LAB – 2: ADVANCE LINUX COMMANDS

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Problem Statement:
Execution of advance Linux commands

Objectives:
1. To understand how to use Unix commands.
2. To understand How and Why they are used in Shell Programming

Simple Filters:

1. *pr <file>* :Paginating the file
   Ex *pr –h "test" –d –n fname*
2. *head <file>* :Display first 10 lines of file
   Ex *head –n -3 fname*
3. *tail <file>* :To display last 10 lines of file
   Ex *tail -3 fname ; tail –c 100 fname*
4. *cut <file>* :Splitting file vertically
   Ex *cut –c 2-10,12-14 fname*
   cut –d "|" –f 2,4 fname
5. *paste<file1> <file2>* :To combine two file vertically rather than horizontally
   Ex *paste –d "|" fname1 fname2*
6. *sort <file>* :To sort file in order by field wise
   Ex *sort –t"|" –k 2 fname*
   sort –r fname
7. *uniq <file>* :Locate repeated & unrepeated lines
   Ex *uniq fname; uniq –d fname*
8. *tr ch1 ch2 < <file1>* :To translate occurrence of ch1 by ch2
   Ex. *tr '|' '+' < fname1*
9. *tee* :Read from standard input and write to standard output and files
   Ex. *ls *.txt | wc -l | tee count.txt*

File permission:

Use the chmod command to change file permissions

1. Changing permission relative manner

Category	Operation	Permission
u - user g - group o - other a - all	+ assign - removal = assign abs permission	r - read w - write x - execute

Syntax: *chmod category operation perm. <file>*

Ex *chmod u+x fname*

chmod a+x fname

chmod u-x fname

chmod a-x, go+r fname

2. Changing permission absolute manner

Read=4

Write =2

Execute=1 Generate an employee report using AWK programming.

Ex *chmod 666 fname*

chmod 644 fname

chmod -R 644

3. Change owner & group

Syntax: *chown options owner files*

Ex *chown "xyz" fname*

Syntax: *chgrp options group files*

Ex *chgrp "xyz" fname*

Redirection: Provide a powerful command line controls

Most Linux commands read input, such as a file or another attribute for the command, and write output. By default, input is being given with the keyboard, and output is displayed on your screen. Your keyboard is your standard input (stdin) device, and the screen or a particular terminal window is the standard output (stdout) device. There are 3 types of redirection available in Linux

1. Standard input redirection: It is used to redirect standard input.

   Ex. *cat < fname*

2. Standard output redirection : It is used to redirect standard output.

Ex *cat > fname*

3. Standard error redirection: It is used to redirect standard error.
   Ex *cat fname 2 > Errorfile*

Pipe:

- Connects commands so the output of previous command becomes input for the second.
- Vertical bar(|) is the pipe operator.
- Ex. *ls -l | more*
  cat file1 file2 | sort > file3
  Concatenates file1 and file2
  Sends the result to the sort command
  Store the alphabetized, concatenate result as a new file called file3

Grep: Global Regular Expression Print

- Searching and pattern matching tools
- Searches files for one or more pattern arguments. It does plain string, basic regular expression, and extended regular expression searching
- Following are some of the options for grep
  1. *-i* ignore case for matching
  2. *-v* doesn't display lines matching expression
  3. *-n* display line numbers along of occurrences
  4. *-c* counting number of occurrences
  5. *-l* display list of file names
  6. *-e* exp for matching
  7. *-f* file take patterns from file
  8. *-E* treat pattern as an extended reg. exp
  9. *-F* matches multiple fixed strings (fgrep)

Problems to be solved in the lab:

1. Change your password to a password you would like to use for the remainder of the semester.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ passwd
Changing password for shrutisd.
Current password:
New password:
Retype new password:
passwd: password updated successfully
```

2. Display the system's date.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ date
Monday 15 January 2024 10:41:33 PM IST
```

