Concepts of Operating System Assignment 1

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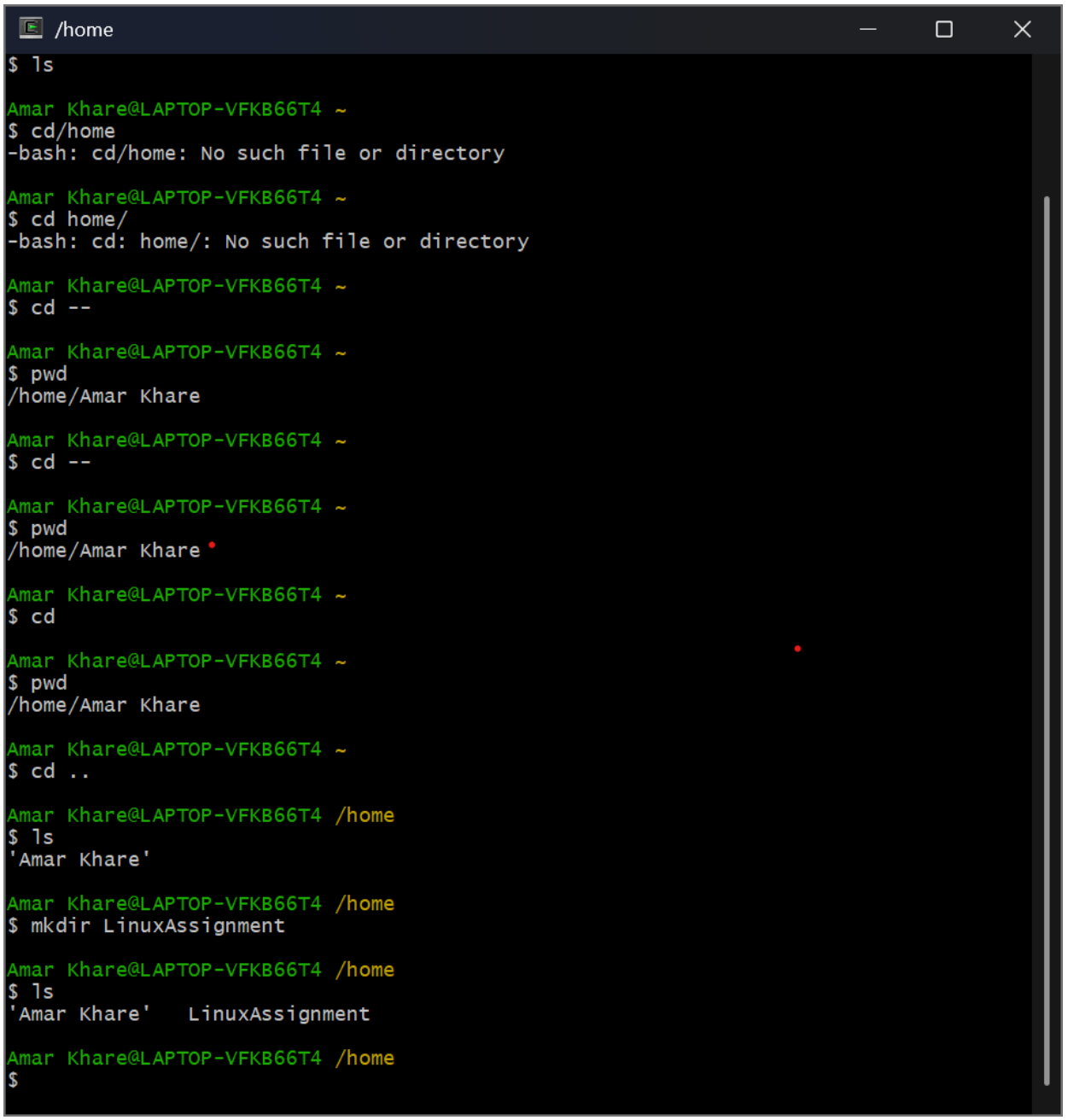
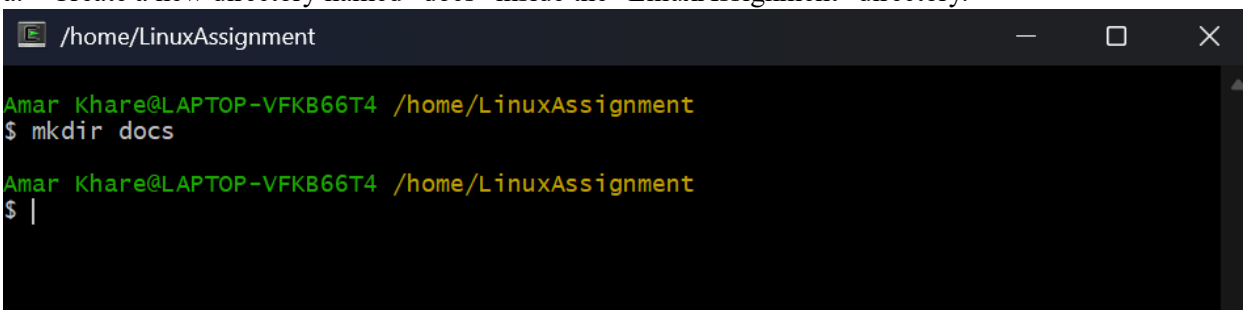
Problem 1: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.

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.

