

# National Textile University, Faisalabad



## Department of Computer Science

<b>Name</b>	Dawood Saif
<b>Class</b>	SE-5 <sup>th</sup> (A)
<b>Reg. No.</b>	23-NTU-CS-1145
<b>Course</b>	Operating system
<b>Submitted To</b>	Sir Nasir
<b>Submission Date</b>	9/10/2025
<b>Lab No.</b>	3 (Home Work)

## Lab No. 3 (Home Work)

### Part 1: File and Directory Operations:

Create the following directory structure in your home directory:

Lab\_3/

```
|—— docs/
|   |—— drafts/
|   |—— data/
|       |—— raw/
|       |—— processed/
|—— scripts/
```

2. Inside docs/ :

Create three files: intro.txt, notes.txt, summary.txt.

Add at least **two lines of text** into each using echo>>.

Copy summary.txt into the drafts/ folder using cp command.

3. Inside data/raw/ :

Create two files: raw1.txt, raw2.txt.

Append the **current date** into raw1.txt using the date command.

Move raw2.txt into processed/ using mv. The syntax is:

`mv source destination`

4. Inside scripts/ :

Create a script named hello.sh with the following content:

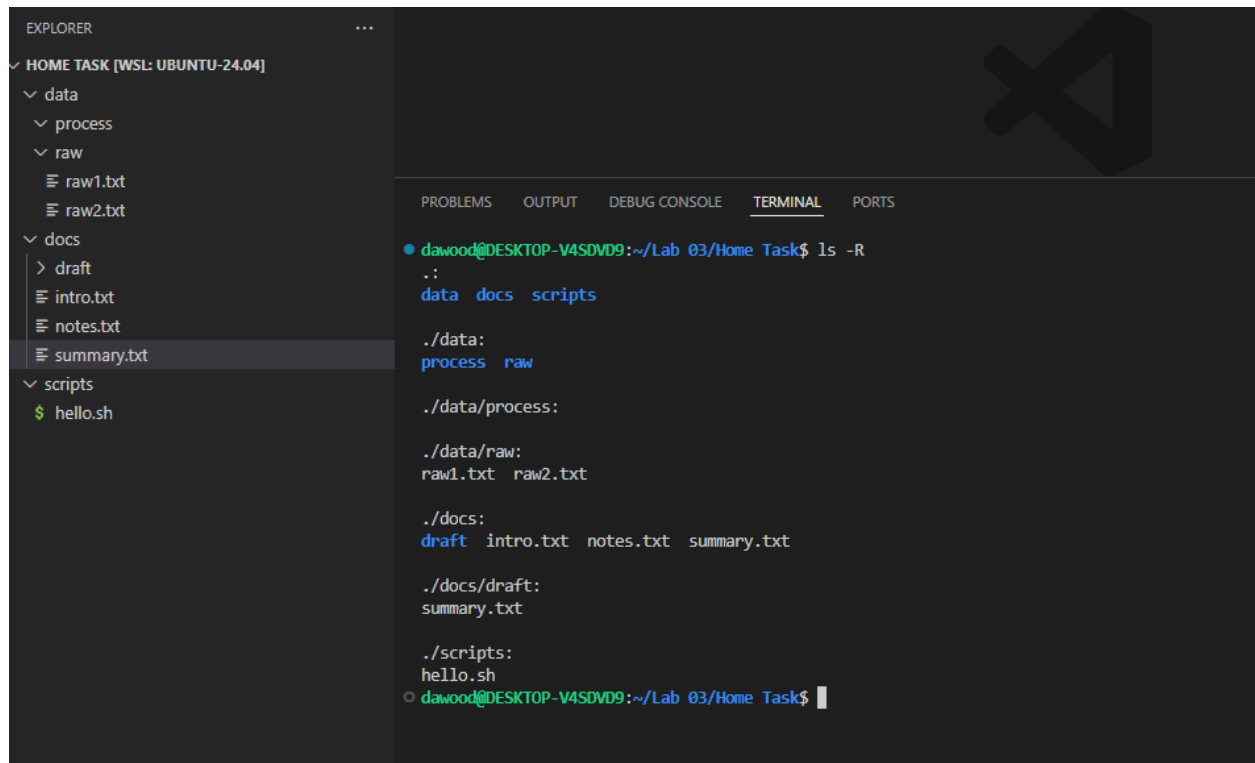
`echo "Hello World"`

`pwd`

`ls -lh`

Later, you will make it executable (in Part 3).

