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-CNIG80F:~$ ls
demo
cdac@DESKTOP-CNIG80F:~$ mkdir LinuxAssignment
cdac@DESKTOP-CNIG80F:~$ ls
LinuxAssignment  demo
cdac@DESKTOP-CNIG80F:~$
```

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

```
cdac@DESKTOP-CNIG80F:~$ pwd
/home/cdac
cdac@DESKTOP-CNIG80F:~$ cd LinuxAssignment/
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ nano file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cat file1.txt
C-Dac Kharghar
Akshay Anil Nalkol
```

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

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ ls
file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ mkdir docs
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ ls
docs  file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$
```

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

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ ls
docs  file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cp file1.txt ./docs/file2.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cd docs
cdac@DESKTOP-CNIG80F:~/LinuxAssignment/docs$ ls
file2.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment/docs$ cat file2.txt
C-Dac Kharghar
Akshay Anil Nalkol
```

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-CNIG80F:~/LinuxAssignment/docs$ ls -l
total 0
-rw-r--r-- 1 cdac cdac 35 Aug 29 11:27 file2.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment/docs$ chmod u+wx file2.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment/docs$ ls -l
total 0
-rwxr--r-- 1 cdac cdac 35 Aug 29 11:27 file2.txt
cdac@DESKTOP-CNIG80F:~/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@DESKTOP-CNIG80F:~/LinuxAssignment/docs$ ls
file2.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment/docs$ cd ..
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ ls
docs  file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cd ..
cdac@DESKTOP-CNIG80F:~$ ls
LinuxAssignment  demo
cdac@DESKTOP-CNIG80F:~$ cd ..
cdac@DESKTOP-CNIG80F:/home$ ls
cdac  user  user2
cdac@DESKTOP-CNIG80F:/home$ cd ..
cdac@DESKTOP-CNIG80F:/$ ls
bin   dev  home  lib    lib64   media  opt   root  sbin  srv  tmp  var
boot  etc  init  lib32  libx32  mnt    proc  run   snap  sys  usr
cdac@DESKTOP-CNIG80F:/$
```

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).

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ find . -name "*.txt"
./docs/file2.txt
./file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ grep "Akshay" file1.txt
Akshay Anil Nalkol
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ S
```

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

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ date
Thu Aug 29 11:52:05 IST 2024
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ date -u
Thu Aug 29 06:22:13 UTC 2024
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ date --utc
Thu Aug 29 06:22:23 UTC 2024
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$
```

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).

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ hostname
DESKTOP-CNIG80F
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ hostname -i
127.0.1.1
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ ping google.com
PING google.com (142.250.183.174) 56(84) bytes of data.
64 bytes from bom07s32-in-f14.1e100.net (142.250.183.174): icmp_seq=1 ttl=57 time=9.92 ms
64 bytes from bom07s32-in-f14.1e100.net (142.250.183.174): icmp_seq=2 ttl=57 time=10.3 ms
64 bytes from bom07s32-in-f14.1e100.net (142.250.183.174): icmp_seq=3 ttl=57 time=11.8 ms
64 bytes from bom07s32-in-f14.1e100.net (142.250.183.174): icmp_seq=4 ttl=57 time=10.9 ms
^C
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 9.922/10.710/11.806/0.714 ms
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$
```

j) File Compression: a. Compress the "docs" directory into a zip file. b. Extract the contents of the zip file into a new directory.

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ zip --version
Copyright (c) 1990-2008 Info-ZIP - Type 'zip "-L"' for software license.
This is Zip 3.0 (July 5th 2008), by Info-ZIP.
Currently maintained by E. Gordon.  Please send bug reports to
the authors using the web page at www.info-zip.org; see README for details.

Latest sources and executables are at ftp://ftp.info-zip.org/pub/infozip,
as of above date; see http://www.info-zip.org/ for other sites.

Compiled with gcc 11.2.0 for Unix (Linux ELF).

Zip special compilation options:
        USE_EF_UT_TIME       (store Universal Time)
        BZIP2_SUPPORT        (bzip2 library version 1.0.8, 13-Jul-2019)
            bzip2 code and library copyright (c) Julian R Seward
            (See the bzip2 license for terms of use)
        SYMLINK_SUPPORT      (symbolic links supported)
        LARGE_FILE_SUPPORT   (can read and write large files on file system)
        ZIP64_SUPPORT        (use Zip64 to store large files in archives)
        UNICODE_SUPPORT      (store and read UTF-8 Unicode paths)
        STORE_UNIX_UIDs_GIDs (store UID/GID sizes/values using new extra field)
        UIDGID_NOT_16BIT     (old Unix 16-bit UID/GID extra field not used)
        [encryption, version 2.91 of 05 Jan 2007] (modified for Zip 3)

Encryption notice:
        The encryption code of this program is not copyrighted and is
        put in the public domain.  It was originally written in Europe
        and, to the best of our knowledge, can be freely distributed
        in both source and object forms from any country, including
        the USA under License Exception TSU of the U.S. Export
        Administration Regulations (section 740.13(e)) of 6 June 2002.

Zip environment options:
             ZIP:  [none]
          ZIPOPT:  [none]
```

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ zip -r docs docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ unzip docs.zip -d new_docs
Archive:  docs.zip
   creating: new_docs/docs/
 extracting: new_docs/docs/file2.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$
```

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).

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt  new_docs
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ nano file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ sed -i 's/C-Dac/CDAC/g' file1.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cat file1.txt
CDAC Mumbai
Akshay Anil Nalkol
```

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-CNIG80F:~/LinuxAssignment$ nano data.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ head data.txt
Line 1
Line 2
Line 3
Line 4
Line 5
Line 6
Line 7
Line 8
Line 9
Line 10
cdac@DESKTOP-CNIG80F:~/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.

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ tail -5 data.txt
Line 8
Line 9
Line 10
Line 11
Line 12
cdac@DESKTOP-CNIG80F:~/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.

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ nano numbers.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ head -15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$
```

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

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ tail -3 numbers.txt
18
19
20
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ s
```

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-CNIG80F:~/LinuxAssignment$ nano input.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cat input.txt
Akshay Anil Nalkol
CDAC Mumbai
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cat input.txt | tr 'a-z' 'A-Z'>output.txt
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cat output.txt
AKSHAY ANIL NALKOL
CDAC MUMBAI
cdac@DESKTOP-CNIG80F:~/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."

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cat duplicate.txt
Apple
Apple
Mango
Orange
Orange
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ sort duplicate.txt | uniq
Apple
Mango
Orange
cdac@DESKTOP-CNIG80F:~/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."

```
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ cat duplicate.txt
Apple
Apple
Mango
Orange
Orange
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$ sort duplicate.txt | uniq -c
      2 Apple
      1 Mango
      2 Orange
cdac@DESKTOP-CNIG80F:~/LinuxAssignment$
```