3. Count the number of lines in the /etc/passwd file.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ wc -l /etc/passwd
48 /etc/passwd
```

4. Find out who else is on the system.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ w
 22:43:02 up  1:32,  1 user,  load average: 1.05, 1.04, 1.00
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
shrutisd :0       :0               21:12   ?xdm?   1:35m  0.02s /usr/lib/gdm3/g
dm-x-session --run-script env GNOME_SHELL_SESSION_MODE=ubuntu /usr/bin/gnome-se
ssion --systemd --session=ubuntu
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ who
shrutisd :0           2024-01-15 21:12 (:0)
```

5. Direct the output of the man pages for the date command to a file named mydate.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ man date > mydate
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cat mydate
DATE(1)                                                          User Commands

NAME
       date - print or set the system date and time

SYNOPSIS
       date [OPTION]... [+FORMAT]
       date [-u|--utc|--universal] [MMDDhhmm[[CC]YY][.ss]]

DESCRIPTION
       Display the current time in the given FORMAT, or set the system date.

       Mandatory arguments to long options are mandatory for short options too.

       -d, --date=STRING
              display time described by STRING, not 'now'

       --debug
              annotate the parsed date, and warn about questionable usage to stderr

       -f, --file=DATEFILE
              like --date; once for each line of DATEFILE
```

6. Create a subdirectory called mydir.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ mkdir mydir
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ ls
dir  file1.txt  file2.txt  file3.txt  file.txt  mydate  mydir
```

7. Move the file mydate into the new subdirectory.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ mv mydate mydir/
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ ls
dir  file1.txt  file2.txt  file3.txt  file.txt  mydir
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cd mydir
shrutisd@shrutisd:~/Desktop/SHRUTI/OS/mydir$ ls
mydate
```

8. Go to the subdirectory mydir and copy the file mydate to a new file called ourdate

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cd mydir
shrutisd@shrutisd:~/Desktop/SHRUTI/OS/mydir$ cp mydate ourdate
shrutisd@shrutisd:~/Desktop/SHRUTI/OS/mydir$ ls
mydate  ourdate
shrutisd@shrutisd:~/Desktop/SHRUTI/OS/mydir$ cat ourdate
DATE(1)                                                                 User Commands

NAME
       date - print or set the system date and time

SYNOPSIS
       date [OPTION]... [+FORMAT]
       date [-u|--utc|--universal] [MMDDhhmm[[CC]YY][.ss]]

DESCRIPTION
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              annotate the parsed date, and warn about questionable usage to stderr

       -f, --file=DATEFILE
              like --date; once for each line of DATEFILE
```

9. List the contents of mydir.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS/mydir$ ls
mydate  ourdate
```

10. Do a long listing on the file ourdate and note the permissions.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS/mydir$ ls -l ourdate
-rw-rw-r-- 1 shrutisd shrutisd 6451 Jan 15 22:49 ourdate
```

11. Display the name of the current directory starting from the root.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS/mydir$ pwd
/home/shrutisd/Desktop/SHRUTI/OS/mydir
```

12. Move the files in the directory mydir back to the HOME directory.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ mv mydir/* ~/
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$
```

13. List all the files in your HOME directory.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cd ~
shrutisd@shrutisd:~$ ls
Desktop  Documents  Downloads  Music  mydate  ourdate  Pictures  Public  snap  Templates  Videos
```

14. Display the first 5 lines of mydate.

```
shrutisd@shrutisd:~$ head -n 5 mydate
DATE(1)                                                                 User Commands

NAME
       date - print or set the system date and time
```

15. Display the last 8 lines of mydate.

```
shrutisd@shrutisd:~$ tail -n 8 mydate
       Copyright © 2018 Free Software Foundation, Inc.  License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
       This is free software: you are free to change and redistribute it.  There is NO WARRANTY, to the extent permitted by law.

