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.

```
cdac@DESKTOP-E4S120V:~$ pwd
/home/cdac
cdac@DESKTOP-E4S120V:~$ cd /
cdac@DESKTOP-E4S120V:/$ pwd
/
cdac@DESKTOP-E4S120V:/$ cd ..
cdac@DESKTOP-E4S120V:/$ pwd
/
cdac@DESKTOP-E4S120V:/$ cd /
cdac@DESKTOP-E4S120V:/$ ls
bin   dev  home  lib    lib64   lost+found  mnt  proc  run   snap  sys  usr
boot  etc  init  lib32  libx32  media       opt  root  sbin  srv   tmp  var
cdac@DESKTOP-E4S120V:/$ cd /LinuxAssignment
-bash: cd: /LinuxAssignment: No such file or directory
cdac@DESKTOP-E4S120V:/$ mkdir Linuxassignment
mkdir: cannot create directory ‘Linuxassignment’: Permission denied
cdac@DESKTOP-E4S120V:/$ sudo su
[sudo] password for cdac:
root@DESKTOP-E4S120V:/# mkdir LinuxAssignment
root@DESKTOP-E4S120V:/# cd /
root@DESKTOP-E4S120V:/# ls
LinuxAssignment  boot  etc   init  lib32  libx32      media  opt   root  sbin  srv  tmp  var
bin              dev   home  lib   lib64  lost+found  mnt    proc  run   snap  sys  usr
root@DESKTOP-E4S120V:/#
```

b) **File Management:**
   a. Inside the "LinuxAssignment" directory, create a new file named "file1.txt". Display its contents.

```
root@DESKTOP-E4S120V:/# cd /LinuxAssignment
root@DESKTOP-E4S120V:/LinuxAssignment# nano file1.txt
root@DESKTOP-E4S120V:/LinuxAssignment#
```

```
root@DESKTOP-E4S120V:/LinuxAssignment# ls
docs  file1.txt
root@DESKTOP-E4S120V:/LinuxAssignment#
```

c) **Directory Management:**
   a. Create a new directory named "docs" inside the "LinuxAssignment" directory.

```
root@DESKTOP-E4S120V:/LinuxAssignment# mkdir docs
root@DESKTOP-E4S120V:/LinuxAssignment# ls
docs
root@DESKTOP-E4S120V:/LinuxAssignment#
```

d) **Copy and Move Files:**
   a. Copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt".

```
root@DESKTOP-E4S120V:/LinuxAssignment# cp file1.txt docs
root@DESKTOP-E4S120V:/LinuxAssignment# ls
docs  file1.txt
root@DESKTOP-E4S120V:/LinuxAssignment# cd /docs
bash: cd: /docs: No such file or directory
root@DESKTOP-E4S120V:/LinuxAssignment# ls
docs  file1.txt
root@DESKTOP-E4S120V:/LinuxAssignment# cd docs
root@DESKTOP-E4S120V:/LinuxAssignment/docs# ls
file1.txt
root@DESKTOP-E4S120V:/LinuxAssignment/docs# mv file1.txt file2.txt
root@DESKTOP-E4S120V:/LinuxAssignment/docs# ls
file2.txt
root@DESKTOP-E4S120V:/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@DESKTOP-E4S120V:/LinuxAssignment/docs$ ls -l
total 0
-rwxrwxrwx 1 root root 0 Aug 30 12:29 file2.txt
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ sudo chmod g-rwx file2.txt
[sudo] password for cdac:
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ ls -l
total 0
-rwx---rwx 1 root root 0 Aug 30 12:29 file2.txt
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ chmod o-wx file2.txt
chmod: changing permissions of 'file2.txt': Operation not permitted
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ sudo o-wx file2.txt
sudo: o-wx: command not found
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ sudo chmod o-wx file2.txt
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ ls -l
total 0
-rwx---r-- 1 root root 0 Aug 30 12:29 file2.txt
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ chown cdac file2.txt
chown: changing ownership of 'file2.txt': Operation not permitted
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ sudo chown cdac file2.txt
cdac@DESKTOP-E4S120V:/LinuxAssignment/docs$ ls -l
total 0
-rwx---r-- 1 cdac root 0 Aug 30 12:29 file2.txt
cdac@DESKTOP-E4S120V:/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.

