18CS2064 - Open Source technologies Lab | URK17CS044

Ex 1 ADVANCED LINUX COMMANDS
Date: 18.08.20

Aim:

To study and implement the Linux commands

Description:

Sl. No.	Command Name	Meaning	options
1.	**ls**	List files and/or directories.	-a, --all do not ignore entries starting with. -A, --almost-all do not list implied. and. --author with -l, print the author of each file -b, --escape print C-style escapes for nongraphic characters --block-size=SIZE
2.	**Who am i**	This command reveals the user who is currently logged in.	-a, --all =same as -b -d --login -p -r -t -T -u -b, --boot time of last system boot -d, --dead print dead processes -H, --heading print line of column headings -l, --login print system login processes --lookup attempt to canonicalize hostnames via DNS
3.	**pwd**	prints the absolute path to the current working directory	-L, --logical use PWD from the environment, even if it contains symlinks

			-P, --physical avoid all symlinks
4.	**cal**	Displays the calendar of the current month	-1, --one Display single month output. (This is the default.) -3, --three Display prev/current/next month output. -s, --Sunday Display Sunday as the first day of the week. -m, --Monday Display Monday as the first day of the week. -j, --Julian Display Julian dates (days one-based, numbered from January 1). -y, --year
5.	**echo**	This command will echo whatever you provide it.	-n do not output the trailing newline -e enable interpretation of backslash escapes -E disable the interpretation of backslash escapes (default)
6.	**date**	Displays current time and date.	-d, --date=STRING display time described by STRING, not 'now'

			-f, --file=DATEFILE like --date once for each line of DATAFILE
7.	**tty**	Displays the current terminal.	
8.	**id**	This command prints user and groups (UID and GID) of the current user.	-a ignore, for compatibility with other versions -Z, --context print only the security context of the current user -g, --troup print only the effective group ID -G, --groups print all group IDs -n, --name print a name instead of a number, for -ugG
9.	**clear**	This command clears the screen.	
10.	**man**	To show manual page	
11.	**cd**	Change the current working directory to the directory provided as an argument.	
12.	**mkdir**	To create a directory, the ‘mkdir’ command is used.	
13.	**touch**	For creating an empty file, use the touch command.	
14.	**cp**	Copy files and directories	

15.	**mv**	Move files or directories. The 'mv' command works like 'cp' command, except that the original file is removed. But, the mv command can be used to rename the files (or directories).	
16.	**rmdir**	the command removes any empty directories, but cannot delete a directory if a file is present in it.	
17.	**file**	The file command determines the file type of a given file.	
18.	**cat**	The 'cat' command is actually a concatenator but can be used to view the contents of a file.	
19.	**head**	Displays the first few lines of a file. By default, the ‘head’ command displays the first 10 lines of a file.	
20.	**tail**	the ‘tail’ command shows the last 10 lines by default	-c, --bytes=[-]K print the first K bytes of each file -n, --lines=[-]K print the first K lines instead of the first 10 -q, --quiet, --silent never print headers giving file names
21.	**wc**	This command counts lines, words, and letters of the input given to it.	
22.	**grep**	The ‘grep’ command searches for a pattern in a file (or standard input).	

23.	**vi**	Visual editor	
24.	**alias**	The 'alias' is another name for a command.	
25.	**history**	shows the commands you have entered on your terminal so far.	
26.	**passwd**	To change your password	
27.	**help**	With almost every command, '--help' option shows usage summary for that command.	
28.	**chmod**	The *chmod* command lets you change access permissions for a file.	
29.	**stat**	To check the status of a file. This provides more detailed information about a file than 'ls -l' output.	-L, --dereference follow links -f, --file-system display file system status instead of file status -c --format=FORMAT use the specified FORMAT instead of the default; output a newline after each use of FORMAT --printf=FORMAT
30.	**ln**	The ln command is used in Linux to create links.	

