

# Operating Systems – COC 3071L

## SE 5th A – Fall 2025 Part

### 1: File and Directory Operations

1. 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:

```
ls -R
```

---

```
Select hafsa1162@DESKTOP-LA0D5TK: ~/Lab_3
hafsa1162@DESKTOP-LA0D5TK:~$ cd ~/HomeTask2
hafsa1162@DESKTOP-LA0D5TK:~/HomeTask2$ code .
Updating VS Code Server to version 03c265b1adee71ac88f833e065f7bb956b60550a
Removing previous installation...
Installing VS Code Server for Linux x64 (03c265b1adee71ac88f833e065f7bb956b60550a)
Downloading: 100%
Unpacking: 100%
Unpacked 2265 files and folders to /home/hafsa1162/.vscode-server/bin/03c265b1adee71ac88f833e065f7bb956b60550a.
Looking for compatibility check script at /home/hafsa1162/.vscode-server/bin/03c265b1adee71ac88f833e065f7bb956b60550a/bin/helpers/check-requirements.sh
Running compatibility check script
Compatibility check successful (0)
hafsa1162@DESKTOP-LA0D5TK:~/HomeTask2$ cd ~
hafsa1162@DESKTOP-LA0D5TK:~$ mkdir -p Lab_3/docs
hafsa1162@DESKTOP-LA0D5TK:~$ mkdir -p Lab_3/drafts/data/raw
hafsa1162@DESKTOP-LA0D5TK:~$ mkdir -p Lab_3/drafts/data/processed
hafsa1162@DESKTOP-LA0D5TK:~$ mkdir -p Lab_3/drafts/scripts
hafsa1162@DESKTOP-LA0D5TK:~$ cd ~/Lab_3/docs
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ echo "This is the introduction file." >> intro.txt
echo: This is the introduction file.: command not found
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ echo "This is the introduction file." >> intro.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ echo "It contains the basic interview of Lab 3." >> intro.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ echo "There are some important notes for Lab 3." >> notes.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ echo "Remember to follow the directory structure carefully." >> notes.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ echo "This is the summary file for lab 3" >> summary.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ echo "It include the brief recap of the tasks " >> summary.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ summary.txt ~/Lab_3/drafts/
summary.txt: command not found
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ cp summary.txt ~/Lab_3/drafts/
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ cd ~/Lab_3/drafts/data/raw
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/drafts/data/raw$ touch raw1.txt raw2.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/drafts/data/raw$ date >> raw1.txt
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/drafts/data/raw$ mv raw2.txt ../processed/
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3/drafts/data/raw$ cd ~/Lab_3
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3$ ls
docs drafts
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3$
```

```
hafsa1162@DESKTOP-LA0D5TK: ~/Lab_3
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3$ echo "Hello world"
Hello world
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3$ pwd
/home/hafsa1162/Lab_3
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3$ ls -lh
total 8.0K
drwxr-xr-x 2 hafsa1162 hafsa1162 4.0K Oct 9 23:20 docs
drwxr-xr-x 4 hafsa1162 hafsa1162 4.0K Oct 9 23:23 drafts
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3$ ls -R
.:
docs drafts

./docs:
intro.txt notes.txt summary.txt

./drafts:
data scripts summary.txt

./drafts/data:
processed raw

./drafts/data/processed:
raw2.txt

./drafts/data/raw:
raw1.txt

./drafts/scripts:
hafsa1162@DESKTOP-LA0D5TK:~/Lab_3$
```

```
hafsai162@DESKTOP-LA0D5TK: ~/Lab_3
sudo apt install tree
hafsai162@DESKTOP-LA0D5TK:~/Lab_3$ sudo apt install tree -y
[sudo] password for hafsai162:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following package was automatically installed and is no longer required:
  libllvm19
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  tree
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 47.1 kB of archives.
Selecting previously unselected package tree.sk space will be used.
(Reading database ... 45086 files and directories currently installed.)
Preparing to unpack .../tree_2.1.1-2ubuntu3_amd64.deb ...
Unpacking tree (2.1.1-2ubuntu3) ...
Setting up tree (2.1.1-2ubuntu3) ...
Processing triggers for man-db (2.12.0-4build2) ...
hafsai162@DESKTOP-LA0D5TK:~/Lab_3$ tree
.
├── docs
│   ├── intro.txtn 4s (12.6 kB/s)
│   ├── notes.txt
│   └── summary.txt
├── drafts
│   ├── data
│   │   ├── processed
│   │   └── raw
│   │       ├── raw2.txt
│   │       └── raw1.txt
│   └── scripts
│       └── summary.txt
└── 7 directories, 6 files
hafsai162@DESKTOP-LA0D5TK:~/Lab_3$
```