```
user1@DESKTOP-E4S120V:/LinuxAssignment/docs$ cd ..
user1@DESKTOP-E4S120V:/LinuxAssignment$ ls
docs  file1.txt
user1@DESKTOP-E4S120V:/LinuxAssignment$
```

```
user1@DESKTOP-E4S120V:/$ ls
LinuxAssignment  boot  etc   init  lib32  libx32      media  opt   root  sbin  srv  tmp  var
bin              dev   home  lib   lib64  lost+found  mnt    proc  run   snap  sys  usr
user1@DESKTOP-E4S120V:/$
```

g) **File Searching:**

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

```
cdac@DESKTOP-E4S120V:~$ find /home/cdac/file -name "*.txt"
/home/cdac/file/data.txt
/home/cdac/file/file.txt
```

b. Display lines containing a specific word in a file (provide a file name and the specific word to search).4

```
cdac@DESKTOP-E4S120V:~$ grep -r "pattern" file.txt
Birds are pattern
Sun shines pattern
Wind pattern quietly
Flowers pattern beautifully
pattern drift down
Leaves rustle pattern
Fire pattern warmly
cdac@DESKTOP-E4S120V:~$
```

h) **System Information:**

a. Display the current system date and time.

```
cdac@DESKTOP-E4S120V:~$ pwd
/home/cdac
cdac@DESKTOP-E4S120V:~$ date
Sat Aug 31 02:40:46 IST 2024
cdac@DESKTOP-E4S120V:~$
```

i) **Networking:**

a. Display the IP address of the system.

```
cdac@DESKTOP-E4S120V:~$ ip addr
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:a1:63:2c brd ff:ff:ff:ff:ff:ff
    inet 172.28.151.75/20 brd 172.28.159.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fea1:632c/64 scope link
       valid_lft forever preferred_lft forever
```

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

