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## **Concepts of Operating System**

### **Assignment 1**

**Problem 1: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.**

#### **a) Navigate and List:**

a. Start by navigating to your home directory and list its contents. Then, move into a directory named "LinuxAssignment" if it exists; otherwise, create it.

```
cdac@GaneshPawar: ~  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
cdac@GaneshPawar:~$ WHOAMI  
WHOAMI: command not found  
cdac@GaneshPawar:~$ whoami  
cdac  
cdac@GaneshPawar:~$ cd LinuxAssignment  
-bash: cd: LinuxAssignment: No such file or directory  
cdac@GaneshPawar:~$ mkdir LinuxAssignment  
cdac@GaneshPawar:~$ ls  
LinuxAssignment  demo  file1.txt  
cdac@GaneshPawar:~$ cd LinuxAssignment  
cdac@GaneshPawar:~/LinuxAssignment$ touch demofile.txt  
cdac@GaneshPawar:~/LinuxAssignment$ ls  
demofile.txt  
cdac@GaneshPawar:~/LinuxAssignment$ mkdir LinuxAssignment_Child  
cdac@GaneshPawar:~/LinuxAssignment$ cd LinuxAssignment_Child/  
cdac@GaneshPawar:~/LinuxAssignment/LinuxAssignment_Child$ ls  
cdac@GaneshPawar:~/LinuxAssignment/LinuxAssignment_Child$ cd ..  
cdac@GaneshPawar:~/LinuxAssignment$ cd ..  
cdac@GaneshPawar:~$ █
```

## b) File Management:

a. Inside the "LinuxAssignment" directory, create a new file named "file1.txt". Display its contents.

```
cdac@GaneshPawar: ~/LinuxAssignment
cdac@GaneshPawar:~$ cd LinuxAssignment/
cdac@GaneshPawar:~/LinuxAssignment$ nano file1.txt
cdac@GaneshPawar:~/LinuxAssignment$ cat file.txt
cat: file.txt: No such file or directory
cdac@GaneshPawar:~/LinuxAssignment$ cat file1.txt
Hii, Practice of Assignment 1 of operating system.
cdac@GaneshPawar:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 12:32 LinuxAssignment_Child
-rw-r--r-- 1 cdac cdac  0 Aug 28 12:32 demofile.txt
-rw-r--r-- 1 cdac cdac  51 Aug 28 12:37 file1.txt
cdac@GaneshPawar:~/LinuxAssignment$
```

## c) Directory Management:

a. Create a new directory named "docs" inside the "LinuxAssignment" directory.

```
cdac@GaneshPawar: ~/LinuxAssignment
cdac@GaneshPawar:~$ cd LinuxAssignment/
cdac@GaneshPawar:~/LinuxAssignment$ mkdir docs
cdac@GaneshPawar:~/LinuxAssignment$ ls
docs  file1.txt
```

## d) Copy and Move Files:

a. Copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt".

```

cdac@GaneshPawar: ~/LinuxAssignment/docs
cdac@GaneshPawar:~$ cd LinuxAssignment/
cdac@GaneshPawar:~/LinuxAssignment$ cp file1.txt docs/file1.txt
cdac@GaneshPawar:~/LinuxAssignment$ ls
docs  file1.txt
cdac@GaneshPawar:~/LinuxAssignment$ cd docs/
cdac@GaneshPawar:~/LinuxAssignment/docs$ la
file1.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ mb file1.txt file2.txt
mb: command not found
cdac@GaneshPawar:~/LinuxAssignment/docs$ mv file1.txt file2.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ ls
file2.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ █

```

### e) Permissions and Ownership:

a. Change the permissions of "file2.txt" to allow read, write, and execute permissions for the owner and only read permissions for others. Then, change the owner of "file2.txt" to the current user.

```

cdac@GaneshPawar: ~/LinuxAssignment/docs
cdac@GaneshPawar:~$ cd LinuxAssignment/
cdac@GaneshPawar:~/LinuxAssignment$ cd docs/
cdac@GaneshPawar:~/LinuxAssignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 51 Aug 28 12:45 file2.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ chmod u+x file2.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 51 Aug 28 12:45 file2.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ sudo useradd user1
[sudo] password for cdac:
cdac@GaneshPawar:~/LinuxAssignment/docs$ sudo user1 docs/file2.txt
sudo: user1: command not found
cdac@GaneshPawar:~/LinuxAssignment/docs$ sudo chown user1 docs/file2.txt
chown: cannot access 'docs/file2.txt': No such file or directory
cdac@GaneshPawar:~/LinuxAssignment/docs$ cd ..
cdac@GaneshPawar:~/LinuxAssignment$ sudo chown user1 docs/file2.txt
cdac@GaneshPawar:~/LinuxAssignment$ cd docs/
cdac@GaneshPawar:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 user1 cdac 51 Aug 28 12:45 file2.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ █

