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Concept Of Operating System
Assignment 1 Solution

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@MD-ANAS:~$ ls
cdac@MD-ANAS:~$




cdac@MD-ANAS:~$ mkdir LinuxAssignment
cdac@MD-ANAS:~$ ls
LinuxAssignment
cdac@MD-ANAS:~$
```

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

```
cdac@MD-ANAS:~$ cd LinuxAssignment/
cdac@MD-ANAS:~/LinuxAssignment$ touch file1.txt
cdac@MD-ANAS:~/LinuxAssignment$ nano file1.txt
```

```
cdac@MD-ANAS:~/LinuxAssignment$ cat file1.txt
Deep into that darkness peering,

Long I stood there, wondering, fearing,

Doubting, dreaming dreams no mortals

Ever dared to dream before;

But the silence was unbroken,

And the stillness gave no token,

And the only word there spoken

Was the whispered word, "Lenore!"

This I whispered, and an echo

Murmured back the word, "Lenore!"

Merely this, and nothing more.
cdac@MD-ANAS:~/LinuxAssignment$
```

c) **Directory Management:**

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

```
cdac@MD-ANAS:~/LinuxAssignment$ mkdir docs
cdac@MD-ANAS:~/LinuxAssignment$ ls
docs  file1.txt
cdac@MD-ANAS:~/LinuxAssignment$
```

d) **Copy and Move Files:**

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

```
cdac@MD-ANAS:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@MD-ANAS:~/LinuxAssignment$ cd docs/file2.txt
-bash: cd: docs/file2.txt: Not a directory
cdac@MD-ANAS:~/LinuxAssignment$ cd docs
cdac@MD-ANAS:~/LinuxAssignment/docs$ cat file2.txt
Deep into that darkness peering,

Long I stood there, wondering, fearing,

Doubting, dreaming dreams no mortals

Ever dared to dream before;

But the silence was unbroken,

And the stillness gave no token,

And the only word there spoken

Was the whispered word, "Lenore!"

This I whispered, and an echo

Murmured back the word, "Lenore!"

Merely this, and nothing more.
```

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@MD-ANAS:~/LinuxAssignment/docs$ chmod 744 file2.txt
cdac@MD-ANAS:~/LinuxAssignment/docs$ ls -l file2.txt
-rwxr--r-- 1 cdac cdac 371 Feb 27 12:37 file2.txt
cdac@MD-ANAS:~/LinuxAssignment/docs$ chown $(whoami) file2.txt
cdac@MD-ANAS:~/LinuxAssignment/docs$ ls -l file2.txt
-rwxr--r-- 1 cdac cdac 371 Feb 27 12:37 file2.txt
cdac@MD-ANAS:~/LinuxAssignment/docs$ whoami
cdac
cdac@MD-ANAS:~/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@MD-ANAS:~$ ls -l LinuxAssignment/
total 8
drwxr-xr-x 2 cdac cdac 4096 Feb 27 12:37 docs
-rw-r--r-- 1 cdac cdac  371 Feb 27 12:34 file1.txt
cdac@MD-ANAS:~$ ls -l /
total 2284
lrwxrwxrwx   1 root root       7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x   2 root root    4096 Feb 26  2024 bin.usr-is-merged
drwxr-xr-x   2 root root    4096 Apr 22  2024 boot
drwxr-xr-x  16 root root    3560 Feb 27 15:08 dev
drwxr-xr-x  88 root root    4096 Feb 27 15:08 etc
drwxr-xr-x   3 root root    4096 Feb 24 11:56 home
-rwxrwxrwx   1 root root 2260248 Nov  9 16:26 init
lrwxrwxrwx   1 root root       7 Apr 22  2024 lib -> usr/lib
drwxr-xr-x   2 root root    4096 Apr  8  2024 lib.usr-is-merged
lrwxrwxrwx   1 root root       9 Apr 22  2024 lib64 -> usr/lib64
drwx------   2 root root   16384 Feb 24 11:39 lost+found
drwxr-xr-x   2 root root    4096 Jan  6 20:13 media
drwxr-xr-x   5 root root    4096 Feb 24 11:40 mnt
drwxr-xr-x   2 root root    4096 Jan  6 20:13 opt
dr-xr-xr-x 228 root root       0 Feb 27 15:08 proc
drwx------   4 root root    4096 Feb 24 11:40 root
drwxr-xr-x  18 root root     540 Feb 27 15:08 run
lrwxrwxrwx   1 root root       8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x   2 root root    4096 Mar 31  2024 sbin.usr-is-merged
drwxr-xr-x   2 root root    4096 Feb 24 11:40 snap
drwxr-xr-x   2 root root    4096 Jan  6 20:13 srv
dr-xr-xr-x  11 root root       0 Feb 27 15:08 sys
drwxrwxrwt  11 root root    4096 Feb 27 15:08 tmp
drwxr-xr-x  12 root root    4096 Jan  6 20:13 usr
drwxr-xr-x  13 root root    4096 Feb 24 11:40 var
cdac@MD-ANAS:~$
```

g) **File Searching:**
   a. Search for all files with the extension ".txt" in the current directory and its subdirectories.

```
cdac@MD-ANAS:~$ find . -type f -iname "*.txt"
./LinuxAssignment/file1.txt
./LinuxAssignment/docs/file2.txt
cdac@MD-ANAS:~$
```