```
cdac@DESKTOP-E4S120V:~$ ping google.com
PING google.com (142.250.183.206) 56(84) bytes of data.
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=1 ttl=58 time=70.2 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=2 ttl=58 time=53.2 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=3 ttl=58 time=50.9 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=4 ttl=58 time=64.0 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=5 ttl=58 time=47.7 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=6 ttl=58 time=71.4 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=7 ttl=58 time=70.6 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=8 ttl=58 time=68.2 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=9 ttl=58 time=42.5 ms
64 bytes from bom07s33-in-f14.1e100.net (142.250.183.206): icmp_seq=10 ttl=58 time=65.9 ms
^C
--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9014ms
rtt min/avg/max/mdev = 42.518/60.454/71.350/10.232 ms
cdac@DESKTOP-E4S120V:~$
```

j) **File Compression:**

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

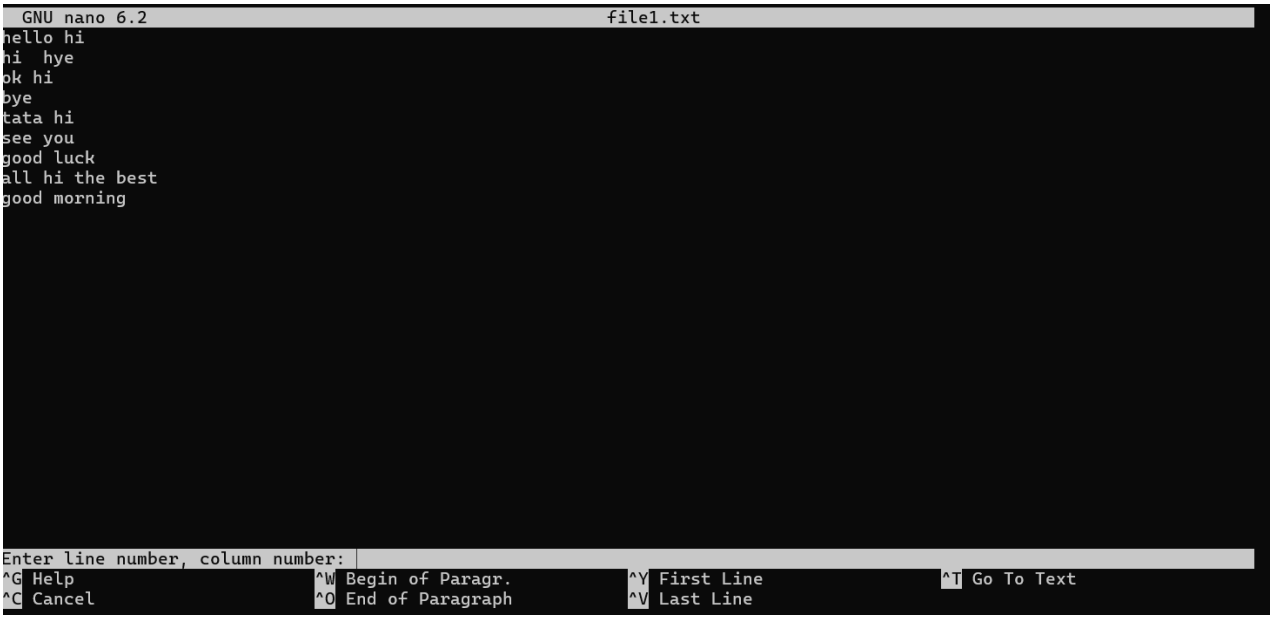
```
dac@DESKTOP-E4S120V:/LinuxAssignment$ sudo zip -r myzip.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
dac@DESKTOP-E4S120V:/LinuxAssignment$ ls -l
otal 8
rwxr-xr-x 2 root root 4096 Aug 30 12:30 docs
rw-r--r-- 1 root root    0 Aug 30 12:07 file1.txt
rw-r--r-- 1 root root  316 Aug 31 03:18 myzip.zip
dac@DESKTOP-E4S120V:/LinuxAssignment$
```

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

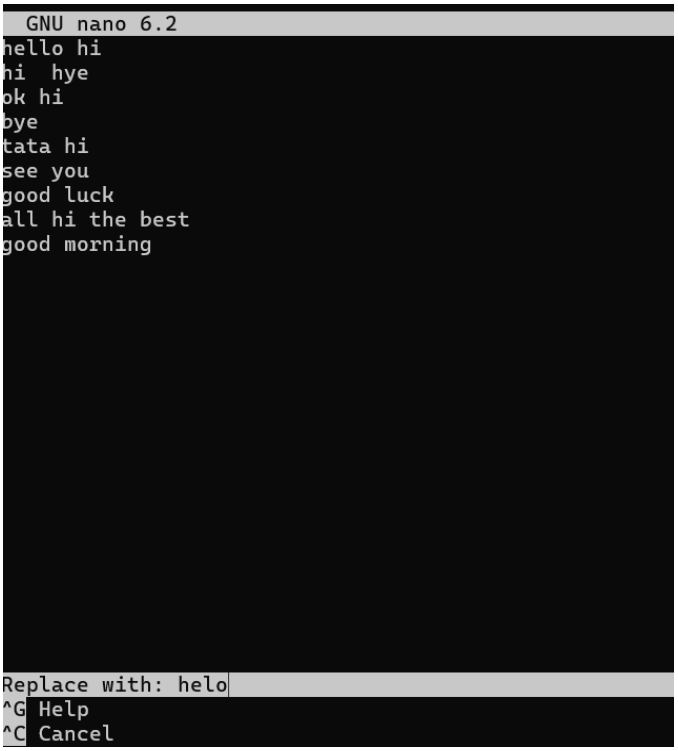
```
unable to process docs/file2.txt.
dac@DESKTOP-E4S120V:/LinuxAssignment$ ls
docs  file1.txt  myzip.zip  new
dac@DESKTOP-E4S120V:/LinuxAssignment$ sudo unzip myzip.zip -d new
Archive:  myzip.zip
   creating: new/docs/
  extracting: new/docs/file2.txt
dac@DESKTOP-E4S120V:/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 root root 4096 Aug 30 12:30 docs
-rw-r--r-- 1 root root    0 Aug 30 12:07 file1.txt
-rw-r--r-- 1 root root  316 Aug 31 03:18 myzip.zip
drwxr-xr-x 3 root root 4096 Aug 31 03:26 new
dac@DESKTOP-E4S120V:/LinuxAssignment$ cd new/
dac@DESKTOP-E4S120V:/LinuxAssignment/new$ ls
docs
dac@DESKTOP-E4S120V:/LinuxAssignment/new$ ls -l
total 4
drwxr-xr-x 2 root root 4096 Aug 30 12:30 docs
dac@DESKTOP-E4S120V:/LinuxAssignment/new$
```

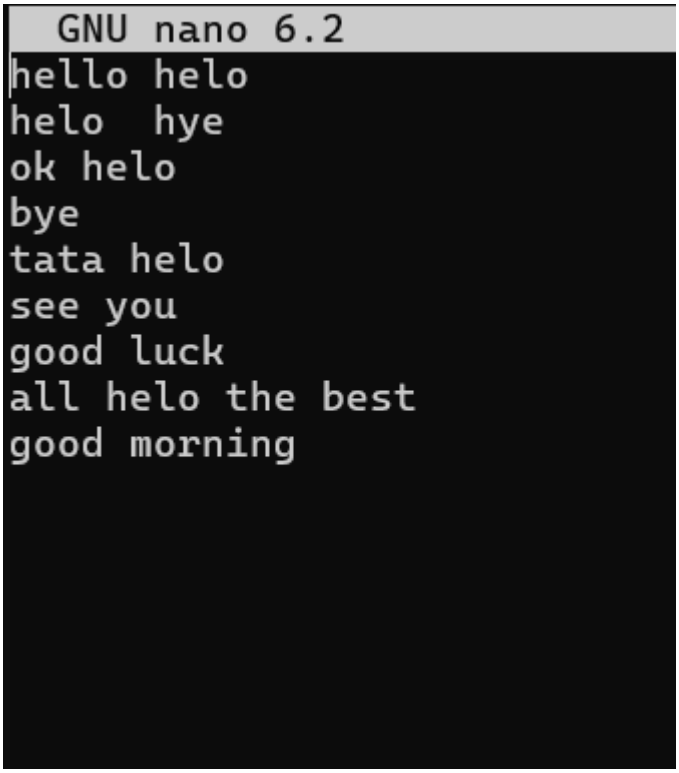
k) **File Editing:**

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).


GNU nano 6.2
hello hi
hi hye
ok hi
bye
tata hi
see you
good luck
all hi the best
good morning
Replace with: helo
^G Help
^C Cancel


GNU nano 6.2
hello helo
helo hye
ok helo
bye
tata helo
see you
good luck
all helo the best
good morning

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@DESKTOP-E4S120V:~$ nano data.txt
cdac@DESKTOP-E4S120V:~$ head data.txt
Sky is blue
Birds are singing
Trees stand tall
Rivers flow gently
Mountains rise high
Sun shines bright
Stars twinkle softly
Moon glows peacefully
Wind whispers quietly
Waves crash loudly
cdac@DESKTOP-E4S120V:~$
```

