

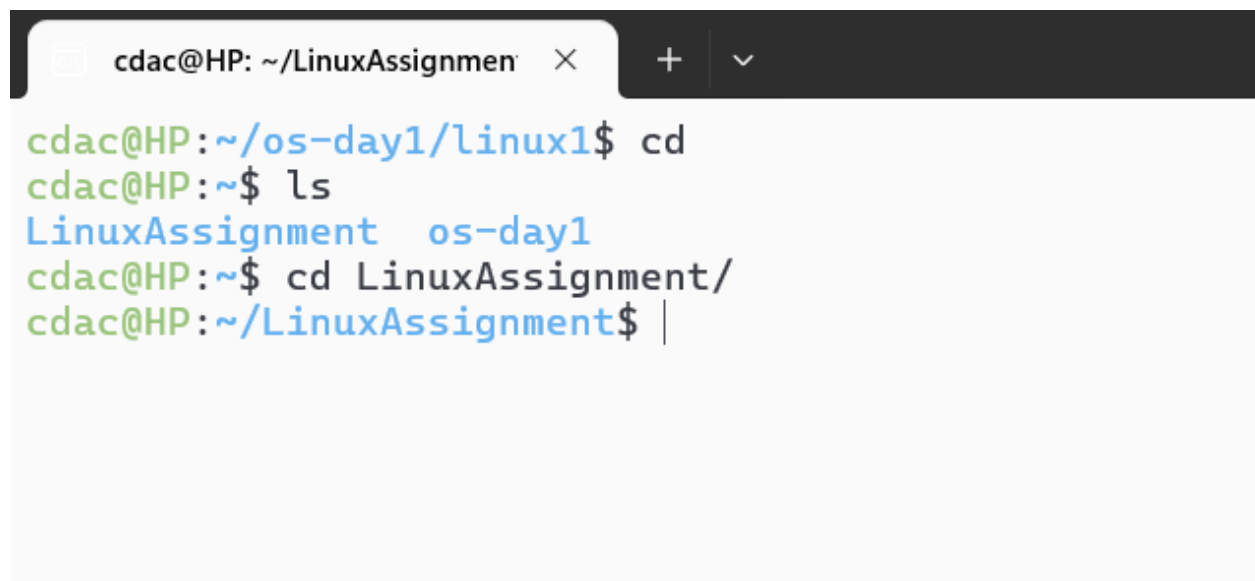
Concepts of Operating System

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.

A terminal window with a dark header bar. The header bar contains a tab labeled 'cdac@HP: ~/LinuxAssignmen' with a close button 'X' on the right, and '+' and 'v' icons. The terminal content shows a sequence of commands and their outputs: 'cd' changes the directory to ~/os-day1/linux1; 'ls' lists the contents as 'LinuxAssignment' and 'os-day1'; 'cd LinuxAssignment/' changes the directory to ~/LinuxAssignment; and the prompt is now 'cdac@HP:~/LinuxAssignment\$' with a cursor at the end.

```
cdac@HP:~/os-day1/linux1$ cd
cdac@HP:~$ ls
LinuxAssignment  os-day1
cdac@HP:~$ cd LinuxAssignment/
cdac@HP:~/LinuxAssignment$ |
```

b) File Management:

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

```
cdac@HP: ~/LinuxAssignmen  X + v
cdac@HP:~/LinuxAssignment$ touch file1.txt
cdac@HP:~/LinuxAssignment$ cat file1.txt
cdac@HP:~/LinuxAssignment$
cdac@HP:~/LinuxAssignment$ nano file1.txt
cdac@HP:~/LinuxAssignment$ cat file1.txt
abc
def
efg
hij
klm
cdac@HP:~/LinuxAssignment$ |
```

```
cdac@HP: ~/LinuxAssignmen  X + v
GNU nano 6.2 file1.txt
abc
def
efg
hij
klm

[ Read 5 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify
^C Location   M-U Undo     M-A Set Mark
^_/ Go To Line M-E Redo     M-G Copy
```

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

```
cdac@HP: ~/LinuxAssignmen  ×  +  v
cdac@HP:~/LinuxAssignment$ mkdir docs
cdac@HP:~/LinuxAssignment$ ls
docs  file1.txt
cdac@HP:~/LinuxAssignment$ |
```

