



# National Textile University

## Department of Computer Science

Subject: Operating System

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Lab no.: lab3 (Home task)

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Semester: 5<sup>th</sup>

## Lab 3 Home task

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To make a folder of lab3\_home task we use following commands

As I'm making all labs folder in 1170-lab-os which is in home folder so:

- Home > 1170\_OS\_LAB > lab3\_hometask

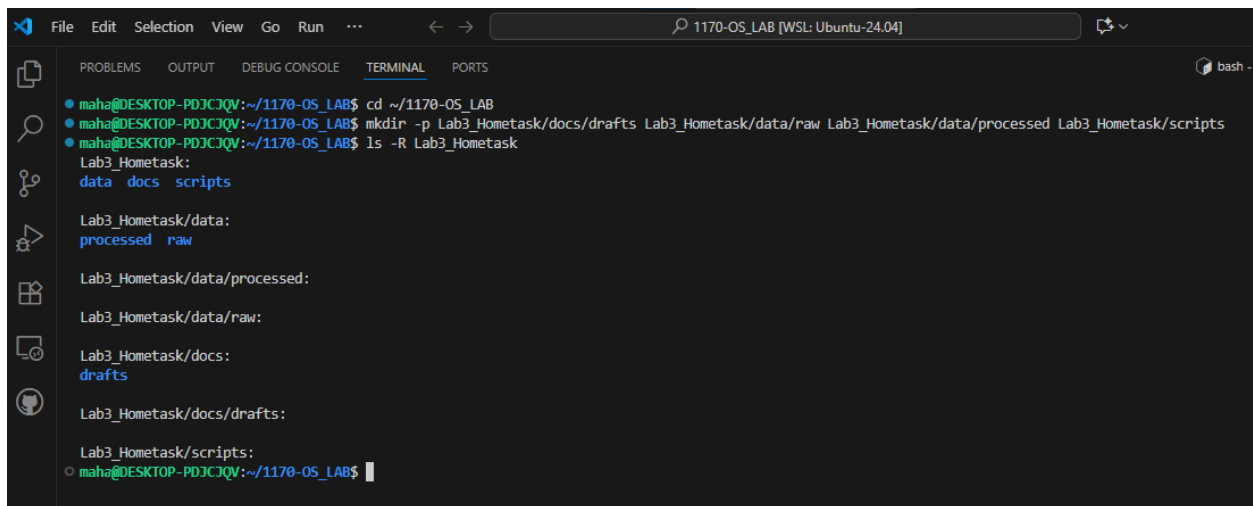
Step 1:

Commands:

- `cd ~/1170-OS_LAB`
- `mkdir -p Lab3_Hometask/docs/drafts Lab3_Hometask/data/raw Lab3_Hometask/data/processed Lab3_Hometask/scripts`

To verify folders and subfolder we just created

- `ls -R Lab3_Hometask`



```
File Edit Selection View Go Run ... 1170-OS_LAB [WSL: Ubuntu-24.04]
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ cd ~/1170-OS_LAB
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ mkdir -p Lab3_Hometask/docs/drafts Lab3_Hometask/data/raw Lab3_Hometask/data/processed Lab3_Hometask/scripts
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ ls -R Lab3_Hometask
Lab3_Hometask:
data docs scripts

Lab3_Hometask/data:
processed raw

Lab3_Hometask/data/processed:

Lab3_Hometask/data/raw:

Lab3_Hometask/docs:
drafts

Lab3_Hometask/docs/drafts:

Lab3_Hometask/scripts:
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$
```

Step2:

Create files and add text in each file using linux commands

open docx folder

- `cd ~/1170-OS_LAB/Lab3_Hometask/docs`

Create files

- `touch intro.txt notes.txt summary.txt`

Add text into each file:

- `printf "Intro line 1\nIntro line 2\n" > intro.txt`
- `printf "Notes line 1\nNotes line 2\n" > notes.txt`
- `printf "Summary line 1\nSummary line 2\n" > summary.txt`

copy summary.txt into drafts folder:

- `cp summary.txt drafts/`

```
Lab3_Hometask/scripts:
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ cd ~/1170-OS_LAB/Lab3_Hometask/docs
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ touch intro.txt notes.txt summary.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ printf "Lab3_hometask/n Created this file and insert task using linux commands" > intro.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ printf "Inserted teaxt in notes.txt using commands of linux for practice\n" > notes.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ printf "Summary.txt file \n Text using commands into Summary.txt file">summary.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ cp summary.txt drafts/
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Verify creation of folders and text inside folders

- `ls -la`
- `ls -la drafts`
- `cat intro.txt`

