

**Lab Assignment - 1**  
**(Operating Systems Practice)**

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## LAB - ASSIGNMENT - I

### OPERATING SYSTEMS

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- 1) ls:- This command is used to list all the files and directory in the current directory.
- 2) ls -l:- This command ~~will~~ is a long listing format for the files in the folder. Lists all the details of the file such as permissions, name, owner, last modified date and time.
- 3) ll:- alias of ls -l.
- 4) cat:- This command is used to display the contents of a file. You can read the file contents using the cat command.
- 5) more:- It is an old terminal pager which opens the file in the terminal in an interactive mode. It displays contents page by page.
- 6) less:- "less" is also similar to "more" but has more features such as search, go to end & start immediately, etc.

## 1) ls command

```
kurries@Beast:~$ ls
Desktop    Dropbox   Music          Public        snap       Videos
Documents  links.txt my-config.cnf reside      Templates
Downloads  mariadb   Pictures       scikit_learn_data temp.txt
```

## 2) ls -l command

```
kurries@Beast:~$ ls -l
total 164
drwxr-xr-x  2 kurries kurries  4096 Aug  2 11:36 Desktop
drwxr-xr-x  7 kurries kurries  4096 Aug  3 12:30 Documents
drwxr-xr-x  4 kurries kurries  4096 Jun 19 19:06 Downloads
drwxr----- 5 kurries kurries  4096 Aug  6 09:51 Dropbox
-rw-rw-r--  1 kurries kurries   328 Aug  6 15:22 links.txt
drwxrwxr-x  6 kurries kurries  4096 Jul  8 12:45 mariadb
drwxr-xr-x  2 kurries kurries  4096 May  8 17:40 Music
-rw-rw-r--  1 kurries kurries   176 Jul  8 13:00 my-config.cnf
drwxr-xr-x  3 kurries kurries  4096 Jul  6 17:30 Pictures
drwxr-xr-x  2 kurries kurries  4096 May  8 17:40 Public
drwxrwxr-x  8 kurries kurries  4096 Aug  6 15:55 reside
drwxrwxr-x  3 kurries kurries  4096 Jun  5 12:32 scikit_learn_data
drwxr-xr-x 11 kurries kurries  4096 Aug  3 11:29 snap
drwxr-xr-x  2 kurries kurries  4096 May  8 17:40 Templates
-rw-rw-r--  1 kurries kurries 99163 Aug  6 16:03 temp.txt
drwxr-xr-x  2 kurries kurries  4096 Aug  5 12:03 Videos
```

