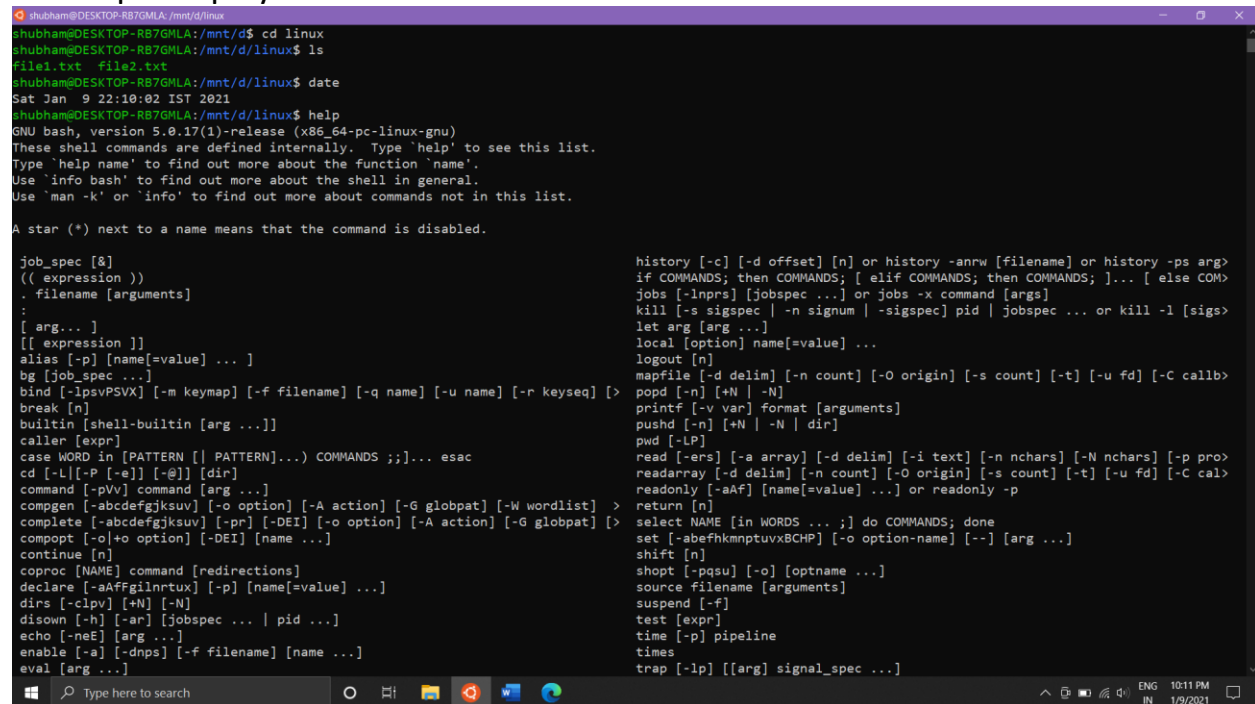# U18CO018
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OS
Assignment-1

Execute all commands on Linux terminal and note down the functionality of each.
(1) Basic Unix/Linux commands: ls, date, help, info, man, who, pwd, cat, more, mv, rm, chmod, logout,wc,grep,sort,mkdir,rmdir,cd,tail,cmp,diff,cp,clear, df,du,uname,apt-get,find,wget,top,mpstate,netstat,sar

1-> ls – List all files of current directory
2-> date – print or set the system date and time
3-> help - Display information about builtin commands