5. Display the directory structure recursively and take a Screenshot:



## Part 2: Practice with Basic Linux Commands

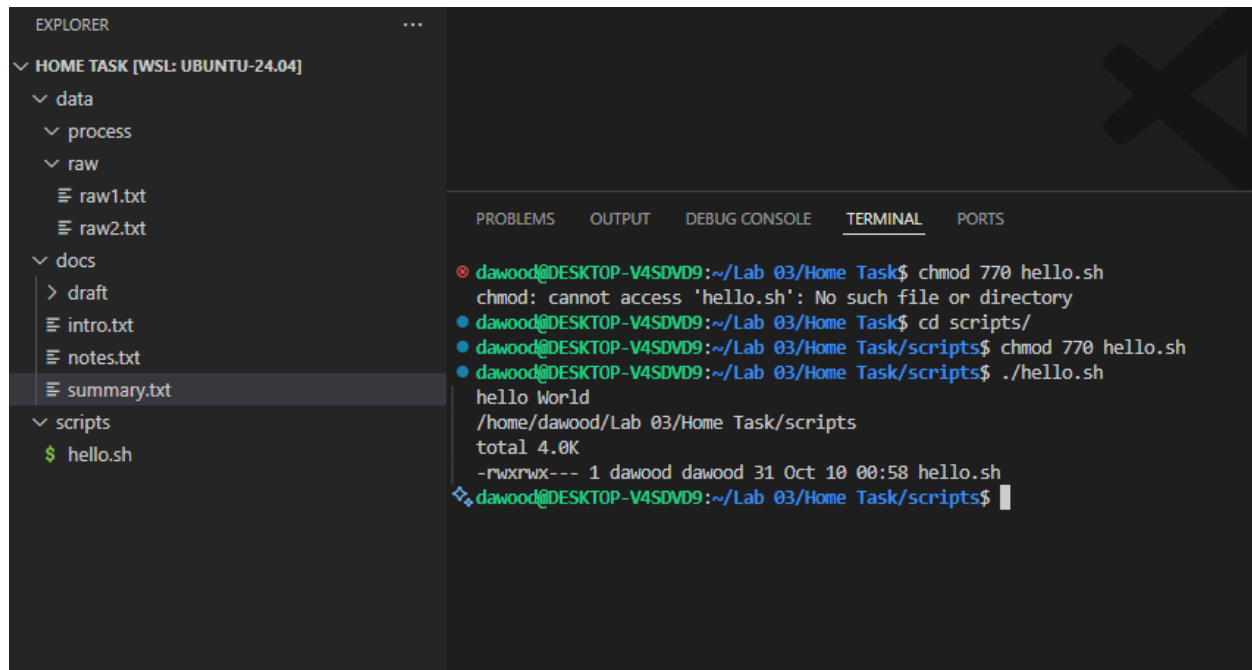
Screenshot:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ pwd
/home/dawood/Lab 03/Home Task
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ whoami
dawood
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ touch extra.txt
⊗ dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ cat intro.txt
cat: intro.txt: No such file or directory
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ rm extra.txt
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ history | tail -n 5
352  whoami
353  touch extra.txt
354  cat intro.txt
355  rm extra.txt
356  history | tail -n 5
○ dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$
```

## Part 3: File Permissions and Ownership

1. Changing Permissions of hello.sh using 770 in chmod



The image shows a screenshot of the Visual Studio Code (VS Code) interface. On the left, the Explorer sidebar is open, showing the file structure of a project named 'HOME TASK [WSL: UBUNTU-24.04]'. The structure includes a 'data' directory, a 'process' directory, a 'raw' directory with files 'raw1.txt' and 'raw2.txt', a 'docs' directory with files 'draft', 'intro.txt', 'notes.txt', and 'summary.txt', and a 'scripts' directory with a file 'hello.sh'. The 'scripts' directory is selected, and 'hello.sh' is highlighted. On the right, the Terminal panel is active, showing the following commands and output:

```
dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ chmod 770 hello.sh
chmod: cannot access 'hello.sh': No such file or directory
dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ cd scripts/
dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/scripts$ chmod 770 hello.sh
dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/scripts$ ./hello.sh
hello World
/home/dawood/Lab 03/Home Task/scripts
total 4.0K
-rwxrwx--- 1 dawood dawood 31 Oct 10 00:58 hello.sh
dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/scripts$
```

- Change the permissions of intro.txt using **numeric notation** so that
- Change the permissions of notes.txt using **symbolic notation** so that others don't have any permission on it.

