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.
      - **Command:**
        cdac@LAPTOP-TJIPEEAU:~$ pwd
        /home/cdac
        cdac@LAPTOP-TJIPEEAU:~$ mkdir LinuxAssignment
        cdac@LAPTOP-TJIPEEAU:~$ cd LinuxAssignment
        cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$

b) **File Management:**
   a. Inside the "LinuxAssignment" directory, create a new file named "file1.txt". Display its contents.
      - **Command:**
        cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ touch file1.txt
        cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ ls -l
        total 0
        -rw-rw-r-- 1 cdac cdac 0 Aug 28 18:15 file1.txt

c) **Directory Management:**
   a. Create a new directory named "docs" inside the "LinuxAssignment" directory.
      - **Command:**
        cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ mkdir doc

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ ls -l
total 4
drwxrwxr-x 2 cdac cdac 4096 Aug 28 18:30 docs
-rw-rw-r-- 1 cdac cdac    0 Aug 28 18:15 file.txt
-rw-rw-r-- 1 cdac cdac    0 Aug 28 18:22 file1.txt
```

d) Copy and Move Files:

    a. Copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt".
    Command:
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ cp file1.txt docs
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ ls
    docs file1.txt
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ cd docs
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ ls
    file1.txt
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ mv file1.txt file2.txt
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ ls -l
    total 0
    -rw-rw-r-- 1 cdac cdac 0 Aug 28 20:07 file2.txt
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ ls
    file2.txt
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ cp file1.txt docs
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ ls
docs  file.txt  file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ cd docs
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ ls
file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ mv file1.txt file2.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ ls -l
total 0
-rw-rw-r-- 1 cdac cdac 0 Aug 28 20:07 file2.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ ls
file2.txt
cdac@LAPTOP-TJIPEEAU:~/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.
    Command:
    cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ chmod u+rwx file2.txt

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ chmod u+rwx file2.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/docs$ ls -l
total 0
-rwxrw-r-- 1 cdac cdac 0 Aug 28 20:07 file2.txt
cdac@LAPTOP-TJIPEEAU:~/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.
    Command: ls -l ,
    or
    Command: ls -l ~/LinuxAssignmen

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ ls -l
total 4
drwxrwxr-x 2 cdac cdac 4096 Aug 28 20:08 docs
-rw-rw-r-- 1 cdac cdac    0 Aug 28 18:15 file.txt
-rw-rw-r-- 1 cdac cdac    0 Aug 28 18:22 file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ la -l ~/LinuxAssignment
total 4
drwxrwxr-x 2 cdac cdac 4096 Aug 28 20:08 docs
-rw-rw-r-- 1 cdac cdac    0 Aug 28 18:15 file.txt
-rw-rw-r-- 1 cdac cdac    0 Aug 28 18:22 file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

the root directory:
commands: ls -l /

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ 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 19:22 dev
drwxr-xr-x  73 root root    4096 Aug 28 19:24 etc
drwxr-xr-x   3 root root    4096 Aug 27 18:22 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 Apr 10  2019 lost+found
drwxr-xr-x   2 root root    4096 Nov 23  2023 media
drwxr-xr-x   5 root root    4096 Aug 27 17:53 mnt
drwxr-xr-x   2 root root    4096 Nov 23  2023 opt
dr-xr-xr-x 214 root root       0 Aug 28 19:22 proc
drwx------   4 root root    4096 Aug 27 21:53 root
drwxr-xr-x  18 root root     540 Aug 28 19:22 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 18:58 sys
drwxrwxrwt  10 root root    4096 Aug 28 19:32 tmp
drwxr-xr-x  14 root root    4096 Nov 23  2023 usr
drwxr-xr-x  13 root root    4096 Nov 23  2023 var
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

g) File Searching:

a. Search for all files with the extension ".txt" in the current directory and its subdirectories.
   Command: -type f -name "*.txt"

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ find . -type f -name "*.txt"
./file.txt
./docs/file2.txt
./file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

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

   Command: grep "Rahul" file1.txt

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ LinuxAssignment$ grep "Rahul" file1.txt
LinuxAssignment$: command not found
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$  grep "Rahul" file1.txt
Hello I am Rahul.
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

h) System Information:
    a. Display the current system date and time.
      Command: date

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ date
Wed Aug 28 21:07:23 IST 2024
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

i) Networking:
    a. Display the IP address of the system.

      Command: ip a

```
cdac@LAPTOP-TJIPEEAU:~$ ip a
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:76:19:93 brd ff:ff:ff:ff:ff:ff
    inet 172.22.163.41/20 brd 172.22.175.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe76:1993/64 scope link
       valid_lft forever preferred_lft forever
cdac@LAPTOP-TJIPEEAU:~$
```

    b. Ping a remote server to check connectivity (provide a remote server address to ping).
      Command: ping google.com