4-> info- read Info documents


```
shubham@DESKTOP-RB7GMLA: /mnt/d/linux
File: dir,      Node: Top,      This is the top of the INFO tree.

This is the Info main menu (aka directory node).
A few useful Info commands:

  'q' quits;
  'H' lists all Info commands;
  'h' starts the Info tutorial;
  'mTexinfo RET' visits the Texinfo manual, etc.

* Menu:

Basics
* Common options: (coreutils)Common options.
* Coreutils: (coreutils).       Core GNU (file, text, shell) utilities.
* Date input formats: (coreutils)Date input formats.
* Ed: (ed).                     The GNU line editor
* File permissions: (coreutils)File permissions.
                                Access modes.
* Finding files: (find).        Operating on files matching certain criteria.

Compression
* Gzip: (gzip).                 General (de)compression of files (lzw).

Editors
* nano: (nano).                 Small and friendly text editor.

General Commands
* Screen: (screen).             Full-screen window manager.

GNU organization
* Maintaining Findutils: (find-maint).
                                Maintaining GNU findutils

GNU Utilities
* dirmngr-client: (gnupg).      X.509 CRL and OCSP client.
* dirmngr: (gnupg).             X.509 CRL and OCSP server.
* gpg-agent: (gnupg).           The secret key daemon.
-----Info: (dir)Top, 180 lines --Top------------------------------------------
Welcome to Info version 6.7.  Type H for help, h for tutorial.
```

5-> man – an interface to the on-line reference manuals


```
shubham@DESKTOP-RB7GMLA: /mnt/d/linux
MAN(1)                            Manual pager utils                            MAN(1)

NAME
       man - an interface to the system reference manuals

SYNOPSIS
       man [man options] [[section] page ...] ...
       man -k [apropos options] regexp ...
       man -K [man options] [section] term ...
       man -f [whatis options] page ...
       man -l [man options] file ...
       man -w|-W [man options] page ...

DESCRIPTION
       man is the system's manual pager.  Each page argument given to man is normally the name of a program, utility or function.  The manual page associ-
       ated with each of these arguments is then found and displayed.  A section, if provided, will direct man to look only in that section of the manual.
       The  default  action  is  to  search in all of the available sections following a pre-defined order (see DEFAULTS), and to show only the first page
       found, even if page exists in several sections.

       The table below shows the section numbers of the manual followed by the types of pages they contain.

       1   Executable programs or shell commands
       2   System calls (functions provided by the kernel)
       3   Library calls (functions within program libraries)
       4   Special files (usually found in /dev)
       5   File formats and conventions, e.g. /etc/passwd
       6   Games
       7   Miscellaneous (including macro packages and conventions), e.g. man(7), groff(7)
       8   System administration commands (usually only for root)
       9   Kernel routines [Non standard]

       A manual page consists of several sections.

       Conventional section names include NAME, SYNOPSIS, CONFIGURATION, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUE, ERRORS, ENVIRONMENT, FILES, VER-
       SIONS, CONFORMING TO, NOTES, BUGS, EXAMPLE, AUTHORS, and SEE ALSO.

       The following conventions apply to the SYNOPSIS section and can be used as a guide in other sections.

       bold text          type exactly as shown.
Manual page man(1) line 1 (press h for help or q to quit)
```
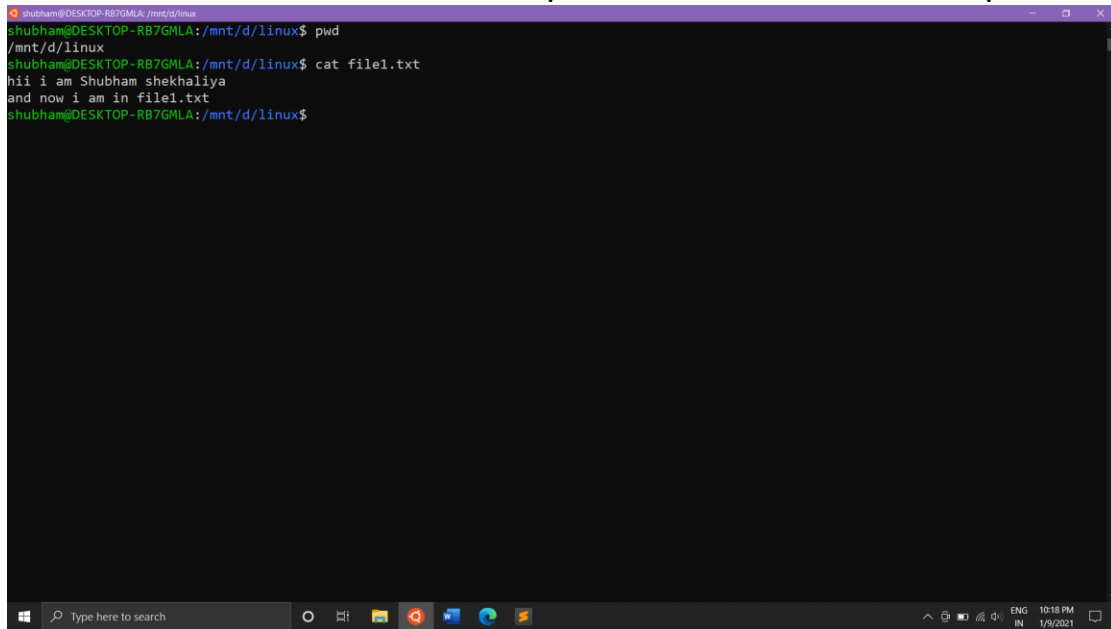
6-> who – show who is logged in

