



National Textile University
Department of Computer Science

Subject: Operating System

Submitted to: Sir Nasir Mahmood

Submitted by: Nimra Tanveer

Reg number:23-NTU-CS-1201

Section: BS SE A

Semester: 5th

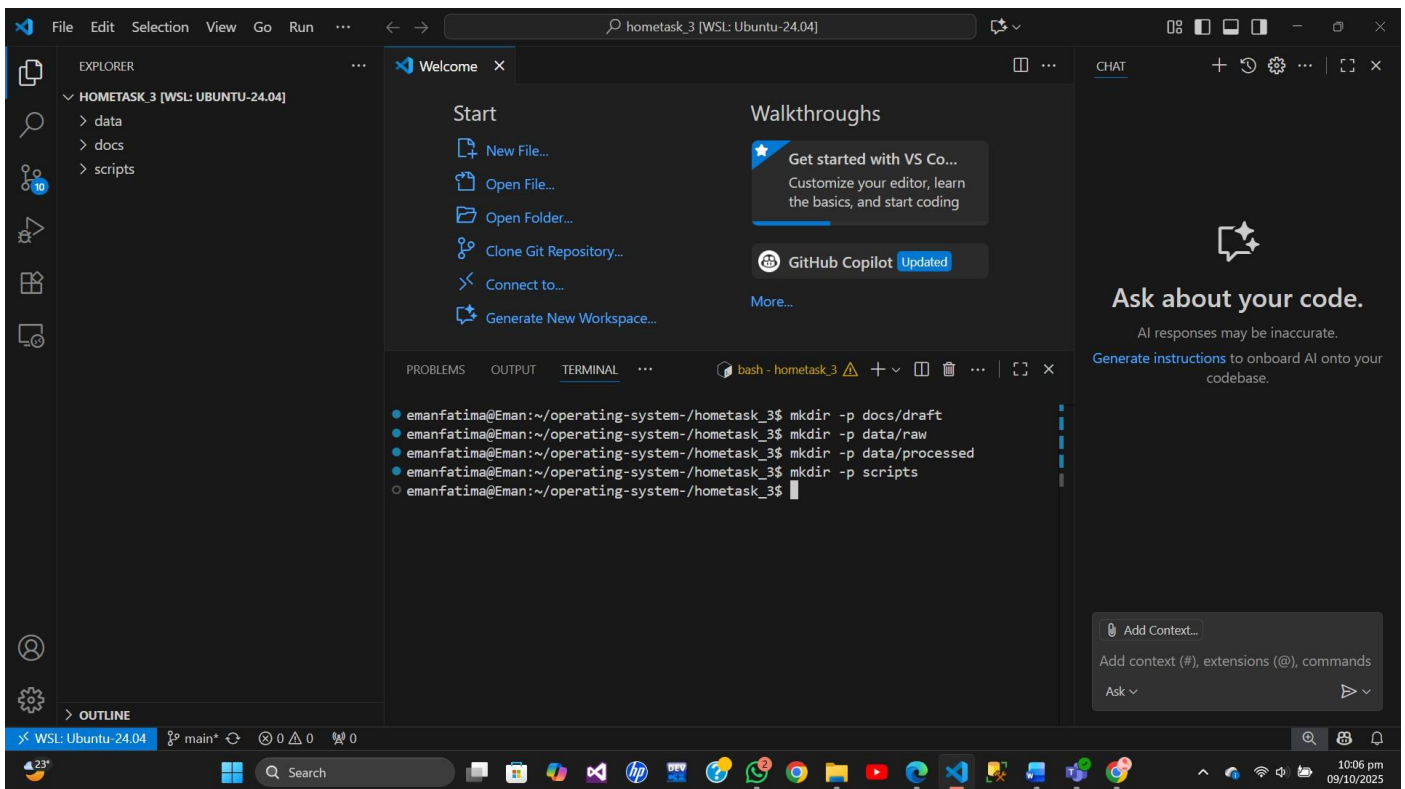
Home task 3:

Task 1:

1. Create the following directory structure in your home directory:

```
Lab_3/  
├── docs/  
│   └── drafts/  
├── data/  
│   ├── raw/  
│   └── processed/  
└── scripts/
```

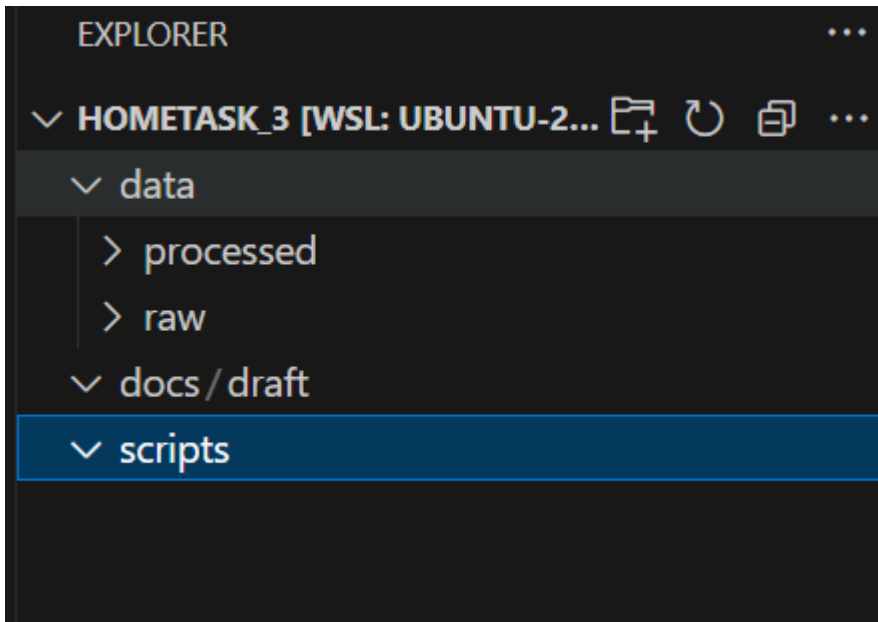
Answer :



The screenshot shows the Visual Studio Code interface with the Explorer panel on the left displaying the directory structure: `hometask_3 [WSL: UBUNTU-24.04]` containing `data`, `docs`, and `scripts`. The Terminal panel at the bottom shows the following commands and output:

```
emanfatima@Eman:~/operating-system-/hometask_3$ mkdir -p docs/draft  
emanfatima@Eman:~/operating-system-/hometask_3$ mkdir -p data/raw  
emanfatima@Eman:~/operating-system-/hometask_3$ mkdir -p data/processed  
emanfatima@Eman:~/operating-system-/hometask_3$ mkdir -p scripts  
emanfatima@Eman:~/operating-system-/hometask_3$
```

The right sidebar shows the Chat panel with the prompt "Ask about your code." and a button to "Generate instructions to onboard AI onto your codebase."



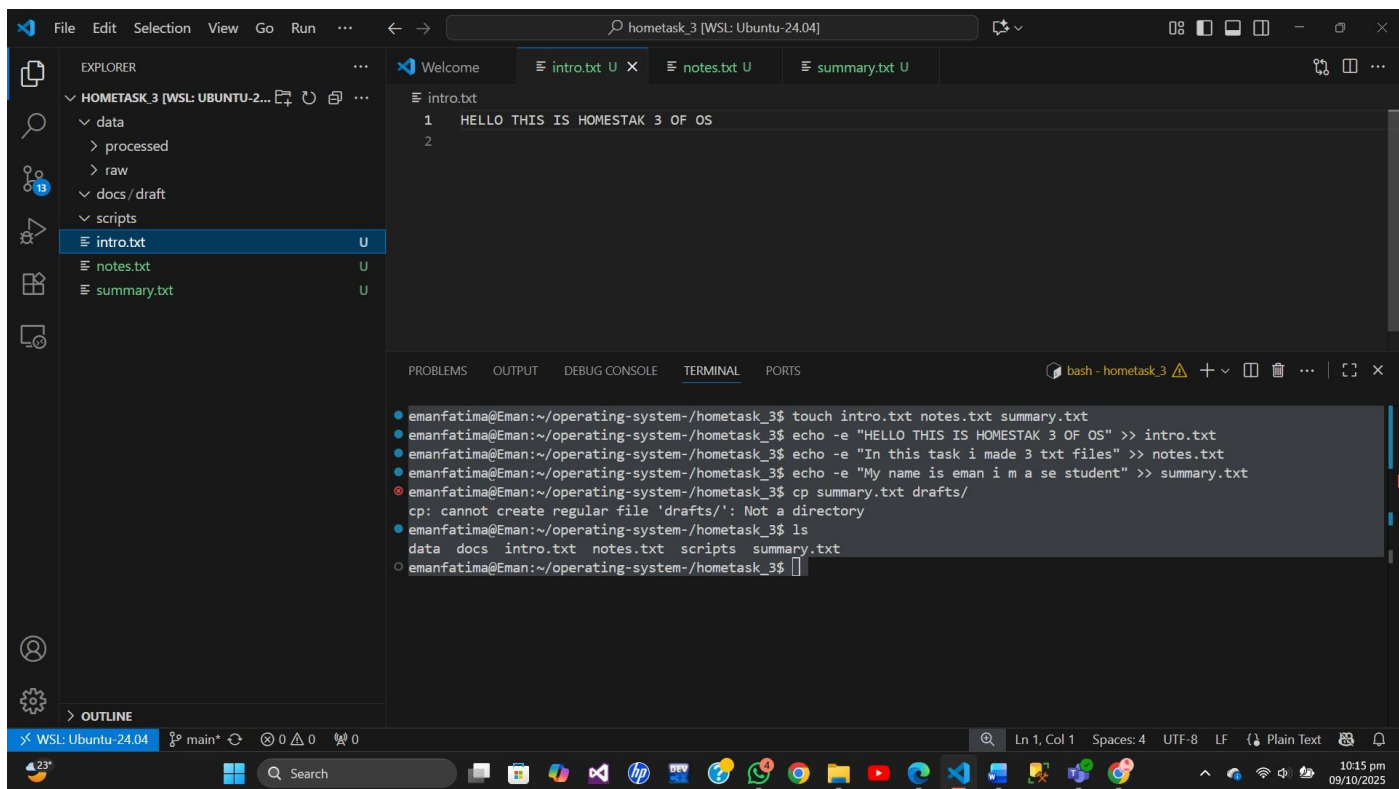
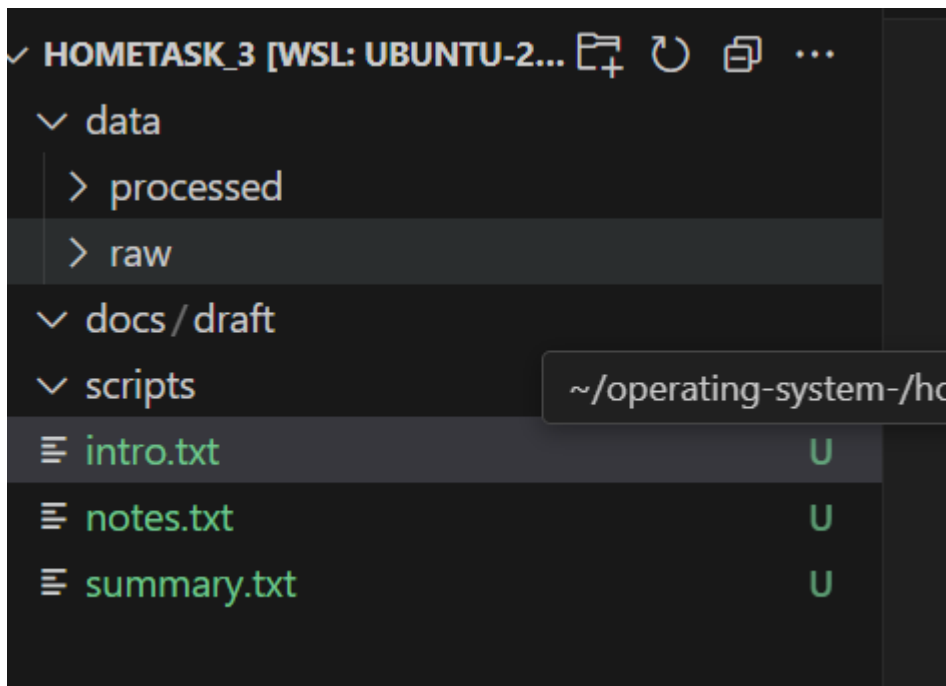
Task 2:

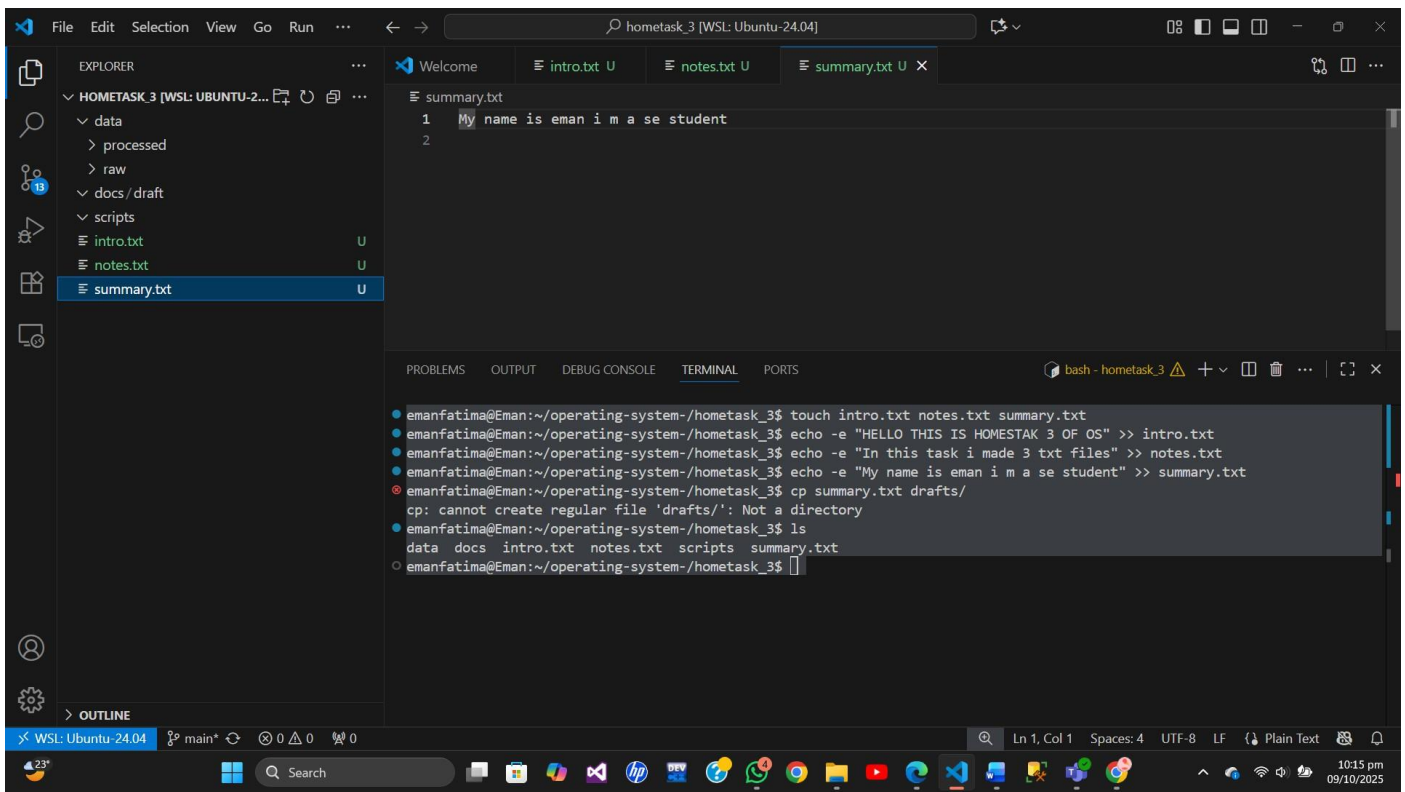
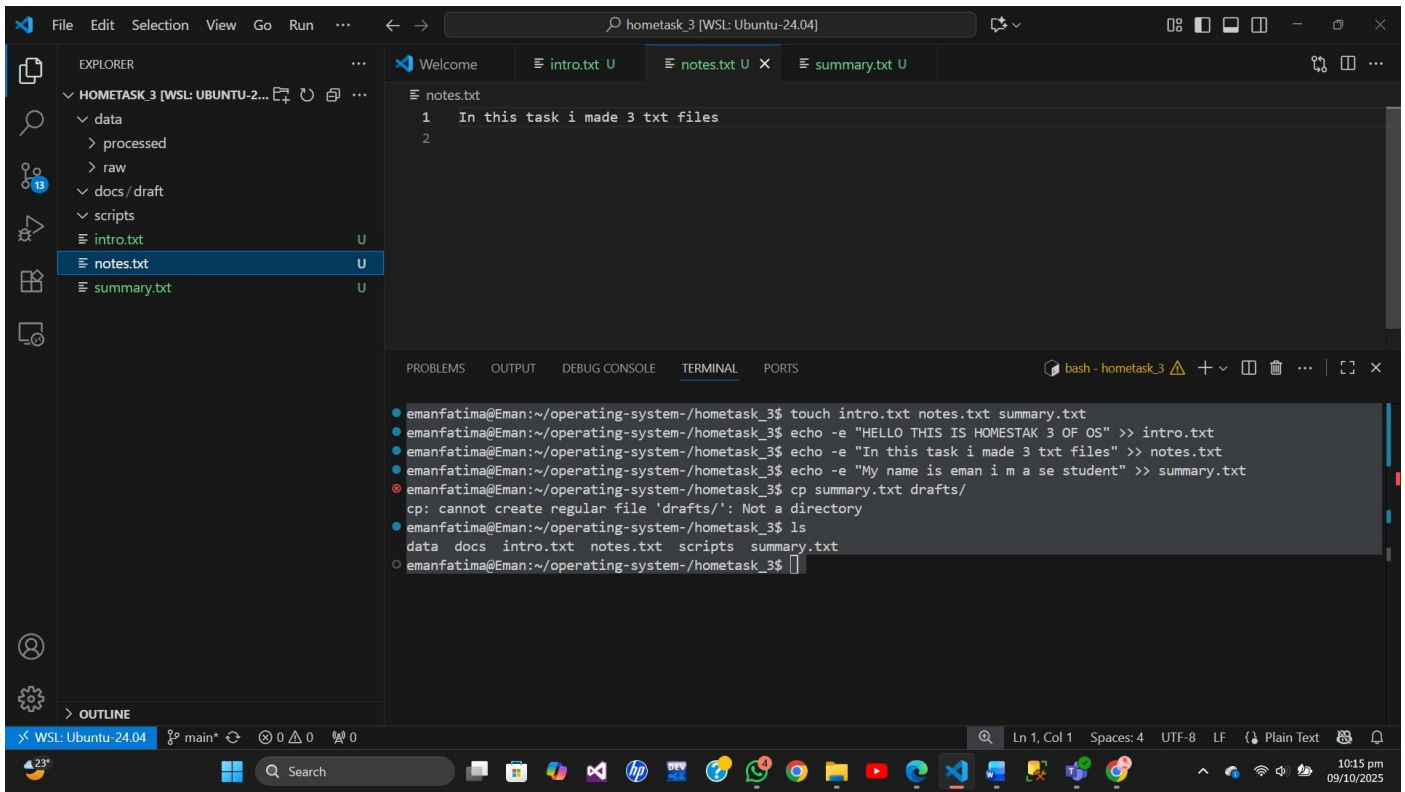
2. Inside docs/ :

- 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.

Answer :

```
emanfatima@Eman:~/operating-system-/hometask_3$ touch intro.txt notes.txt summary.txt
emanfatima@Eman:~/operating-system-/hometask_3$ echo -e "HELLO THIS IS HOMESTAK 3 OF OS" >> intro.txt
emanfatima@Eman:~/operating-system-/hometask_3$ echo -e "In this task i made 3 txt files" >> notes.txt
emanfatima@Eman:~/operating-system-/hometask_3$ echo -e "My name is eman i m a se student" >> summary.txt
emanfatima@Eman:~/operating-system-/hometask_3$ cp summary.txt drafts/
cp: cannot create regular file 'drafts/': Not a directory
emanfatima@Eman:~/operating-system-/hometask_3$ ls
data docs intro.txt notes.txt scripts summary.txt
emanfatima@Eman:~/operating-system-/hometask_3$
```





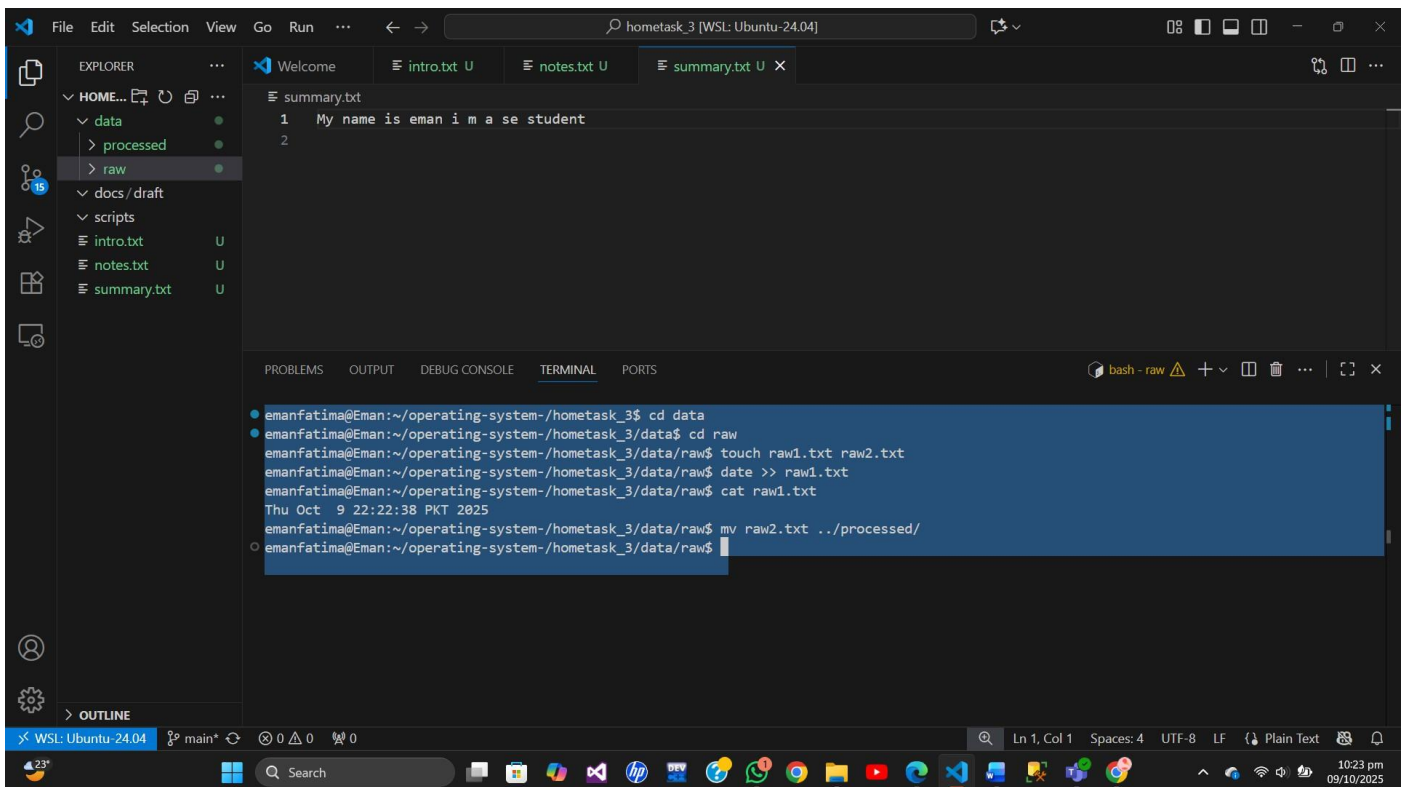
Task 3:

3. Inside data/raw/ :

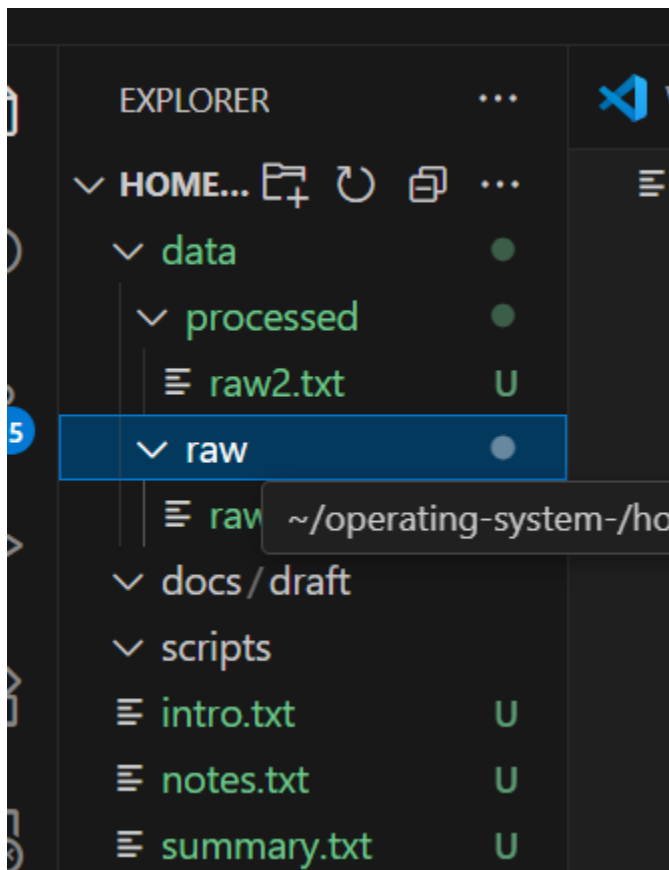
- Create two files: `raw1.txt` , `raw2.txt` .
- Append the **current date** into `raw1.txt` using the `date` command.
- Move `raw2.txt` into `processed/` using `mv` . The syntax is:

```
mv source destination
```

Answer :



```
File Edit Selection View Go Run ... hometask_3 [WSL: Ubuntu-24.04]
EXPLORER
  HOME...
  data
  processed
  raw
  docs / draft
  scripts
  intro.txt U
  notes.txt U
  summary.txt U
  summary.txt
1 My name is eman i m a se student
2
TERMINAL
  bash - raw
  emanfatima@Eman:~/operating-system-/hometask_3$ cd data
  emanfatima@Eman:~/operating-system-/hometask_3/data$ cd raw
  emanfatima@Eman:~/operating-system-/hometask_3/data/raw$ touch raw1.txt raw2.txt
  emanfatima@Eman:~/operating-system-/hometask_3/data/raw$ date >> raw1.txt
  emanfatima@Eman:~/operating-system-/hometask_3/data/raw$ cat raw1.txt
  Thu Oct 9 22:22:38 PKT 2025
  emanfatima@Eman:~/operating-system-/hometask_3/data/raw$ mv raw2.txt ../processed/
  emanfatima@Eman:~/operating-system-/hometask_3/data/raw$
```



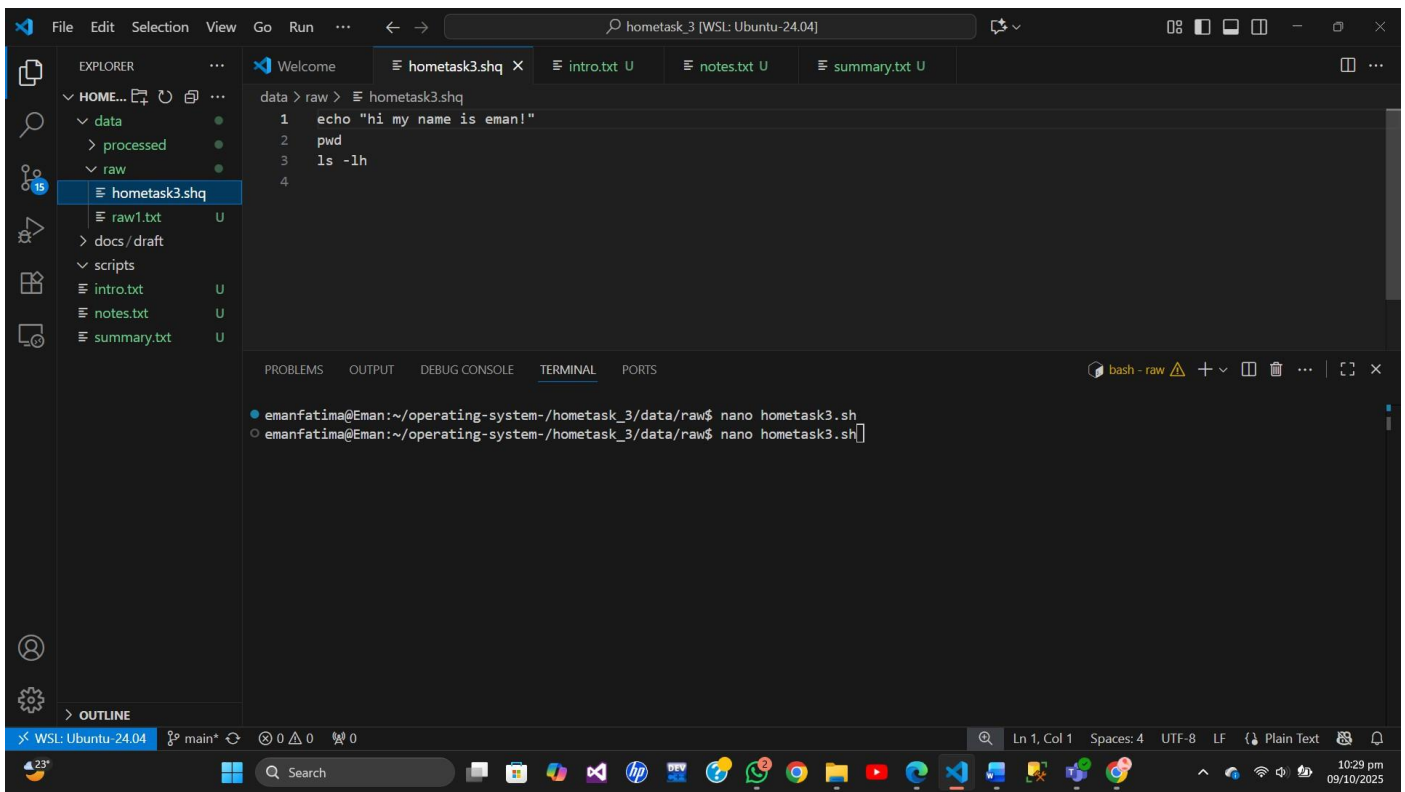
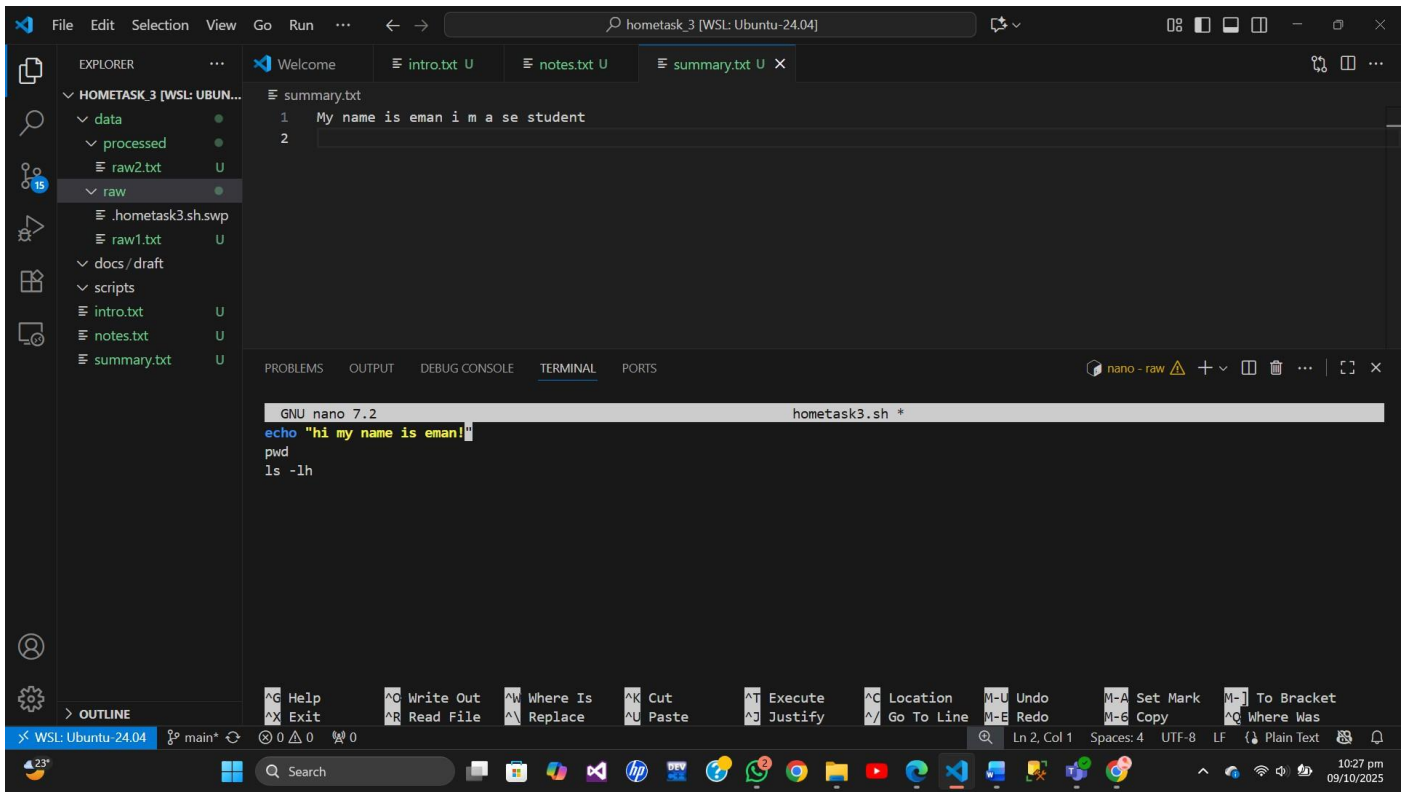
Task 4:

4. Inside scripts/ :

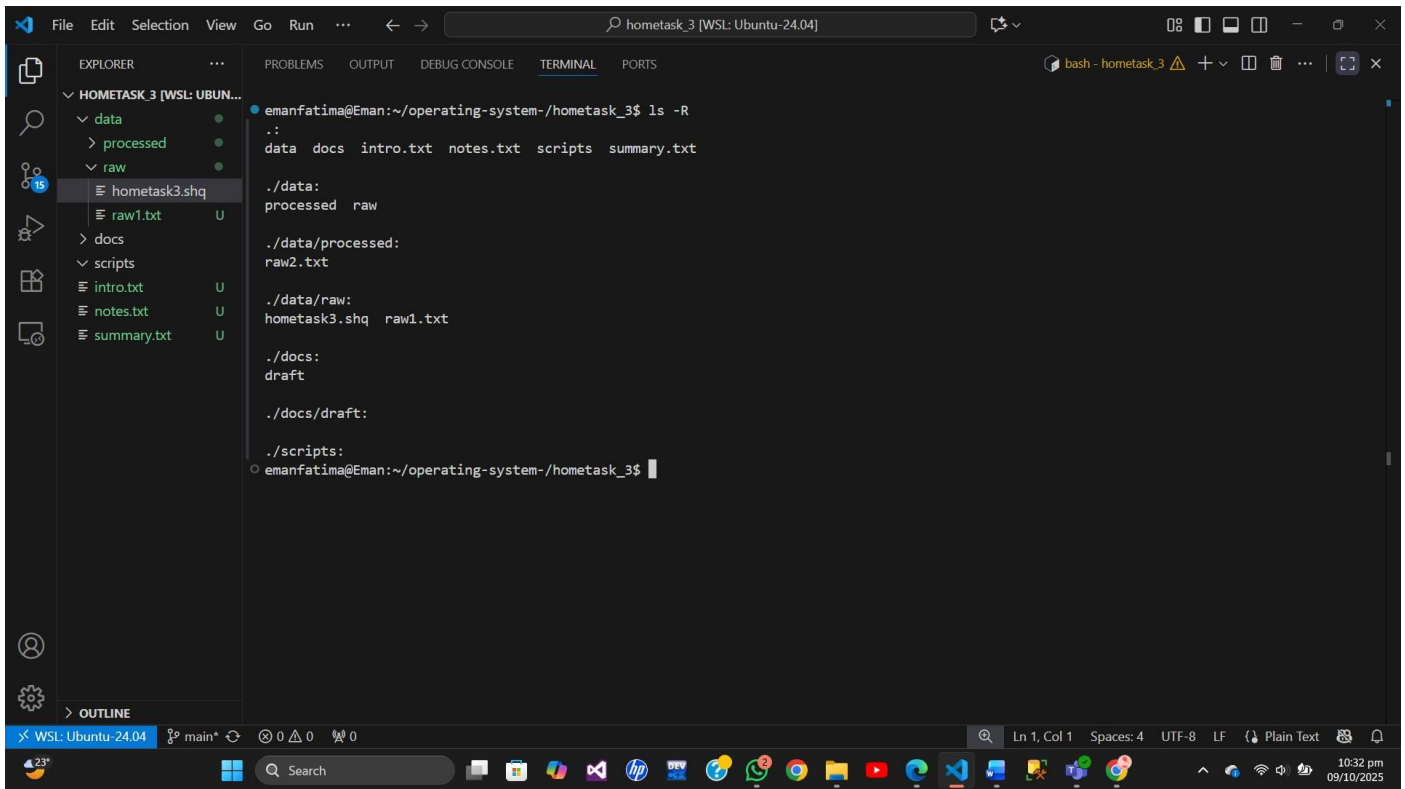
- Create a script named `hello.sh` with the following content:

```
echo "Hello World"
pwd
ls -lh
```

Answer :



Task 5:



The screenshot shows the Visual Studio Code interface with the Explorer sidebar on the left. The file explorer shows a project named 'HOMETASK_3 [WSL: UBUN...]' with a directory structure: 'data' (containing 'processed' and 'raw'), 'docs' (containing 'intro.txt', 'notes.txt', and 'summary.txt'), and 'scripts' (containing 'intro.txt', 'notes.txt', and 'summary.txt'). The file 'homework3.shq' is selected in the Explorer. The Terminal panel on the right shows the output of the command 'ls -R' in the directory '~/.operating-system-/homework_3'. The output lists the directory structure: 'data docs intro.txt notes.txt scripts summary.txt', followed by the contents of the subdirectories: 'data: processed raw', 'data/processed: raw2.txt', 'data/raw: homework3.shq raw1.txt', 'docs: draft', 'docs/draft:', and 'scripts:'.

```
emanfatima@Eman:~/operating-system-/homework_3$ ls -R
.:
data docs intro.txt notes.txt scripts summary.txt

./data:
processed raw

./data/processed:
raw2.txt

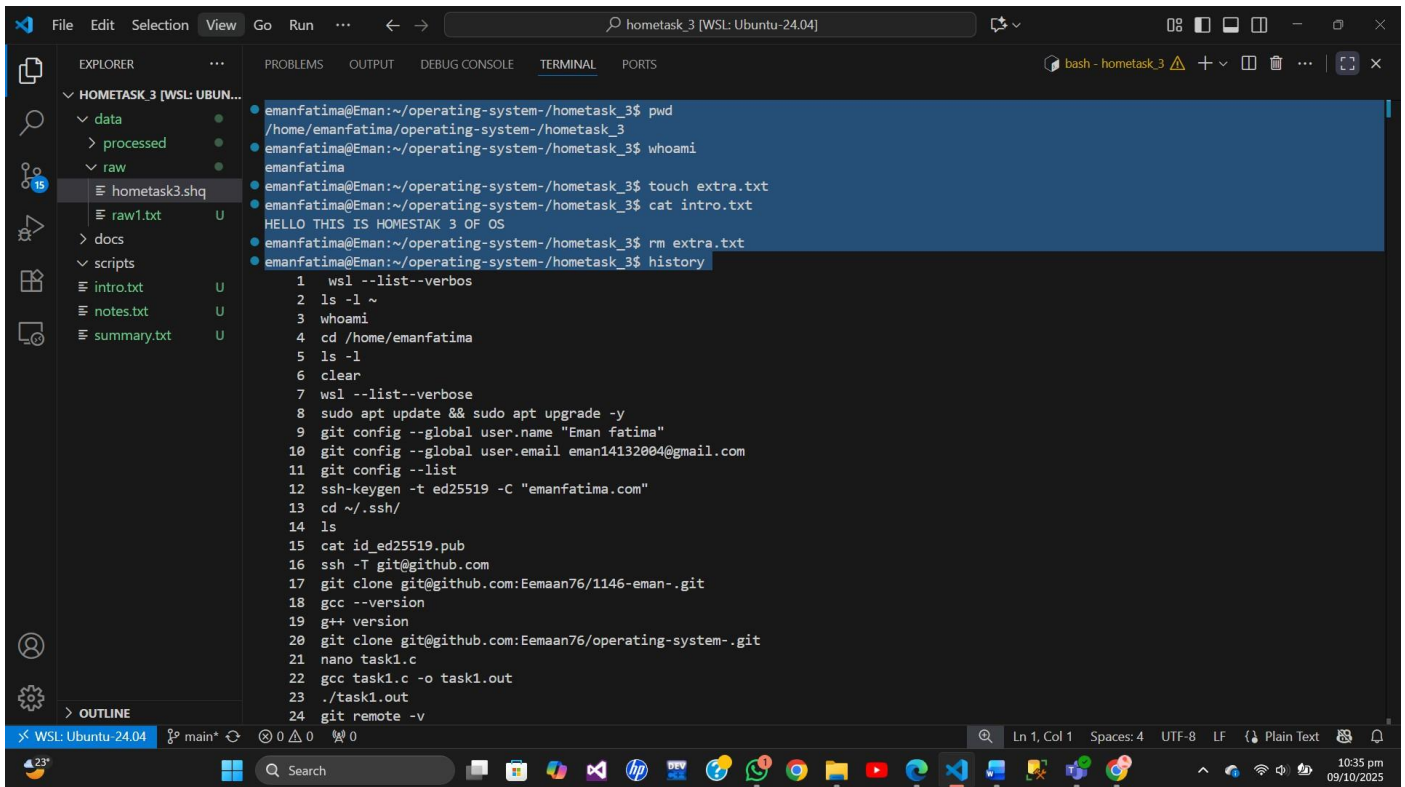
./data/raw:
homework3.shq raw1.txt

./docs:
draft

./docs/draft:

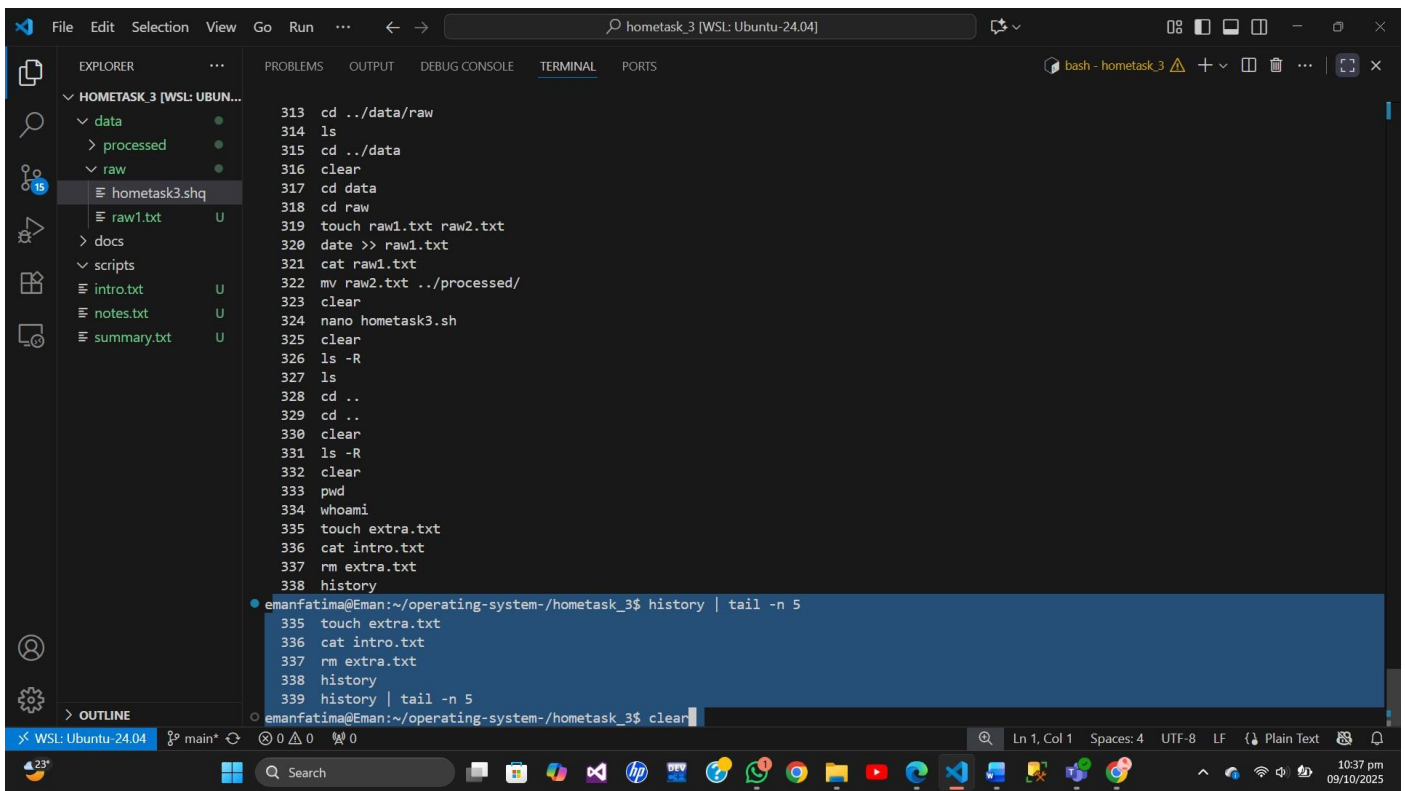
./scripts:
```