```
       valid_lft forever preferred_lft forever
cdac@LAPTOP-TJIPEEAU:~$ ping google.com
PING google.com (142.250.71.110) 56(84) bytes of data.
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=1 ttl=60 time=5.44 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=2 ttl=60 time=3.54 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=3 ttl=60 time=4.03 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=4 ttl=60 time=4.19 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=5 ttl=60 time=4.79 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=6 ttl=60 time=3.13 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=7 ttl=60 time=4.81 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=8 ttl=60 time=4.13 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=9 ttl=60 time=3.67 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=10 ttl=60 time=4.67 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=11 ttl=60 time=4.69 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=12 ttl=60 time=3.38 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=13 ttl=60 time=3.47 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=14 ttl=60 time=4.16 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=15 ttl=60 time=3.89 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=16 ttl=60 time=3.91 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=17 ttl=60 time=3.68 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=18 ttl=60 time=3.54 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=19 ttl=60 time=3.72 ms
^C
--- google.com ping statistics ---
19 packets transmitted, 19 received, 0% packet loss, time 18031ms
rtt min/avg/max/mdev = 3.128/4.043/5.439/0.583 ms
cdac@LAPTOP-TJIPEEAU:~$
```

j) File Compression:

a. Compress the "docs" directory into a zip file.
   Command: zip -r Docs2.zip Docs2

b. Extract the contents of the zip file into a new directory.
   Command: unzip Docs2.zip
   Command : unzip Docs2.zip -d /home/cdac/rahul

```
bash: cd: docs2: No such file or directory
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ cd Docs2
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/Docs2$ touch tile3.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/Docs2$ ls
tile3.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/Docs2$ mv Docs2.zip Docs2
mv: cannot stat 'Docs2.zip': No such file or directory
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/Docs2$ cd
cdac@LAPTOP-TJIPEEAU:~$ mv Docs2.zip Docs2
mv: cannot stat 'Docs2.zip': No such file or directory
cdac@LAPTOP-TJIPEEAU:~$ cd LinuxAssignment
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ mv Docs2.zip Docs2
mv: cannot stat 'Docs2.zip': No such file or directory
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$  zip -r Docs2.zip Docs2
  adding: Docs2/ (stored 0%)
  adding: Docs2/tile3.txt (stored 0%)
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ ls
Docs2      data.txt  docs.tar.gz    file.txt   fruits.txt  newdirectory  output.txt       vdocs.zip
Docs2.zip  docs      dublicates.txt file1.txt  input.txt   numbers.txt   unique_lines.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ unzip Docs2.zip
Archive:  Docs2.zip
replace Docs2/tile3.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: y
 extracting: Docs2/tile3.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ ls
Docs2      data.txt  docs.tar.gz    file.txt   fruits.txt  newdirectory  output.txt       vdocs.zip
Docs2.zip  docs      dublicates.txt file1.txt  input.txt   numbers.txt   unique_lines.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ cd Docs2
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/Docs2$ ls
tile3.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment/Docs2$ |
```

k) File Editing:

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

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

   Command:
   sed -i 's/Rahul/Sumit/g' file1.txt

```
cdac@LAPTOP-TJIPEEAU:~$ cd LinuxAssignment
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ sed -i 's/Rahul/Sumit/g' file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ |
```

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

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

Command: nano data.txt

$ head -10 data.txt

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano data.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ head -10 data.txt
India playing 11
Rohit Sharma
Virat Kohli
Rishab Pant
Suryakumar Yadav
Hardik Pandya
Shivam Dube
Ravindra Jadeja
Axar Patel
Kuldeep Yadav
cdac@LAPTOP-TJIPEEAU:~/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.
Command: tail -5 data.txt

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ tail -5 data.txt
Shivam Dube
Ravindra Jadeja
Axar Patel
Kuldeep Yadav
Jaspreet Bumrah
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

c. In a file named "numbers.txt," there are a series of numbers. Display the first 15 lines ofthis file to analyze the initial data set.
Commands : nano numbers.txt
Head -15 numbers.txt

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ head -15 numbers.txt
264
212
209
208
171
162
152
140
131
111
117
156
126
108
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

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

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ tail -3 numbers.txt
156
126
108
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

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

Command:
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano input.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ touch output.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano output.txt

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano input.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ touch output.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ tr 'a-z''A-Z'<input.text>output.txt
bash: input.text: No such file or directory
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ tr 'a-z''A-Z'<input.txt>output.txt
tr: missing operand after 'a-zA-Z'
Two strings must be given when translating.
Try 'tr --help' for more information.
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ tr 'a-zA-Z'<input.txt>output.txt
tr: missing operand after 'a-zA-Z'
Two strings must be given when translating.
Try 'tr --help' for more information.
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.
txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano output.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano output.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```

```
  GNU nano 6.2
ABSDFFSDFDSDSFGFGFSS
```

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."
Commands:
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano dublicates.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ sort dublicates.txt | uniq

```
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano dublicates.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ sort dublictes.txt | uniq
sort: cannot read: dublictes.txt: No such file or directory
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ sort dublicates.txt | uniq
Rahul Rahul
Rhit Sharma Rahit Sharma
Rishabh Pant Rishabh pant
Siddh Siddh
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano dublicates.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ sort dublicates.txt | uniq
Rahul
Rahul
Rhit Sharma
Rishabh Pant
Rohit Sharma
Siddh
Siddh
```

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

Commands:
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano fruits.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano fruits.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ sort fruits.txt | uniq -c

```
      1 pear
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano fruits.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ nano fruits.txt
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$ sort fruits.txt | uniq -c
      2 apple
      3 banana
      2 grape
      2 mango
      1 mango
      2 orange
      1 pear
cdac@LAPTOP-TJIPEEAU:~/LinuxAssignment$
```