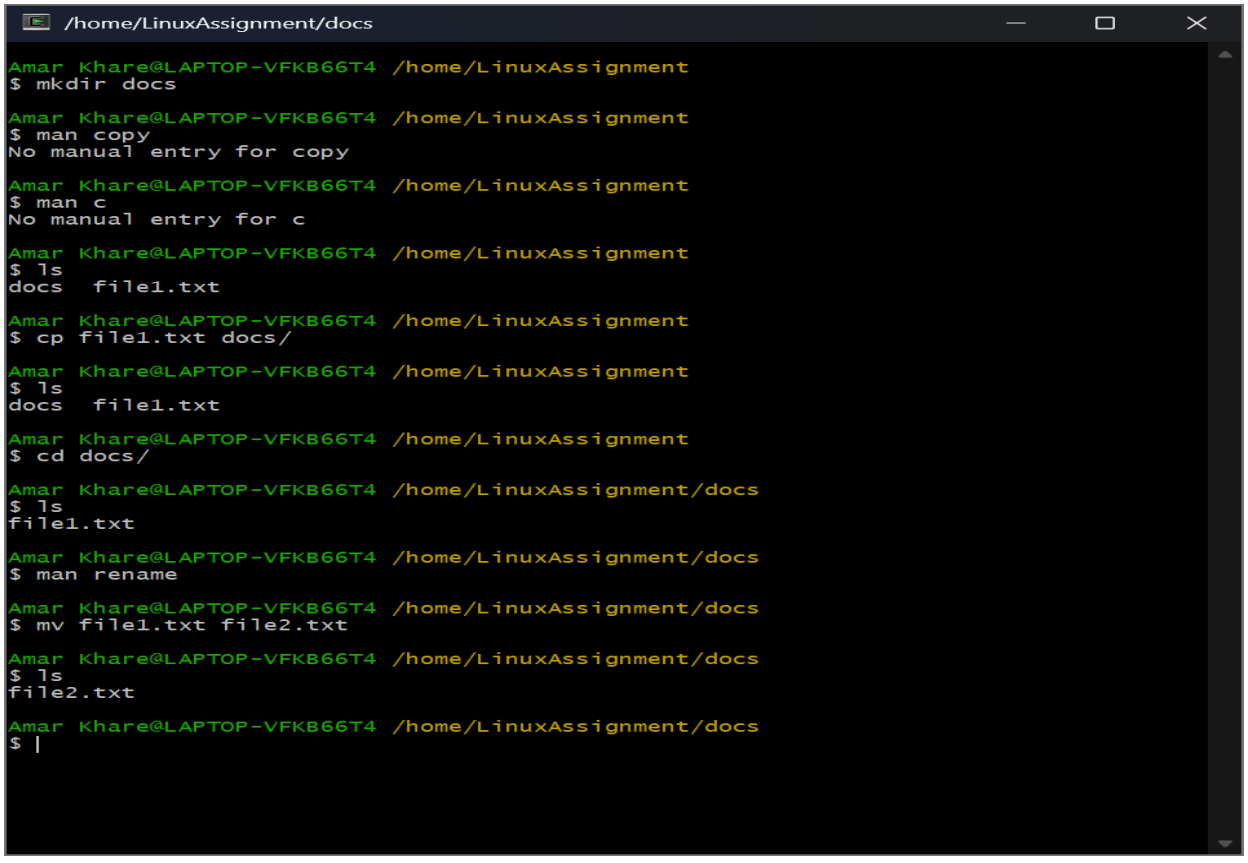


b) File Management:
   a. Inside the "LinuxAssignment" directory, create a new file named "file1.txt". Display its contents.

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



d) Copy and Move Files:
   a. Copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt".
   - Searched command to copy and paste > cp source_file destination.
   - Searched for To rename > mv prevname newname.



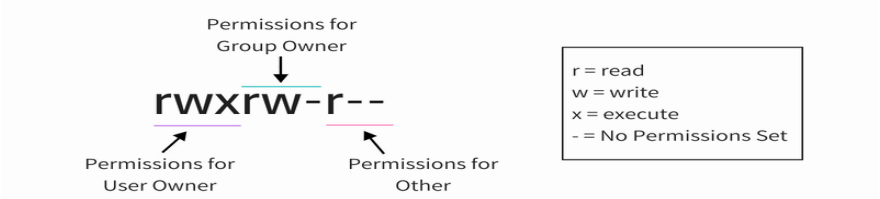
e) Permissions and Ownership:

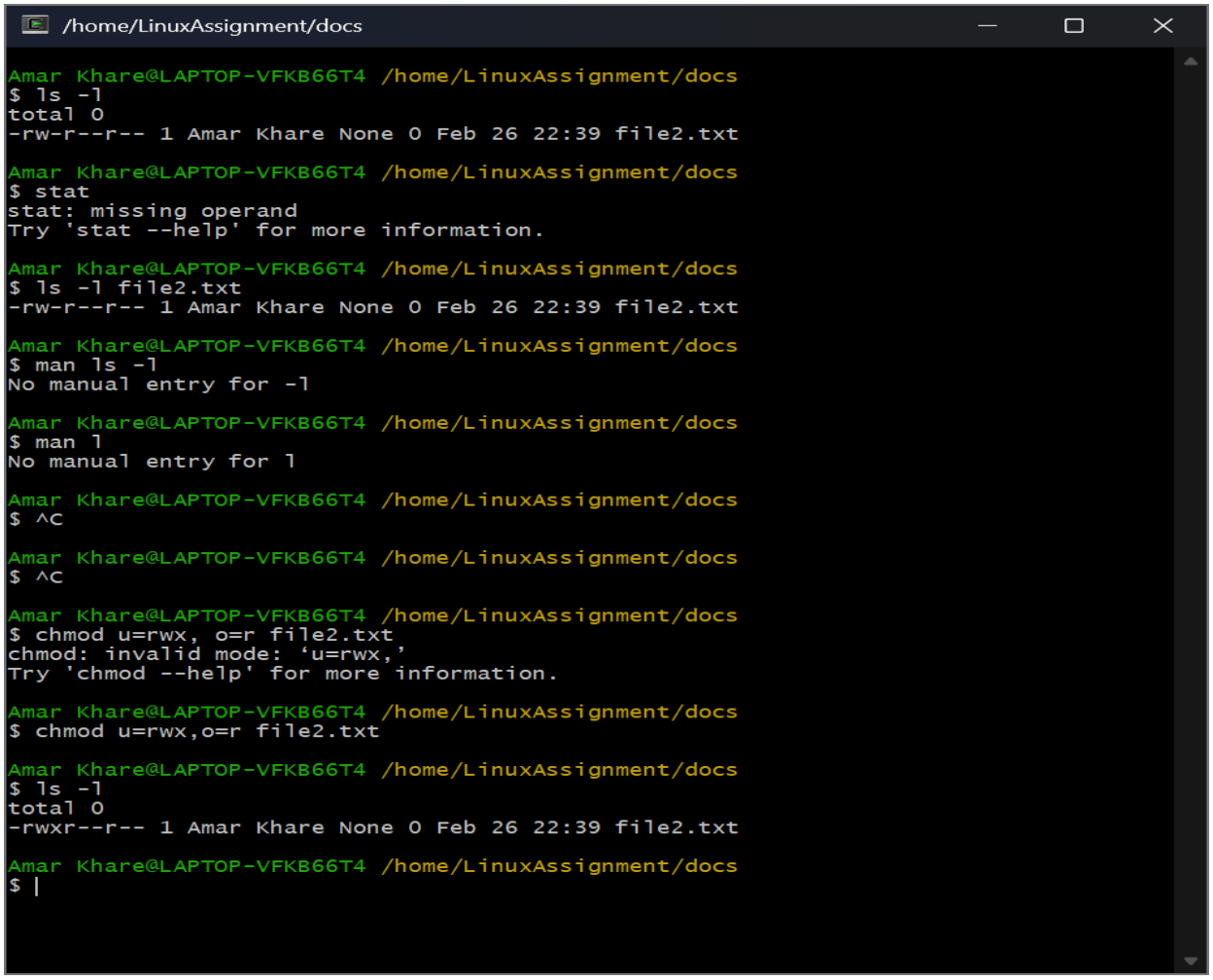
a. Change the permissions of "file2.txt" to allow read, write, and execute permissions for the owner and only read permissions for others. Then, change the owner of "file2.txt" to the current user.

- Listing permission > ls -l
- Changing permission chomd u=rws,o=r file2.txt

- Before -rw-r--r-- 1 Amar Khare None 0 Feb 26 22:39 file2.txt
- After -rwxr--r-- 1 Amar Khare None 0 Feb 26 22:39 file2.txt

- The first character = **'-'**, which means it's a file **'d'**, which means it's a directory.
- The next nine characters = (rw-r–r–) show the security
- The next column shows the owner of the file.
- The next column shows the group owner of the file. (which has special access to these files)
- The next column shows the size of the file in bytes.
- The next column shows the date and time the file was last modified.





