

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.

```
root@DESKTOP-O9GM2B2: ~  
root@DESKTOP-O9GM2B2:~# pwd  
/root  
root@DESKTOP-O9GM2B2:~# ls -l  
total 8  
drwxr-xr-x 2 root root 4096 Aug 28 22:40 Day1  
drwx----- 3 root root 4096 Aug 28 22:20 snap  
root@DESKTOP-O9GM2B2:~# mkdir LinuxAssignment  
root@DESKTOP-O9GM2B2:~# ls  
Day1 LinuxAssignment snap  
root@DESKTOP-O9GM2B2:~#
```

b) File Management:

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

```
root@DESKTOP-O9GM2B2:~# cd LinuxAssignment/  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# touch file1  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# ls  
file1  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# touch file1.txt  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# ls  
file1 file1.txt  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# rm file1  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# ls  
file1.txt  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# nano file1.txt  
root@DESKTOP-O9GM2B2:~/LinuxAssignment# cat file1.txt  
I  
am  
Rupali.  
I am Cdac student.  
root@DESKTOP-O9GM2B2:~/LinuxAssignment#
```

c) **Directory Management:**

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

```
root@DESKTOP-09GM2B2: ~
root@DESKTOP-09GM2B2:~/LinuxAssignment# mkdir docs
root@DESKTOP-09GM2B2:~/LinuxAssignment# ls
docs  file1.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cd ~
root@DESKTOP-09GM2B2:~# ls
Day1  LinuxAssignment  snap
root@DESKTOP-09GM2B2:~#
```

d) **Copy and Move Files:**

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

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment/docs
root@DESKTOP-09GM2B2:~# cd LinuxAssignment/
root@DESKTOP-09GM2B2:~/LinuxAssignment# ls
docs  file1.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cp file1.txt docs
root@DESKTOP-09GM2B2:~/LinuxAssignment# cd docs/
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ls
file1.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# mv file1.txt file2.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ls
file2.txt
root@DESKTOP-09GM2B2:~/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.

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment/docs
root@DESKTOP-09GM2B2:~# cd LinuxAssignment/
root@DESKTOP-09GM2B2:~/LinuxAssignment# ls
docs  file1.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cp file1.txt docs
root@DESKTOP-09GM2B2:~/LinuxAssignment# cd docs/
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ls
file1.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# mv file1.txt file2.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ls
file2.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ls -l
total 4
-rw-r--r-- 1 root root 32 Aug 28 23:12 file2.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# chmod u+x file2.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ls -l
total 4
-rwxr--r-- 1 root root 32 Aug 28 23:12 file2.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# chown --help
```

f) **Final Checklist:**

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

```
root@DESKTOP-09GM2B2: ~
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# cd ..
root@DESKTOP-09GM2B2:~/LinuxAssignment# ls -l
total 8
drwxr-xr-x 2 root root 4096 Aug 28 23:13 docs
-rw-r--r-- 1 root root 37 Aug 29 21:37 file1.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cd ~
root@DESKTOP-09GM2B2:~# ls -l
total 12
drwxr-xr-x 3 root root 4096 Aug 28 22:57 Day1
drwxr-xr-x 3 root root 4096 Aug 29 22:00 LinuxAssignment
drwx----- 3 root root 4096 Aug 28 22:20 snap
root@DESKTOP-09GM2B2:~#
```

g) File Searching:

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

```
root@DESKTOP-09GM2B2: ~
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# cd ..
root@DESKTOP-09GM2B2:~/LinuxAssignment# ls -l
total 8
drwxr-xr-x 2 root root 4096 Aug 28 23:13 docs
-rw-r--r-- 1 root root 37 Aug 29 21:37 file1.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cd ~
root@DESKTOP-09GM2B2:~# ls -l
total 12
drwxr-xr-x 3 root root 4096 Aug 28 22:57 Day1
drwxr-xr-x 3 root root 4096 Aug 29 22:00 LinuxAssignment
drwx----- 3 root root 4096 Aug 28 22:20 snap
root@DESKTOP-09GM2B2:~# find ~/LinuxAssignment/ -type f -name "*.txt"
/root/LinuxAssignment/docs/file2.txt
/root/LinuxAssignment/file1.txt
root@DESKTOP-09GM2B2:~#
```

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

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment/docs
root@DESKTOP-09GM2B2:~# cd LinuxAssignment/
root@DESKTOP-09GM2B2:~/LinuxAssignment# cd docs/
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# grep 'Cdac' file2.txt
I am Cdac student.
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs#
```

h) System Information:

- a. Display the current system date and time.