Exercise

1. List the contents of user's home directory including the hidden files

```
[urk17cs044@code ~]$ ls -a
.               binary.cpp          condition.c     exp10b.cpp      .exp9-2.cpp.swp  iiiiiiiiiiiiiii  ope2.cpp        result.cpp      st5.cpp         unixlab
..              bin.cpp             .config         exp10c.cpp      exp9-4.cpp       .ipynb_checkpoints  ope.cpp      robi            static.cpp      Untitled1.ipynb
\               bit.cpp             cout.cpp        exp113.cpp      exp9-7.cpp       .ipython        over.cpp        room.cpp        st.cpp          Untitled2.ipynb
1               bitwise.c           cust.c          exp11a.cpp      exp9-9.cpp       .jupyter        overload1.cpp   .sam.l.swp      str6.cpp        Untitled3.ipynb
.10exp1.sh.swp  books.txt           data.c          exp11b.cpp      exp9cc.cpp       .k5login        overloading.cpp sample1         str.cpp         Untitled4.ipynb
9a.y            borrowed.txt        date.cpp        exp311.sh       exp9cc.cppclear  lex.yy.c        pal.cpp         sample10        .str.cpp.swn    Untitled5.ipynb
.9a.y.swp       calc.sh             .date.cpp.swp   exp314.sh       exp9c.cpp        .local          palin.c         sample11        .str.cpp.swo    Untitled6.ipynb
9.y             cla.cpp             dates.cpp       exp315.sh       exp.txt          ludo.cpp        palin.cpp       sample12        .str.cpp.swp    Untitled7.ipynb
a1              class.cpp           dir2            exp411.sh       f1.txt           mar.cpp         palindrome.sh   sample1.txt     string.c        Untitled8.ipynb
a2              classname           dis.cpp         .exp411.sh.swp  f2.txt           marks.cpp       passwd          saum            string.cy       Untitled.ipynb
a3              comexp111.y         display.txt     exp412.sh       f3.txt           matrix.c        ph.cpp          saumya          student.cpp     untitled.txt
acc.cpp         .comexp111.y.swp    distance.c      exp413.sh       fact.c           matrixs.c       phone.cpp       .saumya         studinfo        users.txt
accen.cpp       comp6a.sh           .emacs          exp414.sh       fact.sh          max.cpp         .point.cpp.swp  sec.cpp         sum.c           .viminfo
.accen.cpp.swp  comp6bbb.sh         empl.cpp        exp415.sh       fi1.cpp          memory.cpp      power.c         .sec.cpp.swp    sum.sh          volume2.cpp
a.out           comp6b.sh           employee.cpp    exp416.sh       fi2.cpp          memorymore.cpp  prepost.c       second.cpp      swap.c          .volume2.cpp.swp
area.c          compexp4.1          enter           exp41.sh        fi3.cpp          .mozilla        prepost.cy      second.cppls    swap.cpp        vowel.cpp
armst.c         compexp5.1          ex10b.cpp       .exp41.sh.swp   fib.c            mul.sh          prepost.cyyxxxyyy  serie.sh     switch.cpp      wel.cpp
array.c         compiler7b.c        ex10.cpp        exp4co.sh       fib.sh           mu.sh           prog.cpp        series.sh       swit.cpp        .wel.cpp.swp
array.cpp       compiler7.c         .ex10.cpp.swp   exp511.sh       file4.txt        music.cpp       .prog.cpp.swp   show.cpp        test            y.tab.c
ascending.sh    .compiler7.c.swp    ex112a.cpp      exp7a.cpp       filename2        nob.cpp         program.cpp     simple          test1.txt
ascend.sh       compiler8a.c        ex113.cpp       .exp7a.cpp.swo  first.c          note.cpp        project.cpp     snakeandladder.cpp  text1.txt
ban.cpp         compiler8b.c        ex411.sh        .exp7a.cpp.swp  gra.cpp          notes.cpp       py22.ipynb      snakeladder.cpp  tf.
banking.cpp     compiler8c.c        ex7b.cpp        exp7b.cpp       grade.cpp        number.txt      quadrat.c       sort.c          tf.c
.bash_history   compiler9a.c        ex7b.cppclear   exp8-1.sh       great.sh         num.txt         quadratic       square.sh       tool.cpp
.bash_logout    compiler9b.c        ex9-9.cpp       exp9-1.sh       gr.sh            odd.cpp         qu.c            square.sh#      traffic.cpp
.bash_profile   compiler9c.c        exp10-1.cpp     exp9-2.cpp      ha.cpp           op.cpp          record.bank     .square.sh.swp  triangle.c
.bashrc         .compilerex4.1.swp  exp10a.cpp      exp9,2.cpp      hangman.cpp      .op.cpp.swp     res.cpp         squares.sh      triangle.c.save
[urk17cs044@code ~]$
```