- whoami – check the current user(who has logged in) – Amar Khare
- ls – l - shows the owner name (who has created file) – Amar Khare
- User is the one who has logged in currently. owner is the creator of the file/folder, which is shown when you do a "ls -l".

```
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ whoami
Amar Khare

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ man chown

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ chown Amar Khare file2.txt
chown: invalid user: ‘Amar’

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ chown 'Amar khare' file2.txt

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ ls -l
total 0
-rwxr--r-- 1 Amar Khare None 0 Feb 26 22:39 file2.txt

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$
```

f) Final Checklist:

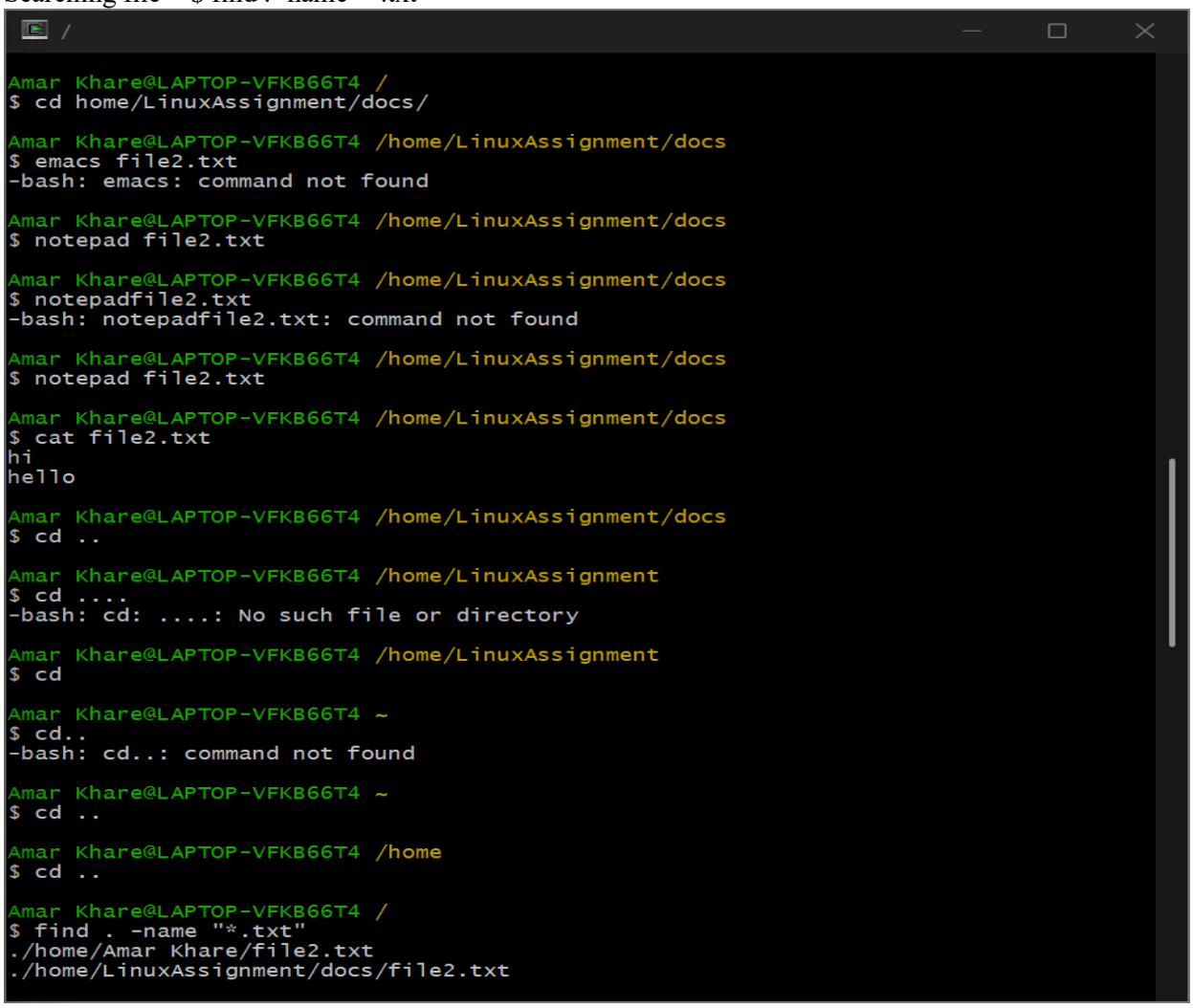
a. Finally, list the contents of the "LinuxAssignment" directory and the root directory to ensure that all operations were performed correctly.

```
/home/LinuxAssignment
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ cd

Amar Khare@LAPTOP-VFKB66T4 ~
$ ls

Amar Khare@LAPTOP-VFKB66T4 ~
$ man ls

Amar Khare@LAPTOP-VFKB66T4 ~
$ ls a
ls: cannot access 'a': No such file or directory

Amar Khare@LAPTOP-VFKB66T4 ~
$ la -a
-bash: la: command not found

Amar Khare@LAPTOP-VFKB66T4 ~
$ ls -a
.  ..  .bash_history  .bash_profile  .bashrc  .inputrc  .lesshst  .profile

Amar Khare@LAPTOP-VFKB66T4 ~
$ cd ..

Amar Khare@LAPTOP-VFKB66T4 /home
$ cd ..

Amar Khare@LAPTOP-VFKB66T4 /
$ ls
Cygwin-Terminal.ico  Cygwin.ico  cygdrive  etc   lib   sbin  usr
Cygwin.bat           bin         dev       home  proc  tmp   var

Amar Khare@LAPTOP-VFKB66T4 /
$ cd home/

Amar Khare@LAPTOP-VFKB66T4 /home
$ cd LinuxAssignment/

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ ls
docs  file1.txt

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ man ls

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$
```

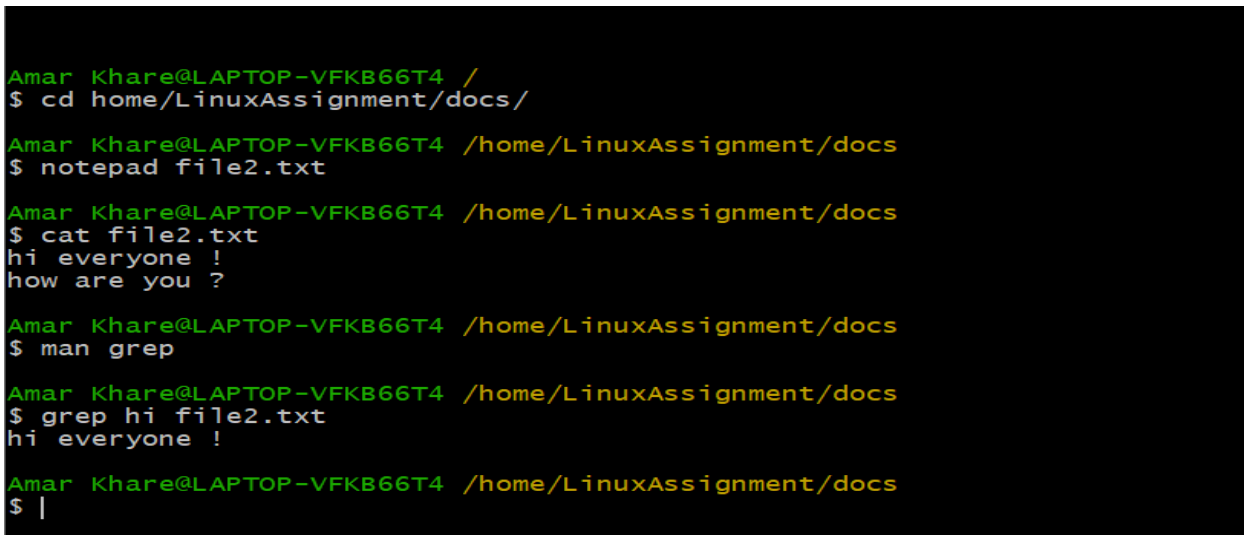
g) File Searching:

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).

