

Operating Systems

ASSIGNMENT-1

Linux Commands

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a.) Basics

1. echo - to display the string/text

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~$ echo i m roehit ranganathan ra1911033010017
i m roehit ranganathan ra1911033010017
roehit@LAPTOP-0SIPK43K:~$
```

2. clear - to clear the screen.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~
roehit@LAPTOP-0SIPK43K:~$
```

3. date – to display the current date and time.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~
roehit@LAPTOP-0SIPK43K:~$ date
Thu Feb 4 12:37:58 IST 2021
roehit@LAPTOP-0SIPK43K:~$
```

4. cal year – to display the calendar for the year 2001.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~$ cal 2001
                2001
    January          February          March
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
   1  2  3  4  5  6          1  2  3          1  2  3
   7  8  9 10 11 12 13      4  5  6  7  8  9 10      4  5  6  7  8  9 10
  14 15 16 17 18 19 20     11 12 13 14 15 16 17     11 12 13 14 15 16 17
  21 22 23 24 25 26 27     18 19 20 21 22 23 24     18 19 20 21 22 23 24
  28 29 30 31             25 26 27 28             25 26 27 28 29 30 31

    April           May              June
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
   1  2  3  4  5  6  7          1  2  3  4  5          1  2
   8  9 10 11 12 13 14      6  7  8  9 10 11 12      3  4  5  6  7  8  9
  15 16 17 18 19 20 21     13 14 15 16 17 18 19     10 11 12 13 14 15 16
  22 23 24 25 26 27 28     20 21 22 23 24 25 26     17 18 19 20 21 22 23
  29 30             27 28 29 30 31             24 25 26 27 28 29 30

    July           August           September
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
   1  2  3  4  5  6  7          1  2  3  4          1
   8  9 10 11 12 13 14      5  6  7  8  9 10 11      2  3  4  5  6  7  8
  15 16 17 18 19 20 21     12 13 14 15 16 17 18      9 10 11 12 13 14 15
  22 23 24 25 26 27 28     19 20 21 22 23 24 25     16 17 18 19 20 21 22
  29 30 31             26 27 28 29 30 31             23 24 25 26 27 28 29
                                     30

    October        November        December
Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa
   1  2  3  4  5  6          1  2  3          1
   7  8  9 10 11 12 13      4  5  6  7  8  9 10      2  3  4  5  6  7  8
  14 15 16 17 18 19 20     11 12 13 14 15 16 17      9 10 11 12 13 14 15
  21 22 23 24 25 26 27     18 19 20 21 22 23 24     16 17 18 19 20 21 22
  28 29 30 31             25 26 27 28 29 30             23 24 25 26 27 28 29
                                     30 31
```

5. cal month year - to display the calendar for the July-2001.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~$ cal 8 2001
    August 2001
Su Mo Tu We Th Fr Sa
                1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
```

6. passwd – to change password.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~
roehit@LAPTOP-0SIPK43K:~$ passwd
Changing password for roehit.
Current password:
New password:
Retype new password:
passwd: password updated successfully
roehit@LAPTOP-0SIPK43K:~$
```

b.)Working with Files

7. ls - to list files in the present working directory.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: /
roehit@LAPTOP-0SIPK43K:/$ ls
bin  boot  dev  etc  home  init  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  snap  srv  sys  tmp  usr  var
roehit@LAPTOP-0SIPK43K:/$
```

8. ls -l – to list files with detailed information (long list).

Ref. screenshot:

```

roehit@LAPTOP-0SIPK43K: /
roehit@LAPTOP-0SIPK43K:/$ ls -l
total 620
lrwxrwxrwx 1 root root 7 Aug 5 2020 bin -> usr/bin
drwxr-xr-x 1 root root 4096 Aug 5 2020 boot
drwxr-xr-x 1 root root 4096 Feb 4 12:36 dev
drwxr-xr-x 1 root root 4096 Feb 4 12:39 etc
drwxr-xr-x 1 root root 4096 Jan 27 04:58 home
-rwxr-xr-x 1 root root 631968 Dec 7 2019 init
lrwxrwxrwx 1 root root 7 Aug 5 2020 lib -> usr/lib
lrwxrwxrwx 1 root root 9 Aug 5 2020 lib32 -> usr/lib32
lrwxrwxrwx 1 root root 9 Aug 5 2020 lib64 -> usr/lib64
lrwxrwxrwx 1 root root 10 Aug 5 2020 libx32 -> usr/libx32
drwxr-xr-x 1 root root 4096 Aug 5 2020 media
drwxr-xr-x 1 root root 4096 Jan 27 04:58 mnt
drwxr-xr-x 1 root root 4096 Aug 5 2020 opt
dr-xr-xr-x 9 root root 0 Feb 4 12:36 proc
drwx----- 1 root root 4096 Aug 5 2020 root
drwxr-xr-x 1 root root 4096 Feb 4 12:36 run
lrwxrwxrwx 1 root root 8 Aug 5 2020 sbin -> usr/sbin
drwxr-xr-x 1 root root 4096 Jul 10 2020 snap
drwxr-xr-x 1 root root 4096 Aug 5 2020 srv
dr-xr-xr-x 12 root root 0 Feb 4 12:36 sys
drwxrwxrwt 1 root root 4096 Jan 28 11:41 tmp
drwxr-xr-x 1 root root 4096 Aug 5 2020 usr
drwxr-xr-x 1 root root 4096 Aug 5 2020 var
roehit@LAPTOP-0SIPK43K:/$

```

9. `ls -a` – to list all files including the hidden files.

Ref. screenshot:

```

roehit@LAPTOP-0SIPK43K: /
roehit@LAPTOP-0SIPK43K:/$ ls -a
. .. bin boot dev etc home init lib lib32 lib64 libx32 media mnt opt proc root run sbin snap srv sys tmp usr var
roehit@LAPTOP-0SIPK43K:/$

```

10. `cat > filename` - to create a file (Press `^d` to finish typing).

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ cat > f1  
hello world  
I am roehit Ranganathan  
this is OS LAB  
roehit@LAPTOP-0SIPK43K:~$
```

11. cat filename - to display the content of the file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ cat f1  
hello world  
I am roehit Ranganathan  
this is OS LAB  
roehit@LAPTOP-0SIPK43K:~$
```

12. wc filename - to list no. of characters, words & lines of a file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ wc f1  
3 10 51 f1  
roehit@LAPTOP-0SIPK43K:~$
```

13. wc -c filename - to list only no. of characters of file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ wc -c f1  
51 f1  
roehit@LAPTOP-0SIPK43K:~$
```

14. `wc -w filename` - to list only no. of words of file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ wc -w f1  
10 f1  
roehit@LAPTOP-0SIPK43K:~$
```

15. `wc -l filename` – to list only no. of lines of file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~$ wc -l f1  
3 f1  
roehit@LAPTOP-0SIPK43K:~$
```

16. `cp filename1 filename2` – to copy file filename1 into filename2.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ cp f1 f2  
roehit@LAPTOP-0SIPK43K:~$ ls  
f1 f2  
roehit@LAPTOP-0SIPK43K:~$
```

17. `mv filename1 filename2` - to rename file filename1 as filename2.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ mv f1 f2  
roehit@LAPTOP-0SIPK43K:~$ cat f2  
hello world  
I am roehit Ranganathan  
this is OS LAB  
roehit@LAPTOP-0SIPK43K:~$
```

18. `rm filename` - to remove the file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ rm f1  
rm: cannot remove 'f1': No such file or directory  
roehit@LAPTOP-0SIPK43K:~$ ls  
f2  
roehit@LAPTOP-0SIPK43K:~$
```

19. `head -n filename` – to list first n lines of the file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ head -2 f2  
hello world  
I am roehit Ranganathan  
roehit@LAPTOP-0SIPK43K:~$
```

20. `tail -n filename` - to list last n lines of a file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~$ tail -2 f2  
I am roehit Ranganathan  
this is OS LAB  
roehit@LAPTOP-0SIPK43K:~$
```

b.)Working with Directories

21. `mkdir directoryname` - to create the directory `directoryname`

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ mkdir RA1911033010017  
roehit@LAPTOP-0SIPK43K:~$ ls  
RA1911033010017  f2  
roehit@LAPTOP-0SIPK43K:~$
```

22. `cd filename` - to change the directory as filename.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017  
roehit@LAPTOP-0SIPK43K:~$ cd RA1911033010017  
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

23. `rmdir directoryname` – to remove the directory `directoryname`.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~$ mkdir new  
roehit@LAPTOP-0SIPK43K:~$ ls  
RA1911033010017  f2  new  
roehit@LAPTOP-0SIPK43K:~$ rmdir new  
roehit@LAPTOP-0SIPK43K:~$ ls  
RA1911033010017  f2  
roehit@LAPTOP-0SIPK43K:~$ _
```

24. `pwd` - to display the path of the present working directory.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~  
roehit@LAPTOP-0SIPK43K:~$ pwd  
/home/roehit  
roehit@LAPTOP-0SIPK43K:~$ _
```

25. `cd..` - to go to the parent directory.

Ref. screenshot:


```
roehit@LAPTOP-0SIPK43K: /home
roehit@LAPTOP-0SIPK43K:~$ cd ..
roehit@LAPTOP-0SIPK43K: /home$
```

26. `cd -` - to go to the previous working directory.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: /home$ cd -
/home/roehit
roehit@LAPTOP-0SIPK43K:~$
```

27. `cd /` - to go to the root directory.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: /
roehit@LAPTOP-0SIPK43K:~$ cd /
roehit@LAPTOP-0SIPK43K:/$
```

d.)File name Substitution

28. `ls i?` – to list files start with ‘i’ and followed by any one character.

Ref. screenshot:

```

roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat > i1
bik
ljhsoh
jlbnejf
nlkenlf
nojsnl
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat > i2
k;pkgefk
kjsb
jbj
jbjhl
jgb
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat > i3
jhlijhd
jadjk
ndjhl
jbdk
jodjh
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ ls i?
i1 i2 i3
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$

```

29. `ls *.extension` - to list files with extension.

Ref. screenshot:

```

roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat > index.html
<html>
<body>
<p>hello world</p>
</body>
</html>
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ ls *.html
index.html
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$

```

30. `ls [a-e,m-t]leftout filename` - to list files whose first letter is any one of the character from a to e and m to t and followed by the leftout filename.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ ls [a-j,k-z]1
i1
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ █
```

31. `ls [abcd]leftout filename` - to list files whose first letter is any one of the character a,b,c,d and followed by the leftout filename.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ ls [iace]1
i1
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

e.)I/O Redirection

32. `wc -l < filename` – to find the number of lines of the file ‘filename’.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ wc -l < index.html
5
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ █
```

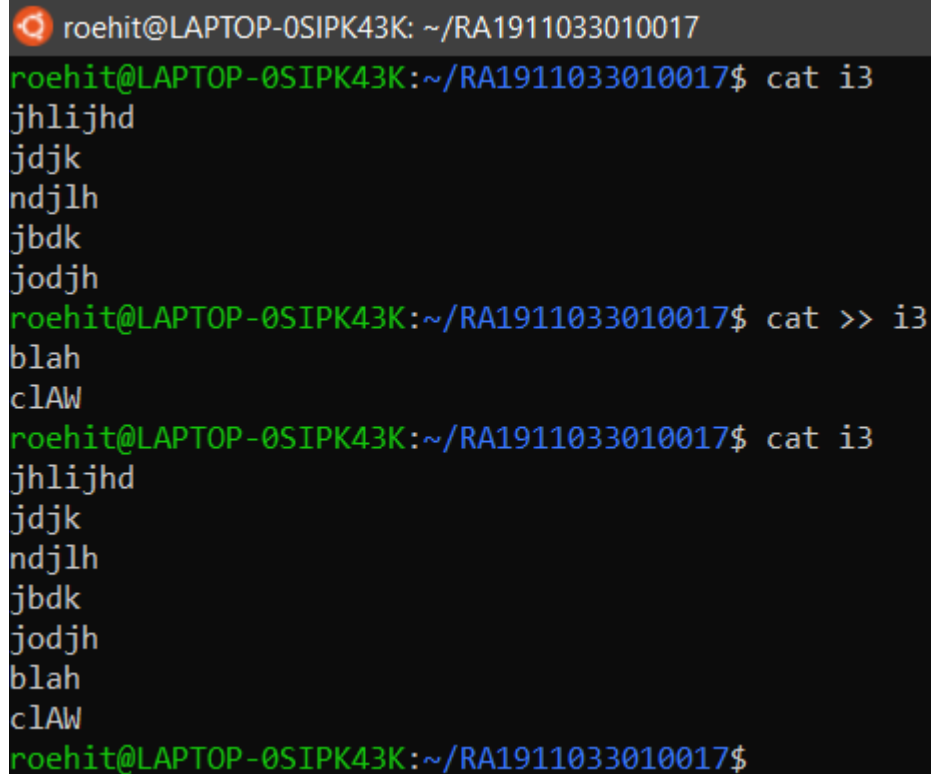
33. `who > filename` – to get the output of ‘who’ will be redirected to file.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat i2
k;pkgefk
kjsb
jbj
jbjhl
jgb
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ who > i2
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat i2
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

34. `cat >> filename` - to append more into the file.

Ref. screenshot:

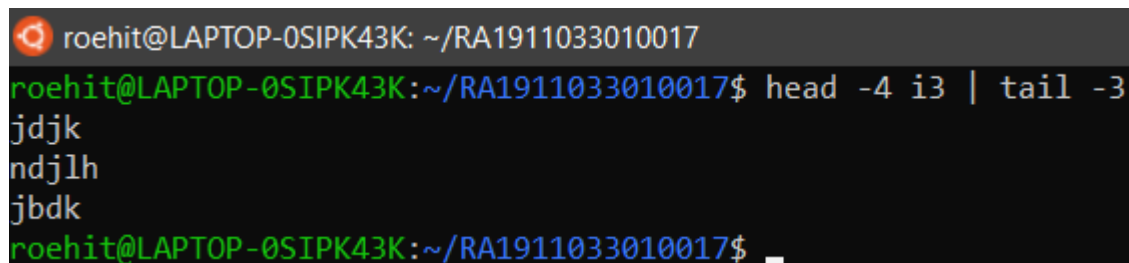


