CDAC MUMBAI

Concepts of Operating System

Assignment 1

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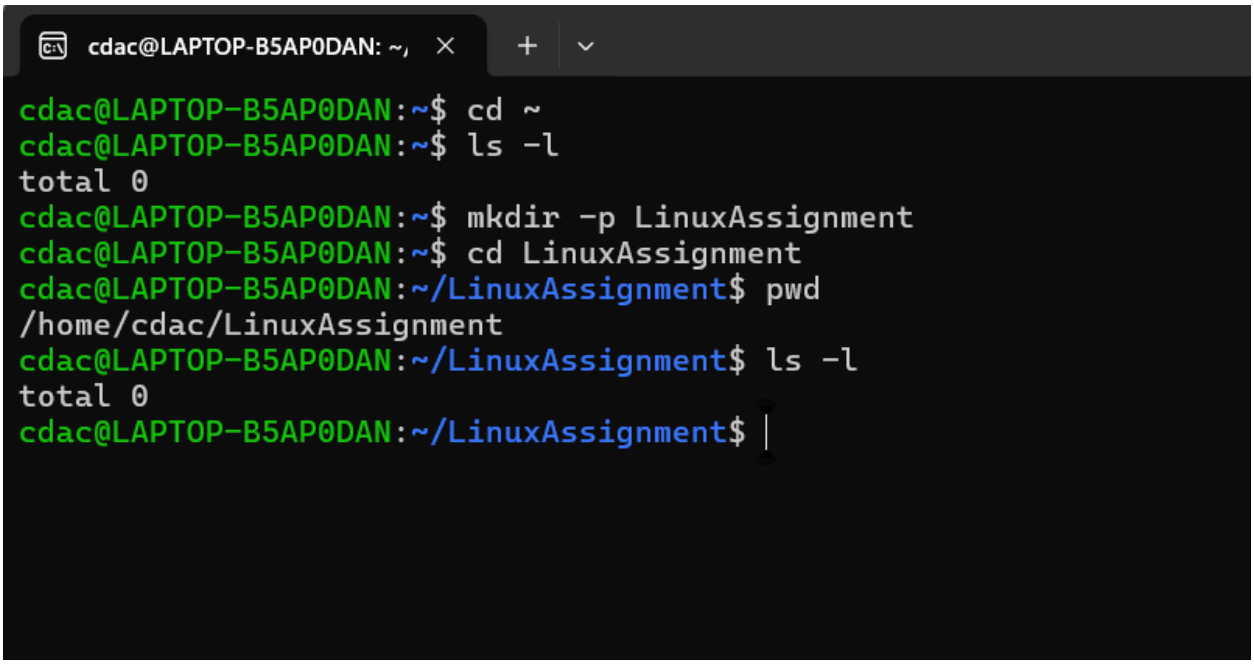
Problem 1: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.

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.

Output:



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b) File Management:

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

Output:

```
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cd ~/LinuxAssignment
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ touch file1.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ ls -l
total 0
-rw-r--r-- 1 cdac cdac 0 Feb 26 20:41 file1.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cat file1.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$
```

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c) Directory Management:

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

Output:

```
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cd ~/LinuxAssignment
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ mkdir docs
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$  ls -l
total 4
drwxr-xr-x 2 cdac cdac 4096 Feb 26 20:48 docs
-rw-r--r-- 1 cdac cdac    0 Feb 26 20:41 file1.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$
```

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d) Copy and Move Files:

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

Output:

```
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cd ~/LinuxAssignment
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ ls -l docs
total 0
-rw-r--r-- 1 cdac cdac 0 Feb 26 20:51 file2.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$
```

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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.