Task 6:



The screenshot shows the Visual Studio Code interface with the Explorer sidebar on the left. The file explorer shows a project named 'HOMETASK_3 [WSL: UBUN...]' with a directory structure: 'data' (containing 'processed' and 'raw'), 'docs' (containing 'intro.txt', 'notes.txt', and 'summary.txt'), and 'scripts' (containing 'intro.txt', 'notes.txt', and 'summary.txt'). The file 'homework3.shq' is selected in the Explorer. The Terminal panel on the right shows the output of the command 'history' in the directory '~/.operating-system-/homework_3'. The output lists the commands executed: 'wsl --list--verbos', 'ls -l ~', 'whoami', 'cd /home/emanfatima', 'ls -l', 'clear', 'wsl --list--verbose', 'sudo apt update && sudo apt upgrade -y', 'git config --global user.name "Eman fatima"', 'git config --global user.email eman14132004@gmail.com', 'git config --list', 'ssh-keygen -t ed25519 -C "emanfatima.com"', 'cd ~/.ssh/', 'ls', 'cat id_ed25519.pub', 'ssh -T git@github.com', 'git clone git@github.com:Eemaan76/1146-eman-.git', 'gcc --version', 'g++ version', 'git clone git@github.com:Eemaan76/operating-system-.git', 'nano task1.c', 'gcc task1.c -o task1.out', './task1.out', and 'git remote -v'.

```
emanfatima@Eman:~/operating-system-/homework_3$ pwd
/home/emanfatima/operating-system-/homework_3
emanfatima@Eman:~/operating-system-/homework_3$ whoami
emanfatima
emanfatima@Eman:~/operating-system-/homework_3$ touch extra.txt
emanfatima@Eman:~/operating-system-/homework_3$ cat intro.txt
HELLO THIS IS HOMESTAK 3 OF OS
emanfatima@Eman:~/operating-system-/homework_3$ rm extra.txt
emanfatima@Eman:~/operating-system-/homework_3$ history
1  wsl --list--verbos
2  ls -l ~
3  whoami
4  cd /home/emanfatima
5  ls -l
6  clear
7  wsl --list--verbose
8  sudo apt update && sudo apt upgrade -y
9  git config --global user.name "Eman fatima"
10 git config --global user.email eman14132004@gmail.com
11 git config --list
12 ssh-keygen -t ed25519 -C "emanfatima.com"
13 cd ~/.ssh/
14 ls
15 cat id_ed25519.pub
16 ssh -T git@github.com
17 git clone git@github.com:Eemaan76/1146-eman-.git
18 gcc --version
19 g++ version
20 git clone git@github.com:Eemaan76/operating-system-.git
21 nano task1.c
22 gcc task1.c -o task1.out
23 ./task1.out
24 git remote -v
```

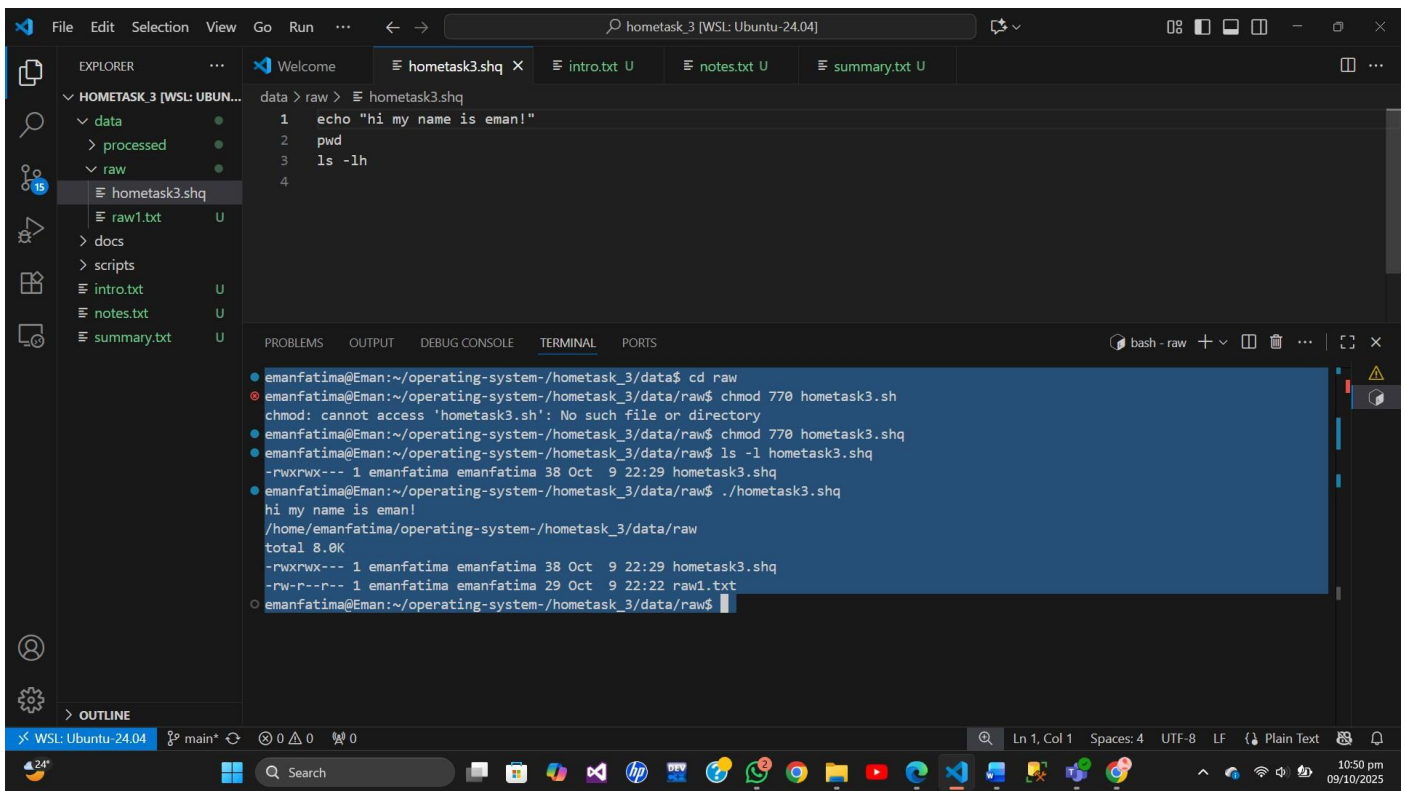


Task 7:

1. Change the permissions of `hello.sh` so that:

- Owner → Read, Write & Execute
- Group → Read, Write & Execute
- Others → No permissions
- Run the script using:

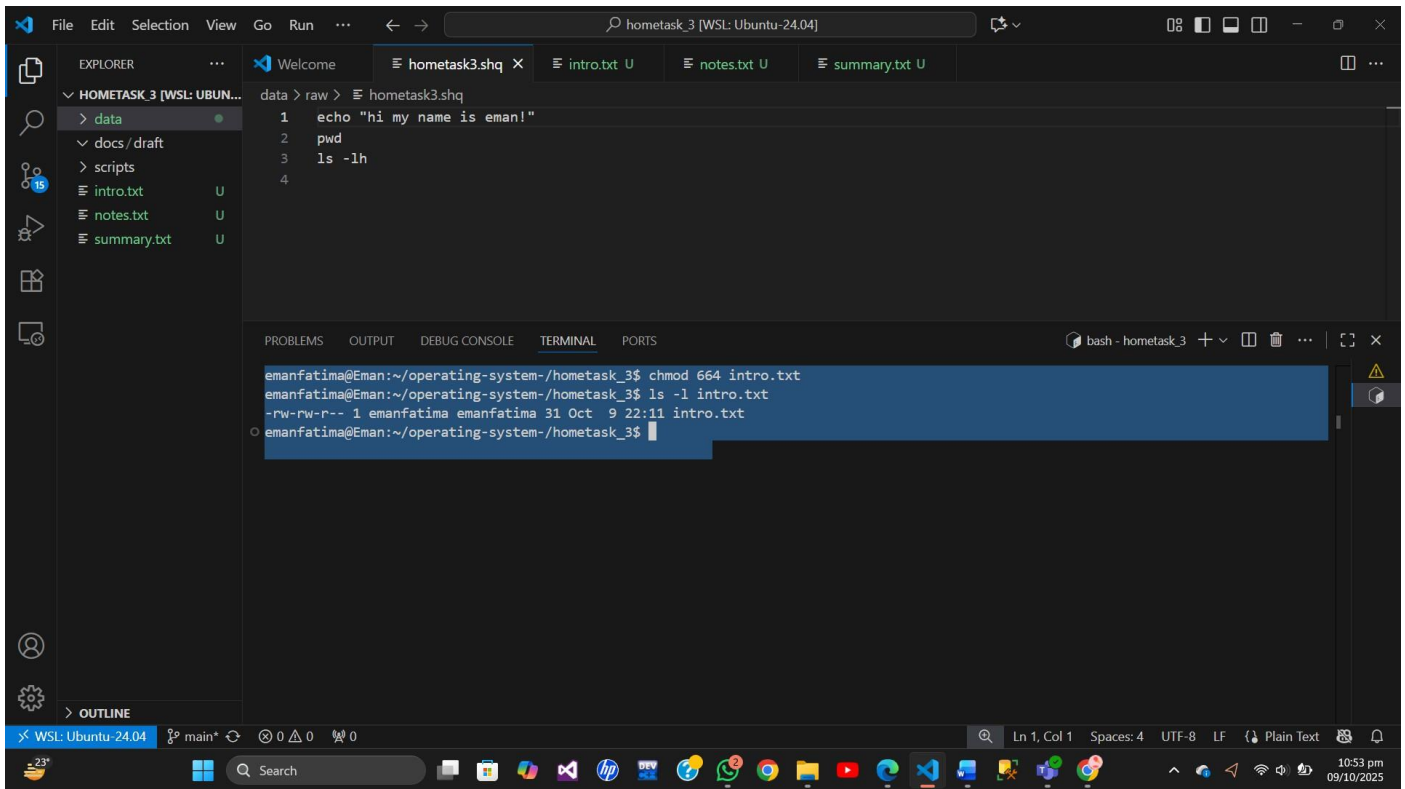
```
./hello.sh
```



Task 8 :

