

# CDAC MUMBAI

## 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.

```
This message is shown once a day. To disable it please create the
/home/cdac/.hushlogin file.
cdac@chetan:~$ pwd
/home/cdac
cdac@chetan:~$ ls
Day-2  abc.txt  chetan
cdac@chetan:~$ mkdir LinuxAssignment
cdac@chetan:~$ ls
Day-2  LinuxAssignment  abc.txt  chetan
cdac@chetan:~$ cd LinuxAssignment/
cdac@chetan:~/LinuxAssignment$ |
```

b) **File Management:**

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

```
cdac@chetan:~$ cd LinuxAssignment/
cdac@chetan:~/LinuxAssignment$ nano file1.txt
cdac@chetan:~/LinuxAssignment$ cat file1.txt
hello cdacian
cdac@chetan:~/LinuxAssignment$
```

c) **Directory Management:**

- a. Create a new directory named "docs" inside the "LinuxAssignment" directory.  
`mkdir docs`

d) **Copy and Move Files:**

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

```
cp file1.txt docs/file2.txt
```

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.

```
chmod u+rw file2.txt
```

```
chown $(whoami) file2.txt
```

f) **Final Checklist:**

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

```
ls -l ~/LinuxAssignment
```

```
ls -l /
```

g) **File Searching:**

- a. Search for all files with the extension ".txt" in the current directory and its subdirectories.
- b. Display lines containing a specific word in a file (provide a file name and the specific word to search).

```
find . -type f -name "*.txt"  
grep "hello" file2.txt
```

h) **System Information:**

- a. Display the current system date and time.

```
date
```

i) **Networking:**

- a. Display the IP address of the system.
- b. Ping a remote server to check connectivity (provide a remote server address to ping).

```
ip addr show
```

```
hostname -I
```

```
ping example.com
```

j) **File Compression:**

- a. Compress the "docs" directory into a zip file.
- b. Extract the contents of the zip file into a new directory.

```
zip -r docs.zip docs
```

```
mkdir new_directory
```

```
unzip docs.zip -d new_directory
```

k) **File Editing:**

- a. Open the "file1.txt" file in a text editor and add some text to it.
- b. Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).

```
sed -i 's/hello cdacian/hey how are u?/g' file2.txt
```

```
cat file2.txt
```

```

cdac@chetan:~$ pwd
/home/cdac
cdac@chetan:~$ ls
Day-2 abc.txt chetan
cdac@chetan:~$ mkdir LinuxAssignment
cdac@chetan:~$ ls
Day-2 LinuxAssignment abc.txt chetan
cdac@chetan:~$ cd LinuxAssignment/
cdac@chetan:~/LinuxAssignment$ nano file1.txt
cdac@chetan:~/LinuxAssignment$ cat file1.txt
hello cdacian
cdac@chetan:~/LinuxAssignment$ mkdir docs
cdac@chetan:~/LinuxAssignment$ cp file1.txt
cp: missing destination file operand after 'file1.txt'
Try 'cp --help' for more information.
cdac@chetan:~/LinuxAssignment$ ls
docs file1.txt
cdac@chetan:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@chetan:~/LinuxAssignment$ cd docs/
cdac@chetan:~/LinuxAssignment/docs$ ls
file2.txt
cdac@chetan:~/LinuxAssignment/docs$ chmod u+rwx file2.txt
cdac@chetan:~/LinuxAssignment/docs$ chown $(whoami) file2.txt
cdac@chetan:~/LinuxAssignment/docs$ ls -l ~/LinuxAssignment
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 18:12 docs
-rw-r--r-- 1 cdac cdac 14 Aug 28 18:05 file1.txt
cdac@chetan:~/LinuxAssignment/docs$ ls -l /
total 2144
lrwxrwxrwx 1 root root 7 Nov 23 2023 bin -> usr/bin
drwxr-xr-x 2 root root 4096 Apr 18 2022 boot
drwxr-xr-x 16 root root 3560 Aug 28 18:01 dev
drwxr-xr-x 73 root root 4096 Aug 28 18:01 etc
drwxr-xr-x 3 root root 4096 Aug 27 19:43 home
-rwxrwxrwx 1 root root 2127224 Apr 25 23:47 init
lrwxrwxrwx 1 root root 7 Nov 23 2023 lib -> usr/lib
lrwxrwxrwx 1 root root 9 Nov 23 2023 lib32 ->
usr/lib32
lrwxrwxrwx 1 root root 9 Nov 23 2023 lib64 ->
usr/lib64
lrwxrwxrwx 1 root root 10 Nov 23 2023 libx32 -> usr/libx32
drwx----- 2 root root 16384 Aug 27 19:42 lost+found
drwxr-xr-x 2 root root 4096 Nov 23 2023 media
drwxr-xr-x 8 root root 4096 Aug 27 19:42 mnt
drwxr-xr-x 2 root root 4096 Nov 23 2023 opt
dr-xr-xr-x 210 root root 0 Aug 28 18:01 proc
drwx----- 4 root root 4096 Aug 27 19:43 root
drwxr-xr-x 18 root root 540 Aug 28 18:01 run
lrwxrwxrwx 1 root root 8 Nov 23 2023 sbin -> usr/sbin
drwxr-xr-x 8 root root 4096 Nov 23 2023 snap
drwxr-xr-x 2 root root 4096 Nov 23 2023 srv
dr-xr-xr-x 11 root root 0 Aug 28 18:01 sys
drwxrwxrwt 10 root root 4096 Aug 28 18:11 tmp
drwxr-xr-x 14 root root 4096 Nov 23 2023 usr
drwxr-xr-x 13 root root 4096 Nov 23 2023 var
cdac@chetan:~/LinuxAssignment/docs$ find . -type f -name "*.txt"
./file2.txt
cdac@chetan:~/LinuxAssignment/docs$ grep "word_to_search" filename.txt
grep: filename.txt: No such file or directory
cdac@chetan:~/LinuxAssignment/docs$ grep file2.txt
^X
^C
cdac@chetan:~/LinuxAssignment/docs$ whoami
cdac
cdac@chetan:~/LinuxAssignment/docs$ ls
file2.txt
cdac@chetan:~/LinuxAssignment/docs$ find . -type f -name "*.txt"