7-> pwd – print name of current/working directory

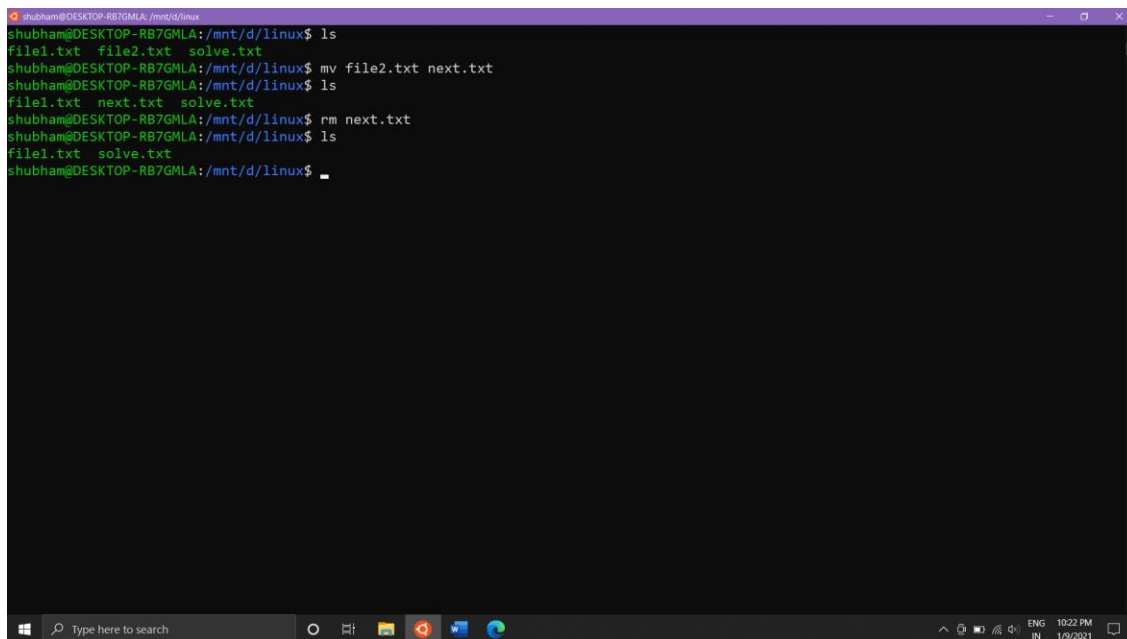8-> cat – concatenate files and print on the standard output

9-> more – Open a file for interactive reading, allowing scrolling and search(in forward direction only).