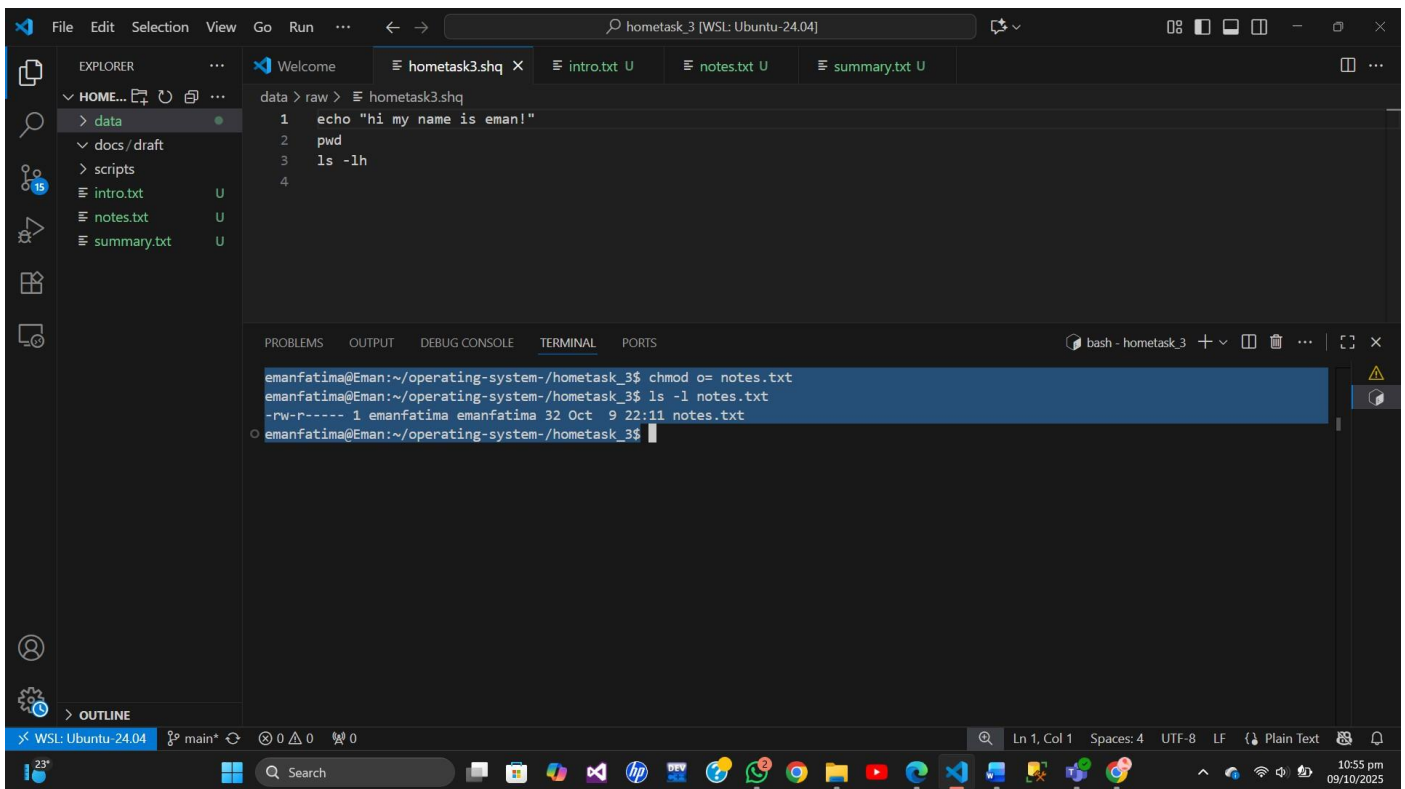
Take a screenshot of its output.

2. Change the permissions of `intro.txt` using **numeric notation** so that:
 - Owner → Read & Write
 - Group → Read & Write
 - Others → Read only



Task 9:

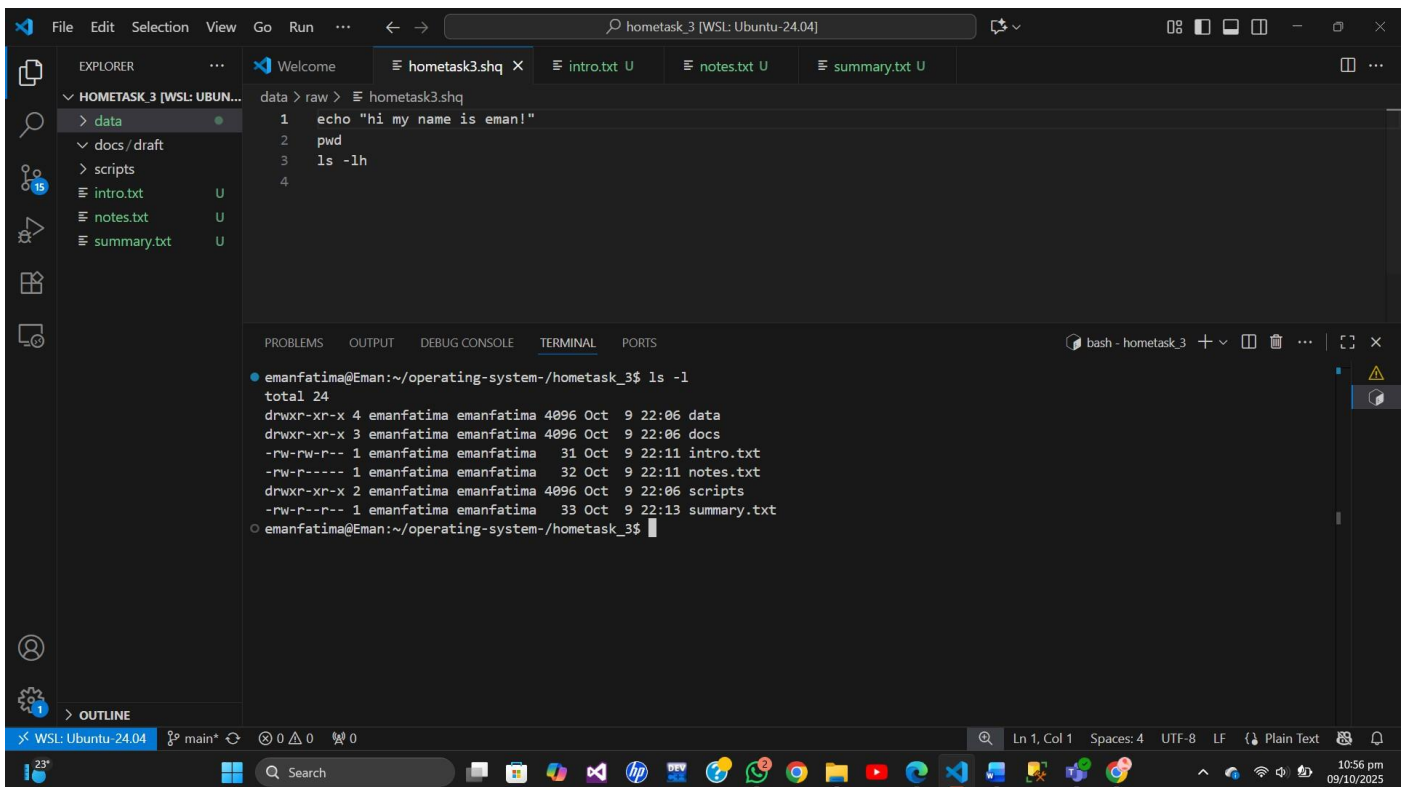
3. Change the permissions of `notes.txt` using **symbolic notation** so that **others** don't have any permission on it.



Task 10:

4. Verify all changes with:

```
ls -l
```



The screenshot shows the Visual Studio Code interface with a file explorer on the left, a code editor in the center, and a terminal at the bottom. The file explorer shows a project named 'HOMETASK_3 [WSL: UBUN...]' with a 'data' directory containing 'intro.txt', 'notes.txt', and 'summary.txt'. The code editor shows a file named 'hometask3.shq' with the following content:

```
1 echo "hi my name is eman!"
2 pwd
3 ls -lh
4
```

The terminal shows the output of the script execution:

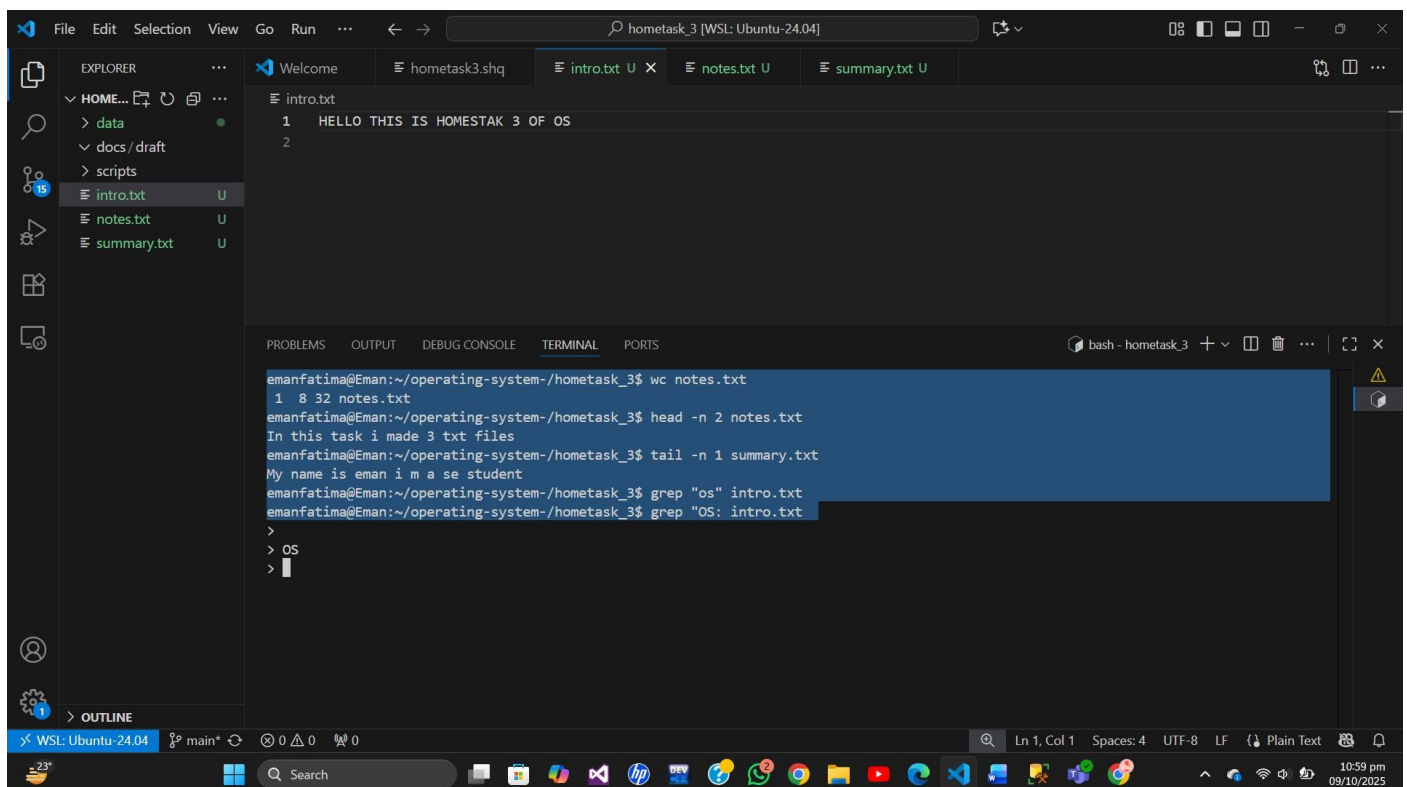
```
emanfatima@Eman:~/operating-system-/hometask_3$ ls -l
total 24
drwxr-xr-x 4 emanfatima emanfatima 4096 Oct 9 22:06 data
drwxr-xr-x 3 emanfatima emanfatima 4096 Oct 9 22:06 docs
-rw-rw-r-- 1 emanfatima emanfatima 31 Oct 9 22:11 intro.txt
-rw-r----- 1 emanfatima emanfatima 32 Oct 9 22:11 notes.txt
drwxr-xr-x 2 emanfatima emanfatima 4096 Oct 9 22:06 scripts
-rw-r--r-- 1 emanfatima emanfatima 33 Oct 9 22:13 summary.txt
emanfatima@Eman:~/operating-system-/hometask_3$
```