```
HOME TASK [WSL: UBUNTU-24.04]
└─ data
  └─ process
  └─ raw
    ├── raw1.txt
    └── raw2.txt
└─ docs
  ├── draft
  ├── intro.txt
  ├── notes.txt
  └── summary.txt
└─ scripts
  └─ hello.sh
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
⊗ dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ chmod 770 hello.sh
chmod: cannot access 'hello.sh': No such file or directory
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ cd scripts/
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/scripts$ chmod 770 hello.sh
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/scripts$ ./hello.sh
hello World
/home/dawood/Lab 03/Home Task/scripts
total 4.0K
-rwxrwx--- 1 dawood dawood 31 Oct 10 00:58 hello.sh
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/scripts$ cd ..
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ cd docs/
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ ls
draft intro.txt notes.txt summary.txt
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ chmod 664 intro.txt
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ chmod o-rwx notes.txt
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ ls -l
total 16
drwxr-xr-x 2 dawood dawood 4096 Oct 10 00:48 draft
-rw-rw-r-- 1 dawood dawood 65 Oct 8 19:45 intro.txt
-rw-r----- 1 dawood dawood 170 Oct 10 00:34 notes.txt
-rw-r--r-- 1 dawood dawood 318 Oct 10 00:39 summary.txt
○ dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$
```

## Part 4: Reading & Searching Files:

1. Count the number of lines, words, and characters in notes.txt using wc .
  2. Show only the first 2 lines of summary.txt using head -n 2 .
- Take screenshots.
3. Show the last line of summary.txt using tail -n 1 .
  4. Search for a keyword (of your choice) in intro.txt using grep

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task$ cd docs/
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ wc intro.txt
  2 14 65 intro.txt
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ wc notes.txt
  3 36 170 notes.txt
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ head -n 2 summary.txt
this the third file of docs directory in this file i have to write something
but i dont know what to write so i am just writing what i dont know
● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ tail -n 1 summary.txt

● dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$ grep "Dawood" intro.txt
How are you? Dawood
○ dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task/docs$
```

## Part 5: Linux Process Commands

### 1. Exploring Processes

Use `ps -ef` and identify **3 processes** running on your system. Note their **PID**, **PPID**, and **command**.

Run `top` for 20–30 seconds. Write down:

Which process is consuming the most CPU.

Which process is consuming the most memory.

### 2. Practice with Infinite Process

Start:

```
yes > /dev/null &
```

Locate its PID using `ps -ef | grep yes`.

Kill it using `kill <PID>` and verify using `ps`.

### 3. Foreground & Background Jobs

Run `sleep 60` in **foreground** and terminate it with **Ctrl + C**.

Run `sleep 60 &` in **background**, bring it to foreground with `fg`, stop with **Ctrl + Z**,

then resume in background using `bg` .

## Part 6: C Programs on Processes

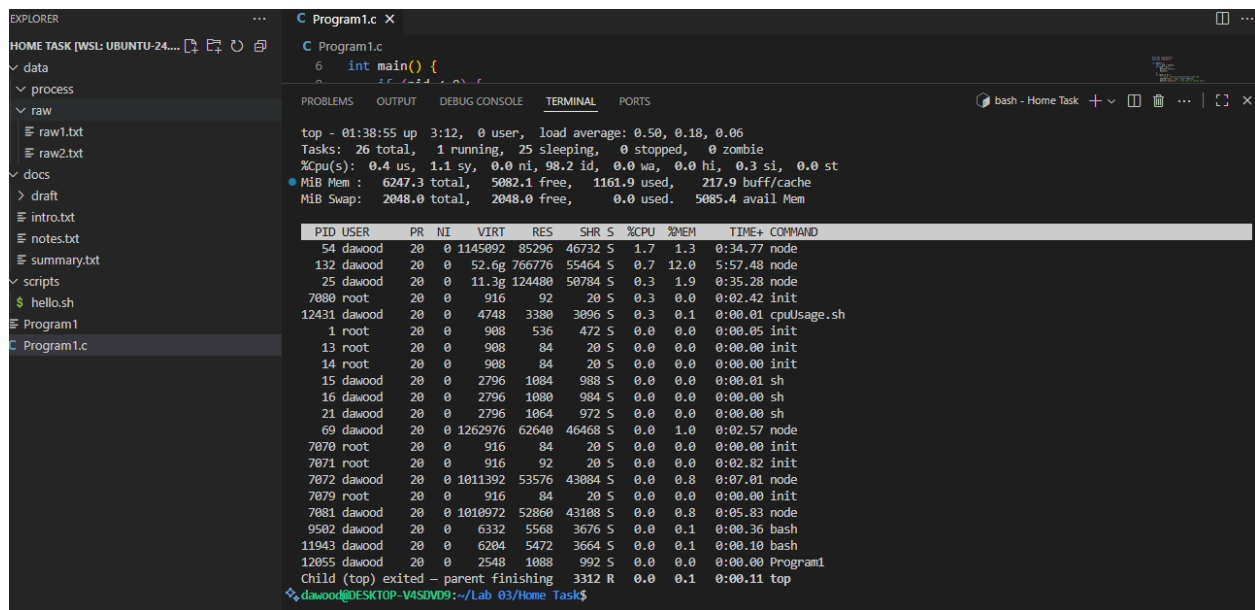
### Program 1 – Exec with `top`

Modify the `exec` program so that the child runs `top` instead of `ls -l` .