```

```

cdac@chetan:~/LinuxAssignment/docs$ find . -type f -name "*.txt"
./file2.txt
cdac@chetan:~/LinuxAssignment/docs$ grep "hello" file2.txt
hello cdacian
cdac@chetan:~/LinuxAssignment/docs$ grep -i "hello" file2.txt
hello cdacian
cdac@chetan:~/LinuxAssignment/docs$ date
Wed Aug 28 18:35:34 IST 2024
cdac@chetan:~/LinuxAssignment/docs$ ip addr show
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
    inet 10.255.255.254/32 brd 10.255.255.254 scope global lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:77:ef:93 brd ff:ff:ff:ff:ff:ff
    inet 172.18.194.123/20 brd 172.18.207.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe77:ef93/64 scope link
        valid_lft forever preferred_lft forever
cdac@chetan:~/LinuxAssignment/docs$ hostname -I
172.18.194.123
cdac@chetan:~/LinuxAssignment/docs$ ping example.com
PING example.com (93.184.215.14) 56(84) bytes of data.
64 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=1 ttl=48 time=241 ms
64 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=2 ttl=48 time=306 ms
64 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=3 ttl=48 time=240 ms
64 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=4 ttl=48 time=240 ms
64 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=5 ttl=48 time=240 ms
^C64 bytes from 93.184.215.14: icmp_seq=6 ttl=48 time=239 ms

--- example.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 19344ms
rtt min/avg/max/mdev = 239.477/251.067/306.396/24.746 ms
cdac@chetan:~/LinuxAssignment/docs$ zip -r docs.zip docs
Command 'zip' not found, but can be installed with:
sudo apt install zip
cdac@chetan:~/LinuxAssignment/docs$ 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 128 not upgraded.
Need to get 350 kB of archives.
After this operation, 930 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 unzip amd64 6.0-26ubuntu3.2 [175 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 zip amd64 3.0-12build2 [176 kB]
Fetched 350 kB in 5s (76.6 kB/s)
Selecting previously unselected package unzip.
(Reading database ... 24208 files and directories currently installed.)
Preparing to unpack .../unzip_6.0-26ubuntu3.2_amd64.deb ...
Unpacking unzip (6.0-26ubuntu3.2) ...
Selecting previously unselected package zip.
Preparing to unpack .../zip_3.0-12build2_amd64.deb ...
Unpacking zip (3.0-12build2) ...
Setting up unzip (6.0-26ubuntu3.2) ...
Setting up zip (3.0-12build2) ...
Processing triggers for man-db (2.10.2-1) ...
cdac@chetan:~/LinuxAssignment/docs$ zip -r docs.zip docs
zip warning: name not matched: docs

```

```
zip error: Nothing to do! (try: zip -r docs.zip . -i docs)
cdac@chetan:~/LinuxAssignment/docs$ mkdir new_directory
cdac@chetan:~/LinuxAssignment/docs$ zip -r docs.zip . -i docs
zip warning: zip file empty
cdac@chetan:~/LinuxAssignment/docs$ unzip docs.zip -d new_directory
Archive: docs.zip
warning [docs.zip]: zipfile is empty
cdac@chetan:~/LinuxAssignment/docs$ ls
docs.zip  file2.txt  new_directory
cdac@chetan:~/LinuxAssignment/docs$ sed -i 's/old_word/new_word/g' file2.txt
cdac@chetan:~/LinuxAssignment/docs$ ls
docs.zip  file2.txt  new_directory
cdac@chetan:~/LinuxAssignment/docs$ sed -i 's/hello cdacian/hey how are u?/g' file2.txt
cdac@chetan:~/LinuxAssignment/docs$ cat file2.txt
hey how are u?
cdac@chetan:~/LinuxAssignment/docs$ cd
cdac@chetan:~$ pwd
/home/cdac
cdac@chetan:~$ cd LinuxAssignment/
```

