d) *comm* command: Compares sorted files and shows difference .
Edit the file *product2* using *vi* editor, and compare it to the sorted file *product*.

| | |
|--|---|
| <pre>samir@linux-ces1:~/Review/Review5> cat product2 air filter alternator brake chain coil muffler oil filter radiator samir@linux-ces1:~/Review/Review5> █</pre> | <pre>samir@linux-ces1:~/Review/Review5> comm product1 product2 air filter alternator battery battery brake chain coil coil muffler muffler oil filter radiator radiator shocks spark plugs</pre> |
|--|---|

- e) *diff* command: shows lines that differ between two files.
Edit the file *faculty2* using *vi* editor, and compare it to the file *faculty*.

| | |
|---|---|
| <pre>samir@linux-ces1:~/Review/Review5> cat faculty2 1 Robertson Myra 2 Smith Neal 3 Robinson Lisa 4 Fillipo Paul</pre> | <pre>samir@linux-ces1:~/Review/Review5> diff faculty1 faculty2 3c3 < 3 Arlec Lisa --- > 3 Robinson Lisa samir@linux-ces1:~/Review/Review5> █</pre> |
|---|---|

- f) *wc* command: shows the number of lines, words, and characters in file.

| | |
|---|--|
| <pre>samir@linux-ces1:~/Review/Review5> wc faculty1 4 12 100 faculty1</pre> | <pre>samir@linux-ces1:~/Review/Review5> wc -wc faculty1 12 100 faculty1</pre> |
|---|--|

- Manipulation and Transformation commands

| Command | Purpose |
|---------|---|
| awk | Invokes Awk, a processing and pattern-scanning language |
| cat | Concatenates files |
| chmod | Changes the security mode of a file or directory |
| join | Joins two files, matching row by row |
| paste | Pastes multiple files, column by column |
| sort | Sorts and merges multiple files |
| sed | Edits data streams |
| tr | Translates and deletes character by character |
| pr | Formats and prints |

a) *sed* command: for global change on large files.

| | |
|---|--|
| <pre>samir@linux-ces1:~/Review/Review5> sed -n 2,3p faculty 2 Smith Neal 3 Arlec Lisa samir@linux-ces1:~/Review/Review5> █ samir@linux-ces1:~/Review/Review5> sed -n s/Arlec/Robinson/p faculty > facultybis1 samir@linux-ces1:~/Review/Review5> cat facultybis1 3 Robinson Lisa samir@linux-ces1:~/Review/Review5> █</pre> | <pre>samir@linux-ces1:~/Review/Review5> sed -n -e 2,3d -e p faculty 1 Robertson Myra 4 Fillipo Paul samir@linux-ces1:~/Review/Review5> █ samir@linux-ces1:~/Review/Review5> sed -n -e 2,3d -e p faculty > facultybis samir@linux-ces1:~/Review/Review5> cat facultybis 1 Robertson Myra 4 Fillipo Paul samir@linux-ces1:~/Review/Review5> █</pre> |
|---|--|

b) *tr* command: translate command copies data from one format to another .

```
samir@linux-ces1:~/Review/Review5> tr [a-z] [A-Z] < faculty
1      ROBERTSON  MYRA
2      SMITH      NEAL
3      ARLEC      LISA
4      FILLIPO    PAUL
samir@linux-ces1:~/Review/Review5>
```

c) *pr* command: prints file on the standard output in paginated form.

```
samir@linux-ces1:~/Review/Review5> pr faculty

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1      Robertson  Myra
2      Smith      Neal
3      Arlec      Lisa
4      Fillipo    Paul
```

3. Designing an Application

The purpose of learning selection, manipulation, and transformation commands is to develop an application.

- Using *faculty* and *student* files of previous lab, display all students supervised by faculty member “Arlec Lisa” using **grep** command as shown in Figure 1.
- Using a file of previous lab, display the information of number of line, words and characters available in a given file as shown in Figure 2.
- Using *student* file of previous lab, display all students with *s_id* from 3 to 6 as shown in Figure 3, using a **sed** command with appropriate options.
- Using *product2* file, display the list of spare parts as shown in Figure 4, using a **tr** command with appropriate options.

| | |
|--|---|
| <pre>2 Sanchez Jim EX 3 3 White Peter EX 3 samir@linux-ces1:~/Review/Review5> █</pre> <p>Figure 1</p> | <pre>6 30 116 student samir@linux-ces1:~/Review/Review5> █</pre> <p>Figure 2</p> |
| <pre>3 White Peter EX 3 4 Phelp David JR 1 5 Lewis Sheila SR 2 6 James Thomas JR 1 samir@linux-ces1:~/Review/Review5> █</pre> <p>Figure 3</p> | <pre>AIR FILTER ALTERNATOR BRAKE CHAIN COIL MUFFLER OIL FILTER RADIATOR</pre> <p>Figure 4</p> |

Objectives

- Advanced Linux Commands, awk Program

1. Fill in the gaps: (2 marks)

- In vi, use _____ in command mode to delete the current line.
- The _____ command combines files side by side.
- You can make a shell script file executable by using the _____ with the x argument.
- You can use the _____ command to associate lines in two files on the basis of a common field in both files.
- _____ is the default shell in Linux, and it is the shell many users prefer.
- You use the _____ command to search for a specified pattern in a file, such as a particular word or phrase.
- The _____ command prints the specified files on the standard output in paginated form.
- The _____ statement continues to loop and execute commands or statements as long as a given condition or set of conditions is true.
- You use the _____ command to select lines from the beginning of a file.
- You use the _____ command to select unique lines or rows.

2. Review Question (2 marks)

- Complete review question 2, 3, 5, 7, 19 page 237-238-240

3. (3 marks) Complete the exercises of:

- Hands-On Projects 5-6 page 247.
- Hands-On Projects 5-8 page 250.

What to hand in

Create and Submit the Word file LinuxCh5-6YourName.doc for storing the following:

1. A good sample of output screenshots. For this purpose, students should capture the screen display and use Paint to cut/past and submit the appropriate windows (and not the entire screen display) displaying the output for each question, if any. You have to paste the Script shell commands used for this purpose, if any.