Concepts of Operating System-Assignment 1 February 27, 2025

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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.

Step 1: Navigate to the Home Directory use the command:

cd ~

Step 2: To list the Contents of the Home Directory use the command:

ls

Step 3: Check if the "LinuxAssignment" Directory is Exist

ls LinuxAssignment

If the directory exists, its contents will be listed. If it doesn't exist, an error message will be displayed.

Step 4: Create the "LinuxAssignment" Directory if it Doesn't exist create it using the mkdir command:

mkdir LinuxAssignment

Step 5: Move into the "LinuxAssignment" Directory using the cd command:

cd LinuxAssignment

Now you should be inside the "LinuxAssignment" directory, ready to perform further tasks.

Output:

b) File Management:

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

contents.

Step 1: Create a New File Named "file1.txt" use the touch command:

touch file1.txt

Step 2: Insert Data into the file use a text editor like nano:

nano file1.txt

Insert some text, for example:

"Hello, World!

This is file1.txt inside the LinuxAssignment directory."

Step 3: Display the Contents of the file use the cat command:

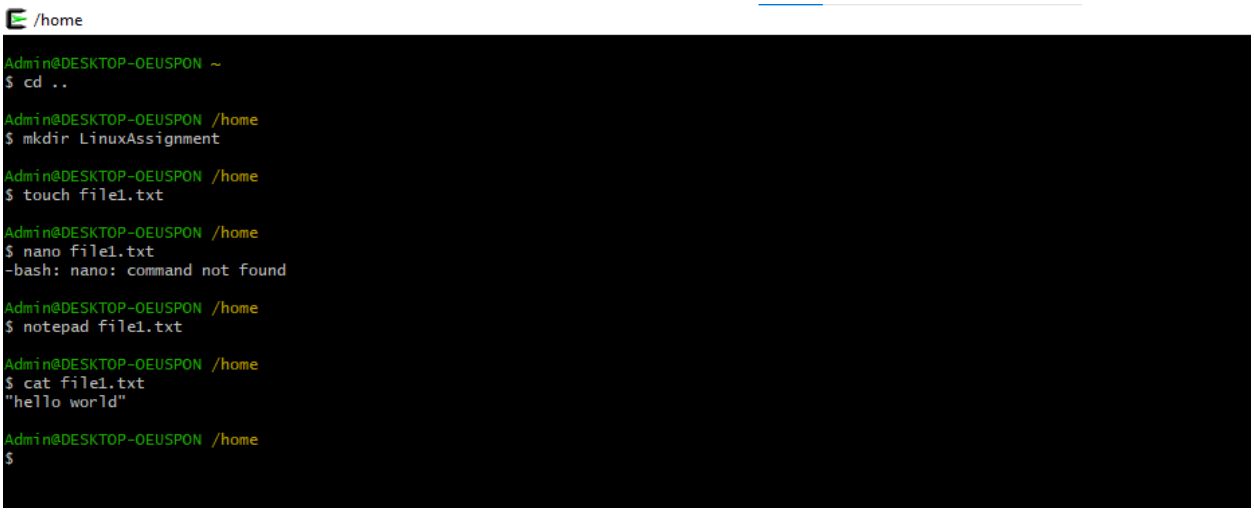
cat file1.txt

This will display the contents of the file:

"Hello, World!

This is file1.txt inside the LinuxAssignment directory."

Output:



c) Directory Management:

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

Step 1: Create a New Directory Named "docs"

To create a new directory named "docs", use the mkdir command

mkdir docs

verify that the directory has been created by listing the contents of the "LinuxAssignment" directory:

ls

This should display the newly created "docs" directory:

file1.txt

docs

Now you have created a new directory named "docs" inside the "LinuxAssignment" directory.

Output:

d) Copy and Move Files:

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

Step 1: Copy the "file1.txt" File into the "docs" Directory and Rename it to "file2.txt"

To copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt", use the cp command:

cp file1.txt docs/file2.txt

This command copies the "file1.txt" file into the "docs" directory and renames it to "file2.txt".

You can verify that the file has been copied and renamed by listing the contents of the "docs" directory:

ls docs

This should display the newly copied and renamed "file2.txt" file:

file2.txt

Now you have copied the "file1.txt" file into the "docs" directory and renamed it to "file2.txt".