**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.  
**head -n 10 data.txt**
- b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command.  
**tail -n 5 data.txt**
- 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.  
**head -n 15 numbers.txt**
- d. To focus on the last few numbers of the dataset, display the last 3 lines of "numbers.txt".  
**tail -n 3 numbers.txt**
- 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."  
**tr 'a-z' 'A-Z' < input.txt > output.txt**
- 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."  
**uniq duplicate.txt**  
**sort duplicate.txt | uniq**
- 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."  
**sort fruit.txt | uniq -c**  
**awk '{count[\$1]++} END {for (fruit in count) print count[fruit], fruit}'**  
**fruit.txt**

```
cdac@chetan:~$ cd LinuxAssignment/
cdac@chetan:~/LinuxAssignment$ nano data.txt
cdac@chetan:~/LinuxAssignment$ head -n 10 data.txt
hello
goodmorning
good evening
good day
how are u?
nice day
good night
cdacian
good
chetan
cdac@chetan:~/LinuxAssignment$ tail -n 5 data.txt
good
chetan
good daayyy
nice day

cdac@chetan:~/LinuxAssignment$ nano numbers.txt
cdac@chetan:~/LinuxAssignment$ head -n 15 numbers.txt
Sure! Here are 15 words:

1. **Adventure**
2. **Blossom**
3. **Courage**
4. **Dream**
5. **Eclipse**
6. **Fantasy**
7. **Glorious**
8. **Harmony**
9. **Journey**
10. **Kaleidoscope**
11. **Luminous**
12. **Mystery**
13. **Nurture**
cdac@chetan:~/LinuxAssignment$ tail -n numbers.txt
tail: invalid number of lines: 'numbers.txt'
cdac@chetan:~/LinuxAssignment$ tail -n numbers.txt
tail: invalid number of lines: 'numbers.txt'
cdac@chetan:~/LinuxAssignment$ tr 'a-z' 'A-Z' < data.txt > numbers.txt
cdac@chetan:~/LinuxAssignment$ cat numbers.txt
HELLO
GOODMORNING
GOOD EVENING
GOOD DAY
HOW ARE U?
NICE DAY
GOOD NIGHT
CDACIAN
GOOD
CHETAN
GOOD DAAYYY
NICE DAY

cdac@chetan:~/LinuxAssignment$ cat data.txt
hello
goodmorning
good evening
good day
how are u?
nice day
good night
cdacian
good
chetan
good daayyy
nice day
```

```

cdac@chetan:~/LinuxAssignment$ mkdir
mkdir: missing operand
Try 'mkdir --help' for more information.
cdac@chetan:~/LinuxAssignment$ mkdir duplicate.txt
cdac@chetan:~/LinuxAssignment$ uniq duplicate.txt
uniq: error reading 'duplicate.txt'
cdac@chetan:~/LinuxAssignment$ sort duplicate.txt | uniq
sort: read failed: duplicate.txt: Is a directory
cdac@chetan:~/LinuxAssignment$ ls
data.txt  docs  duplicate.txt  file1.txt  numbers.txt
cdac@chetan:~/LinuxAssignment$ du
du          dumpe2fs      duser.dll     dusmsvc.dll
dui70.dll  dumpkeys     duserapi.dll  dusmtask.exe
cdac@chetan:~/LinuxAssignment$ duplicate.txt/
-bash: duplicate.txt/: Is a directory
cdac@chetan:~/LinuxAssignment$ cat duplicate.txt/
cat: duplicate.txt/: Is a directory
cdac@chetan:~/LinuxAssignment$ ls
data.txt  docs  duplicate.txt  file1.txt  numbers.txt
cdac@chetan:~/LinuxAssignment$ nano duplicate.txt/
cdac@chetan:~/LinuxAssignment$ nano d
data.txt  docs/      duplicate.txt/
cdac@chetan:~/LinuxAssignment$ nano duplicate.txt/
cdac@chetan:~/LinuxAssignment$ uniq duplicate
duplicate.txt/  duplicate1.txt
cdac@chetan:~/LinuxAssignment$ uniq duplicate1.txt

1. **Hello**
2. **World**
3. **Love**
4. **Time**
5. **Happy**
6. **Friend**
7. **Good**
8. **Day**
9. **Home**
10. **Family**
11. **Work**
12. **Life**
13. **Help**
14. **Best**
15. **Food**

cdac@chetan:~/LinuxAssignment$ sort duplicate1.txt | uniq

1. **Hello**
10. **Family**
11. **Work**
12. **Life**
13. **Help**
14. **Best**
15. **Food**
2. **World**
3. **Love**
4. **Time**
5. **Happy**
6. **Friend**
7. **Good**
8. **Day**
9. **Home**
cdac@chetan:~/LinuxAssignment$ |

```

#### Submission Guidelines:

- Document each step of your solution and any challenges faced.
- Upload it on your GitHub repository

#### Additional Tips:

- Experiment with different options and parameters of each command to explore their functionalities.