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

```
cdac@MD-ANAS:~$ cd LinuxAssignment/
cdac@MD-ANAS:~/LinuxAssignment$ grep "token" file1.txt
And the stillness gave no token,
cdac@MD-ANAS:~/LinuxAssignment$
```

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

```
cdac@MD-ANAS:~/LinuxAssignment$ date
Thu Feb 27 15:20:12 UTC 2025
cdac@MD-ANAS:~/LinuxAssignment$
```

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

```
cdac@MD-ANAS:~/LinuxAssignment$ 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:28:b3:07 brd ff:ff:ff:ff:ff:ff
    inet 192.168.109.188/20 brd 192.168.111.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe28:b307/64 scope link
       valid_lft forever preferred_lft forever
cdac@MD-ANAS:~/LinuxAssignment$
```

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

```
                valid_lft forever preferred_lft forever
cdac@MD-ANAS:~/LinuxAssignment$ ping google.com
PING google.com (142.250.207.206) 56(84) bytes of data.
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=1 ttl=111 time=38.2 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=2 ttl=111 time=68.8 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=3 ttl=111 time=57.2 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=4 ttl=111 time=54.7 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=5 ttl=111 time=43.0 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=6 ttl=111 time=46.8 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=7 ttl=111 time=48.9 ms

64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=8 ttl=111 time=47.8 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=9 ttl=111 time=35.8 ms
^[64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=10 ttl=111 time=44.7 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=11 ttl=111 time=40.7 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=12 ttl=111 time=43.0 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=13 ttl=111 time=39.6 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=14 ttl=111 time=43.8 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=15 ttl=111 time=36.5 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=16 ttl=111 time=74.2 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=17 ttl=111 time=33.3 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=18 ttl=111 time=36.3 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=19 ttl=111 time=29.0 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=20 ttl=111 time=67.2 ms
64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=21 ttl=111 time=70.3 ms
q64 bytes from del12s10-in-f14.1e100.net (142.250.207.206): icmp_seq=22 ttl=111 time=58.9 ms
```

j) **File Compression:**

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

```
cdac@MD-ANAS:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (deflated 40%)
cdac@MD-ANAS:~/LinuxAssignment$ ls -l docs.zip
-rw-r--r-- 1 cdac cdac 538 Feb 27 15:22 docs.zip
cdac@MD-ANAS:~/LinuxAssignment$
```

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

```
cdac@MD-ANAS:~/LinuxAssignment$ mkdir new_docs && unzip docs.zip -d new_docs
Archive:  docs.zip
   creating: new_docs/docs/
  inflating: new_docs/docs/file2.txt
cdac@MD-ANAS:~/LinuxAssignment$ ls -l new_docs/
total 4
drwxr-xr-x 2 cdac cdac 4096 Feb 27 12:37 docs
cdac@MD-ANAS:~/LinuxAssignment$
```

k) **File Editing:**
   a. Open the "file1.txt" file in a text editor and add some text to it.

```
cdac@MD-ANAS:~/LinuxAssignment$ nano file.txt

  GNU nano 7.2                                                    file.txt *
Deep into that darkness peering,

Long I stood there, wondering, fearing,

Doubting, dreaming dreams no mortals

Ever dared to dream before;

But the silence was unbroken,

And the stillness gave no token,

And the only word there spoken

Was the whispered word, "Lenore!"

This I whispered, and an echo

Murmured back the word, "Lenore!"

Merely this, and nothing more.
```

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@MD-ANAS:~/LinuxAssignment$ sed -i 's/unbroken/broken/' file1.txt
cdac@MD-ANAS:~/LinuxAssignment$ cat file1.txt
Deep into that darkness peering,

Long I stood there, wondering, fearing,

Doubting, dreaming dreams no mortals

Ever dared to dream before;

But the silence was broken,

And the stillness gave no token,

And the only word there spoken

Was the whispered word, "Lenore!"

This I whispered, and an echo

Murmured back the word, "Lenore!"