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment/docs
root@DESKTOP-09GM2B2:~# cd LinuxAssignment/
root@DESKTOP-09GM2B2:~/LinuxAssignment# cd docs/
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# grep 'Cdac' file2.txt
I am Cdac student.
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# date
Thu Aug 29 22:08:32 IST 2024
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# date -u
Thu Aug 29 16:38:41 UTC 2024
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs#
```

i) Networking:

- a. Display the IP address of the system.

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment/docs
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.17.72.146 netmask 255.255.240.0 broadcast 172.17.79.255
    inet6 fe80::215:5dff:fea5:5fb7 prefixlen 64 scopeid 0x20<link>
    ether 00:15:5d:a5:5f:b7 txqueuelen 1000 (Ethernet)
    RX packets 109702 bytes 227725063 (227.7 MB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 55571 bytes 4528249 (4.5 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 10 bytes 1040 (1.0 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 10 bytes 1040 (1.0 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@DESKTOP-09GM2B2:~/LinuxAssignment/docs#
```

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

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment/docs
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# ping google.com
PING google.com (142.250.192.174) 56(84) bytes of data:
64 bytes from del11s11-in-f14.1e100.net (142.250.192.174): icmp_seq=1 ttl=109 time=90.3 ms
64 bytes from del11s11-in-f14.1e100.net (142.250.192.174): icmp_seq=2 ttl=109 time=102 ms
64 bytes from del11s11-in-f14.1e100.net (142.250.192.174): icmp_seq=3 ttl=109 time=46.0 ms
64 bytes from del11s11-in-f14.1e100.net (142.250.192.174): icmp_seq=4 ttl=109 time=45.1 ms
64 bytes from del11s11-in-f14.1e100.net (142.250.192.174): icmp_seq=5 ttl=109 time=44.7 ms
64 bytes from del11s11-in-f14.1e100.net (142.250.192.174): icmp_seq=6 ttl=109 time=45.4 ms
64 bytes from del11s11-in-f14.1e100.net (142.250.192.174): icmp_seq=7 ttl=109 time=45.5 ms
^C
--- google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6011ms
rtt min/avg/max/mdev = 44.718/59.865/102.099/23.184 ms
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs#
```

j) **File Compression:**

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

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment
root@DESKTOP-09GM2B2:~/LinuxAssignment/docs# cd ..
root@DESKTOP-09GM2B2:~/LinuxAssignment# zip -r zipdoc docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
root@DESKTOP-09GM2B2:~/LinuxAssignment# ls -l
total 12
drwxr-xr-x 2 root root 4096 Aug 28 23:13 docs
-rw-r--r-- 1 root root   37 Aug 29 21:37 file1.txt
-rw-r--r-- 1 root root  348 Aug 29 22:15 zipdoc.zip
root@DESKTOP-09GM2B2:~/LinuxAssignment#
```

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

```
root@DESKTOP-O9GM2B2: ~/LinuxAssignment/docs2
root@DESKTOP-O9GM2B2:~/LinuxAssignment/docs# cd ..
root@DESKTOP-O9GM2B2:~/LinuxAssignment# zip -r zipdoc docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
root@DESKTOP-O9GM2B2:~/LinuxAssignment# ls -l
total 12
drwxr-xr-x 2 root root 4096 Aug 28 23:13 docs
-rw-r--r-- 1 root root  37 Aug 29 21:37 file1.txt
-rw-r--r-- 1 root root 348 Aug 29 22:15 zipdoc.zip
root@DESKTOP-O9GM2B2:~/LinuxAssignment# mkdir docs2
root@DESKTOP-O9GM2B2:~/LinuxAssignment# unzip zipdoc.zip -d docs2
Archive:  zipdoc.zip
  creating: docs2/docs/
  extracting: docs2/docs/file2.txt
root@DESKTOP-O9GM2B2:~/LinuxAssignment# ls -l
total 16
drwxr-xr-x 2 root root 4096 Aug 28 23:13 docs
drwxr-xr-x 3 root root 4096 Aug 29 22:17 docs2
-rw-r--r-- 1 root root  37 Aug 29 21:37 file1.txt
-rw-r--r-- 1 root root 348 Aug 29 22:15 zipdoc.zip
root@DESKTOP-O9GM2B2:~/LinuxAssignment# cd docs2
root@DESKTOP-O9GM2B2:~/LinuxAssignment/docs2# ls-l
ls-l: command not found
root@DESKTOP-O9GM2B2:~/LinuxAssignment/docs2# ls -l
total 4
drwxr-xr-x 2 root root 4096 Aug 28 23:13 docs
root@DESKTOP-O9GM2B2:~/LinuxAssignment/docs2#
```

k) **File Editing:**

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

```
root@DESKTOP-O9GM2B2: ~/LinuxAssignment
root@DESKTOP-O9GM2B2:~/LinuxAssignment/docs2# cd ..
root@DESKTOP-O9GM2B2:~/LinuxAssignment# nano file1.txt
root@DESKTOP-O9GM2B2:~/LinuxAssignment# cat file1.txt
Hii
Good Morning
I am Rupali Kumari.
root@DESKTOP-O9GM2B2:~/LinuxAssignment#
```