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@DESKTOP-E4S120V:~$ tail -5 data.txt
Fire burns warmly
Shadows stretch long
Grass grows green
Paths wind ahead
Time moves on
cdac@DESKTOP-E4S120V:~$
```

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@DESKTOP-E4S120V:~$ head -n15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
```

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

```
cdac@DESKTOP-E4S120V:~$ tail -3 numbers.txt
23
24
25
cdac@DESKTOP-E4S120V:~$
```

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@DESKTOP-E4S120V:~$ pwd
/home/cdac
cdac@DESKTOP-E4S120V:~$ nano input.txt
cdac@DESKTOP-E4S120V:~$ tr a-z A-Z < output.txt


CAT
PWD
CD

cdac@DESKTOP-E4S120V:~$ tr a-z A-Z < input.txt > output.txt
cdac@DESKTOP-E4S120V:~$ cat output.txt
FLOWERS BLOOM BEAUTIFULLY
RAIN FALLS GENTLY
LEAVES RUSTLE SOFTLY
CLOUDS FLOAT ABOVE
FIRE BURNS WARMLY
SHADOWS STRETCH LONG
GRASS GROWS GREEN
PATHS WIND AHEAD
TIME MOVES ON
cdac@DESKTOP-E4S120V:~$
```

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@DESKTOP-E4S120V:~$ nano duplicate1.txt
cdac@DESKTOP-E4S120V:~$ cat duplicate1.txt
Apple
Banana
Orange
Strawberry
Grapes
Apple
Banana
Orange
Strawberry
Grapes
cdac@DESKTOP-E4S120V:~$ sort duplicate1.txt | uniq
Apple
Banana
Grapes
Orange
Strawberry
cdac@DESKTOP-E4S120V:~$
```

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@DESKTOP-E4S120V:~$ sort duplicate1.txt | uniq -c
      2 Apple
      2 Banana
      2 Grapes
      2 Orange
      2 Strawberry
cdac@DESKTOP-E4S120V:~$
```

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.