## Part 2: Practice with Basic Linux Commands

Run the following commands inside Lab\_3/ and note their outputs:

- `pwd` → Show current working directory.
- `whoami` → Display the current logged-in user.
- `touch extra.txt` → Create an empty file. `cat`
- `intro.txt` → Display file contents. `rm extra.txt` →
- Delete a file.
- `history | tail -n 5` → Show your last 5 executed commands. `clear` → Clear
- the terminal.

Take screenshots of commands and outputs.

```
hafsai1162@DESKTOP-LA0D5TK: ~/Lab_3
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ pwd
/home/hafsai1162/Lab_3
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ whoami
hafsai1162
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ touch extra.txt
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ intro.txt
intro.txt: command not found
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ cat docs/intro.txt
This is the introduction file.
It contains the basic interview of Lab 3.
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ~/Lab_3$ history |tail -n 5
-bash: /home/hafsai1162/Lab_3$: No such file or directory
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ~/Lab_3$ history | tail -n 5
~Lab_3$: command not found
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ~/Lab_3$ history | tail -n 5
-bash: /home/hafsai1162/Lab_3$: No such file or directory
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ history | tail -n 5
72 cat docs/intro.txt
73 ~/Lab_3$ history |tail -n 5
74 ~Lab_3$ history | tail -n 5
75 ~/Lab_3$ history | tail -n 5
76 history | tail -n 5
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$
```

## Part 3: File Permissions and Ownership

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
```

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

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

4. Verify all changes with:

```
ls -l
```

Take a screenshot of the output.

```
hafsai1162@DESKTOP-LA0D5TK: ~/Lab_3
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ echo -e '#!/bin/bash\nnecho "Hello world! This is my first script."' > hello.sh
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ chmod 770 hello.sh
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ./hello.sh
Hello world! This is my first script.
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ls -l hello.sh
-rwxrwx--- 1 hafsai1162 hafsai1162 57 Oct 9 23:40 hello.sh
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ./hello.sh
Hello world! This is my first script.
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ chmod 664 docs/intro.txt
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ls -l docs/intro.txt
-rw-rw-r-- 1 hafsai1162 hafsai1162 73 Oct 9 23:16 docs/intro.txt
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ chmod o-rwx docs/notes.txt
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ls -l docs/hello.sh
-rwxrwx--- 1 hafsai1162 hafsai1162 57 Oct 9 23:40 hello.sh
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ls -l docs
total 12
-rw-rw-r-- 1 hafsai1162 hafsai1162 73 Oct 9 23:16 intro.txt
-rw-r--r-- 1 hafsai1162 hafsai1162 95 Oct 9 23:17 notes.txt
-rw-r--r-- 1 hafsai1162 hafsai1162 76 Oct 9 23:21 summary.txt
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ./hello.sh
Hello world! This is my first script.
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$
```

## Part 4: Reading & Searching Files

Inside docs/ :

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.