SEE ALSO
       Full documentation at: <https://www.gnu.org/software/coreutils/date>
       or available locally via: info '(coreutils) date invocation'

GNU coreutils 8.30                                                    September 2019
```

16. Remove the directory mydir.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ ls
dir  file1.txt  file2.txt  file3.txt  file.txt  mydir
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ rm -r mydir
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ ls
dir  file1.txt  file2.txt  file3.txt  file.txt
```

17. Redirect the output of the long listing of files to a file named list.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ ls -l > list
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cat list
total 20
drwxrwxr-x 2 shrutisd shrutisd 4096 Jan 15 21:32 dir
-rw-rw-r-- 5 shrutisd shrutisd   27 Jan 14 21:07 file1.txt
-rw-rw-r-- 1 shrutisd shrutisd   30 Jan 14 21:07 file2.txt
-rw-rw-r-- 1 shrutisd shrutisd   15 Jan 14 20:57 file3.txt
-rw-rw-r-- 1 shrutisd shrutisd 2241 Jan 14 20:43 file.txt
-rw-rw-r-- 1 shrutisd shrutisd    0 Jan 15 23:00 list
```

18. Select any 5 capitals of states in India and enter them in a file named capitals1. Choose 5 more capitals and enter them in a file named capitals2. Choose 5 more capitals and enter them in a file named capitals3. Concatenate all 3 files and redirect the output to a file named capitals.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Delhi" > capitals1
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Mumbai" >> capitals1
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Chennai" >> capitals1
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Kolkata" >> capitals1
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Hyderabad" >> capitals1
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Bangalore" > capitals2
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Ahmedabad" >> capitals2
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Jaipur" >> capitals2
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Lucknow" >> capitals2
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Thiruvananthapuram" >> capitals2
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Bhopal" > capitals3
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Patna" >> capitals3
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Raipur" >> capitals3
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Dehradun" >> capitals3
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo "Dispur" >> capitals3
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cat capitals1 capitals2 capitals3 > capitals
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cat capitals
Delhi
Mumbai
Chennai
Kolkata
Hyderabad
Bangalore
Ahmedabad
Jaipur
Lucknow
Thiruvananthapuram
Bhopal
Patna
Raipur
Dehradun
Dispur
```

19. Concatenate the file capitals2 at the end of file capitals.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cat capitals2 >> capitals
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ cat capitals
Delhi
Mumbai
Chennai
Kolkata
Hyderabad
Bangalore
Ahmedabad
Jaipur
Lucknow
Thiruvananthapuram
Bhopal
Patna
Raipur
Dehradun
Dispur
Bangalore
Ahmedabad
Jaipur
Lucknow
Thiruvananthapuram
```

20. Redirect the file capitals as an input to the command “wc –l”.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ wc -l < capitals
20
```

21. Give read and write permissions to all users for the file capitals.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ chmod a+rw capitals
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$
```

22. Give read permissions only to the owner of the file capitals. Open the file, make some changes and try to save it. What happens?

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ chmod u+r capitals
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$
```

23. Create an alias to concatenate the 3 files capitals1, capitals2, capitals3 and redirect the output to a file named capitals. Activate the alias and make it run.

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ alias concat_capitals='cat capitals1 capitals2 capitals3 > capitals'
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ source ~/.bashrc
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ concat_capitals
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$
```

24. What are the environment variables PATH, HOME and TERM set to on your terminal?

```
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo $HOME
/home/shrutisd
shrutisd@shrutisd:~/Desktop/SHRUTI/OS$ echo $TERM
xterm-256color
```

25. Find out the number of times the string “the” appears in the file mydate.

```
shrutisd@shrutisd:~$ grep -o -i 'the' mydate | wc -l
31
```

26. Find out the line numbers on which the string “date” exists in mydate.