```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat i3
jhlijhd
jddjk
ndjhl
jbdk
jodjh
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat >> i3
blah
clAW
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ cat i3
jhlijhd
jddjk
ndjhl
jbdk
jodjh
blah
clAW
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

f.)Piping

35. `head -n filename | tail -n` – to print the nth & nth lines of the file .

Ref. screenshot:



```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ head -4 i3 | tail -3
jddjk
ndjhl
jbdk
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

g.)Environment variables

36. `echo $HOME` – to display the path of the home directory.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ echo $HOME
/home/roehit
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

37. echo \$PS1 – to display the prompt string \$.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ echo $PS1
\[ \e]0;\u@\h: \w\a\]${debian_chroot:+($debian_chroot)}\[ \033[01;32m\]\u@\h\[ \033[00m\]:\[ \033[01;34m\]\w\[ \033[00m\]\$
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

38. echo \$PS2 – to display the second prompt string (> symbol by default).

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ echo $PS2
>
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ _
```

39. echo \$LOGNAME – to display login name.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ echo $LOGNAME
roehit
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

40. echo \$PATH – to list of pathname where the OS searches.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~/RA1911033010017
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/mnt/c/Program Files/WindowsApps/CanonicalGroupLimited.UbuntuonWindows_2004.2020.812.0_x64__79rhkp1fndgsc:/mnt/c/Python39/Scripts:/mnt/c/Python39:/mnt/c/windows/system32:/mnt/c/windows:/mnt/c/windows/System32/Wbem:/mnt/c/windows/System32/WindowsPowerShell/v1.0:/mnt/c/windows/System32/OpenSSH:/mnt/c/Program Files (x86)/NVIDIA Corporation/PhysX/Common:/mnt/c/Program Files/NVIDIA Corporation/NVIDIA NvDLISR:/mnt/c/WINDOWS/system32:/mnt/c/WINDOWS:/mnt/c/WINDOWS/System32/Wbem:/mnt/c/WINDOWS/System32/WindowsPowerShell/v1.0:/mnt/c/WINDOWS/System32/OpenSSH:/mnt/c/Program Files/nodejs:/mnt/c/ProgramData/chocolatey/bin:/mnt/c/Program Files/Git/cmd:/mnt/c/Users/ROEHIT/AppData/Local/Microsoft/WindowsApps:/mnt/c/Users/ROEHIT/AppData/Local/Programs/Microsoft VS Code/bin:/mnt/c/Users/ROEHIT/AppData/Local/GitHubDesktop/bin:/mnt/c/Users/ROEHIT/AppData/Roaming/npm:/snap/bin
roehit@LAPTOP-0SIPK43K:~/RA1911033010017$
```

h.)File permission

41. --chmod – to change the access permission of a file..

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K:~$ ls -l
total 0
drwxr-xr-x 1 roehit roehit 4096 Feb  4 13:36 RA1911033010017
-rw-r--r-- 1 roehit roehit    0 Feb  4 13:38 f2
roehit@LAPTOP-0SIPK43K:~$ chmod ugo+xrw f2
roehit@LAPTOP-0SIPK43K:~$
```

42. chmod 755 filename – Each digit is specified as the sum of following 4 – read permission, 2 – write permission, 1 – execute permission.

Ref. screenshot:

```
roehit@LAPTOP-0SIPK43K: ~
roehit@LAPTOP-0SIPK43K:~$ chmod 775 f2
roehit@LAPTOP-0SIPK43K:~$ ls -l
total 0
drwxr-xr-x 1 roehit roehit 4096 Feb  4 13:36 RA1911033010017
-rwxrwxr-x 1 roehit roehit    0 Feb  4 13:38 f2
roehit@LAPTOP-0SIPK43K:~$
```