Output:

~

```
Admin@DESKTOP-OEUSPON ~
$ cp file1.txt docs/file2.txt

Admin@DESKTOP-OEUSPON ~
$ ls docs
file2.txt

Admin@DESKTOP-OEUSPON ~
$
```

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.

Step 1: Change the permissions of "file2.txt" use the chmod command:

chmod 740 docs/file2.txt

This command sets the permissions of "file2.txt" to:

- 7 (rwx) for the owner (read, write, and execute)

- 4 (r--) for the group (read only)

- 0 (---) for others (no permissions)

Step 2: Change the Ownership of "file2.txt"

To change the ownership of "file2.txt", use the chown command:

bash

chown $USER:$USER docs/file2.txt

This command changes the owner and group of "file2.txt" to the current user.

You can verify the changes by using the ls -l command:

bash

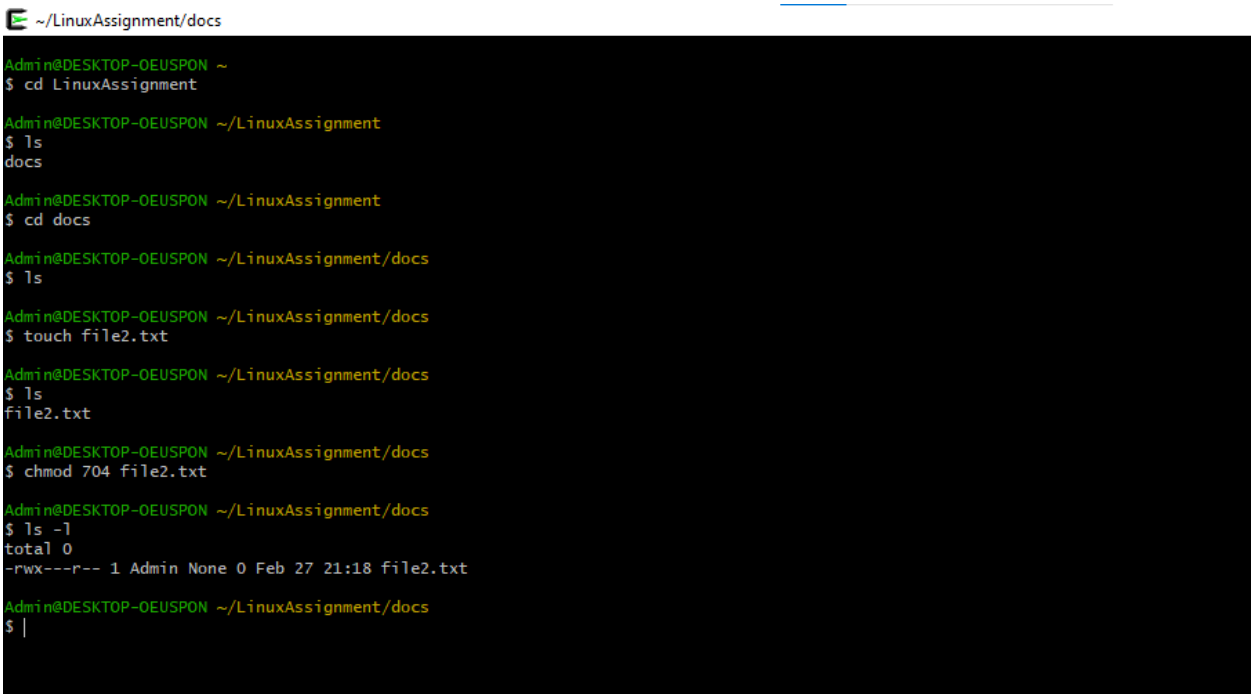
ls -l docs/file2.txt

This should display the updated permissions and ownership:

bash

-rwxr---- 1 <current_user> <current_user> ... file2.txt

Output:



f) Final Checklist:

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

Step 1: List the Contents of the "LinuxAssignment" Directory

To list the contents of the "LinuxAssignment" directory, use the ls command:

bash

ls

or

bash

ls LinuxAssignment

This should display the contents of the "LinuxAssignment" directory:

file1.txt

docs

Step 2: List the contents of the "docs" directory use the ls command:

bash

ls docs

This should display the contents of the "docs" directory:

file2.txt

Step 3: List the contents of the root directory use the ls command with the / path:

ls /

This should display the contents of the root directory:

bin

boot

dev

etc

home

By completing these steps, you have verified that all operations were performed correctly, and the "LinuxAssignment" directory and its contents are in the expected state