### 3) ll command

```
kuries@Beast:~$ ll
total 360
drwxr-xr-x 34 kuries kuries 4096 Aug  6 15:22 /
drwxr-xr-x  4 root  root  4096 May  8 17:13 ..
-rw-----  1 kuries kuries 33371 Aug  5 23:01 .bash_history
-rw-r--r--  1 kuries kuries 220 May  8 17:13 .bash_logout
-rw-r--r--  1 kuries kuries 4195 Jul 23 20:58 .bashrc
drwxr-xr-x 29 kuries kuries 4096 Jul 31 22:36 .cache/
drwxr-xr-x 31 kuries kuries 4096 Aug  6 10:29 .config/
drwxr-xr-x  3 kuries kuries 4096 May 14 10:43 .dbus/
drwxr-xr-x  2 kuries kuries 4096 Aug  2 11:34 Desktop/
drwxr-xr-x  5 kuries kuries 4096 Jul 26 20:05 dia/
drwxr-xr-x  7 kuries kuries 4096 Aug  3 12:30 Documents/
drwxr-xr-x  4 kuries kuries 4096 Jun 19 19:00 Downloads/
drwxr-xr-x  8 kuries kuries 4096 Aug  6 09:51 dropbox/
drwxr-xr-x  5 kuries kuries 4096 Aug  6 09:51 Dropbox/
drwxrwxr-x  3 kuries kuries 4096 Jul 27 12:16 .dropbox-dist/
-rw-rw-r--  1 kuries kuries 58 May 27 11:04 .gitconfig
drwxr-xr-x  3 kuries kuries 4096 Aug  6 09:52 .gnupg/
drwxr-xr-x  5 kuries kuries 4096 Jun  3 15:25 .ipython/
drwxrwxr-x  3 kuries kuries 4096 May 20 16:46 .java/
drwxrwxr-x  4 kuries kuries 4096 Jun  5 23:19 .jupyter/
-rw-rw-r--  1 kuries kuries 328 Aug  6 15:22 llnks.txt
drwxr-xr-x  5 kuries kuries 4096 Jul 17 20:11 .local/
drwxrwxr-x  4 kuries kuries 4096 Jun 23 21:09 .mc/
drwxrwxr-x  6 kuries kuries 4096 Jul  8 12:45 mariadb/
drwxr-xr-x  5 kuries kuries 4096 May  8 17:43 .mozilla/
-rw-rw-r--  1 kuries kuries 4096 Jul 17 22:51 .mrtrust
drwxr-xr-x  2 kuries kuries 4096 May  8 17:40 .Must/
-rw-rw-r--  1 kuries kuries 176 Jul  8 12:51 .my.cnf
-rw-rw-r--  1 kuries kuries 176 Jul  8 13:00 my-config.cnf
-rw-----  1 kuries kuries 885 Jul 10 22:44 .mysql_history
-rw-----  1 kuries kuries 11 Jul 24 12:43 .node_repl_history
-rw-rw-r--  1 kuries kuries 654 May  8 18:01 .nvidia-settings-rc
-rw-rw-r--  1 kuries kuries 0 Jul  8 12:31 .odbc.ini
drwxr-xr-x  3 kuries kuries 4096 Jul  6 17:30 Pictures/
drwxr-xr-x  3 kuries kuries 4096 May  8 22:31 .pki/
-rw-r----- 1 kuries kuries 807 Jul 17 20:38 .profile
-rw----- 1 kuries kuries 9 Jul 17 22:30 .psql_history
drwxr-xr-x  2 kuries kuries 4096 May  8 17:40 Public/
-rw----- 1 kuries kuries 973 Jul 31 22:36 .python_history
-rw----- 1 kuries kuries 0 Jun 30 12:02 .python_history-08869.tmp
drwxrwxr-x  2 kuries kuries 4096 Jul  3 11:45 .redhat/
drwxrwxr-x  8 kuries kuries 4096 Aug  6 15:55 reside/
drwxrwxr-x  3 kuries kuries 4096 Jun  5 12:32 scikit_learn_data/
```

### 4) cat command

```
kuries@Beast:~$ cat temp.txt
Friday 06 August 2021 04:01:01 PM IST
Friday 06 August 2021 04:02:01 PM IST
Friday 06 August 2021 04:03:01 PM IST
Friday 06 August 2021 04:04:01 PM IST
Friday 06 August 2021 04:05:01 PM IST
sending incremental file list

sent 12,236 bytes received 155 bytes 24,782.00 bytes/sec
total size is 12,951,567 speedup is 1,045.24
```

## 5) more command

```
#define forn(i, n) for(int i=0; i<n; i++)

using namespace std;
typedef long long ll;

typedef pair<int, int> pd;
typedef unordered_multimap<int, int>::iterator umit;

const long long M = 1000000007;

void solve()
{
    ll n, c, i, j;
    map<ll, ll> M;

    cin>>n>>c;
    forn(k, n)
    {
        cin>>i>>j;
        i++;
        if(M.find(i) != M.end())
            M.at(i) += 1;
    }
}
--More-- (27%)
```