2. List the content of /var directory?

```
.bash_history   compiler9a.c        ex7b.cppclear   exp8-1.sh       great.sh         num.txt         quadratic       square.sh       tool.cpp
.bash_logout    compiler9b.c        ex9-9.cpp       exp9-1.sh       gr.sh            odd.cpp         qu.c            square.sh#      traffic.cpp
.bash_profile   compiler9c.c        exp10-1.cpp     exp9-2.cpp      ha.cpp           op.cpp          record.bank     .square.sh.swp  triangle.c
.bashrc         .compilerex4.1.swp  exp10a.cpp      exp9,2.cpp      hangman.cpp      .op.cpp.swp     res.cpp         squares.sh      triangle.c.save
[urk17cs044@code ~]$ ls /var
adm  cache  centrify  centrifyda  centrifydc  crash  db  empty  games  gopher  kerberos  lib  local  lock  log  mail  nis  opt  preserve  run  spool  tmp  yp
[urk17cs044@code ~]$
```

3. Create two directories named dir1 & dir2

```
[urk17cs044@code ~]$ mkdir dir01
[urk17cs044@code ~]$ mkdir dir02
[urk17cs044@code ~]$ cat dir01 dir02
cat: dir01: Is a directory
cat: dir02: Is a directory
[urk17cs044@code ~]$
```

4. Create a hidden directory with your name?

```
[urk17cs044@code ~]$ mkdir .saumya
mkdir: cannot create directory '.saumya': File exists
[urk17cs044@code ~]$ mkdir .saumyap
[urk17cs044@code ~]$ ls -a
.               binary.cpp          condition.c     ex9-9.cpp       exp9-1.sh        gr.sh           odd.cpp         qu.c
..              bin.cpp             .config         exp10-1.cpp     exp9-2.cpp       ha.cpp          op.cpp          record.bank
\               bit.cpp             cout.cpp        exp10a.cpp      exp9,2.cpp       hangman.cpp     .op.cpp.swp     res.cpp
1               bitwise.c           cust.c          exp10b.cpp      .exp9-2.cpp.swp  iiiiiiiiiiiiiii  ope2.cpp        result.cpp
.10exp1.sh.swp  books.txt           data.c          exp10c.cpp      exp9-4.cpp       .ipynb_checkpoints  ope.cpp      robi
9a.y            borrowed.txt        date.cpp        exp113.cpp      exp9-7.cpp       .ipython        over.cpp        room.cpp
.9a.y.swp       calc.sh             .date.cpp.swp   exp11a.cpp      exp9-9.cpp       .jupyter        overload1.cpp   .sam.l.swp
9.y             cla.cpp             dates.cpp       exp11b.cpp      exp9cc.cpp       .k5login        overloading.cpp sample1
a1              class.cpp           dir01           exp311.sh       exp9cc.cppclear  lex.yy.c        pal.cpp         sample10
a2              classname           dir02           exp314.sh       exp9c.cpp        .local          palin.c         sample11
a3              comexp111.y         dir1            exp315.sh       exp.txt          ludo.cpp        palin.cpp       sample12
acc.cpp         .comexp111.y.swp    dir2            exp411.sh       f1.txt           mar.cpp         palindrome.sh   sample1.txt
accen.cpp       comp6a.sh           dis.cpp         .exp411.sh.swp  f2.txt           marks.cpp       passwd          saum
.accen.cpp.swp  comp6bbb.sh         display.txt     exp412.sh       f3.txt           matrix.c        ph.cpp          saumya
a.out           comp6b.sh           distance.c      exp413.sh       fact.c           matrixs.c       phone.cpp       .saumya
area.c          compexp4.1          .emacs          exp414.sh       fact.sh          max.cpp         .point.cpp.swp  .saumyap
armst.c         compexp5.1          empl.cpp        exp415.sh       fi1.cpp          memory.cpp      power.c         sec.cpp
array.c         compiler7b.c        employee.cpp    exp416.sh       fi2.cpp          memorymore.cpp  prepost.c       .sec.cpp.swp
array.cpp       compiler7.c         enter           exp41.sh        fi3.cpp          .mozilla        prepost.cy      second.cpp
ascending.sh    .compiler7.c.swp    ex10b.cpp       .exp41.sh.swp   fib.c            mul.sh          prepost.cyyxxxyyy  second.cppls
```