```
hafsai1162@DESKTOP-LA0D5TK: ~/Lab_3/docs
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ /docs
-bash: /docs: No such file or directory
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ ./docs
-bash: ./docs: Is a directory
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ cd ~ /Lab_3/docs
-bash: cd: too many arguments
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3$ cd ~/Lab_3/docs
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ wc notes.txt
 2 15 95 notes.txt
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ head -n 2 summary.txt
This is the summary file for lab 3
It include the brief recap of the tasks
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ tail -n 1 summary.txt
It include the brief recap of the tasks
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ grep "file" intro.txt
This is the introduction file.
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ grep "Lab" intro.txt
It contains the basic interview of Lab 3.
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/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.

```
hafsai162@DESKTOP-LA0D5TK: ~/Lab_3/docs$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1        0   0  21:15 ?        00:00:00 /usr/lib/systemd/systemd --sysroot
root           8        1   0  21:15 ?        00:00:02 plan9 --control-socket 7 --log-root
message+    201        1   0  21:15 ?        00:00:01 @dbus-daemon --system --addressroot
root        214        1   0  21:15 ?        00:00:01 /usr/libexec/wsl-pro-service -vroot
root        225        1   0  21:15 tty1    00:00:00 /sbin/agetty -o -p -- \u --noclroot
root        492        2   0 21:24 pts/1    00:00:00 /bin/login -f
hafsai1+    537        1   0  21:24 ?        00:00:00 /usr/lib/systemd/systemd --userhafsai1+
hafsai1+    569        2   0 21:24 pts/1    00:00:00 -bash
polkitd    1083        1   0  21:37 ?        00:00:00 /usr/lib/polkit-1/polkitd --no-root
systemd+   3226        1   0 21:53 ?        00:00:00 /usr/lib/systemd/systemd-timesyn
root       3248        1   0 21:53 ?        00:00:00 /usr/lib/systemd/systemd-resolvsyslog
root       13180        2   0 22:57 ?        00:00:00 /init
root       13191    13180   0 22:57 ?        00:00:00 /init
hafsai1+   13193    13191   0 22:57 pts/0    00:00:00 -bash
root       13422        2   0 23:24 ?        00:00:00 /init
root       13423    13422   0 23:24 ?        00:00:00 /init
hafsai1+   13429    13423   0 23:24 pts/2    00:00:00 sh -c "$VSCODE_WSL_EXT_LOCATIONhafsai1+
fsai1+    13437    13431   0 23:24 pts/2    00:00:00 sh /home/hafsai162/.vscode-server/hafsai1+
root       13452        2   0 23:24 ?        00:00:00 /init
root       13453    13452   0 23:24 ?        00:00:00 /init
hafsai1+   13454    13453   0 23:24 pts/3    00:00:01 /home/hafsai162/.vscode-server/root
root       13466    13463   0 23:24 ?        00:00:00 /init
hafsai1+   13467    13441   0 23:24 pts/2    00:00:01 /home/hafsai162/.vscode-server/hafsai1+
fsai1+    13500    13441   4 23:24 pts/2    00:01:06 /home/hafsai162/.vscode-server/root
root       13507    13506   0 23:24 ?        00:00:00 /init
hafsai1+   13509    13507   0 23:24 pts/5    00:00:02 /home/hafsai162/.vscode-server/root
root       13523    13522   0 23:24 ?        00:00:00 /init
hafsai1+   13524    13523   0 23:24 pts/6    00:00:00 /home/hafsai162/.vscode-server/hafsai1+
root       13565        2   0 23:24 ?        00:00:00 /init
root       13566    13565   0 23:24 ?        00:00:00 /init
hafsai1+   13569    13566   0 23:24 pts/7    00:00:00 /bin/sh -c cd '/home/hafsai162/hafsai1+
hafsai1+   13582    13572   0 23:24 pts/7    00:00:00 /home/hafsai162/.vscode-server/hafsai1+
root       13615        2   0 23:24 ?        00:00:00 /init