## 6) less command

```
using namespace std;
typedef long long ll;

typedef pair<int, int> pd;
typedef unordered_multimap<int, int>::iterator umit;

const long long M = 1000000007;

void solve()
{
    ll n, c, i, j;
    map<ll, ll> M;

    cin>>n>>c;
    forn(k, n)
    {
        cin>>i>>j;
        i++;
        if(M.find(i) != M.end())
            M.at(i) += 1;
        else
            M.insert({i, 1});
    }
}
```

## Manipulating Files :-

M.BINSH  
CED19S036

- ⑦ mkdir:- This command is used to create a new directory in the current folder.
- ⑧ mv:- This command is used to move the file or directory.
- ⑨ cp:- This command is used to copy files/directory.
- ⑩ rm:- This command is used to ~~create or use~~ & remove or delete files / directories.

## Some Other Commands :-

⑪ tar:- Stands for tape archive. It is used to archive and extract the archive files. We can use it to create compressed or uncompressed archive files and also maintain and modify them.

⑫ grep:- Stands for globally search for regular expression and print out.

The grep filter searches a file for a particular pattern of characters, and displays all lines that contain that pattern.

The "i" flag is used to find the word pattern in case insensitive manner.

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13) find :- Command is used to filter the objects in the file system based on a particular pattern. It can be used to find files and directories and perform subsequent operations on them.

14) diff :- Used to display the difference in files by comparing line by line. It also displays which lines in one file is to be changed to make the two of them identical.

15) pwd :- Displays present working directory.

16) sort :- A command used to sort a file, arranging the records in a particular order. By default, the sort command assumes the contents are ASCII.

17) gzip :- It compresses the file. Each single file is compressed into a single file. The compressed file consists of a GNU zip header and deflated data.

If a file is given as an argument, gzip compresses

7) mkdir command

```
kurries@Beast:~/reside/program_files/c++$ ls
a.out B.cpp C.cpp D.cpp E.cpp F.cpp G.py store.cpp test.txt
kurries@Beast:~/reside/program_files/c++$ mkdir example
kurries@Beast:~/reside/program_files/c++$ ls
a.out B.cpp C.cpp D.cpp E.cpp example F.cpp G.py store.cpp test.txt
```

8) mv command

```
kurries@Beast:~/reside/program_files/c++$ ls
a.out B.cpp C.cpp D.cpp E.cpp example F.cpp G.py store.cpp test.txt
kurries@Beast:~/reside/program_files/c++$ mv a.out example/
kurries@Beast:~/reside/program_files/c++$ cd example
kurries@Beast:~/reside/program_files/c++/example$ ls
a.out
```

9) cp command

```
kurries@Beast:~/reside/program_files/c++$ ls
B.cpp C.cpp D.cpp E.cpp example F.cpp G.py store.cpp test.txt
kurries@Beast:~/reside/program_files/c++$ cd example
kurries@Beast:~/reside/program_files/c++/example$ ls
a.out
kurries@Beast:~/reside/program_files/c++/example$ cp a.out ../
kurries@Beast:~/reside/program_files/c++/example$ cd .. && ls
a.out B.cpp C.cpp D.cpp E.cpp example F.cpp G.py store.cpp test.txt
```

10) rm dir

```
kurries@Beast:~/reside/program_files/c++$ ls
a.out B.cpp C.cpp D.cpp E.cpp example F.cpp G.py store.cpp test.txt
kurries@Beast:~/reside/program_files/c++$ rm a.out
kurries@Beast:~/reside/program_files/c++$ ls
B.cpp C.cpp D.cpp E.cpp example F.cpp G.py store.cpp test.txt
```