Task 11:

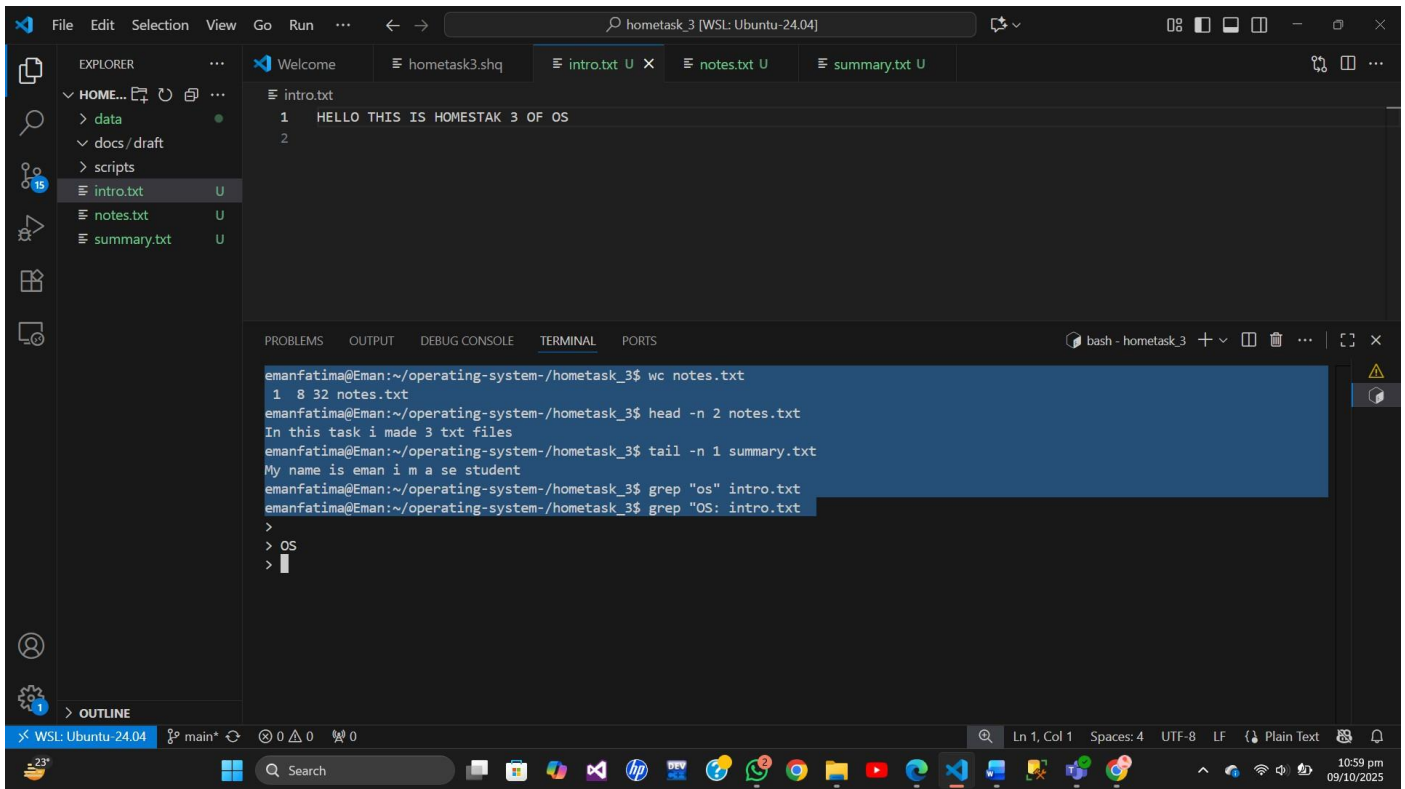
1. Count the number of lines, words, and characters in `notes.txt` using `wc`.
2. Show only the **first 2 lines** of `summary.txt` using `head -n 2`.

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`.

Take screenshots.



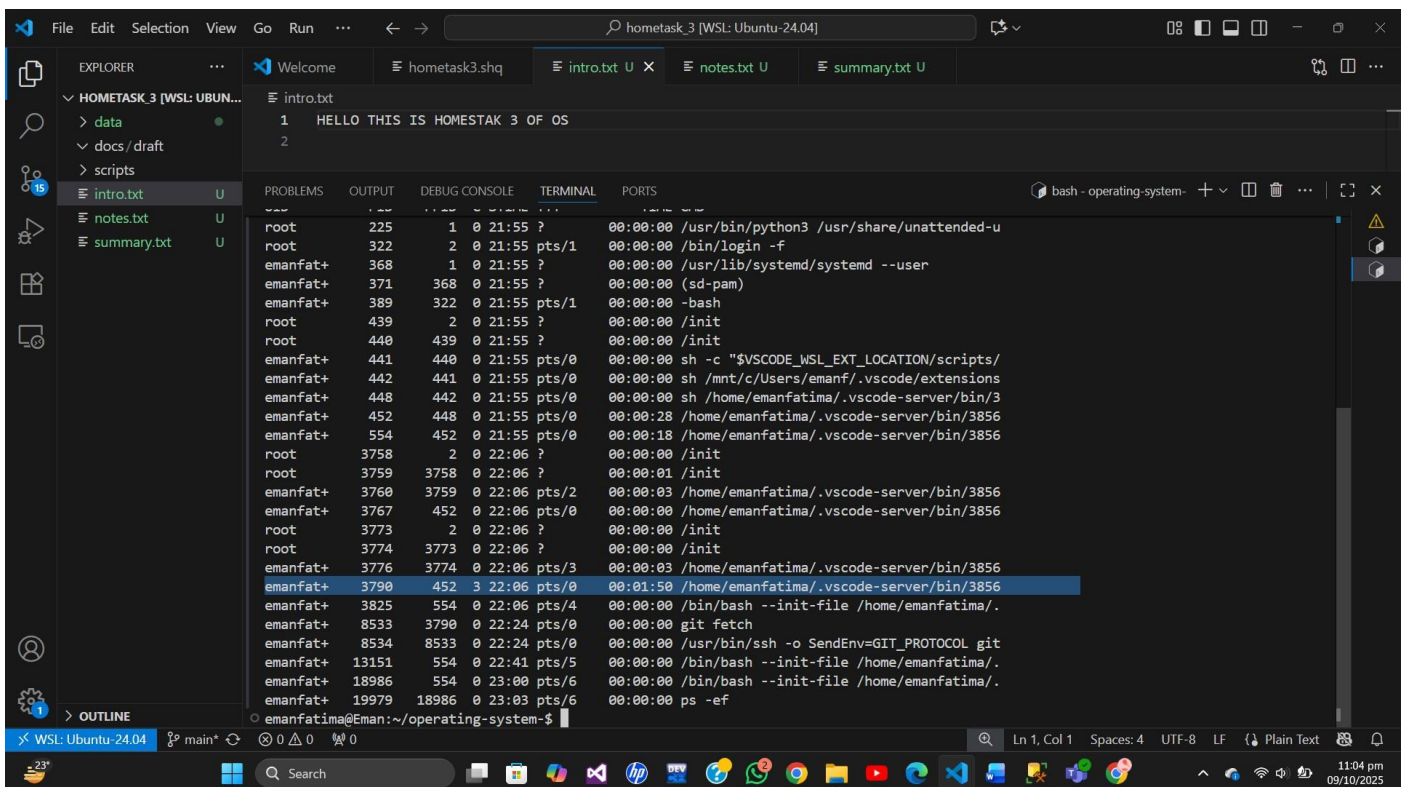
```
emanfatima@Eman:~/operating-system-/hometask_3$ wc notes.txt
 1  8 32 notes.txt
emanfatima@Eman:~/operating-system-/hometask_3$ head -n 2 notes.txt
In this task i made 3 txt files
emanfatima@Eman:~/operating-system-/hometask_3$ tail -n 1 summary.txt
My name is eman i m a se student
emanfatima@Eman:~/operating-system-/hometask_3$ grep "os" intro.txt
emanfatima@Eman:~/operating-system-/hometask_3$ grep "OS: intro.txt
>
> OS
> |
```

Task 12:

1. Exploring Processes

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



PID: 3790 is consuming cpu more .

Task 13:

- Run `top` for 20–30 seconds. Write down:
 - Which process is consuming the most CPU.
 - Which process is consuming the most memory.

```
emanfatima@Eman:~/operating-system-$ top
%Cpu(s):  0.3 us,  0.3 sy,  0.0 ni, 99.2 id,  0.0 wa,  0.0 hi,  0.2 si,  0.0 st
MiB Mem : 3751.2 total, 2266.6 free, 1330.7 used, 229.6 buff/cache
MiB Swap: 1024.0 total, 1024.0 free,  0.0 used, 2420.5 avail Mem

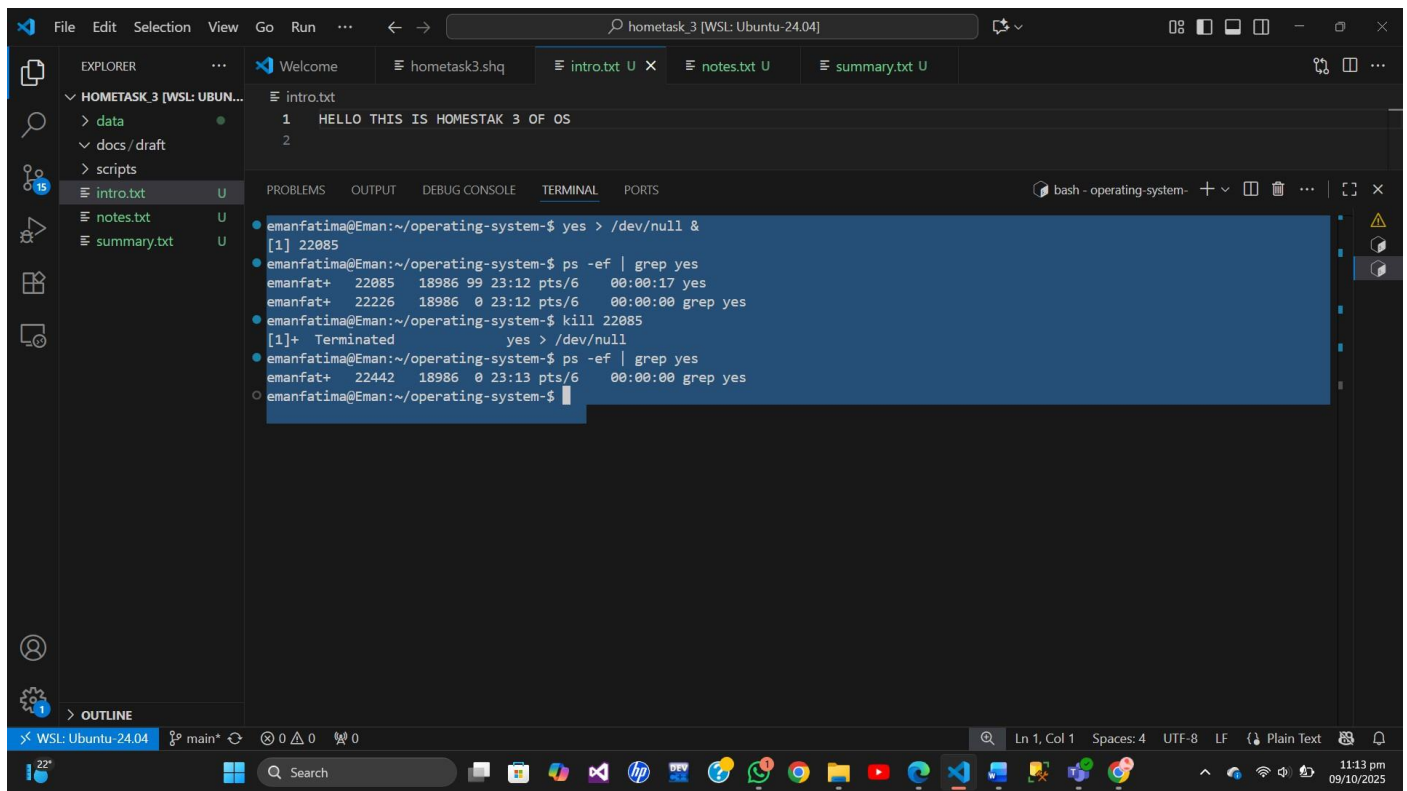
  PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM    TIME+  COMMAND
 3790 emanfat+ 20   0 52.4g 747676 55168 S   3.7  19.5   2:00.59 node
 452 emanfat+ 20   0 11.3g 161936 50816 S   0.3   4.2   0:29.64 node
 554 emanfat+ 20   0 1295064 82268 46976 S   0.3   2.1   0:19.71 node
 3760 emanfat+ 20   0 1018732 60728 42880 S   0.3   1.6   0:04.22 node
    1 root        20   0 21792 12448 9376 S   0.0   0.3   0:01.79 systemd
    2 root        20   0 3072 1664 1664 S   0.0   0.0   0:00.03 init-systemd(Ub
    7 root        20   0 3120 1960 1792 S   0.0   0.1   0:00.38 init
   46 root        19  -1 50356 15872 14976 S   0.0   0.4   0:00.63 systemd-journal
   95 root        20   0 25272 6400 4864 S   0.0   0.2   0:00.75 systemd-udev
  111 systemd+    20   0 21456 11776 9984 S   0.0   0.3   0:00.28 systemd-resolve
  113 systemd+    20   0 91024 7680 6784 S   0.0   0.2   0:00.36 systemd-timesyn
  164 root        20   0 4236 2560 2432 S   0.0   0.1   0:00.03 cron
  165 message+    20   0 9636 4864 4480 S   0.0   0.1   0:00.22 dbus-daemon
  182 root        20   0 17964 8192 7424 S   0.0   0.2   0:00.33 systemd-logind
  184 root        20   0 1755840 12160 10240 S   0.0   0.3   0:00.59 wsl-pro-service
  201 root        20   0 3160 1920 1792 S   0.0   0.0   0:00.01 agetty
  206 syslog      20   0 222508 5248 4480 S   0.0   0.1   0:00.25 rsyslogd
  208 root        20   0 3116 1792 1664 S   0.0   0.0   0:00.01 agetty
  225 root        20   0 107012 22144 13056 S   0.0   0.6   0:00.34 unattended-upgr
  322 root        20   0 6660 4224 3712 S   0.0   0.1   0:00.01 login
```