10->mv – move or rename files and directories

11-> rm – remove files and directories

12-> chmod - Change the access permissions of a file or directory.
Eg. Give the [u]ser rights to [r]ead and [w]rite to a file/directory: chmod u+rw {{file_or_directory}}
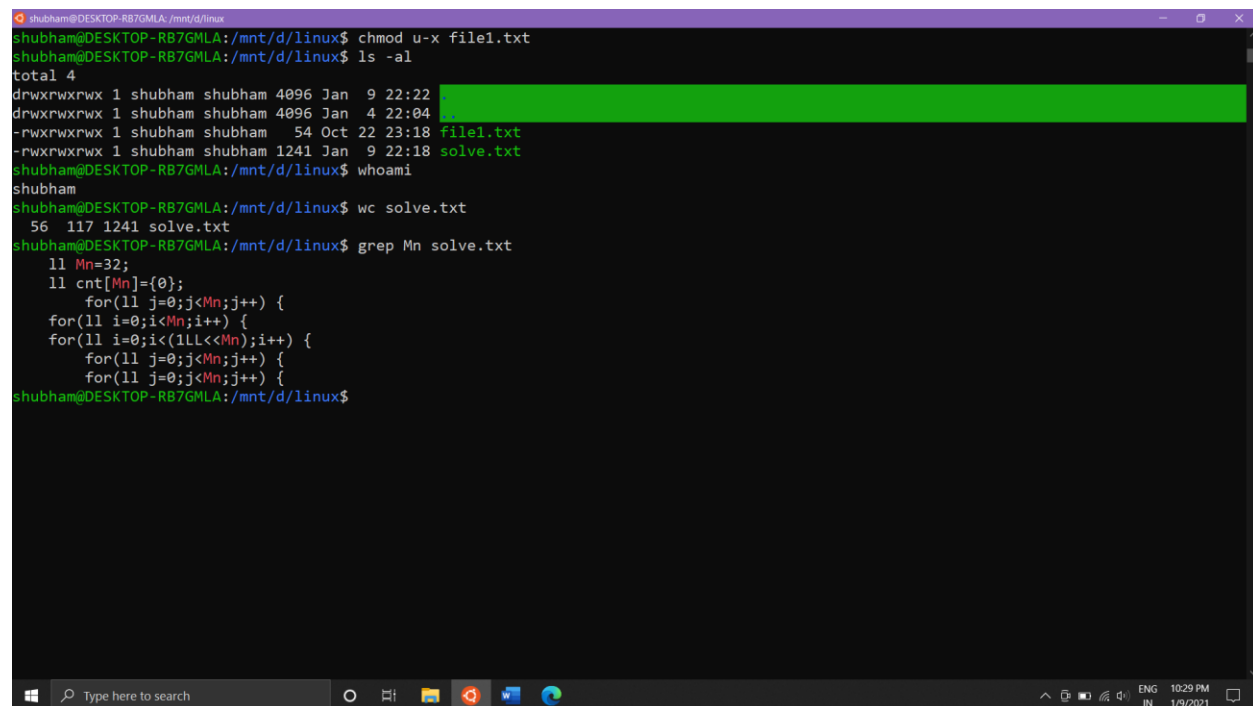13-> Whoami - Print the username associated with the current effective user ID.
14-> Logout - logout command allows you to programmatically logout from your session. causes the session manager to take the requested action immediately.
$ logout
        - User gets logged out
15-> wc – count lines, words or bytes
16-> Grep - Matches patterns in input text. Supports simple patterns and regular expressions.

17-> Sort - Sort lines of text files.

18-> Mkdir - make directory
19-> Rmdir - delete empty directory
20-> Cd - change directory
21-> Tail - Display the last part of a file.
22-> Cmp - Compare two files.

23-> Diff - Compare files and directories.

```
shubham@DESKTOP-RB7GMLA: /mnt/d/linux
file1.txt solve.txt differ: byte 1, line 1
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ diff file1.txt solve.txt
1,2c1,57
< hii i am Shubham shekhaliya
< and now i am in file1.txt
---
> #include <bits/stdc++.h>
> using namespace std;
>
> void solve() {
>     ll n,k;
>     cin>>n>>k;
>     ll Mn=32;
>     ll cnt[Mn]={0};
>     for(ll i=0;i<n;i++) {
>         ll x; cin>>x;
>         for(ll j=0;j<Mn;j++) {
>             if((x&(1LL<<j)))
>                 cnt[j]++;
>         }
>     }
>     ll tp=0;
>     for(ll i=0;i<Mn;i++) {
>         tp+=cnt[i];
>     }
>     if(tp==0) {
>         cout<<"-1\n"; return ;
>     }
>     ll mx=LLONG_MIN,res=0;
>     for(ll i=0;i<(1LL<<Mn);i++) {
>         ll pt=0;
>         for(ll j=0;j<Mn;j++) {
>             if((i&(1LL<<j)))
>                 pt++;
>         }
>         if(pt!=k)
>             continue;
>         ll val=0;
```