5. Display the content of a hidden directory.

```
[urk17cs044@code ~]$ cd .saumyap
[urk17cs044@code .saumyap]$ ls
file1.txt  file2.txt
```

6. Display the calendar of 2020.

```
[urk17cs044@code ~]$ cal 2020
                                2020

      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                      1      1  2  3  4  5  6  7
 5  6  7  8  9 10 11    2  3  4  5  6  7  8      8  9 10 11 12 13 14
12 13 14 15 16 17 18    9 10 11 12 13 14 15     15 16 17 18 19 20 21
19 20 21 22 23 24 25   16 17 18 19 20 21 22     22 23 24 25 26 27 28
26 27 28 29 30 31      23 24 25 26 27 28 29     29 30 31
                       30

       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                   1  2         1  2  3  4  5  6
 5  6  7  8  9 10 11    3  4  5  6  7  8  9      7  8  9 10 11 12 13
12 13 14 15 16 17 18   10 11 12 13 14 15 16     14 15 16 17 18 19 20
19 20 21 22 23 24 25   17 18 19 20 21 22 23     21 22 23 24 25 26 27
26 27 28 29 30         24 25 26 27 28 29 30     28 29 30
                       31

       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                      1            1  2  3  4  5
 5  6  7  8  9 10 11    2  3  4  5  6  7  8      6  7  8  9 10 11 12
12 13 14 15 16 17 18    9 10 11 12 13 14 15     13 14 15 16 17 18 19
19 20 21 22 23 24 25   16 17 18 19 20 21 22     20 21 22 23 24 25 26
26 27 28 29 30 31      23 24 25 26 27 28 29     27 28 29 30
                       30 31

      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    1  2  3  4  5  6  7            1  2  3  4  5
 4  5  6  7  8  9 10    8  9 10 11 12 13 14      6  7  8  9 10 11 12
11 12 13 14 15 16 17   15 16 17 18 19 20 21     13 14 15 16 17 18 19
18 19 20 21 22 23 24   22 23 24 25 26 27 28     20 21 22 23 24 25 26
25 26 27 28 29 30 31   29 30                   27 28 29 30 31
```

7. Copy the file /etc/passwd file to current directory with sample.txt as the filename

```
[urk17cs044@code ~]$ cat /etc/passwd > sample.txt
[urk17cs044@code ~]$ cat sample.txt
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin
systemd-network:x:192:192:systemd Network Management:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
polkitd:x:999:998:User for polkitd:/:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
chrony:x:998:996::/var/lib/chrony:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
tss:x:59:59:Account used by the trousers package to sandbox the tcsd daemon:/dev/null:/sbin/nologin
nginx:x:997:995:Nginx web server:/var/lib/nginx:/sbin/nologin
rpc:x:32:32:Rpcbind Daemon:/var/lib/rpcbind:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
[urk17cs044@code ~]$
```