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

```
root@DESKTOP-O9GM2B2: ~/LinuxAssignment
root@DESKTOP-O9GM2B2:~/LinuxAssignment# cat file1.txt
Hii
Good Morning
I am Rupali Kumari.
root@DESKTOP-O9GM2B2:~/LinuxAssignment# sed -i 's/Morning/Evening/g' file1.txt
root@DESKTOP-O9GM2B2:~/LinuxAssignment# cat file1.txt
Hii
Good Evening
I am Rupali Kumari.
root@DESKTOP-O9GM2B2:~/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.

```
root@DESKTOP-O9GM2B2: ~/LinuxAssignment
root@DESKTOP-O9GM2B2:~/LinuxAssignment# nano data.txt
root@DESKTOP-O9GM2B2:~/LinuxAssignment# head -10 d
data.txt docs/ docs2/
root@DESKTOP-O9GM2B2:~/LinuxAssignment# head -10 data.txt
Cdac
Mumbai
Duhu
Kharghar
Noida
Pune
Hyderabad
Delhi
Patna
Chennai
root@DESKTOP-O9GM2B2:~/LinuxAssignment#
```

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

```
root@DESKTOP-O9GM2B2:~/LinuxAssignment# tail -5 data.txt
Patna
Chennai
tamil nadu
Kolkata
Uttar Pradesh
root@DESKTOP-O9GM2B2:~/LinuxAssignment#
```

- 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.

```
root@DESKTOP-O9GM2B2: ~/LinuxAssignment
root@DESKTOP-O9GM2B2:~/LinuxAssignment# nano numbers.txt
root@DESKTOP-O9GM2B2:~/LinuxAssignment# head -15 numbers.txt
11
12
13
14
15
16
16
18
19
20
21
22
23
24
25
root@DESKTOP-O9GM2B2:~/LinuxAssignment#
```

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

```
root@DESKTOP-O9GM2B2: ~/LinuxAssignment
root@DESKTOP-O9GM2B2:~/LinuxAssignment# tail -3 numbers.txt
24
25
26
root@DESKTOP-O9GM2B2:~/LinuxAssignment#
```

- 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."

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment
root@DESKTOP-09GM2B2:~/LinuxAssignment# tr '[:lower:]' '[:upper:]' < input.txt > output.txt
tr: missing operand after '[:lower:]'[:upper:]'
Two strings must be given when translating.
Try 'tr --help' for more information.
root@DESKTOP-09GM2B2:~/LinuxAssignment# tr '[:lower:]' '[:upper:]' < input.txt > output.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cat input.txt
patna
delhi
pune
mumbai
noida
root@DESKTOP-09GM2B2:~/LinuxAssignment# cat output.txt
PATNA
DELHI
PUNE
MUMBAI
NOIDA
root@DESKTOP-09GM2B2:~/LinuxAssignment#
```

- 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."

```
root@DESKTOP-09GM2B2: ~/LinuxAssignment
root@DESKTOP-09GM2B2:~/LinuxAssignment# nano duplicate.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cat d
data.txt      docs/      docs2/      duplicate.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cat d
data.txt      docs/      docs2/      duplicate.txt
root@DESKTOP-09GM2B2:~/LinuxAssignment# cat duplicate.txt
patna
pune
pune
delhi
juhu
kharghr
juhu
delhi
chennai
root@DESKTOP-09GM2B2:~/LinuxAssignment# cat duplicate.txt | sort | uniq
chennai
delhi
juhu
kharghr
patna
pune
root@DESKTOP-09GM2B2:~/LinuxAssignment#
```

- 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."

```
root@DESKTOP-09GM2B2:~/LinuxAssignment# sort -r fruit.txt
mango
mango
mango
kiwi
guava
grapes
grapes
banana
banana
apple
apple
root@DESKTOP-09GM2B2:~/LinuxAssignment# sort fruit.txt | uniq -c
  2 apple
  2 banana
  2 grapes
  1 guava
  1 kiwi
  2 mango
  1 mango
root@DESKTOP-09GM2B2:~/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.