- Searching file = $ find . -name "*.txt"



- Searching and displaying : Grep hi file2.txt



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

```
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ date
Thu Feb 27 01:19:42 IST 2025

Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$
```

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). j)

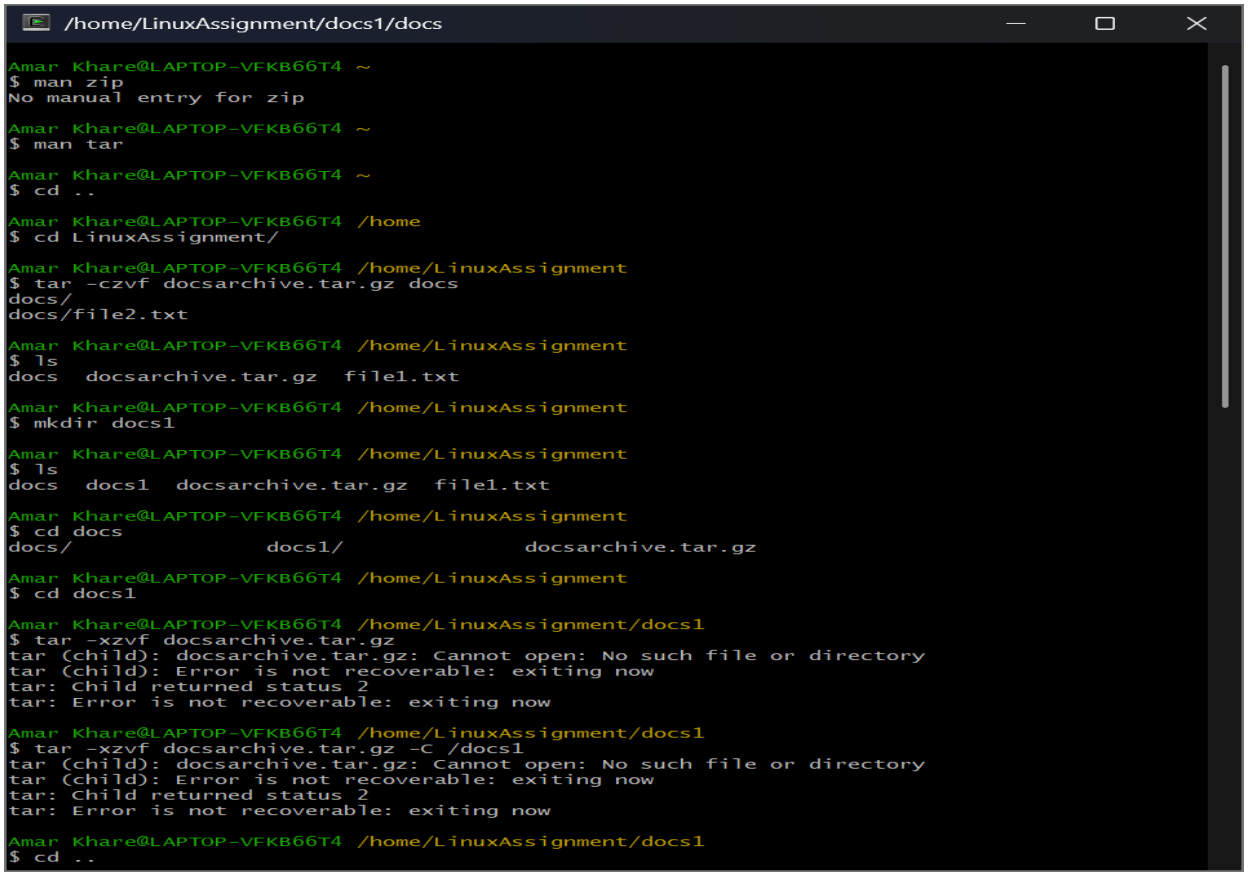
A ping is a basic Internet command that allows a user to test and verify whether a given destination IP address exists and can accept requests in computer network administration. Ping is also used for diagnosis to confirm that the computer the user tries to reach is operational. Ping can be used with any operating system (OS) that supports networking, including the majority of embedded network administration software.