root       13616    13615   0 23:24 ?        00:00:00 /init
hafsai1+   13617    13616   0 23:24 pts/8    00:00:00 /bin/sh -c cd '/' && /bin/sh
hafsai1+   13618    13617   0 23:24 pts/8    00:00:00 /bin/sh
hafsai1+   13628    13618   0 23:24 pts/8    00:00:01 /home/hafsai162/.vscode-server/hafsai1+
hafsai1+   17092    13193   0 23:50 pts/0    00:00:00 ps -ef
hafsai162@DESKTOP-LA0D5TK: ~/Lab_3/docs$
```

```
hafsai162@DESKTOP-LA0D5TK: ~/Lab_3/docs$ top - 23:51:40 up 2:37, 1 user, load average: 0.12, 0.10, 0.09
Tasks: 57 total, 1 running, 56 sleeping, 0 stopped, 0 zombie
%Cpu(s): 1.1 us, 1.7 sy, 0.0 ni, 97.0 id, 0.0 wa, 0.0 hi, 0.2 si, 0.0 st
MiB Mem : 3855.2 total, 2798.0 free, 797.8 used, 409.6 buff/cache
MiB Swap: 1024.0 total, 1024.0 free, 0.0 used, 3057.5 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM    TIME+  COMMAND
 13500 hafsai1+  20   0   31.9g 135424 52480 S   0.3   3.4   1:08.13 node
 13191 root       20   0   3092    1160  1024 S   0.3   0.0   0:00.80 Relay(13193)
 13441 hafsai1+  20   0   11.3g 180664 51328 S   0.3   2.7   0:18.29 node
 17180 hafsai1+  20   0   0300    5632  3456 R   0.3   0.1   0:00.06 top
   1 root       20   0   21964 13056  9600 S   0.0   0.3   0:00.45 systemd
   2 root       20   0   3072    1664  1664 S   0.0   0.0   0:00.22 init-systemd(Ub
   8 root       20   0   3128    2068  1020 S   0.0   0.1   0:02.82 init
 200 root       20   0   4236    2560  2432 S   0.0   0.1   0:00.07 cron
 201 message+  20   0   9852    5120  4352 S   0.0   0.1   0:01.45 dbus-daemon
 212 root       20   0   17960   8448  7552 S   0.0   0.2   0:00.79 systemd-logind
 214 root       20   0   1756096 13952 11008 S   0.0   0.4   0:01.50 wsl-pro-service
 220 root       20   0   3160    1920  1792 S   0.0   0.0   0:00.05 agetty
 225 root       20   0   3116    1664  1664 S   0.0   0.0   0:00.03 agetty
 242 root       20   0   107012 22656 13312 S   0.0   0.6   0:00.46 unattended-upgr
 492 root       20   0   6656    4352  3712 S   0.0   0.1   0:00.03 login
 537 hafsai1+  20   0   20036 10752  9088 S   0.0   0.3   0:00.46 systemd
 538 hafsai1+  20   0   21152 3516  1792 S   0.0   0.1   0:00.00 (sd-pam)
 569 hafsai1+  20   0   6056  4992  3456 S   0.0   0.1   0:00.06 bash
 1083 polkitd    20   0   308164 7808  7040 S   0.0   0.2   0:00.50 polkitd
 1643 root      19  -1   50580 14464 13568 S   0.0   0.4   0:00.07 systemd-journal
 3226 systemd+  20   0   91024 7808  6912 S   0.0   0.2   0:00.22 systemd-timesyn
 3277 root       20   0   24980 6144  4992 S   0.0   0.2   0:02.16 systemd-udev
 3348 systemd+  20   0   21456 13056 10880 S   0.0   0.3   0:00.14 systemd-resolve
 3699 syslog   20   0   222508 5248  4608 S   0.0   0.1   0:00.40 rsyslogd
 13189 root       20   0   3076    1028  896 S   0.0   0.0   0:00.00 SessionLeader
 13193 hafsai1+  20   0   6428  5504  3584 S   0.0   0.1   0:00.72 bash
 13422 root       20   0   3088    1028  896 S   0.0   0.0   0:00.00 SessionLeader
 13423 root       20   0   3088    1164  1024 S   0.0   0.0   0:00.00 Relay(13429)
 13429 hafsai1+  20   0   2800    1664  1664 S   0.0   0.0   0:00.03 sh
 13431 hafsai1+  20   0   2800    1792  1792 S   0.0   0.0   0:00.01 sh
 13437 hafsai1+  20   0   2800    1792  1792 S   0.0   0.0   0:00.00 sh
 13452 root       20   0   3080    1028  896 S   0.0   0.0   0:00.00 SessionLeader
 13453 root       20   0   3096    1164  1024 S   0.0   0.0   0:00.35 Relay(13454)
 13454 hafsai1+  20   0   1012748 53380 42368 S   0.0   1.4   0:01.47 node
 13463 root       20   0   3000    1920  896 S   0.0   0.0   0:00.00 SessionLeader
 13466 root       20   0   3096    1164  1024 S   0.0   0.0   0:00.22 Relay(13468)
 13467 hafsai1+  20   0   1131080 58588 47232 S   0.0   1.5   0:01.02 node
```