```
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ ls -ls
total 16
4 drwxr-xr-x 2 maha maha 4096 Oct  5 07:14 drafts
4 -rw-r--r-- 1 maha maha  70 Oct  5 07:13 intro.txt
4 -rw-r--r-- 1 maha maha  65 Oct  5 07:13 notes.txt
4 -rw-r--r-- 1 maha maha  60 Oct  5 07:14 summary.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ ls -la drafts
total 12
drwxr-xr-x 2 maha maha 4096 Oct  5 07:14 .
drwxr-xr-x 3 maha maha 4096 Oct  5 07:12 ..
-rw-r--r-- 1 maha maha  60 Oct  5 07:14 summary.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ cat intro.txt
Lab3_hometask/n Created this file and insert task using linux commands
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Step 3:

Operations inside data/raw

- `cd ~/1170-OS_LAB/Lab3_Hometask/data/raw`

create files:

- touch raw1.txt raw2.txt

append current data to raw1.txt

- date >> raw1.txt

move raw2.txt to processed folder

- mv raw2.txt ../processed/

```

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ cd ~/1170-OS_LAB/Lab3_Hometask/data/raw
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ touch raw1.txt raw2.txt
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ date >> raw1.txt
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ mv raw2.txt ../processed/
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ █

```

Verify operation in data/raw

- ls -la .
- ls -la ../processed
- cat raw1.txt

```

● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ ls -la .
total 12
drwxr-xr-x 2 maha maha 4096 Oct  5 07:21 .
drwxr-xr-x 4 maha maha 4096 Oct  5 07:09 ..
-rw-r--r-- 1 maha maha   29 Oct  5 07:21 raw1.txt
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ ls -la ../processed
total 8
drwxr-xr-x 2 maha maha 4096 Oct  5 07:21 .
drwxr-xr-x 4 maha maha 4096 Oct  5 07:09 ..
-rw-r--r-- 1 maha maha    0 Oct  5 07:21 raw2.txt
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ cat raw1.txt
Sun Oct  5 07:21:42 PDT 2025
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/data/raw$ █

```

Step 4:

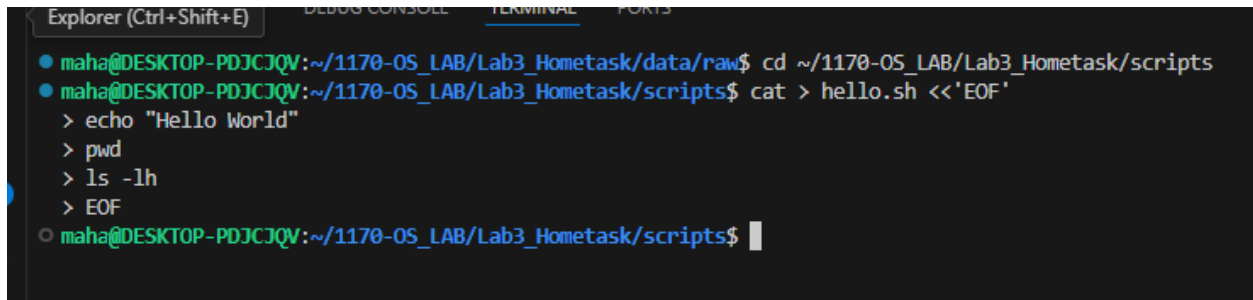
Inside scripts > Create a script named echo "Hello World"

Commands:

- cd ~/1170-OS\_LAB/Lab3\_Hometask/scripts

create hello.sh

- `cat > hello.sh <<'EOF'`
- `echo "Hello World"`
- `pwd`
- `ls -lh`
- `EOF`

A terminal window with tabs for Explorer, DEBUG CONSOLE, TERMINAL, and PORTS. The terminal shows a user named maha at a desktop named PDJJCJQV. The user navigates to the directory ~/1170-OS\_LAB/Lab3\_Hometask/scripts and creates a file named hello.sh using the cat command with a here document. The content of the script is an echo statement for "Hello World", followed by pwd, ls -lh, and EOF. The prompt returns to the user in the same directory.