11) tar command

```
kurries@Beast:~/Downloads$ ls
alarm-clock-applet_0.3.4.orig.tar.gz download
applications final_version.gif
kurries@Beast:~/Downloads$ mkdir discard
kurries@Beast:~/Downloads$ ls
alarm-clock-applet_0.3.4.orig.tar.gz discard final_version.gif
kurries@Beast:~/Downloads$ tar -C discard -xvf alarm-clock-applet_0.3.4.orig.tar.gz
alarm-clock-applet-0.3.4/
alarm-clock-applet-0.3.4/aclocal.m4
alarm-clock-applet-0.3.4/compile
alarm-clock-applet-0.3.4/config.h.in
alarm-clock-applet-0.3.4/po/
alarm-clock-applet-0.3.4/po/es.po
alarm-clock-applet-0.3.4/po/hi.po
alarm-clock-applet-0.3.4/po/pt_BR.po
alarm-clock-applet-0.3.4/po/fo.po
```

```
alarm-clock-applet-0.3.4/NEWS
alarm-clock-applet-0.3.4/ChangeLog
alarm-clock-applet-0.3.4/INSTALL
alarm-clock-applet-0.3.4/intltool-update.in
alarm-clock-applet-0.3.4/install-sh
kurries@Beast:~/Downloads$ ls
alarm-clock-applet_0.3.4.orig.tar.gz  applications  discard  download  final_version.gif
kurries@Beast:~/Downloads$ cd discard
kurries@Beast:~/Downloads/discard$ ls
alarm-clock-applet-0.3.4
```

## 12) grep command

```
kurries@Beast:~/reside/program_files/c++$ grep -i "include" B.cpp
#include<bits/stdc++.h>
kurries@Beast:~/reside/program_files/c++$
```

## 13) find command

```
kurries@Beast:~/reside/program_files$ find ~/reside/program_files -name *.c
/home/kurries/reside/program_files/bash/first_q.c
kurries@Beast:~/reside/program_files$
```

## 14) diff command

```
kurries@Beast:~/reside/program_files/c++$ ls
B.cpp  C.cpp  D.cpp  E.cpp  F.cpp  G.py  store.cpp  test2.txt  test.txt
kurries@Beast:~/reside/program_files/c++$ cat test.txt
dog
mv
CP
comm
kurries@Beast:~/reside/program_files/c++$ cat test2.txt
DOG
cp
diff
comm
kurries@Beast:~/reside/program_files/c++$ diff test.txt test2.txt
1,3c1,3
< dog
< mv
< CP
---
> DOG
> cp
> diff
```

## 15) pwd command

```
kurries@Beast:~/reside/program_files/c++$ pwd
/home/kurries/reside/program_files/c++
```

## 16) sort command

```
kurries@Beast:~/reside/program_files/c++$ cat test.txt
dog
mv
CP
comm
kurries@Beast:~/reside/program_files/c++$ sort test.txt
comm
CP
dog
mv
```

## 17) gzip command

```
kurries@Beast:~/reside/program_files/c++$ ls
B.cpp C.cpp D.cpp E.cpp F.cpp G.py store.cpp test2.txt test.txt
kurries@Beast:~/reside/program_files/c++$ gzip -k test.txt
kurries@Beast:~/reside/program_files/c++$ ls
B.cpp C.cpp D.cpp E.cpp F.cpp G.py store.cpp test2.txt test.txt test.txt.gz
```

## 18) free, ps, kill

```
kurries@Beast:~/reside/program_files/c++$ free
              total        used        free      shared  buff/cache   available
Mem:       7925812     5443636     160888    977508     2321288    1039384
Swap:      10485756      307600    10178156
kurries@Beast:~/reside/program_files/c++$ ps
  PID TTY      TIME CMD
  6690 pts/0    00:00:00 bash
  60092 pts/0    00:00:00 gedit
  60126 pts/0    00:00:00 ps
kurries@Beast:~/reside/program_files/c++$ kill 60092
kurries@Beast:~/reside/program_files/c++$ ps
  PID TTY      TIME CMD
  6690 pts/0    00:00:00 bash
  60152 pts/0    00:00:00 ps
[1]+  Terminated                  gedit B.cpp
```

the file, adds a ".gz" suffix, and deletes the original file.