```

#### f) Final Checklist:

- a. Finally, list the contents of the "LinuxAssignment" directory and the root directory to ensure that all operations were performed correctly.

```
cdac@GaneshPawar: ~/LinuxAssignment/docs
cdac@GaneshPawar:~/LinuxAssignment/new_dir/docs$ cd
cdac@GaneshPawar:~$ ls -l
total 12
drwxr-xr-x 4 cdac cdac 4096 Aug 28 14:11 LinuxAssignment
drwxr-xr-x 2 cdac cdac 4096 Aug 28 05:01 demo
-rw-r--r-- 1 cdac cdac 36 Aug 28 05:01 file1.txt
cdac@GaneshPawar:~$ cd LinuxAssignment/
cdac@GaneshPawar:~/LinuxAssignment$ ls -l
total 16
drwxr-xr-x 2 cdac cdac 4096 Aug 28 13:07 docs
-rw-r--r-- 1 cdac cdac 366 Aug 28 14:00 docs.zip
-rw-r--r-- 1 cdac cdac 275 Aug 28 13:11 file1.txt
-rw-r--r-- 1 cdac cdac 0 Aug 28 13:06 file2.txt
drwxr-xr-x 3 cdac cdac 4096 Aug 28 14:11 new_dir
cdac@GaneshPawar:~/LinuxAssignment$ cd docs/
cdac@GaneshPawar:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 user1 cdac 51 Aug 28 12:45 file2.txt
cdac@GaneshPawar:~/LinuxAssignment/docs$ █
```

#### g) File Searching:

- a. Search for all files with the extension ".txt" in the current directory and its subdirectories.

```
cdac@GaneshPawar: ~
cdac@GaneshPawar:~$ find "*.txt"
find: '*.txt': No such file or directory
cdac@GaneshPawar:~$ find -type -f name "*.txt"
find: Unknown argument to -type: -
cdac@GaneshPawar:~$ find -type f -name "*.txt"
./LinuxAssignment/file1.txt
./LinuxAssignment/docs/file2.txt
./file1.txt
cdac@GaneshPawar:~$ █
```

```

cdac@GaneshPawar: ~
cdac@GaneshPawar:~$ find -name "*.txt"
./output1.txt
./number.txt
./LinuxAssignment/file2.txt
./LinuxAssignment/new_dir/docs/file2.txt
./LinuxAssignment/file1.txt
./LinuxAssignment/docs/file2.txt
./data.txt
./file1.txt
./output.txt
./duplicate.txt
./input.txt
./fruit.txt
cdac@GaneshPawar:~$

```

b. Display lines containing a specific word in a file (provide a file name and the specific word to search).

```

cdac@GaneshPawar: ~/LinuxAssignment
cdac@GaneshPawar:~/LinuxAssignment$ nano file1.txt
cdac@GaneshPawar:~/LinuxAssignment$ cat file1.txt
Hii, Practice of Assignment 1 of operating system.
pwd - check directory
nano - open files, if its not present then it create the file and open
ls - list all the files and subdirectory in the current working directory
touch - create new file
mkdir - to create new durectory
cdac@GaneshPawar:~/LinuxAssignment$ --help
--help: command not found
cdac@GaneshPawar:~/LinuxAssignment$ -help
Command '-help' not found, did you mean:
  command 'dhhelp' from deb dhhelp (0.6.30)
Try: sudo apt install <deb name>
cdac@GaneshPawar:~/LinuxAssignment$ grep "pwd" file1.txt
pwd - check directory
cdac@GaneshPawar:~/LinuxAssignment$ grep "nano" , "ls" file1.txt
grep: ,: No such file or directory
grep: ls: No such file or directory
file1.txt:nano - open files, if its not present then it create the file and open
cdac@GaneshPawar:~/LinuxAssignment$ grep "nano" "ls" file1.txt
grep: ls: No such file or directory
file1.txt:nano - open files, if its not present then it create the file and open
cdac@GaneshPawar:~/LinuxAssignment$

```

## h) System Information:

- a. Display the current system date and time.