Merely this, and nothing more.
cdac@MD-ANAS:~/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.

```
cdac@MD-ANAS:~/LinuxAssignment$ touch data.txt
cdac@MD-ANAS:~/LinuxAssignment$ nano data.txt
cdac@MD-ANAS:~/LinuxAssignment$ nanp data.txt
Command 'nanp' not found, did you mean:
  command 'nap' from snap nap-snippets (0.1.1)
  command 'nano' from snap nano (7.2+pkg-4057)
  command 'nano' from deb nano (7.2-2ubuntu0.1)
See 'snap info <snapname>' for additional versions.
cdac@MD-ANAS:~/LinuxAssignment$ nano data.txt
cdac@MD-ANAS:~/LinuxAssignment$ head -10 data.txt
Adding Insurance Information to your Document
I set aside a day and gathered all the information I had on all of our insurance ANYTHINGS.


I created a new heading for each insurance policy and took notes from what I had in front of me.


Then I called every health insurance, dental insurance and eye doctor insurance company that any of us were covered unde
r, and took notes on things like:
cdac@MD-ANAS:~/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@MD-ANAS:~/LinuxAssignment$ tail -5 data.txt
Go down and hover over "PREPARE."

In the column that appears, you will see "ENCRYPT DOCUMENT."

It'll ask you to enter a password, and … DONE.  Now only you can open that document.  Pretty cool, huh?
cdac@MD-ANAS:~/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@MD-ANAS:~/LinuxAssignment$ touch numbers.txt
cdac@MD-ANAS:~/LinuxAssignment$ nano numbers.txt
cdac@MD-ANAS:~/LinuxAssignment$ seq 1 100 > numbers.txt
cdac@MD-ANAS:~/LinuxAssignment$ head -n 15 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@MD-ANAS:~/LinuxAssignment$ tail -n 3 numbers.txt
98
99
100
cdac@MD-ANAS:~/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."

```
cdac@MD-ANAS:~/LinuxAssignment$ touch input.txt
cdac@MD-ANAS:~/LinuxAssignment$ nano input.txt
cdac@MD-ANAS:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.txt
cdac@MD-ANAS:~/LinuxAssignment$ cat output.txt
THIS IS 2018, PEOPLE.  NO HANDWRITING ALLOWED.  YOU KNOW WHY?  BECAUSE WHEN YOU DECIDE TO SWITCH FROM COMCAST TO AT&T, O
R SWITCH FROM VERIZON TO T-MOBILE, OR WHEN YOU CALL YOUR HUSBAND'S HEALTH INSURANCE COMPANY FOR THE 82ND TIME IN TWO WEE
KS BECAUSE YOU MADE THE MISTAKE OF THINKING IT WOULD BE A GOOD IDEA TO GET DUAL COVERAGE FOR YOUR KIDS WHEN YOU REMARRIE
D, ONLY TO FIND THAT THEIR CURRENT POLICY KICKS INTO SECONDARY MODE WHENEVER ANY OTHER INSURANCE IS ADDED, WHICH ULTIMAT
ELY MAKES EVERY SINGLE MEDICAL BILL DOUBLE THE COST, BUT NO ONE CAN SEEM TO FIGURE OUT HOW TO REMOVE THE CHILDREN FROM S
AID POLICY, AND YOU GET A DIFFERENT PERSON EVERY SINGLE FLIPPIN' PHONE CALL, AND THEN YOU GET TRANSFERRED TO 19 DIFFEREN
T PEOPLE AND YOU HAVE TO EXPLAIN YOUR STORY TO EVERY SINGLE FLIPPIN' ONE OF THOSE PEOPLE, AND YOU WRITE DOWN EACH OF THE
 NAMES OF EACH OF THE PEOPLE YOU TALK TO, JUST IN CASE ONE OF THEM HAPPENS TO SHOW A SPARK OF UNDERSTANDING FOR YOUR REA
LLY NOT-SO-COMPLEX SITUATION, SO YOU CAN ADD THEM TO YOUR CHRISTMAS CARD LIST, AND SEND THEM FLOWERS EVERY YEAR FOR THE
REST OF THEIR LIFE, FOR NOT BEING A TOTAL AND COMPLETELY INCOMPETENT MORON, WELL, YOU WILL RUN OUT OF ROOM, AND THEN YOU
'LL HAVE TO REWRITE EVERYTHING.

SO TAKE IT FROM SOMEONE WHO KNOWS. TYPE IT.
cdac@MD-ANAS:~/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@MD-ANAS:~/LinuxAssignment$ touch duplicate.txt
cdac@MD-ANAS:~/LinuxAssignment$ nano duplicate.txt
cdac@MD-ANAS:~/LinuxAssignment$ cat duplicate.txt
apple
banana
apple
orange
banana
grape
orange
apple
cdac@MD-ANAS:~/LinuxAssignment$ sort duplicate.txt | uniq
apple
banana
grape
orange
cdac@MD-ANAS:~/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@MD-ANAS:~/LinuxAssignment$ cp duplicate.txt fruit.txt
cdac@MD-ANAS:~/LinuxAssignment$ cat fruit.txt
apple
banana
apple
orange
banana
grape
orange
apple
cdac@MD-ANAS:~/LinuxAssignment$ sort fruit.txt | uniq -c
      3 apple
      2 banana
      1 grape
      2 orange
cdac@MD-ANAS:~/LinuxAssignment$
```