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

```
cdac@HP: ~/LinuxAssignmen  ×  +  v
cdac@HP:~/LinuxAssignment$ cp file1.txt docs
cdac@HP:~/LinuxAssignment$ cd docs/
cdac@HP:~/LinuxAssignment/docs$ mv file1.txt file2.txt
cdac@HP:~/LinuxAssignment/docs$ ls
file2.txt
cdac@HP:~/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@HP: ~/LinuxAssignmen  ×  +  v
cdac@HP:~/LinuxAssignment/docs$ chmod u+rwX file2.txt
cdac@HP:~/LinuxAssignment/docs$ chmod g+r file2.txt
cdac@HP:~/LinuxAssignment/docs$ chmod o-wX file2.txt
cdac@HP:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 21 Feb 27 19:26 file2.txt
cdac@HP:~/LinuxAssignment/docs$ chown $(whoami) file2.txt
cdac@HP:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 21 Feb 27 19:26 file2.txt
cdac@HP:~/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@HP: ~/LinuxAssignmen  ×  +  ▾
drwxr-xr-x 2 cdac cdac 4096 Feb 27 19:27 docs
-rw-r--r-- 1 cdac cdac 21 Feb 27 19:04 file1.txt
cdac@HP:~/LinuxAssignment$ ls -l /
total 792
lrwxrwxrwx 1 root root 7 Jan 7 03:05 bin -> usr/bin
drwxr-xr-x 2 root root 4096 Apr 18 2022 boot
drwxr-xr-x 8 root root 2940 Feb 27 18:48 dev
drwxr-xr-x 81 root root 4096 Feb 27 18:48 etc
drwxr-xr-x 3 root root 4096 Feb 24 18:07 home
-rwxr-xr-x 3 root root 1440152 May 7 2022 init
lrwxrwxrwx 1 root root 7 Jan 7 03:05 lib -> usr/lib
lrwxrwxrwx 1 root root 9 Jan 7 03:05 lib32 -> usr/lib32
lrwxrwxrwx 1 root root 9 Jan 7 03:05 lib64 -> usr/lib64
lrwxrwxrwx 1 root root 10 Jan 7 03:05 libx32 -> usr/libx32
drwx----- 2 root root 16384 Apr 10 2019 lost+found
drwxr-xr-x 2 root root 4096 Jan 7 03:05 media
drwxr-xr-x 5 root root 4096 Feb 24 18:06 mnt
drwxr-xr-x 2 root root 4096 Jan 7 03:05 opt
dr-xr-xr-x 196 root root 0 Feb 27 18:48 proc
drwx----- 2 root root 4096 Jan 7 03:07 root
drwxr-xr-x 6 root root 120 Feb 27 18:48 run
lrwxrwxrwx 1 root root 8 Jan 7 03:05 sbin -> usr/sbin
drwxr-xr-x 2 root root 4096 Oct 11 13:35 snap
drwxr-xr-x 2 root root 4096 Jan 7 03:05 srv
dr-xr-xr-x 11 root root 0 Feb 27 18:48 sys
drwxrwxrwt 2 root root 4096 Feb 26 16:25 tmp
drwxr-xr-x 14 root root 4096 Jan 7 03:05 usr
drwxr-xr-x 13 root root 4096 Jan 7 03:07 var
cdac@HP:~/LinuxAssignment$
```

g) File Searching:

- Search for all files with the extension ".txt" in the current directory and its subdirectories.
- Display lines containing a specific word in a file (provide a file name and the specific word to search).

```
cdac@HP: ~/LinuxAssignmen  ×  +  ▾  
cdac@HP:~/LinuxAssignment$ find . -type f -name "*.txt"  
./docs/file2.txt  
./file1.txt  
cdac@HP:~/LinuxAssignment$ grep -n "abc" file1.txt  
1:abc hello good morning all !!!  
cdac@HP:~/LinuxAssignment$ grep -n "hij" file1.txt  
4:hij  
cdac@HP:~/LinuxAssignment$ |
```