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ date  
Wed Aug 28 13:23:32 UTC 2024  
cdac@GaneshPawar:~$
```

## i) Networking:

- a. Display the IP address of the system.

```
Description:  
This command can get or set the h  
also get the DNS domain or the FQ  
Unless you are using bind or NIS  
FQDN (Fully Qualified Domain Name  
part of the FQDN) in the /etc/hos  
cdac@GaneshPawar:~$ hostname -a  
GaneshPawar  
cdac@GaneshPawar:~$ hostname -A  
  
cdac@GaneshPawar:~$ hostname -d  
  
cdac@GaneshPawar:~$ hostname -f  
GaneshPawar.  
cdac@GaneshPawar:~$ hostname -i  
127.0.1.1  
cdac@GaneshPawar:~$ hostname -I  
172.31.145.237  
cdac@GaneshPawar:~$ hostname -s  
GaneshPawar  
cdac@GaneshPawar:~$ hostname -y  
  
cdac@GaneshPawar:~$
```

b. Ping a remote server to check connectivity (provide a remote server address to ping).

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ hostname-i  
hostname-i: command not found  
cdac@GaneshPawar:~$ hostname -i  
127.0.1.1  
cdac@GaneshPawar:~$ ping flipkart.com  
PING flipkart.com (103.243.32.90) 56(84) bytes of data.  
64 bytes from 103.243.32.90: icmp_seq=1 ttl=51 time=97.2 ms  
64 bytes from 103.243.32.90: icmp_seq=2 ttl=51 time=99.3 ms  
64 bytes from 103.243.32.90: icmp_seq=3 ttl=51 time=104 ms  
64 bytes from 103.243.32.90: icmp_seq=4 ttl=51 time=98.2 ms  
^@^@64 bytes from 103.243.32.90: icmp_seq=5 ttl=51 time=104 ms
```

## j) File Compression:

a. Compress the "docs" directory into a zip file.

cdac@GaneshPawar: ~/LinuxAssignment

```
cdac@GaneshPawar:~$ pwd
/home/cdac
cdac@GaneshPawar:~$ cd LinuxAssignment/
cdac@GaneshPawar:~/LinuxAssignment$ zip -r docs.zip docszip
Command 'zip' not found, but can be installed with:
sudo apt install zip
cdac@GaneshPawar:~/LinuxAssignment$ sudo apt install zip
[sudo] password for cdac:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  unzip
The following NEW packages will be installed:
  unzip zip
0 upgraded, 2 newly installed, 0 to remove and 142 not upgraded.
Need to get 350 kB of archives.
After this operation, 933 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 unzip amd64 6.0-28ubuntu4 [175 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/main amd64 zip amd64 3.0-13build1 [175 kB]
Fetched 350 kB in 2s (169 kB/s)
Selecting previously unselected package unzip.
(Reading database ... 40663 files and directories currently installed.)
Preparing to unpack .../unzip_6.0-28ubuntu4_amd64.deb ...
Unpacking unzip (6.0-28ubuntu4) ...
Selecting previously unselected package zip.
Preparing to unpack .../zip_3.0-13build1_amd64.deb ...
Unpacking zip (3.0-13build1) ...
Setting up unzip (6.0-28ubuntu4) ...
Setting up zip (3.0-13build1) ...
Processing triggers for man-db (2.12.0-4build2) ...
cdac@GaneshPawar:~/LinuxAssignment$ zip -r docs.zip docszip
zip warning: name not matched: docszip

zip error: Nothing to do! (try: zip -r docs.zip . -i docszip)
cdac@GaneshPawar:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (deflated 2%)
cdac@GaneshPawar:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt  file2.txt
cdac@GaneshPawar:~/LinuxAssignment$
```