8. Create a file test1.txt using Vim editor with the following contents to it

Name	RegNo	ResearchInterest
Melvin	07af501	GridComputing
Mithin	07af502	ClusterComputing
James	07af503	ImageProcessing
Jane	07af504	Networking
Caroline	07af505	ClusterComputing
Binu	07af506	GridComputing
Aaron	07af507	ImageProcessing
Selvin	07af508	Networking
Jerwin	07af509	WirelessNetworks
Arun	07af510	GridComputing

Answer the following questions

a) Display the student names who are having Research Interest as GridComputing

```
[urk17cs044@code ~]$ grep Grid text1.txt | cut -f 1
Melvin
Binu
Arun
```

b) List all the student names & RegNo in the class

```
[urk17cs044@code ~]$ cut -f 1,2 text1.txt
Name    RegNo
Melvin  07af501
Mithin  07af502
James   07af503
Jane    07af504
Carolin 07af505
Binu    07af506
Aaron   07af507
Selvin  07af508
Jerwin  07af509
Arun    07af510
[urk17cs044@code ~]$
```

c) List the count of students who have an interest as ImageProcessing and store the result in another file.

```
[urk17cs044@code ~]$ grep Image text1.txt | wc -l > text2.txt
[urk17cs044@code ~]$ cat text2.txt
0
```

d) Display the first two rows and last two and store them into another file.

```
0
[urk17cs044@code ~]$ head -3 test1.txt >> display.txt | tail -2 test1.txt >> display.txt
[urk17cs044@code ~]$ vi display.txt
```

9. Display the contents of the file test1.txt without any blank lines

```
Name    RegNo   ResearchInterest
Melvin  07af501 Gridcomputing
Mithin  07af502 ClusterComputing
James   07af503 ImageProcessing
Jane    07af504 Networking
Carolin 07af505 ClusterComputing
Binu    07af506 GridComputing
Aaron   07af507 ImageProcessing
Selvin  07af508 Networking
Jerwin  07af509 WirelessNetworks
Arun    07af510 GridComputing
```

10. Move the file sample.txt from dir1 directory to dir2 directory

```
[urk17cs044@code ~]$ mv sample.txt dir02
[urk17cs044@code ~]$ cd dir02
```

11. Change directory into dir2 directory

```
[urk17cs044@code ~]$ cd dir02
[urk17cs044@code dir02]$ ls
```

12. Check whether the file sample.txt is present their

```
[urk17cs044@code dir02]$ ls
sample.txt
[urk17cs044@code dir02]$ cat sample.txt
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:/:/sbin/nologin
systemd-network:x:192:192:systemd Network Management:/:/sbin/nologin
dbus:x:81:81:System message bus:/:/sbin/nologin
polkitd:x:999:998:User for polkitd:/:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
postfix:x:89:89::/var/spool/postfix:/sbin/nologin
chrony:x:998:996::/var/lib/chrony:/sbin/nologin
ntp:x:38:38::/etc/ntp:/sbin/nologin
```

13. Rename the file sample.txt to new.txt and check whether sample.txt is there or not?

```
[urk17cs044@code dir02]$ mv sample.txt new.txt
[urk17cs044@code dir02]$ ls
new.txt
[urk17cs044@code dir02]$
```

14. Remove the directory dir1

```
[urk17cs044@code ~]$ rm -r dir01
[urk17cs044@code ~]$
```

15. Display last 3 lines of the file test1.txt

```
Selvin   07af508 Networking
Jerwin   07af509 WirelessNetworks
Arun     07af510 GridComputing
```

16. Display all the commands you have executed so far and save the list into a file named todayshistory.txt

```
[urk17cs044@code ~]$ history > todayhis.txt
[urk17cs044@code ~]$ cat todayhis.txt
   69  clear
   70  vi exp10a.cpp
   71  vi exp10c.cpp
   72  ls
   73  vi ex10.cpp
   74  g++ ex10.cpp
   75  ./a.out
   76  vi exp10b.cpp
   77  g++ exp10b.cpp
   78  ./a.out
   79  vi exp10c.cpp
   80  g++ exp10c.cpp
   81  ./a.out
   82  clear
```