24-> Cp - Copy files and directories.

```
shubham@DESKTOP-RB7GMLA: /mnt/d/linux/temp
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ mkdir temp
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ ls
file1.txt  solve.txt  temp
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ cp file1.txt temp
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ cd temp
shubham@DESKTOP-RB7GMLA:/mnt/d/linux/temp$ cat file1.txt
hii i am Shubham shekhaliya
and now i am in file1.txt
shubham@DESKTOP-RB7GMLA:/mnt/d/linux/temp$
```

25-> Clear - clear screen of terminal

26-> Du - Disk usage: estimate and summarize file and directory space usage.
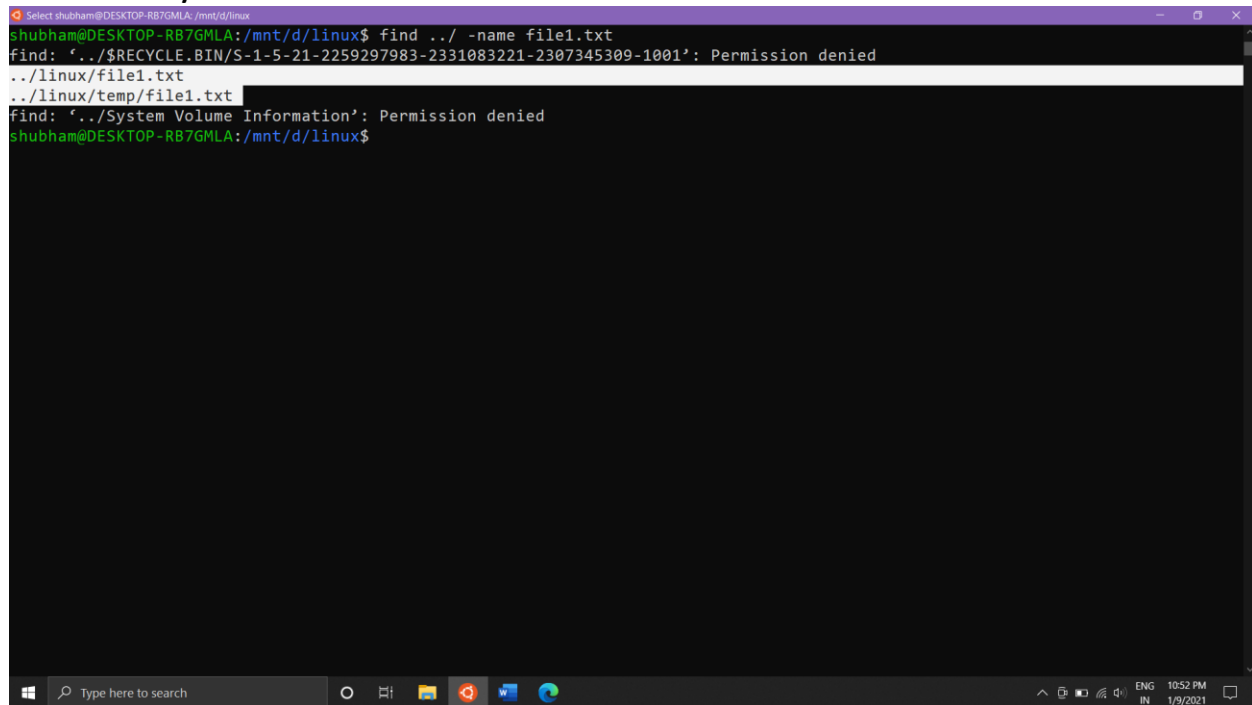
Disk usage of file MIT in KB and MB is shown above.