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(17) ps:- Stands for process status.  
Lists out all the current <sup>running</sup> processes along with their process IDs.

(18) free:- Displays the total amount of free space available along with the amount of memory used and swap the memory in the system, and also the buffers used by the kernel.

(19) kill:- Built-in command which is used to terminate processes manually. kill sends a signal to a process which terminates the process.

Mention the id of the process you want to kill after the "kill" command.

(20) SSH:- Secure Shell. It is a protocol used to securely connect to a remote server/system. SSH is secure in the sense that it transfers the data in encrypted form between the host and client.

## 19) ssh command

③ CHMOD (CHANGING PERMISSIONS)

METHOD  
CHMOD

Syntax chmod [who] op-code permissions filename.

The who argument tells the chmod the user and class may be any of the following:-

u - User, g - Group, o - Other, a - All.

- + adds specified permissions.
- removes specified permissions.
- > assigns specified permissions.

20) chmod command

```
kuries@Beast:~/reside/sem/osp/discard$ ls -l
total 4
-rw-rw-r-- 1 kuries kuries 19 Aug  8 17:45 temp.txt
kuries@Beast:~/reside/sem/osp/discard$ chmod +x temp.txt
kuries@Beast:~/reside/sem/osp/discard$ ls -l
total 4
-rwxrwxr-x 1 kuries kuries 19 Aug  8 17:45 temp.txt
kuries@Beast:~/reside/sem/osp/discard$ cat temp.txt
echo 'Hello World'
kuries@Beast:~/reside/sem/osp/discard$ ./temp.txt
Hello World
```

# C - Program Outputs

6)

```
C CED19I036_lab_1_Q6.c > ...
1 //M.Binesh
2 //CED19I036
3
4 #include<stdio.h>
5
6 int main()
7 {
8     int integer=5;
9     int arr[] = {0,1,2,3,4,5};
10    int *ptr = arr;
11    printf("Address of single integer: %p\n\n", &integer);
12    for(int i=0; i<5; i++)
13        printf("Address of %dth integer: %p\n", i, arr+i);
14    return 0;
15 }
```

```
PROBLEMS    OUTPUT    TERMINAL    DEBUG CONSOLE
kurries@Beast:~/reside/sem/osp$ gcc CED19I036_lab_1_Q6.c && ./a.out
Address of single integer: 0x7ffb565b340
Address of 0th integer: 0x7ffb565b350
Address of 1th integer: 0x7ffb565b354
Address of 2th integer: 0x7ffb565b358
Address of 3th integer: 0x7ffb565b35c
Address of 4th integer: 0x7ffb565b360
kurries@Beast:~/reside/sem/osp$
```

7)

The screenshot shows the Visual Studio Code interface with several tabs open:

- source.txt: Contains the text "1 hello", "2 I CAN SEE", and "3 InKnTer".
- target.txt: Contains the text "1 HELLO", "2 i can see", and "3 iNkNtER".
- CED19I036\_lab\_1\_Q6.c
- target.txt (active tab)
- source.txt
- ...

Below the tabs, there is a terminal window showing the command line:

```
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
kurries@Beast:~/reside/sem/osp$ gcc CED19I036_lab_1_Q7.c && ./a.out
File copied
kurries@Beast:~/reside/sem/osp$
```

8)

The screenshot shows the Visual Studio Code interface with several tabs open:

- source.txt: Contains the text "1 hello", "2 I CAN SEE", and "3 InKnTer".
- target.txt: Contains the text "1 hll", "2 | CN S", and "3 nKnTr".
- CED19I036\_lab\_1\_Q6.c
- target.txt (active tab)
- source.txt
- ...

Below the tabs, there is a terminal window showing the command line:

```
PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE
kurries@Beast:~/reside/sem/osp$ gcc CED19I036_lab_1_Q8.c && ./a.out
File copied
kurries@Beast:~/reside/sem/osp$
```