17. How many files are present under your home directory?

```
[urk17cs044@code ~]$ ls -A  | wc -l
268
[urk17cs044@code ~]$
```

18. Perform the sorting of three files and store the sorted file in the fourth file.

```
urk17cs044@code ~]$ cat > f1.txt
irst file
Z
1]+  Stopped                 cat > f1.txt
urk17cs044@code ~]$ cat > f2.txt
econd file
Z
2]+  Stopped                 cat > f2.txt
urk17cs044@code ~]$ cat > f3.txt
hird file
Z
3]+  Stopped                 cat > f3.txt
urk17cs044@code ~]$ sort f1.txt f2.txt f3.txt > file4.txt
urk17cs044@code ~]$ cat file4.txt
irst file
econd file
hird file
urk17cs044@code ~]$
```

19. Change the permission of your newly created file such that the group users and others don't access any type of access.

```
[urk17cs044@code ~]$ chmod 700 file4.txt
[urk17cs044@code ~]$ ls -l file4.txt
-rwx------ 1 urk17cs044 urk17cs044 34 Mar 15 16:10
file4.txt
[urk17cs044@code ~]$
```

20. Display the network status on the shell.

```
[urk17cs044@code ~]$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 code.karunya.edu:nfs    192.168.0.32:ftps-data  ESTABLISHED
tcp        0      0 code.karunya.edu:48482  code.karunya.edu:hbci   ESTABLISHED
tcp        0      0 code.karunya.edu:https  162.158.50.246:22228    ESTABLISHED
tcp        0      0 code.karunya.edu:nfs    192.168.0.34:790        ESTABLISHED
tcp        0      0 code.karunya.edu:48422  code.karunya.edu:hbci   ESTABLISHED
tcp        0      0 code.karunya.edu:https  162.158.111.194:39906   ESTABLISHED
tcp        0      0 code.karunya.edu:https  192.168.11.208:51151    ESTABLISHED
tcp        0    142 code.karunya.edu:36392  192.168.2.27:ldap       FIN_WAIT1
tcp        0      0 code.karunya.edu:hbci   code.karunya.edu:36546  ESTABLISHED
tcp        0      0 code.karunya.edu:hbci   code.karunya.edu:48482  ESTABLISHED
tcp        0     48 code.karunya.edu:https  108.162.229.224:62552   ESTABLISHED
tcp        0      0 code.karunya.edu:36546  code.karunya.edu:hbci   ESTABLISHED
tcp        0      0 code.karunya.edu:48658  code.karunya.edu:hbci   ESTABLISHED
tcp        0      0 code.karunya.edu:nfs    192.168.0.33:814        ESTABLISHED
tcp        0      0 code.karunya.edu:hbci   code.karunya.edu:48422  ESTABLISHED
tcp        0      0 code.karunya.edu:nfs    192.168.0:owamp-control ESTABLISHED
tcp        0      0 code.karunya.edu:hbci   code.karunya.edu:48658  ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  3      [ ]         DGRAM                    36       /run/systemd/notify
```

21. Compares any two files and search for both common and exclusive features

```
[urk17cs044@code ~]$ diff test.txt test2.txt
1,2c1,3
< 98f
< dhiesyfks     j
---
> Cjl
> VCDaidwoaw3rp3093-
> file2
[urk17cs044@code ~]$
```

22. Display the user ID, process ID, and parent process ID.

```
[urk17cs044@code ~]$ ps -f
UID        PID  PPID  C STIME TTY          TIME CMD
urk17cs+ 14792 14772  0 00:00 pts/3    00:00:00 -bash
urk17cs+ 20158 14792  0 01:23 pts/3    00:00:00 ps -f
[urk17cs044@code ~]$
```