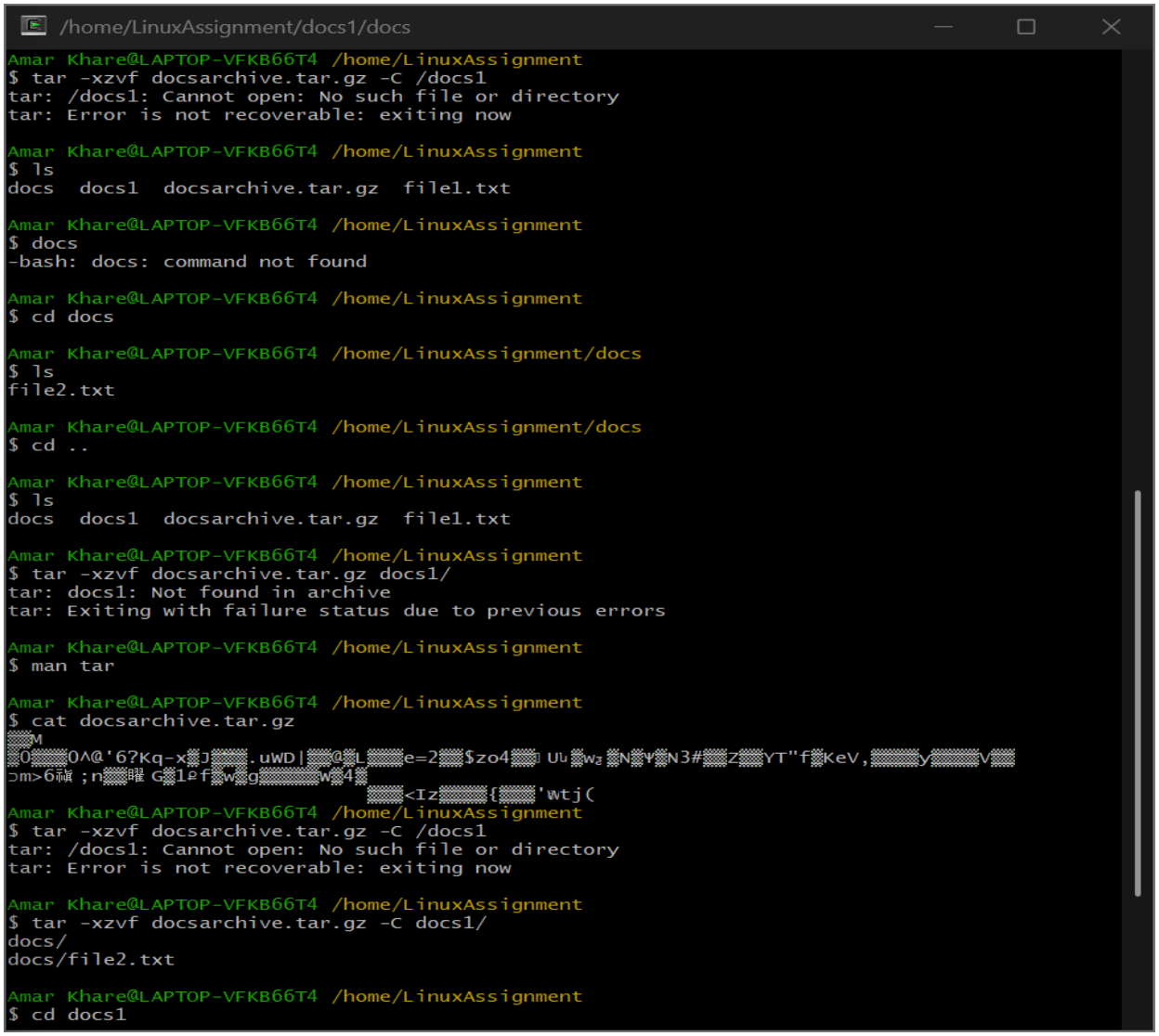
```
~
$ man hostname

Amar Khare@LAPTOP-VFKB66T4 ~
$ hostname -i
fe80::d995:a35f:f98d:a0ef%9 2401:4900:562f:cf66:1484:e4c9:176:8b75 2401:4900:562f:cf
66:973c:ec6b:13c4:3588 192.168.143.93

Amar Khare@LAPTOP-VFKB66T4 ~
$ ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
            [-r count] [-s count] [[-j host-list] | [-k host-list]]
            [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
            [-4] [-6] target_name

Options:
    -t             Ping the specified host until stopped.
                   To see statistics and continue - type Control-Break;
                   To stop - type Control-C.
    -a             Resolve addresses to hostnames.
    -n count       Number of echo requests to send.
    -l size        Send buffer size.
    -f             Set Don't Fragment flag in packet (IPv4-only).
    -i TTL         Time To Live.
    -v TOS         Type Of Service (IPv4-only. This setting has been deprecated
                   and has no effect on the type of service field in the IP
                   Header).
    -r count       Record route for count hops (IPv4-only).
    -s count       Timestamp for count hops (IPv4-only).
    -j host-list   Loose source route along host-list (IPv4-only).
    -k host-list   Strict source route along host-list (IPv4-only).
    -w timeout     Timeout in milliseconds to wait for each reply.
    -R             Use routing header to test reverse route also (IPv6-only).
                   Per RFC 5095 the use of this routing header has been
                   deprecated. Some systems may drop echo requests if
                   this header is used.
    -S srcaddr     Source address to use.
    -c compartment Routing compartment identifier.
    -p             Ping a Hyper-V Network Virtualization provider address.
    -4             Force using IPv4.
    -6             Force using IPv6.


Amar Khare@LAPTOP-VFKB66T4 ~
$ ping 192.168.143.93

Pinging 192.168.143.93 with 32 bytes of data:
Reply from 192.168.143.93: bytes=32 time<1ms TTL=128
Reply from 192.168.143.93: bytes=32 time<1ms TTL=128
Reply from 192.168.143.93: bytes=32 time<1ms TTL=128
Reply from 192.168.143.93: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.143.93:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

Amar Khare@LAPTOP-VFKB66T4 ~
$
```

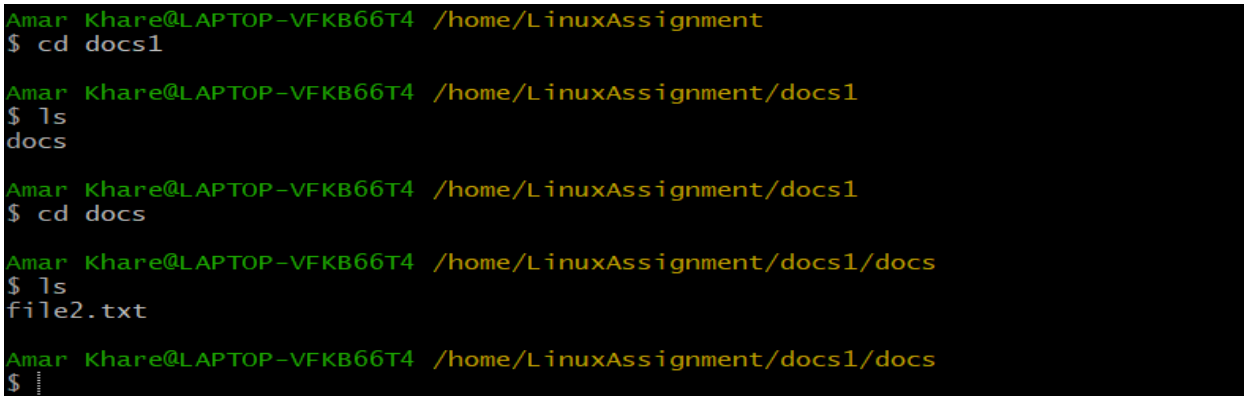
File Compression:

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

- Zip command was not working so used tar command
- `Creating compresed directory :$ tar -czvf docsarchive.tar.gz docs`
  - `-c: Create an archive.`
  - `-z: Compress the archive with gzip.`
  - `-v: Display progress in the terminal while creating the archive, also known as "verbose" mode. The v is always optional in these commands, but it's helpful.`
  - `-f: Allows you to specify the filename of the archive.`
  - `-x : to extraxt`
- `Extracting files : $ tar -xzvf docsarchive.tar.gz -C docs1/`