b. Extract the contents of the zip file into a new directory.

```
cdac@GaneshPawar: ~/LinuxAssignment/new_dir/docs
cdac@GaneshPawar:~/LinuxAssignment$ ls
docs docs.zip file1.txt file2.txt
cdac@GaneshPawar:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Aug 28 13:07 docs
-rw-r--r-- 1 cdac cdac 366 Aug 28 14:00 docs.zip
-rw-r--r-- 1 cdac cdac 275 Aug 28 13:11 file1.txt
-rw-r--r-- 1 cdac cdac 0 Aug 28 13:06 file2.txt
cdac@GaneshPawar:~/LinuxAssignment$ unzip docs.zip -d new_dir
Archive: docs.zip
  creating: new_dir/docs/
  inflating: new_dir/docs/file2.txt
cdac@GaneshPawar:~/LinuxAssignment$ ls -l
total 16
drwxr-xr-x 2 cdac cdac 4096 Aug 28 13:07 docs
-rw-r--r-- 1 cdac cdac 366 Aug 28 14:00 docs.zip
-rw-r--r-- 1 cdac cdac 275 Aug 28 13:11 file1.txt
-rw-r--r-- 1 cdac cdac 0 Aug 28 13:06 file2.txt
drwxr-xr-x 3 cdac cdac 4096 Aug 28 14:11 new_dir
cdac@GaneshPawar:~/LinuxAssignment$ cd new_dir
cdac@GaneshPawar:~/LinuxAssignment/new_dir$ ls -l
total 4
drwxr-xr-x 2 cdac cdac 4096 Aug 28 13:07 docs
cdac@GaneshPawar:~/LinuxAssignment/new_dir$ cd docs
cdac@GaneshPawar:~/LinuxAssignment/new_dir/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 51 Aug 28 12:45 file2.txt
cdac@GaneshPawar:~/LinuxAssignment/new_dir/docs$
```

### k) File Editing:

a. Open the "file1.txt" file in a text editor and add some text to it.

```
cdac@GaneshPawar: ~
cdac@GaneshPawar:~/LinuxAssignment/docs$ cd
cdac@GaneshPawar:~$ nano file1.txt
cdac@GaneshPawar:~$ cat file.txt
cat: file.txt: No such file or directory
cdac@GaneshPawar:~$ cat file1.txt
CDAC Preapration aug 24 batch
cdac@GaneshPawar:~$
```

b. Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).

cdac@GaneshPawar: ~

```
cdac@GaneshPawar:~/LinuxAssignment/docs$ cd
cdac@GaneshPawar:~$ nano file1.txt
cdac@GaneshPawar:~$ cat file.txt
cat: file.txt: No such file or directory
cdac@GaneshPawar:~$ cat file1.txt
CDAC Preapration aug 24 batch
cdac@GaneshPawar:~$ rename
Command 'rename' not found, but can be installed with:
sudo apt install rename
cdac@GaneshPawar:~$ sed -i 's/aug/August/g' file1.txt
cdac@GaneshPawar:~$ cat file1.txt
CDAC Preapration August 24 batch
cdac@GaneshPawar:~$ sed i 's/24/2024/g' file1.txt
sed: -e expression #1, char 1: expected \ after `a', `c' or `i'
cdac@GaneshPawar:~$ sed -i 's/24/2024/g' file1.txt
cdac@GaneshPawar:~$ cat file1.txt
CDAC Preapration August 2024 batch
cdac@GaneshPawar:~$ █
```

**Problem 2: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.**

a. Suppose you have a file named "data.txt" containing important information. Display the first 10 lines of this file to quickly glance at its contents using a command.

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ nano data.txt  
cdac@GaneshPawar:~$ cat data.txt  
line 1  
line 2  
line 3  
line 4  
line 5  
line 6  
line 7  
line 8  
line 9  
line 10  
line 11  
line 12  
line 13  
line 14  
line 15  
  
cdac@GaneshPawar:~$ head -10 data.txt  
line 1  
line 2  
line 3  
line 4  
line 5  
line 6  
line 7  
line 8  
line 9  
line 10
```

b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ nano data.txt  
cdac@GaneshPawar:~$ cat data.txt  
line 1  
line 2  
line 3  
line 4  
line 5  
line 6  
line 7  
line 8  
line 9  
line 10  
line 11  
line 12  
line 13  
line 14  
line 15  
cdac@GaneshPawar:~$ tail -5 data.txt  
line 11  
line 12  
line 13  
line 14  
line 15  
cdac@GaneshPawar:~$
```

c. In a file named "numbers.txt," there are a series of numbers. Display the first 15 lines of this file to analyze the initial data set.