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

```
cdac@HP: ~/LinuxAssignmen  ×  +  ▾  
cdac@HP:~/LinuxAssignment$ date  
Thu Feb 27 21:49:36 IST 2025  
cdac@HP:~/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@HP: ~/LinuxAssignmen  ×  +  ▾
link/ether 9e:fb:5d:ec:94:e8 brd ff:ff:ff:ff:ff:ff
4: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
link/ipip 0.0.0.0 brd 0.0.0.0
5: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
link/sit 0.0.0.0 brd 0.0.0.0
6: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
link/ether 00:15:5d:18:07:89 brd ff:ff:ff:ff:ff:ff
inet 172.23.224.202/20 brd 172.23.239.255 scope global eth0
    valid_lft forever preferred_lft forever
inet6 fe80::215:5dff:fe18:789/64 scope link
    valid_lft forever preferred_lft forever
cdac@HP:~/LinuxAssignment$ ip a | grep "inet "
    inet 127.0.0.1/8 scope host lo
    inet 172.23.224.202/20 brd 172.23.239.255 scope global eth0
cdac@HP:~/LinuxAssignment$ ping -c 4 google.com
PING google.com (142.250.183.110) 56(84) bytes of data.
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=1 ttl=117 time=62.4 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=2 ttl=117 time=68.1 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=3 ttl=117 time=55.9 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=4 ttl=117 time=59.2 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 55.891/61.402/68.108/4.508 ms
cdac@HP:~/LinuxAssignment$ |

```

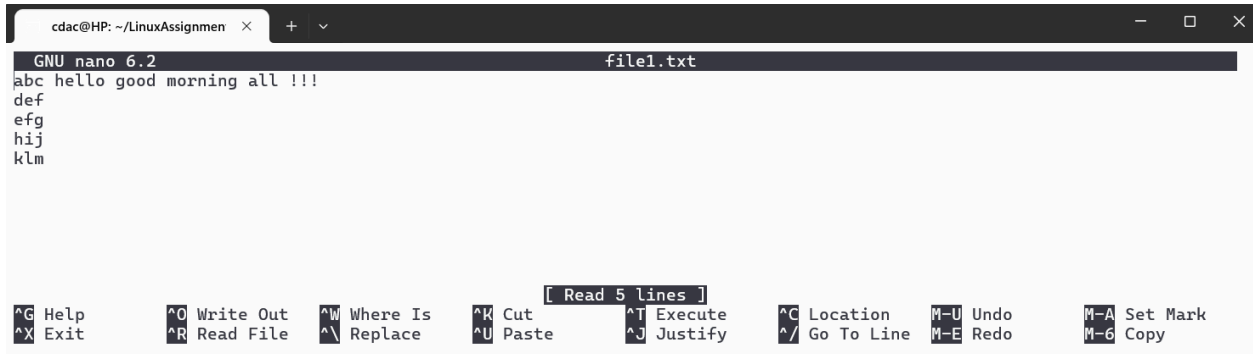
j) File Compression: a. Compress the "docs" directory into a zip file. b. Extract the contents of the zip file into a new directory.

```

cdac@HP: ~/LinuxAssignmen  ×  +  ▾
cdac@HP:~/LinuxAssignment$ zip -r docs.zip docs
adding: docs/ (stored 0%)
adding: docs/file2.txt (stored 0%)
cdac@HP:~/LinuxAssignment$ ls -lh docs.zip
-rw-r--r-- 1 cdac cdac 337 Feb 27 21:57 docs.zip
cdac@HP:~/LinuxAssignment$ unzip docs.zip -d os1
Archive:  docs.zip
creating: os1/docs/
extracting: os1/docs/file2.txt

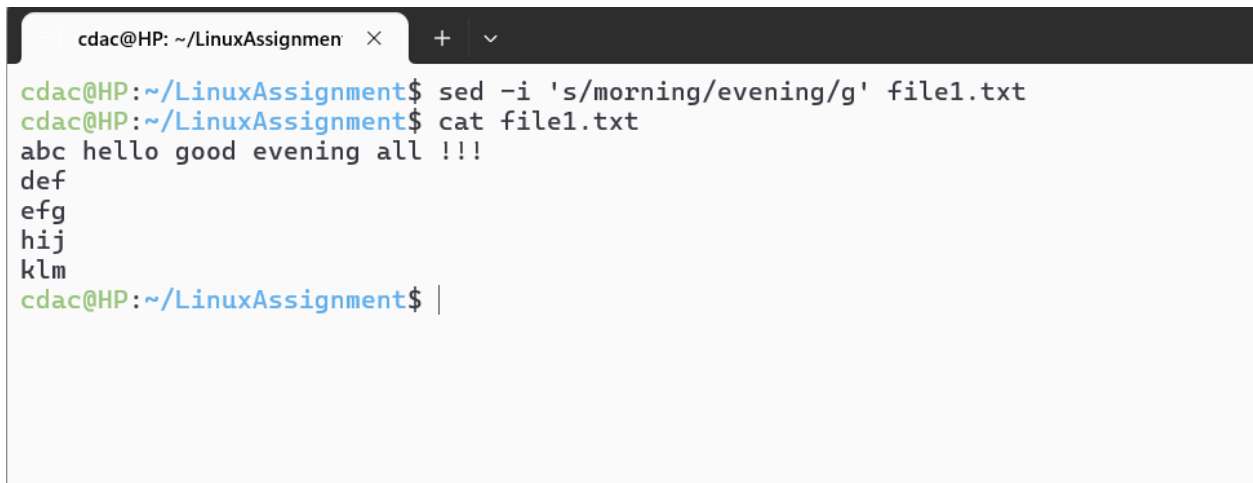
```