Run the program.

In another terminal, use `ps -ef | grep top` (or run `top` ) to find the child's PID.

Use the child's process ID to kill it manually.



The screenshot shows a VS Code editor with a file explorer on the left and a terminal window on the right. The file explorer shows a project named 'Program1.c' with files like 'data', 'process', 'raw', 'docs', 'draft', 'intro.txt', 'notes.txt', 'summary.txt', 'scripts', 'hello.sh', 'Program1', and 'Program1.c'. The terminal window shows the output of the program, which is a `top` command output. The output includes system statistics and a table of running processes.

```
top - 01:38:55 up 3:12, 0 user, load average: 0.50, 0.18, 0.06
Tasks: 26 total, 1 running, 25 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.4 us, 1.1 sy, 0.0 ni, 98.2 id, 0.0 wa, 0.0 hi, 0.3 si, 0.0 st
MiB Mem : 6247.3 total, 5082.1 free, 1161.9 used, 217.9 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used, 5085.4 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
54	dawood	20	0	1145892	85296	46732	S	1.7	1.3	0:34.77	node
132	dawood	20	0	52.6g	766776	55464	S	0.7	12.0	5:57.48	node
25	dawood	20	0	11.3g	124480	50784	S	0.3	1.9	0:35.28	node
7080	root	20	0	916	92	20	S	0.3	0.0	0:02.42	init
12431	dawood	20	0	4748	3380	3096	S	0.3	0.1	0:00.01	cpuUsage.sh
1	root	20	0	908	536	472	S	0.0	0.0	0:00.05	init
13	root	20	0	908	84	20	S	0.0	0.0	0:00.00	init
14	root	20	0	908	84	20	S	0.0	0.0	0:00.00	init
15	dawood	20	0	2796	1084	988	S	0.0	0.0	0:00.01	sh
16	dawood	20	0	2796	1080	984	S	0.0	0.0	0:00.00	sh
21	dawood	20	0	2796	1064	972	S	0.0	0.0	0:00.00	sh
69	dawood	20	0	1262976	62640	46468	S	0.0	1.0	0:02.57	node
7070	root	20	0	916	84	20	S	0.0	0.0	0:00.00	init
7071	root	20	0	916	92	20	S	0.0	0.0	0:02.82	init
7072	dawood	20	0	1011392	53576	43884	S	0.0	0.8	0:07.01	node
7079	root	20	0	916	84	20	S	0.0	0.0	0:00.00	init
7081	dawood	20	0	1010972	52860	43108	S	0.0	0.8	0:05.83	node
9502	dawood	20	0	6332	5568	3676	S	0.0	0.1	0:00.36	bash
11943	dawood	20	0	6204	5472	3664	S	0.0	0.1	0:00.10	bash
12055	dawood	20	0	2548	1088	992	S	0.0	0.0	0:00.00	Program1
Child (top) exited - parent finishing											
3312	R	0.0	0.1	0:00.11	top						

### Program 2 – Incomplete Program

**Task:** Complete the missing parts, run the program, and take a screenshot of the output.



EXPLORER

HOME TASK [WSL: UBUNTU-24.04]

data

process

raw

raw1.txt

raw2.txt

docs

draft

intro.txt

notes.txt

summary.txt

scripts

hello.sh

Program1

Program1.c

Program2

Program2.c

Program1.c

Program2.c X

Program2.c

```
6  int main() {
7      pid_t pid = fork();
8      if (pid < 0) {
9          perror("fork");
10         return 1;
11     }
12     if (pid == 0) {
13         // Child: replace this process with the "date" command
14         execlp("date", "date", (char *)NULL);
15         perror("execlp"); // only runs if execlp fails
16         return 1;
17     } else {
18         // Parent: wait for child, then print
19         wait(NULL);
20         printf("Child finished\n");
21     }
22     return 0;
23 }
24
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

PORTS

dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task\$ gcc Program2.c -o Program2

dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task\$ ./Program2

Fri Oct 10 01:43:29 PKT 2025

Child finished

dawood@DESKTOP-V4SDVD9:~/Lab 03/Home Task\$