23. Report disk usages of the file system.

```
[urk17cs044@code ~]$ du -h
0       ./.mozilla/plugins
0       ./.mozilla/extensions
0       ./.mozilla
16K     ./.config/neofetch
16K     ./.config
4.0K    ./dir2
0       ./saumya
0       ./.saumya
48K     ./.ipynb_checkpoints
4.0K    ./.jupyter
84K     ./.local/share/jupyter/runtime
132K    ./.local/share/jupyter
132K    ./.local/share
132K    ./.local
0       ./.ipython/extensions
0       ./.ipython/nbextensions
0       ./.ipython/profile_default/security
0       ./.ipython/profile_default/log
4.0K    ./.ipython/profile_default/startup
0       ./.ipython/profile_default/pid
0       ./.ipython/profile_default/db
124K    ./.ipython/profile_default
124K    ./.ipython
0       ./unixlab/exp2
20K     ./unixlab/exp3
```

24. Display the statistics of all ports connected to a network.

```
[urk17cs044@code ~]$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:nfs             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:46053           0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:sunrpc          0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:http            0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:mountd          0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:34067           0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:ssh             0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:hbci            0.0.0.0:*               LISTEN
tcp        0      0 localhost:smtp          0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:https           0.0.0.0:*               LISTEN
tcp6       0      0 [::]:nfs                [::]:*                  LISTEN
tcp6       0      0 [::]:sunrpc             [::]:*                  LISTEN
tcp6       0      0 [::]:http               [::]:*                  LISTEN
tcp6       0      0 [::]:mountd             [::]:*                  LISTEN
tcp6       0      0 [::]:ssh                [::]:*                  LISTEN
tcp6       0      0 [::]:57431              [::]:*                  LISTEN
tcp6       0      0 localhost:smtp          [::]:*                  LISTEN
tcp6       0      0 [::]:https              [::]:*                  LISTEN
tcp6       0      0 [::]:39228              [::]:*                  LISTEN
udp        0      0 0.0.0.0:39547           0.0.0.0:*
```

25. Display the uptime of the system.

```
[urk17cs044@code ~]$ uptime
 01:28:11 up 12 days, 13:48, 142 users,  load average: 0.00, 0.01, 0.05
[urk17cs044@code ~]$
```

26. Julian day.

```
[urk17cs044@code ~]$ date
Tue Aug 25 01:30:22 IST 2020
[urk17cs044@code ~]$
```

27. IP information.

```
[urk17cs044@code ~]$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens32: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:50:56:93:66:93 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.29/24 brd 192.168.0.255 scope global noprefixroute ens32
       valid_lft forever preferred_lft forever
    inet6 fe80::1450:18ba:187f:1f02/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
[urk17cs044@code ~]$
```

28. Display only the free space in the system.

```
[urk17cs044@code ~]$ df -k
Filesystem                     1K-blocks     Used Available Use% Mounted on
devtmpfs                         3992636        0   3992636   0% /dev
tmpfs                            4004520        0   4004520   0% /dev/shm
tmpfs                            4004520   427000   3577520  11% /run
tmpfs                            4004520        0   4004520   0% /sys/fs/cgroup
/dev/mapper/centos_kitscode-root  68066844  3014172  65052672   5% /
/dev/sda1                         1942528   334256   1608272  18% /boot
/dev/mapper/centos_kitscode-home  24404336    32992  24371344   1% /home
/dev/mapper/centos_kitscode-data  97609148 26185480  71423668  27% /data
/dev/mapper/centos_kitscode-var   10004480  9315732    688748  94% /var
tmpfs                              800908        0    800908   0% /run/user/1010875247
tmpfs                              800908        0    800908   0% /run/user/1010875463
[urk17cs044@code ~]$
```

29. Linux platform is infected over the network.

30. Display the configuration information of your network.

```
[urk17cs044@code ~]$ netstat -nr
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
0.0.0.0         192.168.0.254   0.0.0.0         UG        0 0          0 ens32
192.168.0.0     0.0.0.0         255.255.255.0   U         0 0          0 ens32
[urk17cs044@code ~]$
```

Results:

The Linux commands are studied and executed.