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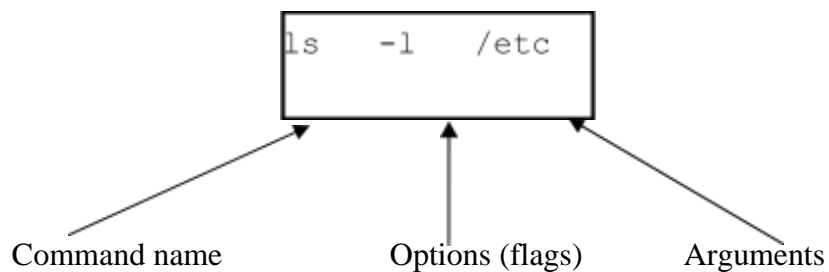
ASSIGNMENT NUMBER: 1(a)

TITLE: Execution of basic & advanced Unix commands
OBJECTIVE:

Study of some Basic & Advance Unix commands on Linux/ Unix Operating System.

THEORY:

To execute a command, type its name, options and arguments at the shell prompt.



General Purpose Commands

1. date: To display current date & time of the system.
2. cal :To display calendar of current month.
3. who:List who is currently logged on to the system.
4. Whoami:Report what user you are logged on as.
5. echo :Echo a string (or list of arguments) to the terminal
6. bc:To perform mathematical operations
7. clear:To clear the screen
8. alias : Used to tailor commands

Ex alias erase=rm

```
alias grep="grep -i"
```

```
alias cp="cp -i"
```

9. `man <cmd name>`: To get help for any command

10. `passwd`: To change the password

11. `exit`: To logout from the terminal

File & Directory Related Commands

1. `cp <fromfile> <tofile>`: Copy from the <fromfile> to the <tofile>
2. `mv <fromfile> <tofile>` : Move/rename the <fromfile> to the <tofile>
3. `rm <file>`:Remove the file named <file>
4. `mkdir <newdir>`:Make a new directory called <newdir>
5. `rmdir <dir>`:Remove an (empty) directory
6. `cd <dir>` :Change the current working directory to *dir*
7. `pwd` : Print (display) the working directory
8. `cat > <file>` :To create new file n save it by pressing ^d
9. `cat >> <file>`: To append contents into file
10. `cat <file>`:To see the contents of existing file
11. `more <file>`:*Paging out the contents of file*
12. `file <file>`:*To check the type of file*
13. `wc <file>`:To count lines,words,charaters of file
14. `cmp <file1> <file2>`:To compare two files
15. `comm <file1> <file2>`:To display common values between two files
16. `diff <file1> <file2>`:To convert one file to another
17. `gzip <file>`:*To compress the file*
18. `gunzip <file>`:To unzip the contents of
19. `ls` :List the files in the current working directory
20. `ls <dir>`:List all files & directories in given directory
21. `ln <fromfile><tofile>`: Creates a symbolic link to a file

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`
 - a. `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
 - a. sort -r fname
 7. uniq <file> :Locate repeated & nonrepeated 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	Perm.
u-user	+ assign	r-read
g-group	- removal	w-write
o-other	= assign abs perm.	x-execute
a-all		

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

Ex chmod 666 fname
 chmod 644 fname
 chmod -R 644

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 one 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

-i ignore case for matching

-v doesn't display lines matching expression

-n display line numbers along of occurrences

- c counting number of occurrences
- l display list of file names
- e exp for matching
- f file take patterns from file
- E treat pattern as an extended reg. exp
- 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
2. Display the system's date.

```
disha21@disha21:~$ date
Friday 23 September 2022 07:48:41 PM IST
disha21@disha21:~$
```

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

```
disha21@disha21:~$ wc -l /etc/passwd
47 /etc/passwd
disha21@disha21:~$
```

4. Find out who else is on the system.

```
disha21@disha21:~$ who
disha21  tty2          2022-09-23 02:21 (tty2)
disha21@disha21:~$
```

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

```
disha21@disha21:~$ man date > mydate
disha21@disha21:~$
```

6. Create a subdirectory called mydir.

```
disha21@disha21:~$ mkdir mydir
disha21@disha21:~$
```

7. Move the file mydate into the new subdirectory.

```
disha21@disha21:~$ ls
Desktop  Downloads  mydate  Pictures  snap      Videos
Documents Music      mydir   Public    Templates
disha21@disha21:~$ mv mydate mydir/
disha21@disha21:~$ ls
Desktop  Downloads  mydir   Public    Templates
Documents Music      Pictures snap      Videos
disha21@disha21:~$
```

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

```
disha21@disha21:~$ cd mydir
disha21@disha21:~/mydir$ ls
mydate
disha21@disha21:~/mydir$ cp mydate ourdate
disha21@disha21:~/mydir$ ls
mydate  ourdate
disha21@disha21:~/mydir$
```