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 file1.txt
abc hello good morning all !!!
def
efg
hij
klm

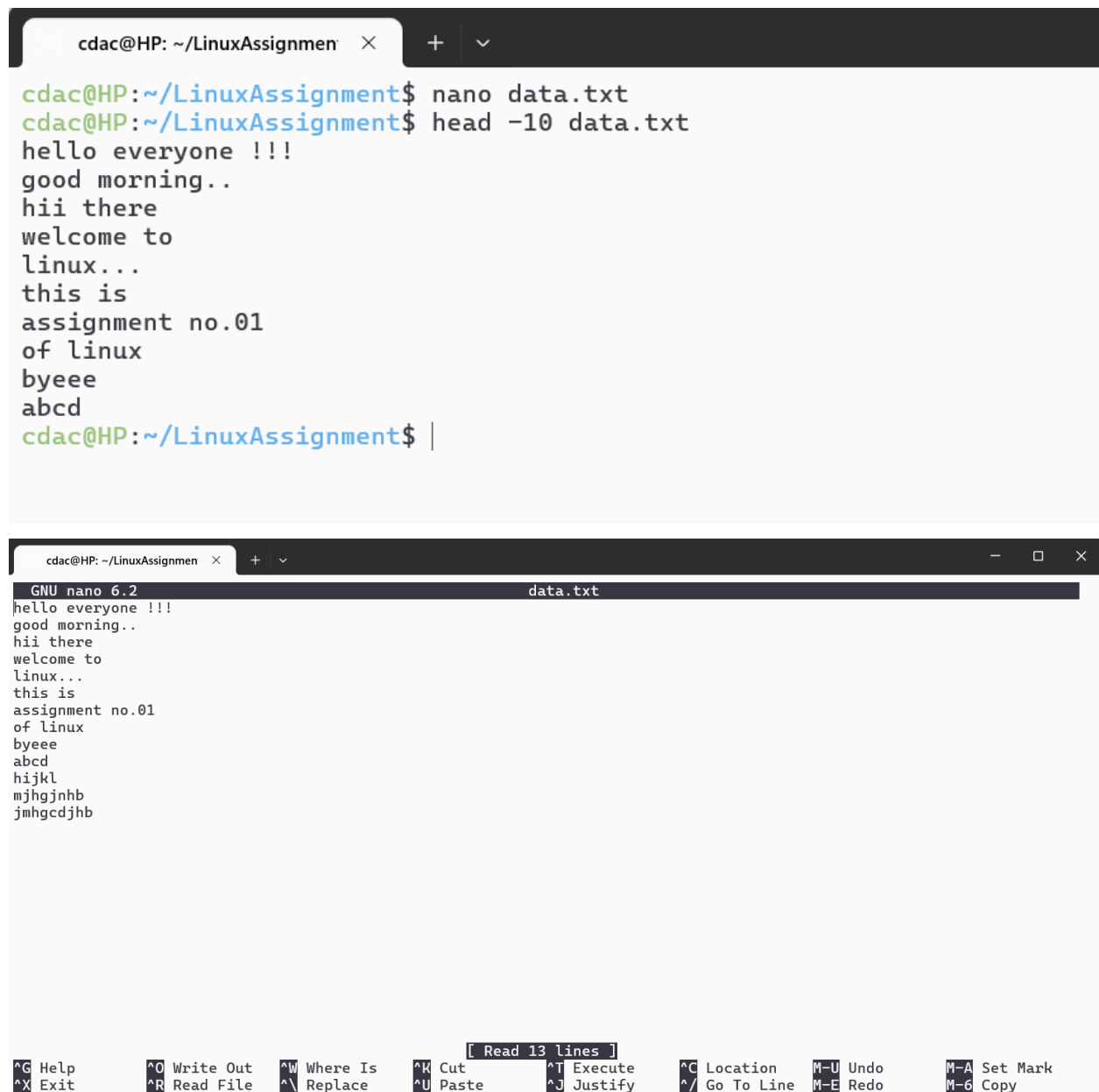
[ Read 5 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line M-E Redo      M-6 Copy
```