Output:

```
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cd ~/LinuxAssignment
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ ls -l docs
total 0
-rw-r--r-- 1 cdac cdac 0 Feb 26 20:51 file2.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$
```

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f) Final Checklist:

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

Output:

```
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ ls -l ~/LinuxAssignment
total 4
drwxr-xr-x 2 cdac cdac 4096 Feb 26 20:51 docs
-rw-r--r-- 1 cdac cdac    0 Feb 26 20:41 file1.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ ls -l /
total 1484
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   8 root root    2940 Feb 26 18:55 dev
drwxr-xr-x  87 root root    4096 Feb 26 20:34 etc
drwxr-xr-x   3 root root    4096 Feb 24 12:26 home
-rwxr-xr-x   3 root root 1440152 May  7  2022 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 Apr 10  2019 lost+found
drwxr-xr-x   2 root root    4096 Jan  6 20:13 media
drwxr-xr-x   5 root root    4096 Feb 24 12:26 mnt
drwxr-xr-x   2 root root    4096 Jan  6 20:13 opt
dr-xr-xr-x 120 root root       0 Feb 26 20:34 proc
drwx------   3 root root    4096 Jan  6 20:15 root
drwxr-xr-x   6 root root     120 Feb 26 20:34 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 Oct 11 08:05 snap
drwxr-xr-x   2 root root    4096 Jan  6 20:13 srv
dr-xr-xr-x  11 root root       0 Feb 26 18:55 sys
drwxrwxrwt   2 root root    4096 Feb 26 10:56 tmp
drwxr-xr-x  12 root root    4096 Jan  6 20:13 usr
```

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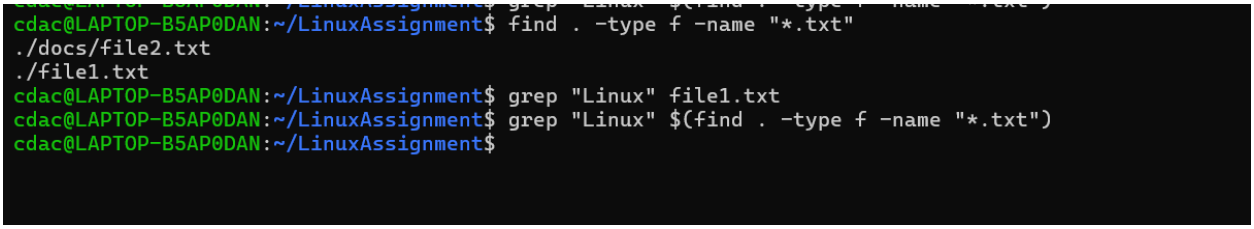
g) File Searching:

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).

Output:



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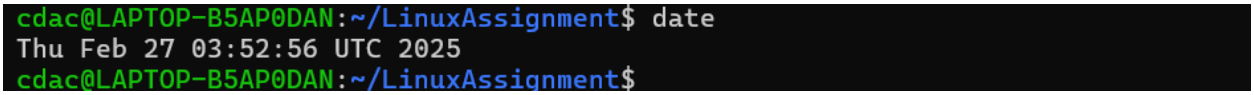
h) System Information:

a. Display the current system date and time.

Output:



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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).

Output:

```
cdac@LAPTOP-B5AP0DAN:~/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
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: bond0: <BROADCAST,MULTICAST,MASTER> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether d6:ee:c8:1d:e5:5f brd ff:ff:ff:ff:ff:ff
3: dummy0: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 86:0f:72:63:0e:37 brd ff:ff:ff:ff:ff:ff
4: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
5: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:b2:70:fe brd ff:ff:ff:ff:ff:ff
    inet 172.22.110.200/20 brd 172.22.111.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:feb2:70fe/64 scope link
       valid_lft forever preferred_lft forever
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ hostname -I
172.22.110.200
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ ping -c 4 google.com
PING google.com (142.250.199.174) 56(84) bytes of data.
64 bytes from bom07s37-in-f14.1e100.net (142.250.199.174): icmp_seq=1 ttl=118 time=6.22 ms
64 bytes from bom07s37-in-f14.1e100.net (142.250.199.174): icmp_seq=2 ttl=118 time=5.48 ms
64 bytes from bom07s37-in-f14.1e100.net (142.250.199.174): icmp_seq=3 ttl=118 time=5.49 ms
64 bytes from bom07s37-in-f14.1e100.net (142.250.199.174): icmp_seq=4 ttl=118 time=5.85 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3006ms
rtt min/avg/max/mdev = 5.483/5.759/6.216/0.302 ms
cdac@LAPTOP-B5AP0DAN:~/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.

Output:

```
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ sudo apt install zip -y
[sudo] password for cdac:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  unzip
The following NEW packages will be installed:
  unzip zip
0 upgraded, 2 newly installed, 0 to remove and 109 not upgraded.
Need to get 350 kB of archives.
After this operation, 933 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 unzip amd64 6.0-28ubuntu4.1 [174 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 zip amd64 3.0-13ubuntu0.2 [176 kB]
Fetched 350 kB in 1s (282 kB/s)
Selecting previously unselected package unzip.
(Reading database ... 40794 files and directories currently installed.)
Preparing to unpack .../unzip_6.0-28ubuntu4.1_amd64.deb ...
Unpacking unzip (6.0-28ubuntu4.1) ...
Selecting previously unselected package zip.
Preparing to unpack .../zip_3.0-13ubuntu0.2_amd64.deb ...
Unpacking zip (3.0-13ubuntu0.2) ...
Setting up unzip (6.0-28ubuntu4.1) ...
Setting up zip (3.0-13ubuntu0.2) ...
Processing triggers for man-db (2.12.0-4build2) ...
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ mkdir extracted_docs
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ unzip docs.zip -d extracted_docs
Archive:  docs.zip
   creating: extracted_docs/docs/
 extracting: extracted_docs/docs/file2.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$
```

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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).

Output:

```
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ sed -i 's/CDAC/CDAC Mumbai/g' file1.txt
cdac@LAPTOP-B5AP0DAN:~/LinuxAssignment$ cat file1.txt
C-DAC is a premier institute for advanced computing.

cdac@LAPTOP-B5AP0DAN:~/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.

Output:

```
cdac@LAPTOP-B5AP0DAN:~$ head -n 10 data.txt
Atomic Habits is a book by James Clear.
Small habits can lead to big changes.
Good habits help us grow and improve.
Bad habits slow us down.
The book gives four simple habit rules.
Make habits easy and rewarding.
Small steps every day create success.
Focus on systems, not just goals.
Change your environment to break bad habits.
Tiny improvements lead to big results.
cdac@LAPTOP-B5AP0DAN:~$
```

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b. Now, to check the end of the file for any recent additions, display the last 5 lines of

"data.txt" using another command.

Output:

```
cdac@LAPTOP-B5AP0DAN:~$ tail -n 5 data.txt
Small steps every day create success.
Focus on systems, not just goals.
Change your environment to break bad habits.
Tiny improvements lead to big results.

cdac@LAPTOP-B5AP0DAN:~$
```

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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.

Output:

```
cdac@LAPTOP-B5AP0DAN:~$ head -n 15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@LAPTOP-B5AP0DAN:~$
```

---

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

Output:

```
cdac@LAPTOP-B5AP0DAN:~$ tail -n 3 numbers.txt
13
14
15
cdac@LAPTOP-B5AP0DAN:~$
```

---

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."

Output:

```
cdac@LAPTOP-B5AP0DAN:~$ tr [:lower:] [:upper:] < input.txt > output.txt
cdac@LAPTOP-B5AP0DAN:~$ cat output.txt
HELLO, HOW ARE YOU?
cdac@LAPTOP-B5AP0DAN:~$ cat input.txt
Hello, How are you?
cdac@LAPTOP-B5AP0DAN:~$
```

---

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."

Output:

```
cdac@LAPTOP-B5AP0DAN:~$ sort duplicate.txt | uniq
Atomic Habits
Ikigai
The Art of Happiness
The Blue Zones
The Happiness Advantage
The Happiness Project
The How of Happiness
The Joy of Living
The Little Book of Hygge
cdac@LAPTOP-B5AP0DAN:~$
```

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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."

Output:

```
cdac@LAPTOP-B5AP0DAN:~$ sort fruit.txt | uniq -c
      3 Apple
      2 Banana
      1 Grapes
      3 Mango
      1 Orange
cdac@LAPTOP-B5AP0DAN:~$
```