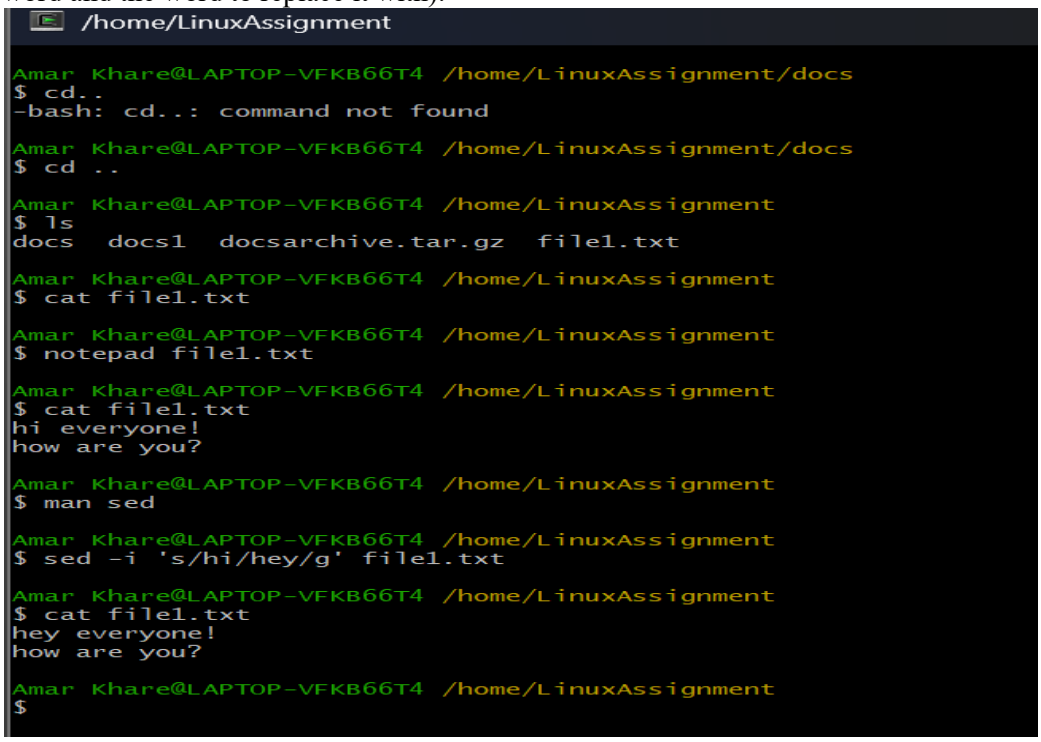



/home/LinuxAssignment/docs1/docs
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ tar -xzvf docsarchive.tar.gz -C /docs1
tar: /docs1: Cannot open: No such file or directory
tar: Error is not recoverable: exiting now
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ ls
docs docs1 docsarchive.tar.gz file1.txt
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ docs
-bash: docs: command not found
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ cd docs
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ ls
file2.txt
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs
$ cd ..
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ ls
docs docs1 docsarchive.tar.gz file1.txt
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ tar -xzvf docsarchive.tar.gz docs1/
tar: docs1: Not found in archive
tar: Exiting with failure status due to previous errors
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ man tar
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ cat docsarchive.tar.gz
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ tar -xzvf docsarchive.tar.gz -C /docs1
tar: /docs1: Cannot open: No such file or directory
tar: Error is not recoverable: exiting now
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ tar -xzvf docsarchive.tar.gz -C docs1/
docs/
docs/file2.txt
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ cd docs1


Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment
$ cd docs1
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs1
$ ls
docs
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs1
$ cd docs
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs1/docs
$ ls
file2.txt
Amar Khare@LAPTOP-VFKB66T4 /home/LinuxAssignment/docs1/docs
$

k) File Editing:

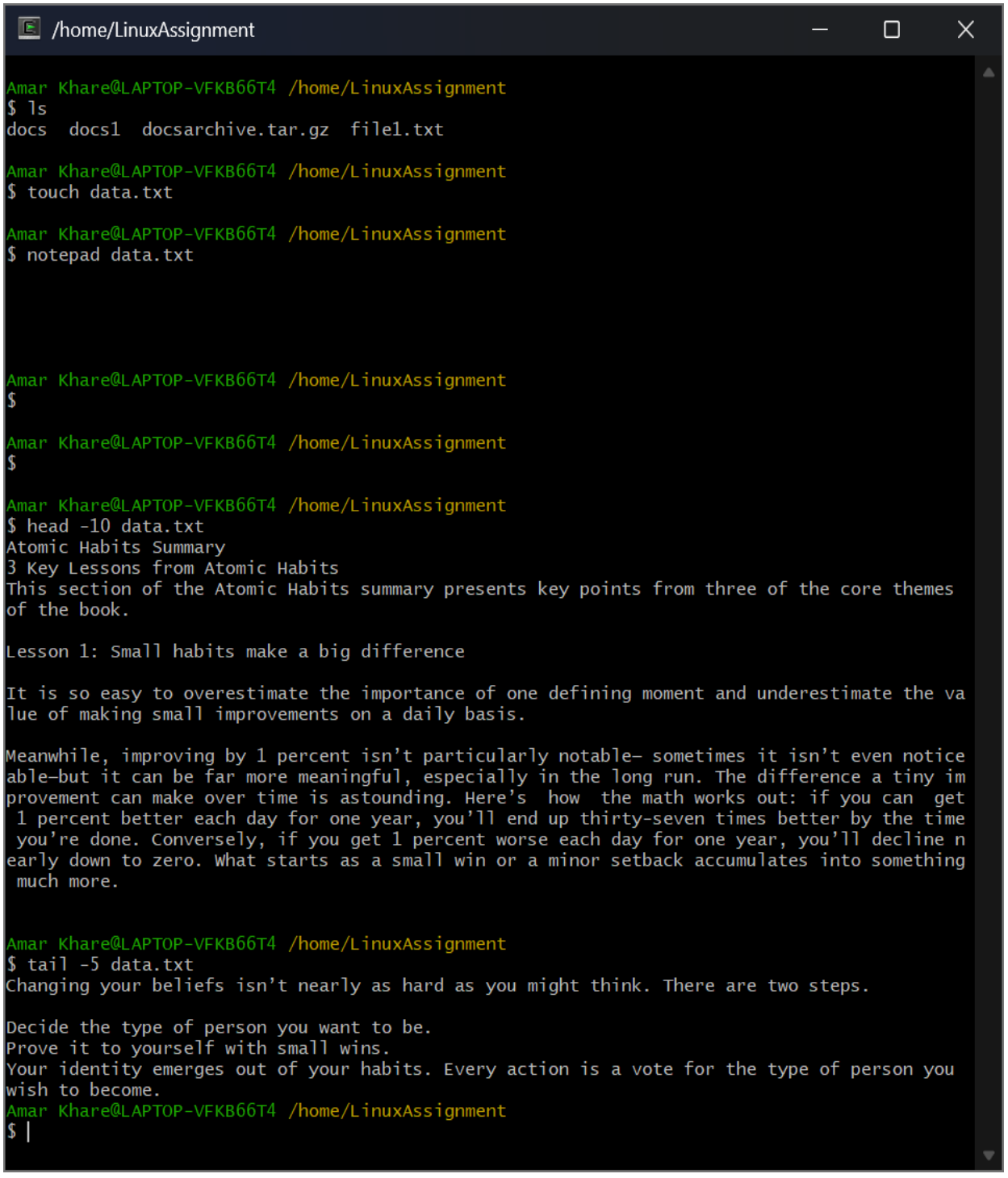
a. Open the "file1.txt" file in a text editor and add some text to it.
b. Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).



Problem 2: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.