```
cdac@HP: ~/LinuxAssignment$ sed -i 's/morning/evening/g' file1.txt
cdac@HP:~/LinuxAssignment$ cat file1.txt
abc hello good evening all !!!
def
efg
hij
klm
cdac@HP:~/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.



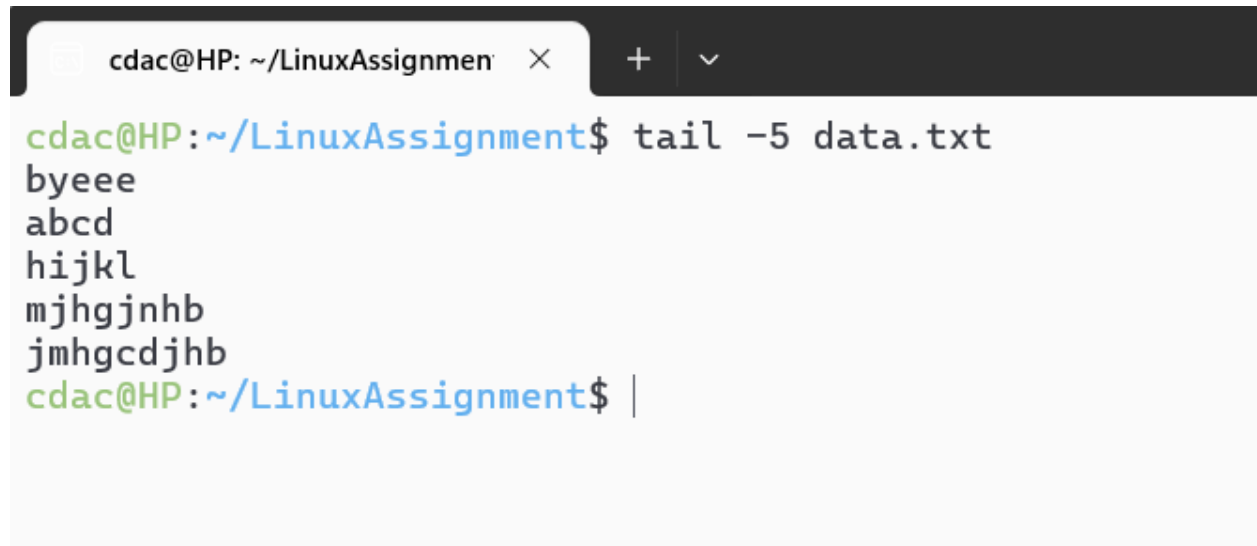
The image shows two screenshots of a Linux terminal and the nano text editor. The top screenshot shows a terminal window with the prompt 'cdac@HP: ~/LinuxAssignmen'. The user has executed 'nano data.txt' and 'head -10 data.txt'. The output of the head command is displayed: 'hello everyone !!!', 'good morning..', 'hii there', 'welcome to', 'linux...', 'this is', 'assignment no.01', 'of linux', 'bye', and 'abcd'. The bottom screenshot shows the nano editor editing 'data.txt'. The file content is the same as the terminal output, but it includes additional lines: 'hijkl', 'mjhgjnhb', and 'jmhgcdjhb'. The nano editor interface shows 'GNU nano 6.2' and a status bar at the bottom with various keyboard shortcuts like '^G Help', '^O Write Out', '^W Where Is', '^K Cut', '^T Execute', '^C Location', '^U Undo', '^M-A Set Mark', '^X Exit', '^R Read File', '^_ Replace', '^P Paste', '^J Justify', '^_ Go To Line', '^M-E Redo', and '^M-6 Copy'. A message '[Read 13 lines]' is also visible in the status bar.

```
cdac@HP: ~/LinuxAssignmen × + v
cdac@HP:~/LinuxAssignment$ nano data.txt
cdac@HP:~/LinuxAssignment$ head -10 data.txt
hello everyone !!!
good morning..
hii there
welcome to
linux...
this is
assignment no.01
of linux
bye
abcd
cdac@HP:~/LinuxAssignment$ |
```