Task 14:

2. Practice with Infinite Process

- Start:

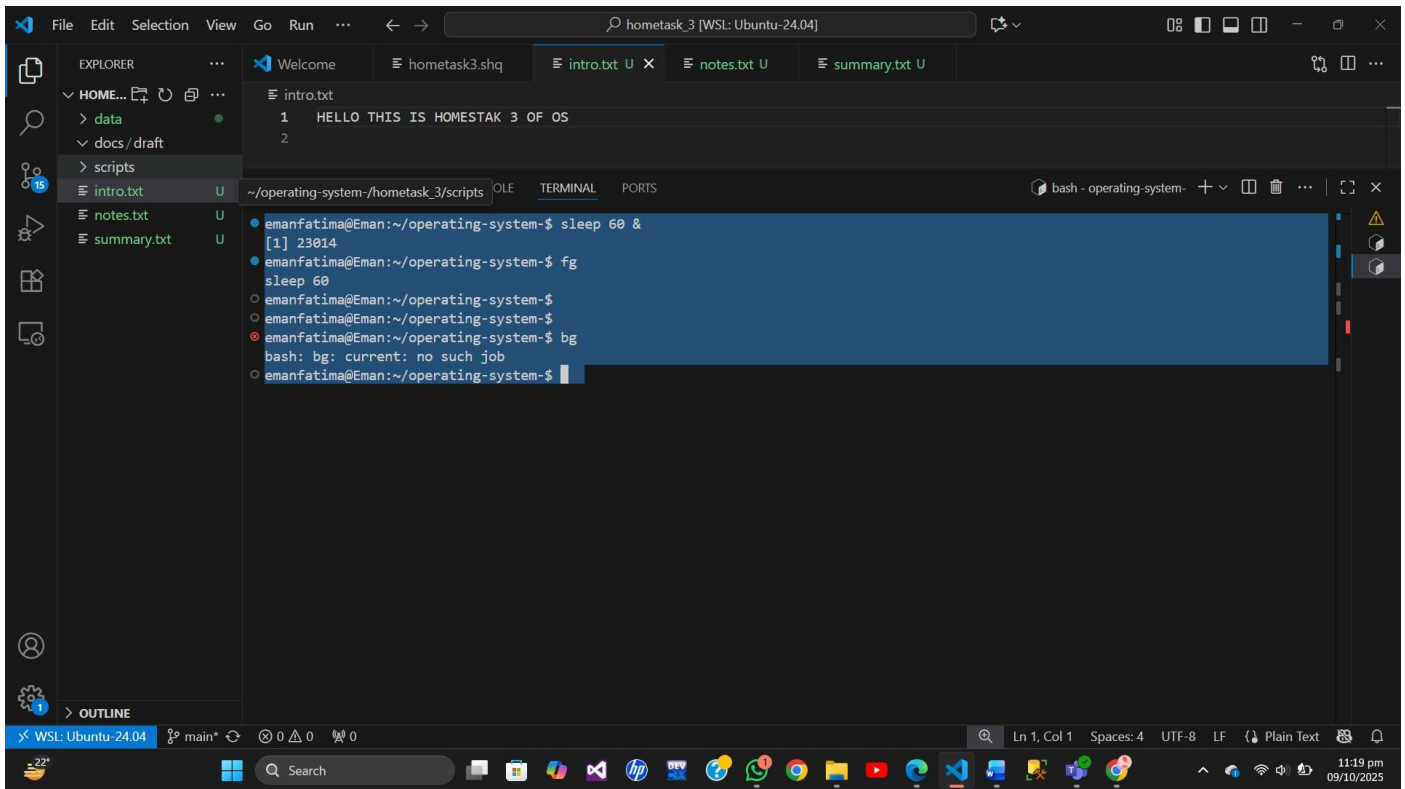
```
yes > /dev/null &
```
- Locate its PID using `ps -ef | grep yes`.
- Kill it using `kill <PID>` and verify using `ps`.



Task 15 :

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`.
-



Task 16 :

Code :

```
#include <unistd.h>
```

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
int main() {
```

```
    pid_t pid = fork();
```

```
    if (pid == -1) {
```

```
        perror("fork failed");
```

```
        exit(1);
```

```
    }
```

```
    else if (pid == 0) {
```

```
        // Child process: create a new session and execute 'top'
```

```
        if (setsid() == -1) {
```

```
            perror("setsid failed");
```

```
        exit(1);
    }

    execl("/usr/bin/top", "top", NULL);

    // If execl fails, this line will execute
    perror("execl failed");
    exit(1);
}

else {
    // Parent process
    printf("Child PID: %d\n", pid);
}

return 0;
}
```

File Edit Selection View Go Run ... hometask_3 [WSL: Ubuntu-24.04]

EXPLOER Welcome hometask3.shq intro.txt U task15.c notes.txt U summary.txt U

HOMETASK_3 [WSL: UBUN...> data docs/draft scripts ans intro.txt U notes.txt U summary.txt U C task15.c

C task15.c

```
1 #include <unistd.h>
2 #include <stdio.h>
3 #include <stdlib.h>
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS bash - hometask_3

```
emanfatima@Eman:~/operating-system-/hometask_3$ ./ans
Child PID: 26981
emanfatima@Eman:~/operating-system-/hometask_3$
top - 23:31:08 up 1:36, 1 user, load average: 0.05, 0.09, 0.08
Tasks: 41 total, 1 running, 40 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.3 us, 0.4 sy, 0.0 ni, 99.1 id, 0.1 wa, 0.0 hi, 0.1 si, 0.0 st
MiB Mem : 3751.2 total, 2257.3 free, 1340.2 used, 229.6 buff/cache
MiB Swap: 1024.0 total, 1024.0 free, 0.0 used, 2411.1 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
3790	emanfat+	20	0	52.4g	748316	55168	S	3.3	19.5	2:34.62	node
113	systemd+	20	0	91024	7680	6784	S	0.7	0.2	0:00.42	systemd-timesyn
452	emanfat+	20	0	11.3g	162064	50816	S	0.7	4.2	0:33.86	node
46	root	19	-1	50356	15872	14976	S	0.3	0.4	0:00.71	systemd-journal
554	emanfat+	20	0	1297624	85596	46976	S	0.3	2.2	0:26.26	node
3759	root	20	0	3096	1160	1024	S	0.3	0.0	0:01.77	Relay(3760)
3760	emanfat+	20	0	1018732	60728	42880	S	0.3	1.6	0:05.62	node
26981	emanfat+	20	0	9264	5376	3328	R	0.3	0.1	0:00.02	top
1	root	20	0	21792	12448	9376	S	0.0	0.3	0:01.82	systemd
2	root	20	0	3072	1664	1664	S	0.0	0.0	0:00.03	init-systemd(Ub
7	root	20	0	3120	1960	1792	S	0.0	0.1	0:00.38	init
95	root	20	0	25272	6400	4864	S	0.0	0.2	0:00.85	systemd-udev
111	systemd+	20	0	21456	11776	9984	S	0.0	0.3	0:00.29	systemd-resolve
164	root	20	0	4236	2560	2432	S	0.0	0.1	0:00.05	cron
165	message+	20	0	9636	4864	4480	S	0.0	0.1	0:00.25	dbus-daemon
182	root	20	0	17964	8192	7424	S	0.0	0.2	0:00.34	systemd-logind
184	root	20	0	1755840	12160	10240	S	0.0	0.3	0:00.67	ws1-pro-service

WSL: Ubuntu-24.04 main* 0 0 0 0 Ln 32, Col 1 Spaces: 4 UTF-8 LF {} C 11:31 pm 09/10/2025

File Edit Selection View Go Run ... hometask_3 [WSL: Ubuntu-24.04]

EXPLOER Welcome hometask3.shq intro.txt U task15.c notes.txt U summary.txt U

HOMETASK_3 [WSL: UBUN...> data docs/draft scripts ans intro.txt U notes.txt U summary.txt U C task15.c

C task15.c

```
1 #include <unistd.h>
2 #include <stdio.h>
3 #include <stdlib.h>
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS bash - hometask_3

```
emanfatima@Eman:~/operating-system-/hometask_3$ ps -ef | grep top
emanfat+ 28213 26350 0 23:34 pts/7 00:00:00 grep top
emanfatima@Eman:~/operating-system-/hometask_3$ kill -9 28213
bash: kill: (28213) - No such process
emanfatima@Eman:~/operating-system-/hometask_3$
```

WSL: Ubuntu-24.04 main* 0 0 0 0 Ln 32, Col 1 Spaces: 4 UTF-8 LF {} C 11:36 pm 09/10/2025