27-> Df - Gives an overview of the file system disk space usage

28-> Uname - Print details about the current machine and the operating system running on it.

29-> Apt-get - Debian and Ubuntu package management utility. Search for packages using apt-cache.
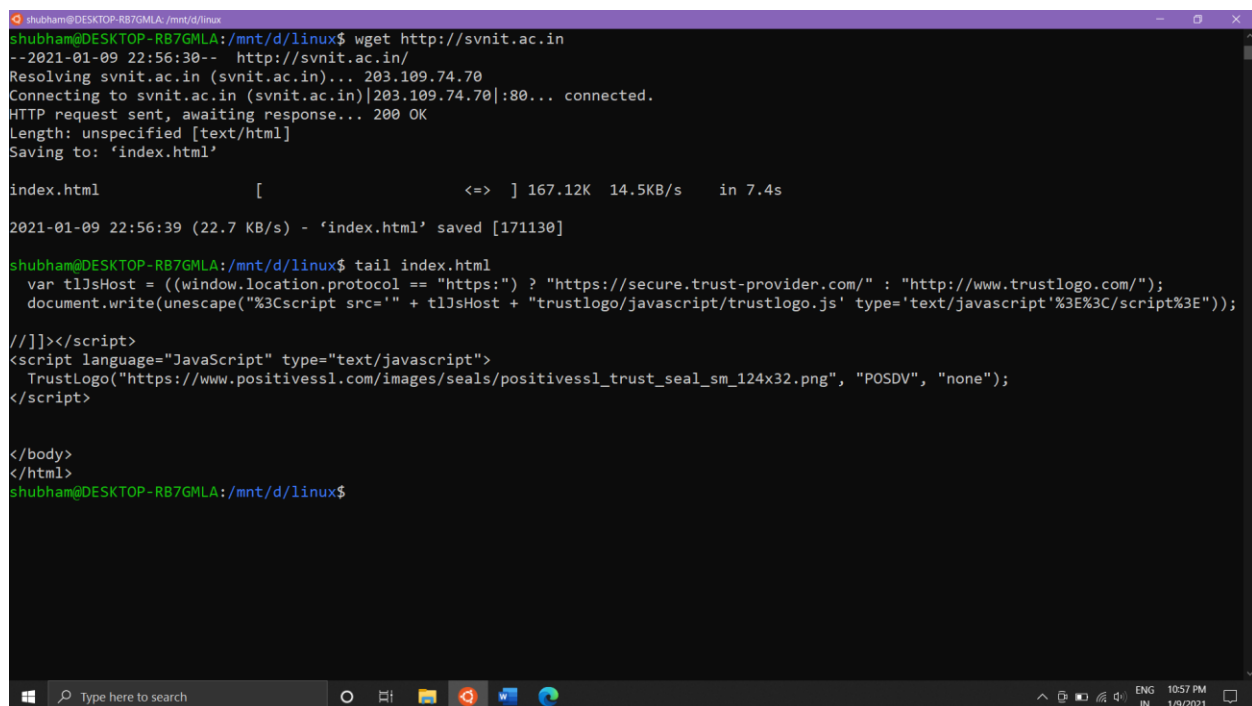
```
shubham@DESKTOP-RB7GMLA: /mnt/d

shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ cd ..
shubham@DESKTOP-RB7GMLA:/mnt/d$ du -m linux
0       linux/temp
1       linux
shubham@DESKTOP-RB7GMLA:/mnt/d$ du -k linux
0       linux/temp
4       linux
shubham@DESKTOP-RB7GMLA:/mnt/d$ df
Filesystem      1K-blocks       Used Available Use% Mounted on
rootfs         746951292   72973408 673977884  10% /
none           746951292   72973408 673977884  10% /dev
none           746951292   72973408 673977884  10% /run
none           746951292   72973408 673977884  10% /run/lock
none           746951292   72973408 673977884  10% /run/shm
none           746951292   72973408 673977884  10% /run/user
tmpfs          746951292   72973408 673977884  10% /sys/fs/cgroup
C:\            746951292   72973408 673977884  10% /mnt/c
D:\            315467772    1219628 314248144   1% /mnt/d
E:\            315466748    5255912 310210836   2% /mnt/e
F:\            559787004  116778940 443008064  21% /mnt/f
shubham@DESKTOP-RB7GMLA:/mnt/d$ uname -srv
Linux 4.4.0-19041-Microsoft #488-Microsoft Mon Sep 01 13:43:00 PST 2020
shubham@DESKTOP-RB7GMLA:/mnt/d$ sudo apt-get autoremove
[sudo] password for shubham:
Reading package lists... Done
Building dependency tree
Reading state information... Done
0 upgraded, 0 newly installed, 0 to remove and 75 not upgraded.
shubham@DESKTOP-RB7GMLA:/mnt/d$
```