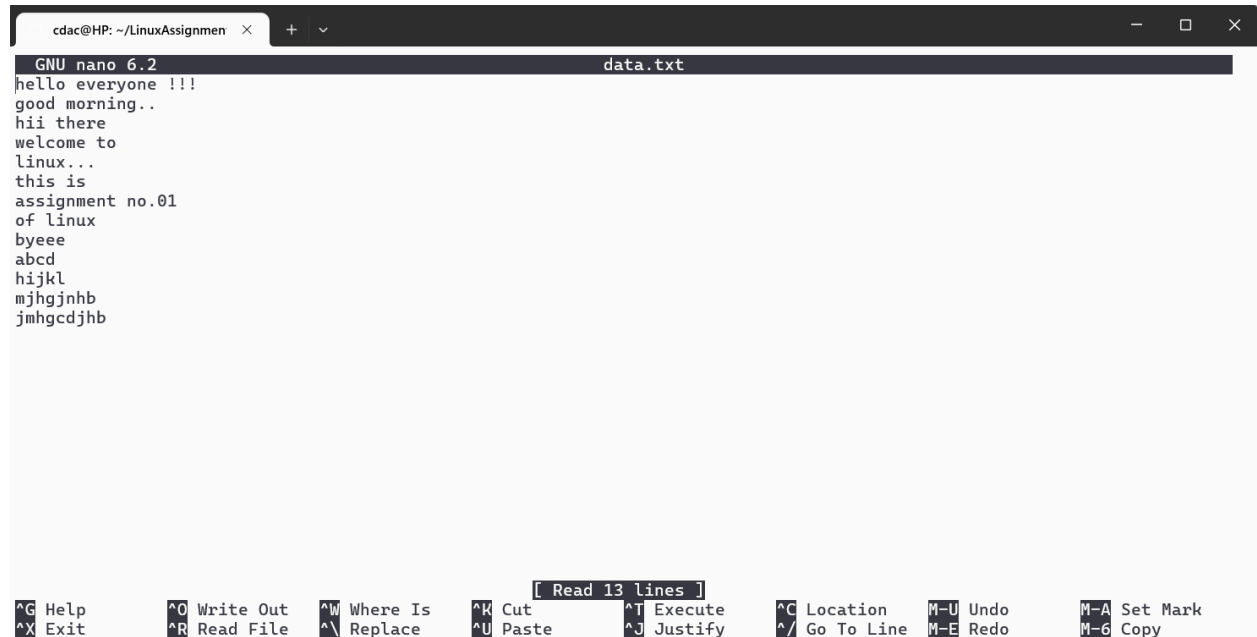
```
GNU nano 6.2 data.txt
hello everyone !!!
good morning..
hii there
welcome to
linux...
this is
assignment no.01
of linux
bye
abcd
hijkl
mjhgjnhb
jmhgcdjhb

[ Read 13 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   ^U Undo       ^M-A Set Mark
^X Exit      ^R Read File  ^_ Replace    ^P Paste      ^J Justify    ^_ Go To Line ^M-E Redo     ^M-6 Copy
```