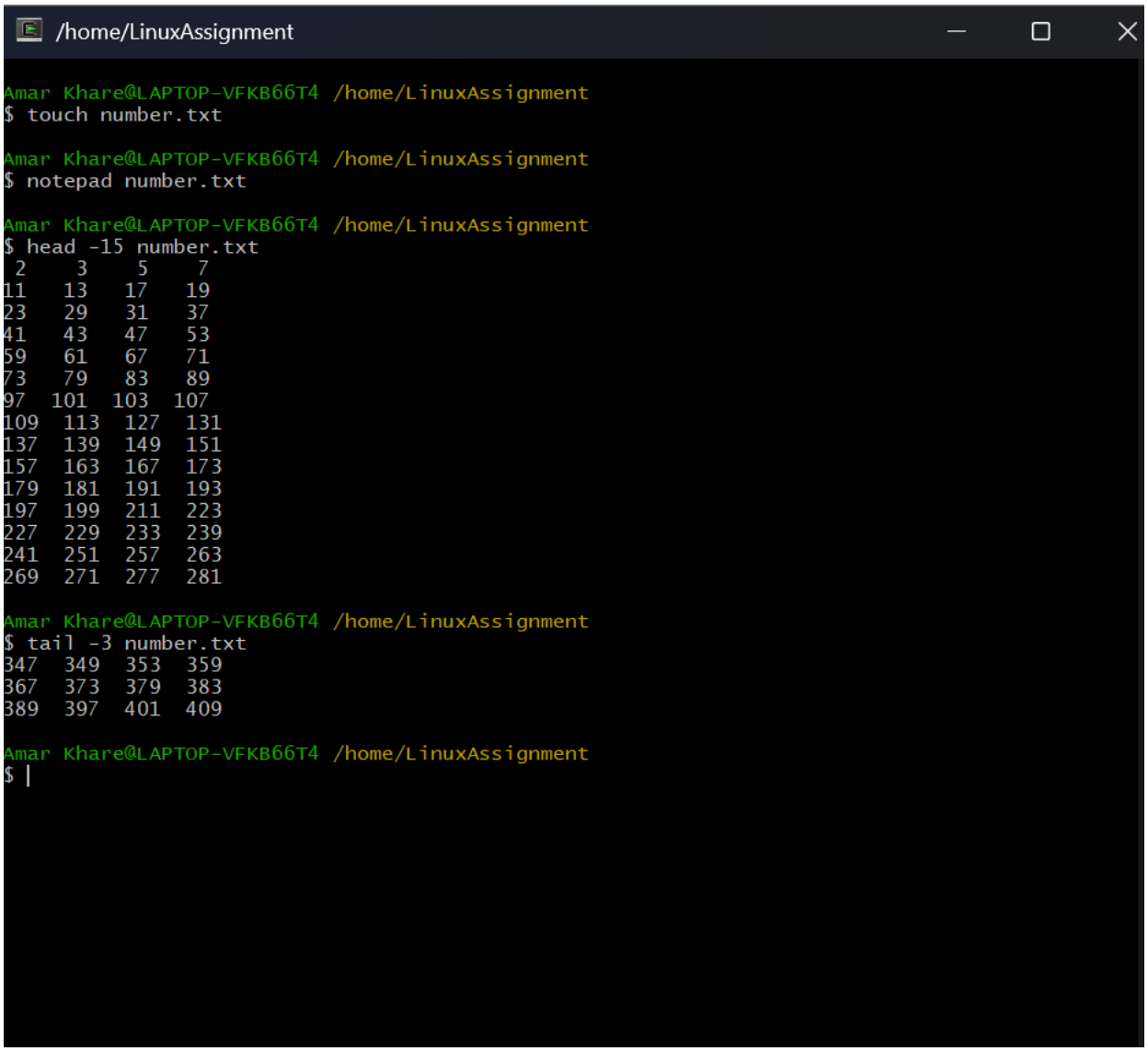
a. Suppose you have a file named "data.txt" containing important information. Display the first 10 lines of this file to quickly glance at its contents using a command.

b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command.