30-> Find - Find files or directories under the given directory tree, recursively

```
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ find ../ -name file1.txt
find: '../$RECYCLE.BIN/S-1-5-21-2259297983-2331083221-2307345309-1001': Permission denied
../linux/file1.txt
../linux/temp/file1.txt
find: '../System Volume Information': Permission denied
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$
```

31-> wget – Download files from the web. Supports HTTP, HTTPS and FTP

```
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ wget http://svnit.ac.in
--2021-01-09 22:56:30--  http://svnit.ac.in/
Resolving svnit.ac.in (svnit.ac.in)... 203.109.74.70
Connecting to svnit.ac.in (svnit.ac.in)|203.109.74.70|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [text/html]
Saving to: 'index.html'

index.html              [           <=>  ] 167.12K  14.5KB/s    in 7.4s

2021-01-09 22:56:39 (22.7 KB/s) - 'index.html' saved [171130]

shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ tail index.html
  var tlJsHost = ((window.location.protocol == "https:") ? "https://secure.trust-provider.com/" : "http://www.trustlogo.com/");
  document.write(unescape("%3Cscript src='" + tlJsHost + "trustlogo/javascript/trustlogo.js' type='text/javascript'%3E%3C/script%3E"));

//]]></script>
<script language="JavaScript" type="text/javascript">
  TrustLogo("https://www.positivessl.com/images/seals/positivessl_trust_seal_sm_124x32.png", "POSDV", "none");
</script>


</body>
</html>
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$
```

32-> top- display dynamic real time information about running processes

33-> mpstat – report CPU statistics

34-> netstat – display network related information such as open connections, open socket ports, etc.

35-> sar – monitor performance of various linux subsystems Displays performance every 3 seconds.

(2) Linux commands related with process:

1-> Ps - Information about running processes. Eg. ps aux lists all processes.

2-> Kill - Sends a signal to a process, usually related to stopping the process.All signals except for SIGKILL and SIGSTOP can be intercepted by the process to perform a clean exit.

```
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ ps aux
USER        PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root          1  0.0  0.0   8936   316 ?        Ssl  22:00   0:00 /init
root          9  0.0  0.0   8936   224 tty1     Ss   22:00   0:00 /init
shubham      10  0.0  0.0  18080  3652 tty1     S    22:00   0:01 -bash
shubham     816  0.0  0.0  18648  1896 tty1     R    23:10   0:00 ps aux
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ kill 10
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ ps aux
USER        PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root          1  0.0  0.0   8936   316 ?        Ssl  22:00   0:00 /init
root          9  0.0  0.0   8936   224 tty1     Ss   22:00   0:00 /init
shubham      10  0.0  0.0  18080  3652 tty1     S    22:00   0:01 -bash
shubham     817  0.0  0.0  18648  1896 tty1     R    23:11   0:00 ps aux
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$
```

3-> Background processes with & -> moves the process to background Eg. Sleep command is moved to background using & and then using fg we bring it to foreground and we get a delay of 5 seconds.

```
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ sleep 10s &
[4] 846
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$ fg
sleep 10s
[3]-  Done                    sleep 10s
shubham@DESKTOP-RB7GMLA:/mnt/d/linux$
```