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@HP: ~/LinuxAssignmen X + v
cdac@HP:~/LinuxAssignment$ tail -5 data.txt
byeee
abcd
hijkl
mjhgjnhb
jmhgcdjhb
cdac@HP:~/LinuxAssignment$ |
```



```
cdac@HP: ~/LinuxAssignmen X + v - □ X
GNU nano 6.2 data.txt
hello everyone !!!
good morning..
hii there
welcome to
linux...
this is
assignment no.01
of linux
byeee
abcd
hijkl
mjhgjnhb
jmhgcdjhb

[ Read 13 lines ]
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo      M-A Set Mark
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line M-E Redo      M-6 Copy
```

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@HP: ~/LinuxAssignmen  ×  +  v
cdac@HP:~/LinuxAssignment$ nano numbers.txt
cdac@HP:~/LinuxAssignment$ head -15 numbers.txt
565
54
45
65
78
9
23
2344
656
190
8523
345
22
1
6
cdac@HP:~/LinuxAssignment$ |
```

```
cdac@HP: ~/LinuxAssignmen  ×  +  v
GNU nano 6.2 numbers.txt
565
54
45
65
78
9
23
2344
656
190
8523
345
22
1
6
788
909
34
34
222
1113
13432
343
[Read 2/1 Lines]
```

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

```
cdac@HP: ~/LinuxAssignmen  ×  +  v  
cdac@HP:~/LinuxAssignment$ tail -3 numbers.txt  
222  
1113  
13432 343  
cdac@HP:~/LinuxAssignment$ nano numbers.txt|
```

```
cdac@HP: ~/LinuxAssignmen  ×  +  v  
GNU nano 6.2 numbers.txt  
565  
54  
45  
65  
78  
9  
23  
2344  
656  
190  
8523  
345  
22  
1  
6  
788  
909  
34  
34  
222  
1113  
13432 343  
[ Read 22 lines ]  
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute  
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify
```

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@HP: ~/LinuxAssignmen  X + v
GNU nano 6.2 input.tx
helloooooo... welcome all
good evening to
everyone present here
```

```
cdac@HP: ~/LinuxAssignmen  X + v
cdac@HP:~/LinuxAssignment$ nano input.txt
cdac@HP:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.txt
cdac@HP:~/LinuxAssignment$ cat output.txt
HELLOOOOOO... WELCOME ALL
GOOD EVENING TO
EVERYONE PRESENT HERE
cdac@HP:~/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@HP: ~/LinuxAssignmen  ×  +  ∨  
GNU nano 6.2 duplicate.txt  
hello everyone !!!!  
good afternoon...  
hello everyone  
what are u doing??  
this is duplicate file  
bye bye..  
hello everyone  
bye bye..  
this is duplicate file
```

```
cdac@HP: ~/LinuxAssignmen  ×  +  ∨  
cdac@HP:~/LinuxAssignment$ nano duplicate.txt  
cdac@HP:~/LinuxAssignment$ cat duplicate.txt | sort | uniq  
bye bye..  
good afternoon...  
hello everyone  
hello everyone !!!!  
this is duplicate file  
what are u doing??  
cdac@HP:~/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@HP: ~/LinuxAssignmen × + ▾
GNU nano 6.2 fruit.txt
apple
mango
Banana
watermelon
banana
Grapes
apple
apple
guava
iceapple
kiwi
guava
mango
banana
```

```
cdac@HP: ~/LinuxAssignmen × + ▾
cdac@HP:~/LinuxAssignment$ nano fruit.txt
cdac@HP:~/LinuxAssignment$ cat fruit.txt | sort | uniq -c
  1 Banana
  1 Grapes
  3 apple
  2 banana
  2 guava
  1 iceapple
  1 kiwi
  2 mango
  1 watermelon
cdac@HP:~/LinuxAssignment$ |
```