9. List the contents of mydir.

```
disha21@disha21:~/mydir$ ls
mydate  ourdate
disha21@disha21:~/mydir$ ls -l ourdate
-rw-rw-r-- 1 disha21 disha21 6509 Sep 23 20:01 ourdate
disha21@disha21:~/mydir$
```

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

```
disha21@disha21:~/mydir$ ls
mydate  ourdate
disha21@disha21:~/mydir$ ls -l ourdate
-rw-rw-r-- 1 disha21 disha21 6509 Sep 23 20:01 ourdate
disha21@disha21:~/mydir$
```

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

```
disha21@disha21:~/mydir$ pwd
/home/disha21/mydir
disha21@disha21:~/mydir$
```

12. Move the files in the directory mydir back to your home directory.

```
disha21@disha21:~/mydir$ mv /home/disha21/mydir/mydate /home/disha21
disha21@disha21:~/mydir$ mv /home/disha21/mydir/ourdate /home/disha21
disha21@disha21:~/mydir$ ls
disha21@disha21:~/mydir$
```

13. Display the first 5 lines of mydate.

```
disha21@disha21:~/mydir$ cd
disha21@disha21:~$ head -5 mydate
DATE(1)                                User Commands                                DATE(1)

NAME
    date - print or set the system date and time

disha21@disha21:~$
```

14. Display the last 8 lines of mydate.

```
disha21@disha21:~$ tail -8 mydate
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 <https://www.gnu.org/software/coreutils/date>
    or available locally via: info '(coreutils) date invocation'

GNU coreutils 8.32                                February 2022                                DATE(1)
disha21@disha21:~$
```

15. Remove the directory mydir.

```
disha21@disha21:~$ ls
Desktop  Downloads  mydate  ourdate  Public  Templates
Documents Music      mydir   Pictures snap    Videos
disha21@disha21:~$ rmdir mydir
disha21@disha21:~$ ls
Desktop  Downloads  mydate  Pictures  snap    Videos
Documents Music      ourdate Public    Templates
disha21@disha21:~$
```

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

```
disha21@disha21:~$ ls
Desktop  Downloads  mydate  Pictures  snap      Videos
Documents Music      ourdate Public    Templates
disha21@disha21:~$ ls -l > list
disha21@disha21:~$ ls
Desktop  Downloads  Music  ourdate  Public  Templates
Documents list       mydate Pictures snap     Videos
disha21@disha21:~$ cat list
total 52
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Desktop
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Documents
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Downloads
-rw-rw-r-- 1 disha21 disha21 0 Sep 23 20:33 list
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Music
-rw-rw-r-- 1 disha21 disha21 6509 Sep 23 19:55 mydate
-rw-rw-r-- 1 disha21 disha21 6509 Sep 23 20:01 ourdate
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Pictures
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Public
drwx----- 3 disha21 disha21 4096 Sep 23 02:21 snap
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Templates
drwxr-xr-x 2 disha21 disha21 4096 Sep 23 02:21 Videos
disha21@disha21:~$
```

17. 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.

```
disha21@disha21:~$ cat > capitals1.txt
Jaipur
Chennai
Mumbai
Ranchi
Indore
disha21@disha21:~$ cat > capitals2.txt
Surat
Shilong
Shimla
Raipur
Patna
disha21@disha21:~$ cat > capitals3.txt
Hyderabad
Thiruvananthapuram
Panji
Kolkata
Bengaluru
disha21@disha21:~$ cat capitals1.txt capitals2.txt capitals3.txt > capitals.txt
disha21@disha21:~$ ls
capitals1.txt  capitals.txt  Downloads  mydate  Public  Videos
capitals2.txt  Desktop      list       ourdate  snap
capitals3.txt  Documents    Music      Pictures  Templates
disha21@disha21:~$ cat capitals.txt
Jaipur
Chennai
Mumbai
Ranchi
Indore
Surat
Shilong
Shimla
Raipur
Patna
Hyderabad
Thiruvananthapuram
Panji
Kolkata
Bengaluru
disha21@disha21:~$
```

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


```
disha21@disha21:~$ cat capitals2.txt >> capitals.txt
disha21@disha21:~$ cat capitals.txt
Jaipur
Chennai
Mumbai
Ranchi
Indore
Surat
Shilong
Shimla
Raipur
Patna
Hyderabad
Thiruvananthapuram
Panaji
Kolkata
Bengaluru
Surat
Shilong
Shimla
Raipur
Patna
disha21@disha21:~$
```

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

```
disha21@disha21:~$ ls -l capitals.txt
-rw-rw-r-- 1 disha21 disha21 159 Sep 23 22:45 capitals.txt
disha21@disha21:~$ chmod 666 capitals.txt
disha21@disha21:~$ ls -l capitals.txt
-rw-rw-rw- 1 disha21 disha21 159 Sep 23 22:45 capitals.txt
```

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

21. 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.

```
disha21@disha21:~$ alias concat="cat capitals1.txt capitals2.txt capitals3.txt>
capitals.txt
```

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

```
disha21@disha21:~$ grep -c 'the' mydate
19
disha21@disha21:~$
```