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ nano number.txt  
cdac@GaneshPawar:~$ head -15 number.txt  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
cdac@GaneshPawar:~$
```

d. To focus on the last few numbers of the dataset, display the last 3 lines of "numbers.txt".

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ nano number.txt  
cdac@GaneshPawar:~$ head -15 number.txt  
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
cdac@GaneshPawar:~$ tail -3 numbers.txt  
tail: cannot open 'numbers.txt' for reading: No such file or directory  
cdac@GaneshPawar:~$ tail -3 number.txt  
18  
19  
20  
cdac@GaneshPawar:~$
```

e. Imagine you have a file named "input.txt" with text content. Use a command to translate all lowercase letters to uppercase in "input.txt" and save the modified text in a new file named "output.txt."

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ nano input.txt  
cdac@GaneshPawar:~$ cat input.txt  
good evening all of you my name is ganesh dattatraya pawar from ahmendagar.  
cdac@GaneshPawar:~$ tr '[:lower:]' '[:upper:]' <input.txt> output.txt  
cdac@GaneshPawar:~$ cat output.txt  
GOOD EVENING ALL OF YOU MY NAME IS GANESH DATTATRAYA PAWAR FROM AHMENDAGAR.  
cdac@GaneshPawar:~$ cat input.txt  
good evening all of you my name is ganesh dattatraya pawar from ahmendagar.  
cdac@GaneshPawar:~$ tr '[:lower:]' '[:upper:]' <input.txt> input.txt  
cdac@GaneshPawar:~$ cat input.txt  
cdac@GaneshPawar:~$ cat output.txt  
GOOD EVENING ALL OF YOU MY NAME IS GANESH DATTATRAYA PAWAR FROM AHMENDAGAR.  
cdac@GaneshPawar:~$ nano input.txt  
cdac@GaneshPawar:~$ tr '[:upper:]' '[:lower:]' <input.txt> output1.txt  
cdac@GaneshPawar:~$ cat output1.txt  
mumbai kharghar is best centre of cdac  
cdac@GaneshPawar:~$
```

f. In a file named "duplicate.txt," there are several lines of text, some of which are duplicates. Use a command to display only the unique lines from "duplicate.txt."

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ nano duplicate.txt  
cdac@GaneshPawar:~$ cat duplicate.txt  
personality points :  
Attitude  
No Excuses  
No Blamming  
Attitude  
Never Give-up  
No Excuses  
No Procastination  
Growth Mindset  
Growth Mindset  
Never Give-up  
Go beyond your comfort zone  
Learning curiosity  
Team Player  
Attitude  
Do not Egostic  
Team Player  
Confidence of success  
Cheerfulness  
cdac@GaneshPawar:~$ sort duplicate.txt | uniq  
Attitude  
Cheerfulness  
Confidence of success  
Do not Egostic  
Go beyond your comfort zone  
Growth Mindset  
Learning curiosity  
Never Give-up  
No Blamming  
No Excuses  
No Procastination  
Team Player  
personality points :  
cdac@GaneshPawar:~$
```

g. In a file named "fruit.txt," there is a list of fruits, but some fruits are repeated. Use a command to display each unique fruit along with the count of its occurrences in "fruit.txt."

```
cdac@GaneshPawar: ~  
cdac@GaneshPawar:~$ nano fruit.txt  
cdac@GaneshPawar:~$ nano fruit.txt  
cdac@GaneshPawar:~$ cat fruit.txt  
Apple  
Grapes  
Mango  
Banana  
Apple  
Grapes  
Mango  
Fig  
Fig  
Kiwi  
Kiwi  
Kiwi  
Apple  
Apple  
Banana  
Grapes  
Fig  
Mango  
Mango  
cdac@GaneshPawar:~$ sort fruit.txt | -c  
-c: command not found  
cdac@GaneshPawar:~$ sort fruit.txt | uniq -c  
  4 Apple  
  2 Banana  
  3 Fig  
  3 Grapes  
  3 Kiwi  
  4 Mango  
cdac@GaneshPawar:~$
```