Output:

~

```
Admin@DESKTOP-OEUSPON ~
$ cd LinuxAssignment

Admin@DESKTOP-OEUSPON ~/LinuxAssignment
$ cd docs

Admin@DESKTOP-OEUSPON ~/LinuxAssignment/docs
$ ls -l
total 0
-rwx---r-- 1 Admin None 0 Feb 27 21:18 file2.txt

Admin@DESKTOP-OEUSPON ~/LinuxAssignment/docs
$ cd ..

Admin@DESKTOP-OEUSPON ~/LinuxAssignment
$ ls -l
total 0
drwxr-xr-x 1 Admin None 0 Feb 27 21:18 docs

Admin@DESKTOP-OEUSPON ~/LinuxAssignment
$ cd ~

Admin@DESKTOP-OEUSPON ~
$ ls -l
total 7
drwxr-xr-x 1 Admin None   0 Feb 27 21:13 LinuxAssignment
-rwxr-xr-x 1 Admin None 118 Feb 27 22:08 data.txt
drwxr-xr-x 1 Admin None   0 Feb 27 19:33 docs
-rw-r--r-- 1 Admin None   4 Feb 27 20:37 file1.txt
-rwxr-xr-x 1 Admin None  79 Feb 27 23:04 fruit.text
-rw-r--r-- 1 Admin None  69 Feb 27 23:13 fruits.txt
-rw-r--r-- 1 Admin None  43 Feb 27 23:27 input.txt
-rwxr-xr-x 1 Admin None  49 Feb 27 22:31 numbers.txt
-rw-r--r-- 1 Admin None  43 Feb 27 23:39 output.txt

Admin@DESKTOP-OEUSPON ~
$
```

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).

Ans:

a. for searching files extentionwise we can use ls -X for ls -R is used to display content of subdirectory recursively.

b. to print specific word in file we can use grep command grep "is"(any word you want to search) abc.txt

Output:

~

```
Admin@DESKTOP-OEUSPON ~
$ ls -X
LinuxAssignment  fruit.text  file1.txt   input.txt    output.txt
docs             data.txt    fruits.txt  numbers.txt

Admin@DESKTOP-OEUSPON ~
$ ls -R
.:
LinuxAssignment  docs       fruit.text  input.txt    output.txt
data.txt         file1.txt  fruits.txt  numbers.txt

./LinuxAssignment:
docs

./LinuxAssignment/docs:
file2.txt

./docs:
file2.txt

Admin@DESKTOP-OEUSPON ~
$ cat > abc.txt
Linux is easy open source

Admin@DESKTOP-OEUSPON ~
$ cat abc.txt
Linux is easy open source

Admin@DESKTOP-OEUSPON ~
$ grep "is" abc.txt
Linux is easy open source

Admin@DESKTOP-OEUSPON ~
$ grep "easy" abc.txt
Linux is easy open source

Admin@DESKTOP-OEUSPON ~
$
```

h) System Information:

a. Display the current system date and time.

Ans. we can use date command

Output:

~

```
Admin@DESKTOP-OEUSPON ~
$ date
Thu Feb 27 20:24:00 IST 2025

Admin@DESKTOP-OEUSPON ~
$
```

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).

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Step 1: Display the IP Address of the System

To display the IP address of the system, use the ip addr show command:

bash

ip addr show

This command will display detailed information about the system's network interfaces, including the IP addresses.

Alternatively, you can use the hostname -I command to display only the IP address:

bash

hostname -I

This will display the IP address of the system, for example:

192.168.1.100

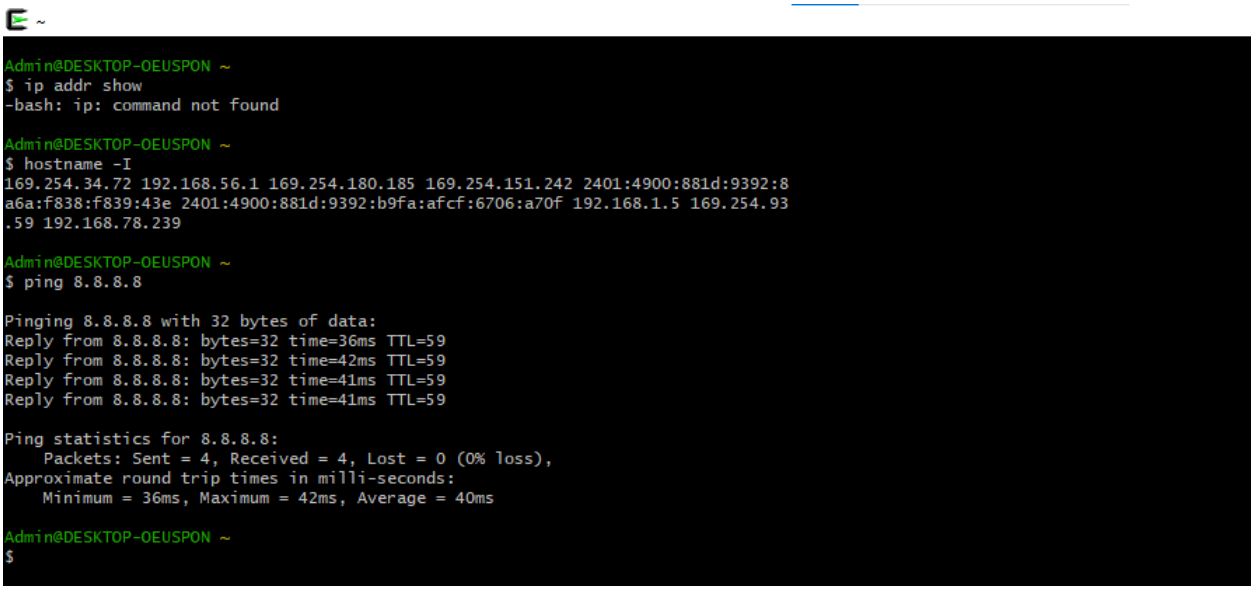
Step 2: Ping a Remote Server

To ping a remote server, use the ping command followed by the remote server's address. Let's use Google's public DNS server (8.8.8.8) as an example:

ping 8.8.8.8

This command will send ICMP echo requests to the remote server and display the responses, indicating whether the connection is successful.

Output:



j) File Compression:

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

Step 1: Compress the "docs" directory into a zip file use the zip command:

zip -r docs.zip docs

This command will create a new zip file named docs.zip containing the compressed contents of the docs directory.

Step 2: Verify the zip file use the ls command:

ls

This should display the newly created docs.zip file:

file1.txt

docs

docs.zip

Step 3: Extract the contents of the zip file use the unzip command:

unzip docs.zip -d extracted_docs

This command will extract the contents of the docs.zip file into a new directory named extracted_docs.

Step 4: Verify the extracted directory use the ls command:

ls extracted_docs

This should display the extracted contents of the docs directory:

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).

Step 1: Open the "file1.txt" file in a text editor use the nano command:

nano file1.txt

Step 2: Add Some Text to the File

"Hello, this is some additional text."

Step 3: Replace a specific word in the Fil use the sed command. Let's replace the word "Hello" with "Hi":

sed -i 's/Hello/Hi/g' file1.txt

This command will replace all occurrences of the word "Hello" with "Hi" in the "file1.txt" file.

Step 4: Verify the changes use the cat command:

cat file1.txt

This should display the updated contents of the "file1.txt" file:

"Hi, World!

This is a Linux file.

Hi, this is some additional text."

Output:

Problem 2:

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.

Ans: by using head command we can print first 10 lines.

Output:

~

```
Admin@DESKTOP-OEUSPON ~
$ notepad data.txt

Admin@DESKTOP-OEUSPON ~
$ cat data.txt
hii
hello
my file
source code
command line
readable file
easy to understand
execution
extenssion
linux source
Admin@DESKTOP-OEUSPON ~
$ head -10 data.txt
hii
hello
my file
source code
command line
readable file
easy to understand
execution
extenssion
linux source
Admin@DESKTOP-OEUSPON ~
$
```

b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command. by using tail command we can print last n lines.(here we can print last 5 lines)

Output:

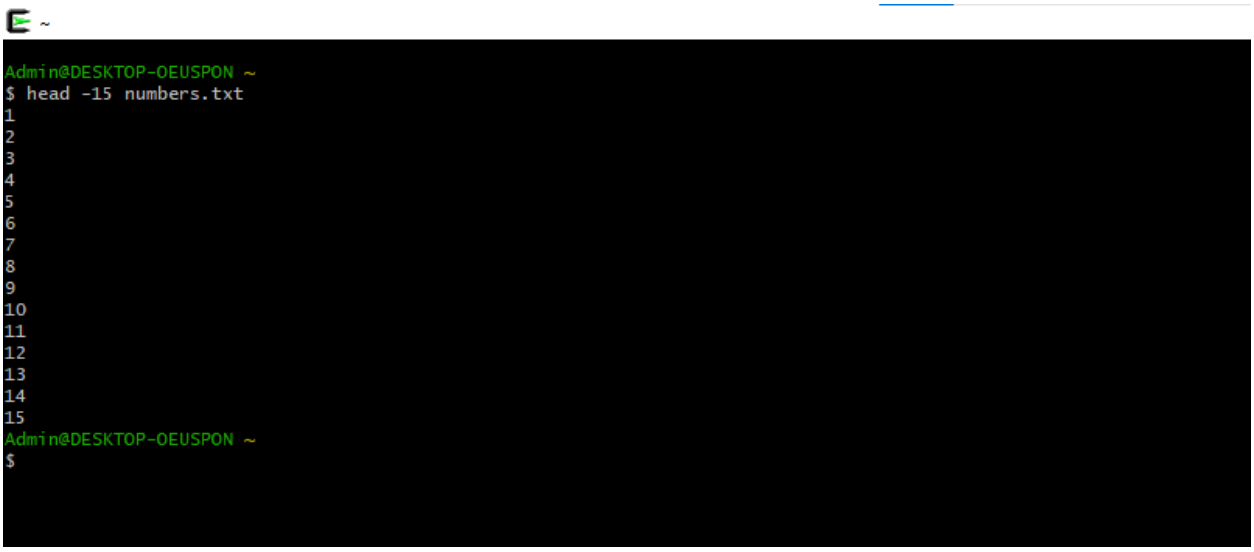
~

```
Admin@DESKTOP-OEUSPON ~
$ notepad data.txt

Admin@DESKTOP-OEUSPON ~
$ cat data.txt
hii
hello
my file
source code
command line
readable file
easy to understand
execution
extenssion
linux source
Admin@DESKTOP-OEUSPON ~
$ head -10 data.txt
hii
hello
my file
source code
command line
readable file
easy to understand
execution
extenssion
linux source
Admin@DESKTOP-OEUSPON ~
$ tail -5 data.txt
readable file
easy to understand
execution
extenssion
linux source
Admin@DESKTOP-OEUSPON ~
$
```

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:



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

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:

```
Admin@DESKTOP-OEUSPON ~
$ cat > input.txt
Hello
Hii
Bye
Linux Sourse
command prompt

Admin@DESKTOP-OEUSPON ~
$ sed 's/[A-Z}/ \U & g/' image.txt
sed: -e expression #1, char 16: unterminated `s' command

Admin@DESKTOP-OEUSPON ~
$ sed 's/[A-Z} / \U & g/' image.txt
sed: -e expression #1, char 17: unterminated `s' command

Admin@DESKTOP-OEUSPON ~
$ sed 's/[A-Z] / \U & g/' image.txt
sed: can't read image.txt: No such file or directory

Admin@DESKTOP-OEUSPON ~
$ sed 's/[A-Z] / \U & g/' input.txt
Hello
Hii
Bye
Linux Sourse
command prompt
```

```
Admin@DESKTOP-OEUSPON ~
$ cat input.txt | tr 'a-z' 'A-Z' > output.txt

Admin@DESKTOP-OEUSPON ~
$ cat output.txt
HELLO
HII
BYE
LINUX SOURSE
COMMAND PROMPT

Admin@DESKTOP-OEUSPON ~
$ cat input.txt | tr 'A-Z' 'a-z' > output.txt

Admin@DESKTOP-OEUSPON ~
$ cat output.txt
hello
hii
bye
linux sourse
command prompt

Admin@DESKTOP-OEUSPON ~
$
```

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:

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:

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~

```
Admin@DESKTOP-OEUSPON ~
$ cat > fruits.txt
banana
apple
pineapple
banana
orange
jackfruit
apple
strobery
orange

Admin@DESKTOP-OEUSPON ~
$ sort fruits.txt | uniq -c
      2 apple
      2 banana
      1 jackfruit
      2 orange
      1 pineapple
      1 strobery

Admin@DESKTOP-OEUSPON ~
$
```