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

```

disha21@disha21:~$ 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.
16:     -d, --date=STRING
20:         annotate the parsed date, and warn about questionable usage to
24:         like --date; once for each line of DATEFILE
27:         output date/time in ISO 8601 format.  FMT='date' for date only
28:         (the default), 'hours', 'minutes', 'seconds', or 'ns' for date
33:         output date and time in RFC 5322 format.  Example: Mon, 14 Aug
37:         output date/time in RFC 3339 format.  FMT='date', 'seconds', or
38:         'ns' for date and time to the indicated precision.  Example:
67:     %c      locale's date and time (e.g., Thu Mar 3 23:05:25 2005)
73:     %D      date; same as %m/%d/%y
77:     %F      full date; like %+4Y-%m-%d
131:    %x      locale's date representation (e.g., 12/31/99)
150:    By default, date pads numeric fields with zeroes.  The following options
171:    Convert seconds since the epoch (1970-01-01 UTC) to a date
173:    $ date --date='@2147483647'
177:    $ TZ='America/Los_Angeles' date
181:    $ date --date='TZ="America/Los_Angeles" 09:00 next Fri'
184:    The --date=STRING is a mostly free format human readable date string
186:    even "next Thursday".  A date string may contain items indicating calendar-
187:    endar date, time of day, time zone, day of week, relative time, relative
188:    date, and numbers.  An empty string indicates the beginning of
189:    the day.  The date string format is more complex than is easily documented.
206:    Full documentation <https://www.gnu.org/software/coreutils/date>
207:    or available locally via: info '(coreutils) date invocation'
disha21@disha21:~$

```

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

```

disha21@disha21:~$ grep -v 'i' mydate
DATE(1)                                User Commands                                DATE(1)

NAME
date [OPTION]... [+FORMAT]

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

DESCRIPTION
date prints the current date and time in the given FORMAT, or sets the system
date to the given date.

-d, --date=STRING
--debug
--stderr

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

2006 02:34:56 -0600

--rfc-3339=FORMAT
2006-08-14 02:34:56-06:00

-r, --reference=FILE

```

25. List the words of 4 letters from the file mydate.

```
disha21@disha21:~$ grep -r '4' mydate
2006-08-14T02:34:56-06:00
output date and time in RFC 5322 format. Example: Mon, 14 Aug
2006 02:34:56 -0600
2006-08-14 02:34:56-06:00
%F full date; like %+4Y-%m-%d
%q quarter of year (1..4)
%r locale's 12-hour clock time (e.g., 11:11:04 PM)
%R 24-hour hour and minute; same as %H:%M
%X locale's time representation (e.g., 23:13:48)
%Z +hhmm numeric time zone (e.g., -0400)
%:z +hh:mm numeric time zone (e.g., -04:00)
%::z +hh:mm:ss numeric time zone (e.g., -04:00:00)
%:::z numeric time zone with : to necessary precision (e.g., -04,
+ pad with zeros, and put '+' before future years with >4 digits
$ date --date='@2147483647'
such as "Sun, 29 Feb 2004 16:21:42 -0800" or "2004-02-29 16:21:42" or
disha21@disha21:~$
```

26. 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.

```
disha21@disha21:~$ cat> mystates.txt
assam
bihar
arunachal pradesh
andhra p
chattishgarh
disha21@disha21:~$ cat> mycapitals.txt
patna
amaravati
abx
syz
raipur
disha21@disha21:~$ paste mystates.txt mycapitals.txt
assam patna
bihar amaravati
arunachal pradesh abx
andhra p syz
chattishgarh raipur
disha21@disha21:~$
```

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

```
disha21@disha21:~$ cut -d: -f 1,3 /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
nobody:65534
systemd-network:100
systemd-resolve:101
messagebus:102
systemd-timesync:103
syslog:104
_apt:105
tss:106
uidd:107
systemd-oom:108
```

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

29. Convert the contents of mystates into uppercase.

```
disha21@disha21:~$ cat mystates.txt
assam
bihar
arunachal pradesh
andhra p
chattishgarh
disha21@disha21:~$ tr a-z A-Z <mystates.txt
ASSAM
BIHAR
ARUNACHAL PRADHESH
ANDHRA P
CHATTISHGARH
disha21@disha21:~$
```

30. Create any two files & display the common values between them.

```
disha21@disha21:~$ cat>f
a
b
c
d
e
f
disha21@disha21:~$ cat>y
c
d
e
f
g
h
l
disha21@disha21:~$ comm f y
a
b
          c
          d
          e
          f
      g
      h
      l
disha21@disha21:~$
```

APPLICATIONS:

1. To enable the user to communicate with the kernel through the command interpreter.
2. Useful in Shell Programming.

FAQs

- 1) What is command Interpreter?
- 2) How will you find current working directory?
- 3) What is hierarchical file structure?
- 4) What are various functions of OS?
- 5) How will you sort the file which contains numeric data?