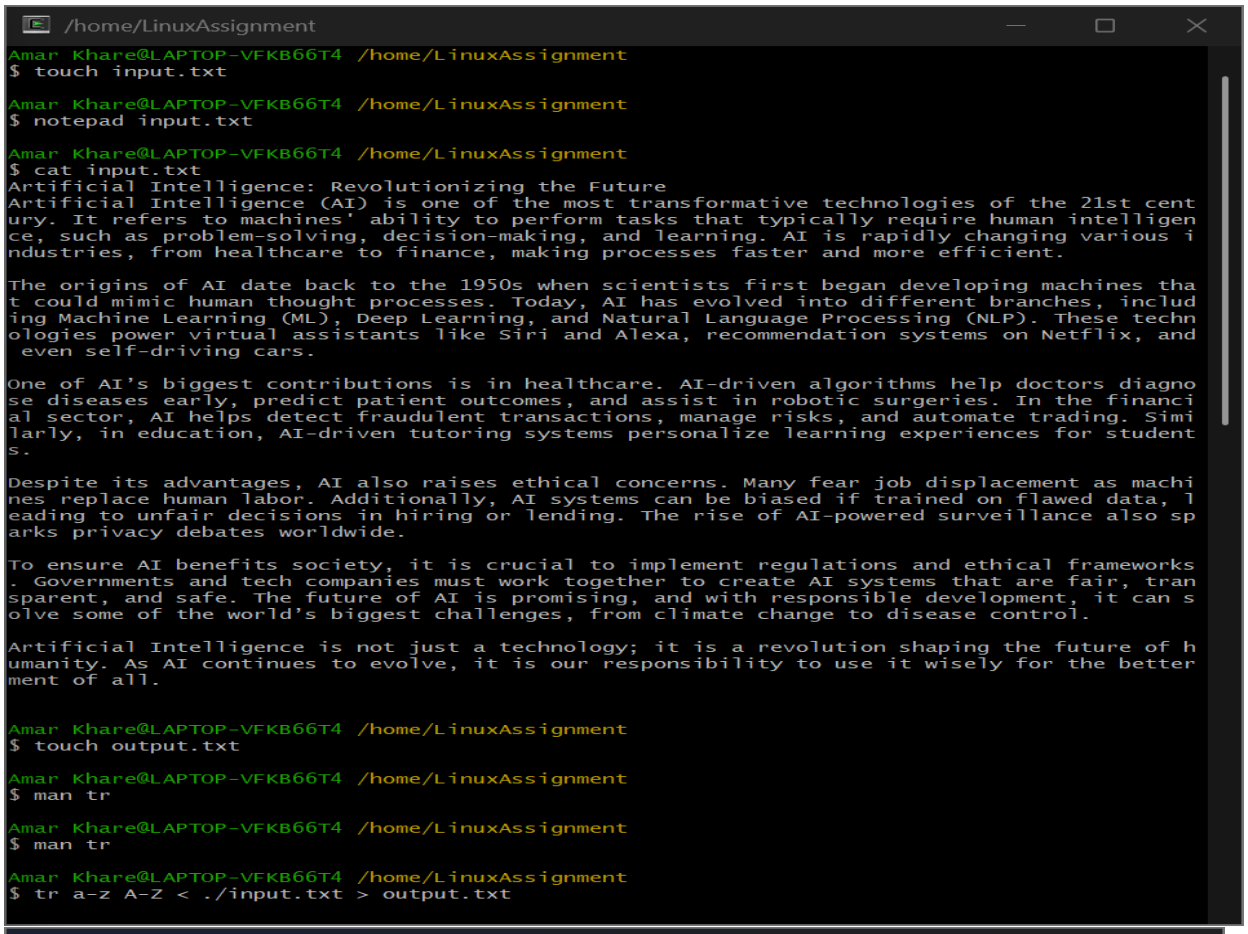


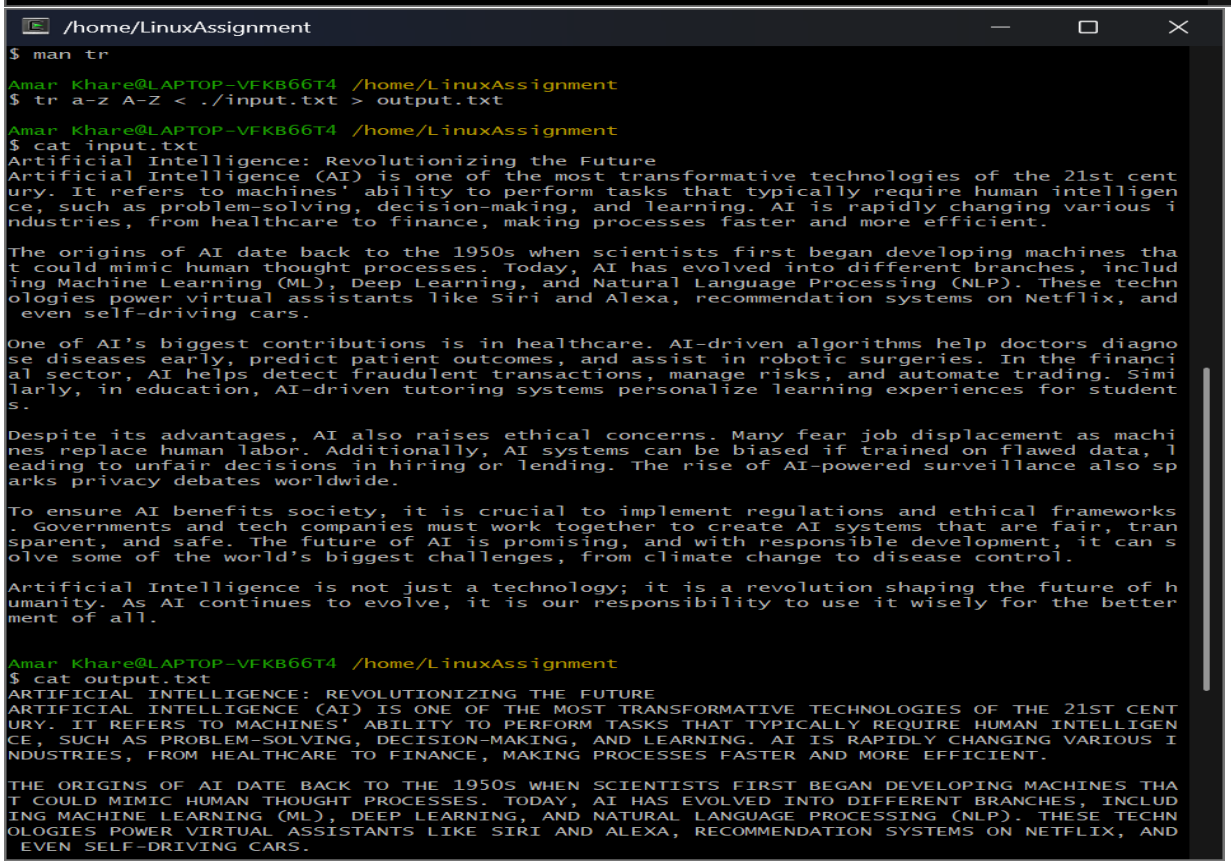
c. In a file named "numbers.txt," there are a series of numbers. Display the first 15 lines of this file to analyze the initial data set.

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

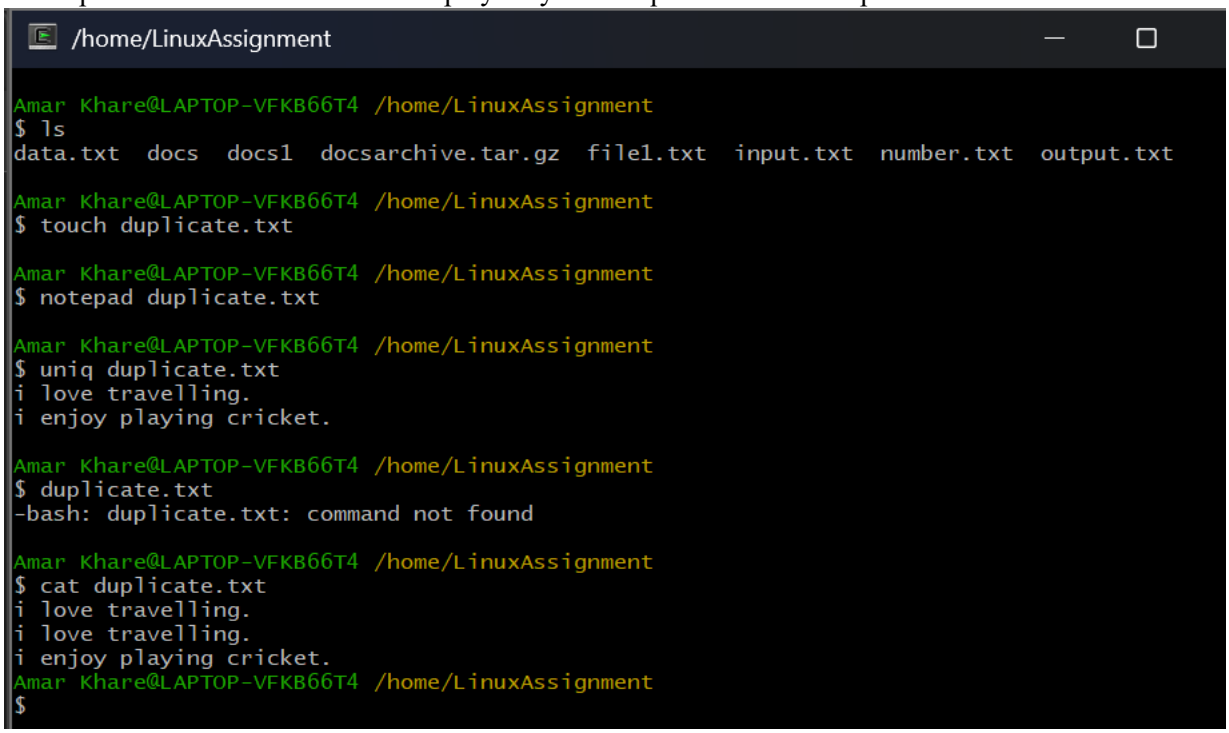


e. Imagine you have a file named "input.txt" with text content. Use a command to translate all lowercase letters to uppercase in "input.txt" and save the modified text in a new file named "output.txt."





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."



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.

- I had to sort it before printing no of unique values