```
shrutisd@shrutisd:~$ grep -n 'date' mydate
4:       date - print or set the system date and time
7:       date [OPTION]... [+FORMAT]
8:       date [-u|--utc|--universal] [MMDDhhmm[[CC]YY][.ss]]
11:       Display the current time in the given FORMAT, or set the system date.
15:       -d, --date=STRING
19:              annotate the parsed date, and warn about questionable usage to stderr
22:              like --date; once for each line of DATEFILE
25:              output  date/time  in  ISO  8601  format.   FMT='date'  for  date  only  (the  default), '
hours', 'minutes', 'seconds', or 'ns' for date and time to the indicated precision.  Example:
29:              output date and time in RFC 5322 format.  Example: Mon, 14 Aug 2006 02:34:56 -0600
32:              output date/time in RFC 3339 format.  FMT='date', 'seconds', or 'ns' for date and time to
the indicated precision.  Example: 2006-08-14 02:34:56-06:00
60:       %c     locale's date and time (e.g., Thu Mar  3 23:05:25 2005)
66:       %D     date; same as %m/%d/%y
70:       %F     full date; same as %Y-%m-%d
124:       %x     locale's date representation (e.g., 12/31/99)
142:       By default, date pads numeric fields with zeroes.  The following optional flags may follow '%':
158:       Convert seconds since the epoch (1970-01-01 UTC) to a date
160:              $ date --date='@2147483647'
164:              $ TZ='America/Los_Angeles' date
168:              $ date --date='TZ="America/Los_Angeles" 09:00 next Fri'
171:       The  --date=STRING  is  a mostly free format human readable date string such as "Sun, 29 Feb 200
4 16:21:42 -0800" or "2004-02-29 16:21:42" or even "next Thursday".  A date string may contain
172:       items indicating calendar date, time of day, time zone, day of week, relative time, relative dat
e, and numbers.  An empty string indicates the beginning of the day.  The date  string  format
180:       Report date translation bugs to <https://translationproject.org/team/>
187:       Full documentation at: <https://www.gnu.org/software/coreutils/date>
188:       or available locally via: info '(coreutils) date invocation'
```

27. Print all lines of mydate except those that have the letter “i” in them.

```
shrutisd@shrutisd:~$ grep -v 'i' mydate
DATE(1)                                                                 User Commands

NAME

SYNOPSIS
       date [OPTION]... [+FORMAT]

DESCRIPTION


       -d, --date=STRING

       --debug


              2006-08-14T02:34:56-06:00


       --rfc-3339=FMT

       -r, --reference=FILE

       -s, --set=STRING



       FORMAT controls the output.  Interpreted sequences are:


       %A     locale's full weekday name (e.g., Sunday)


       %B     locale's full month name (e.g., January)


       %d     day of month (e.g., 01)

       %D     date; same as %m/%d/%y

       %e     day of month, space padded; same as %_d
```

28. Create the file monotonic as follows:

    ^a?b?b?c? .....x?y?z$

    Run the egrep command for monotonic against /usr/dict/words and search for all 4 letter words.

29. List 5 states in north east India in a file mystates. List their corresponding capitals in a file mycapitals. Use the paste command to join the 2 files.

```
shrutisd@shrutisd:~$ echo "Assam" > mystates
shrutisd@shrutisd:~$ echo "Arunachal Pradesh" >> mystates
shrutisd@shrutisd:~$ echo "Meghalaya" >> mystates
shrutisd@shrutisd:~$ echo "Manipur" >> mystates
shrutisd@shrutisd:~$ echo "Nagaland" >> mystates
shrutisd@shrutisd:~$ echo "Dispur" > mycapitals
shrutisd@shrutisd:~$ echo "Itanagar" >> mycapitals
shrutisd@shrutisd:~$ echo "Shillong" >> mycapitals
shrutisd@shrutisd:~$ echo "Imphal" >> mycapitals
shrutisd@shrutisd:~$ echo "Kohima" >> mycapitals
shrutisd@shrutisd:~$ paste mystates mycapitals > northeast_info
shrutisd@shrutisd:~$ cat northeast_info
Assam   Dispur
Arunachal Pradesh       Itanagar
Meghalaya       Shillong
Manipur Imphal
Nagaland        Kohima
```

30. Use the cut command to print the 1st and 3rd columns of the /etc/passwd file for all students in this class.

```
shrutisd@shrutisd:~$ cut -d':' -f1,3 /etc/passwd
root:0
daemon:1
bin:2
sys:3
sync:4
games:5
man:6
lp:7
mail:8
news:9
uucp:10
proxy:13
www-data:33
backup:34
list:38
irc:39
gnats:41
```

31. Count the number of people logged in and also trap the users in a file using the tee command.

```
shrutisd@shrutisd:~$ who | tee logged_users.txt | wc -l
1
shrutisd@shrutisd:~$ cat logged_users.txt
shrutisd :0           2024-01-15 21:12 (:0)
```

Conclusion: Thus, we have studied Advance Linux command.