## 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`.

```
hafsai162@DESKTOP-LA0D5TK: ~/Lab_3/docs
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ yes > /dev/null &
[1] 17412
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ ps -of | grep yes
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ ps -ef | grep yes
hafsai1+ 17412 13193 99 23:53 pts/0 00:00:39 yes
hafsai1+ 17501 13193 0 23:54 pts/0 00:00:00 grep --color=auto yes
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ kill 17412
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ ps -ef | grep yes
hafsai1+ 17551 13193 0 23:54 pts/0 00:00:00 grep --color=auto yes
[1]+ Terminated yes > /dev/null
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ sleep 15
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ sleep 15 &
[1] 17637
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ jobs
[1]+ Running sleep 15 &
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ fg %1
sleep 15
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ bg %1
-bash: bg: %1: no such job
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ ps
  PID TTY          TIME CMD
 13193 pts/0    00:00:00 bash
 17686 pts/0    00:00:00 ps
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$ jobs
hafsai162@DESKTOP-LA0D5TK:~/Lab_3/docs$
```

# 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.

```
hafsai1162@DESKTOP-LA0D5TK: ~/Lab_3/docs
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ ls -l
total 12
-rw-rw-r-- 1 hafsai1162 hafsai1162 73 Oct 9 23:16 intro.txt
-rw-r--r-- 1 hafsai1162 hafsai1162 95 Oct 9 23:17 notes.txt
-rw-r--r-- 1 hafsai1162 hafsai1162 76 Oct 9 23:21 summary.txt
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$ ps -ef | grep top
hafsai11+ 17908 13193 0 23:57 pts/0 00:00:00 grep --color=auto top
hafsai1162@DESKTOP-LA0D5TK:~/Lab_3/docs$
```

## Program 2 – Incomplete Program

```
#include <stdio.h>
#include <unistd.h>
#include <sys/wait.h>

int main() {
    pid_t pid = fork();

    if (pid == 0) {
        // TODO: Replace this child process with the "date" command using
        // execvp
        // Hint: execvp("date", "date", NULL);
    } else {
        // TODO: Make parent wait for child before printing "Child finished"
    }

    return 0;
}
```

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



The screenshot shows a Visual Studio Code editor window with the following components:

- Explorer:** Shows the file structure with 'HOMETASK2 [WSL: UBUNTU-24.04]' containing 'output1' and 'Task6.c'.
- Editor:** Displays the C program 'Task6.c' with the following code:

```
1 #include <stdio.h>
2 #include <unistd.h>
3 #include <sys/wait.h>
4
5 int main() {
6     pid_t pid = fork();
7
8     if (pid == 0) {
9         // Child process: replace with "date" command
10        execlp("date", "date", NULL);
11        // If execlp fails:
12        perror("execlp failed");
13    } else if (pid > 0) {
14        // Parent process: wait for child to finish
```
- Terminal:** Shows the command 'gcc Task6.c -o output1' and the resulting compilation errors:

```
Task6.c:22:11: error: stray '\302' in program
22 | <U+00A0><U+00A0><U+00A0><U+00A0>return 0;
    |           ^
Task6.c:22:11: error: stray '\302' in program
22 | <U+00A0><U+00A0><U+00A0><U+00A0>return 0;
    |           ^
Task6.c:22:11: error: stray '\302' in program
22 | <U+00A0><U+00A0><U+00A0><U+00A0>return 0;
    |           ^
Task6.c:22:11: error: stray '\302' in program
22 | <U+00A0><U+00A0><U+00A0><U+00A0>return 0;
    |           ^
hafsai162@DESKTOP-LA005TK:~/HomeTask2$ gcc Task6.c -o output1
hafsai162@DESKTOP-LA005TK:~/HomeTask2$ ./output1
Fri Oct 10 00:09:34 PKT 2025
Child finished
hafsai162@DESKTOP-LA005TK:~/HomeTask2$
```
- Problems:** Lists the compilation errors.
- Terminal:** Shows the command 'gcc Task6.c -o output1' and the resulting compilation errors.

# Submission Guidelines

- Submit a **single PDF file** including:
  - Screenshots of all said commands & outputs.
  - Modified & completed C program code and outputs.
- **Deadline:** 9th October, 2025, 11:59 PM.