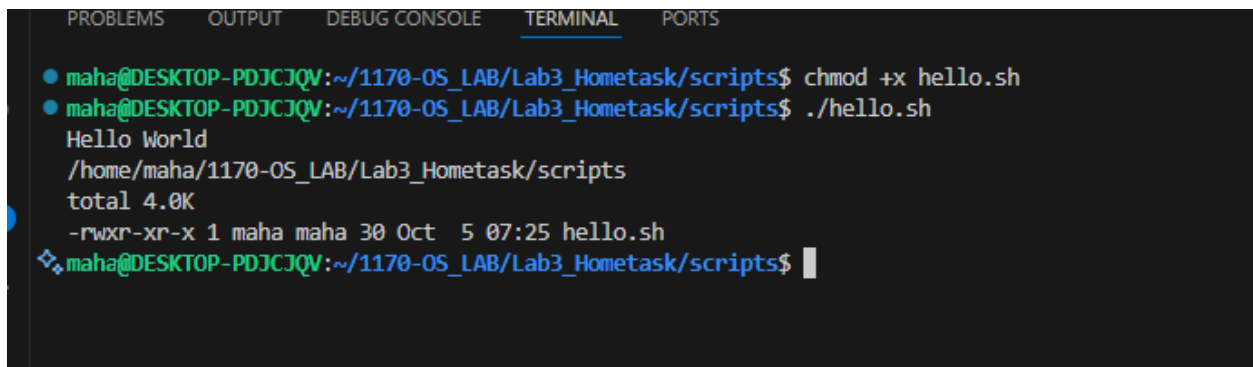
```
maha@DESKTOP-PDJJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ cd ~/1170-OS_LAB/Lab3_Hometask/scripts
maha@DESKTOP-PDJJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ cat > hello.sh <<'EOF'
> echo "Hello World"
> pwd
> ls -lh
> EOF
maha@DESKTOP-PDJJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$
```

make executable

- `chmod +x hello.sh`

run

- `./hello.sh`

A terminal window showing the execution of the script. The user runs 'chmod +x hello.sh' and then './hello.sh'. The output shows 'Hello World', the current directory path, the total size of the directory (4.0K), and the file permissions for hello.sh. The prompt returns to the user.

```
maha@DESKTOP-PDJJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ chmod +x hello.sh
maha@DESKTOP-PDJJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ ./hello.sh
Hello World
/home/maha/1170-OS_LAB/Lab3_Hometask/scripts
total 4.0K
-rwxr-xr-x 1 maha maha 30 Oct  5 07:25 hello.sh
maha@DESKTOP-PDJJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$
```

Step 5:

Display the directory structure recursively

Commands:

- `cd ~/1170-OS_LAB`
- `ls -R Lab3_Hometask`

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ cd ~/1170-OS_LAB
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ ls -R Lab3_Hometask
Lab3_Hometask:
data docs scripts

Lab3_Hometask/data:
processed raw

Lab3_Hometask/data/processed:
raw2.txt

Lab3_Hometask/data/raw:
raw1.txt

Lab3_Hometask/docs:
drafts intro.txt notes.txt summary.txt

Lab3_Hometask/docs/drafts:
summary.txt

Lab3_Hometask/scripts:
hello.sh
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$
```

## Part 2:

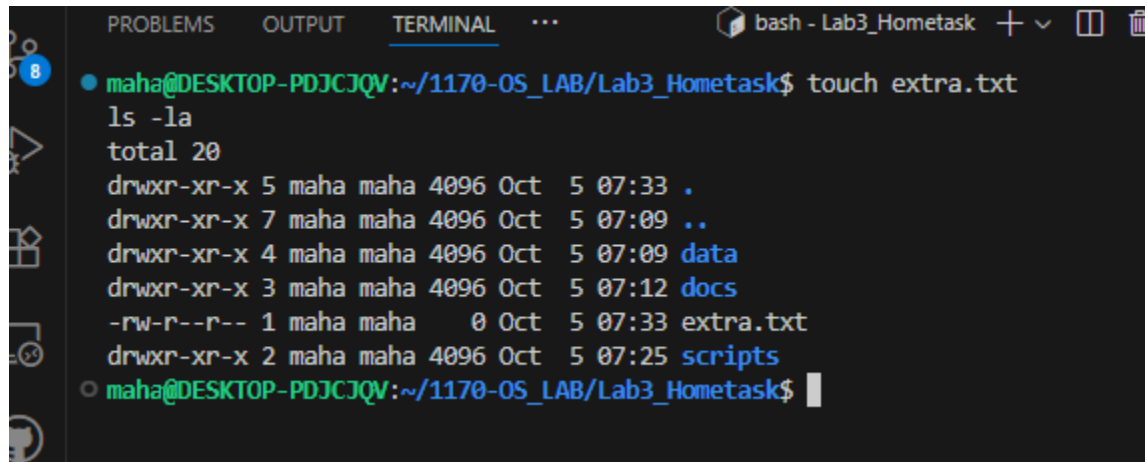
Run the following commands inside Lab\_3/ and note their outputs

1. pwd
2. whoami

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

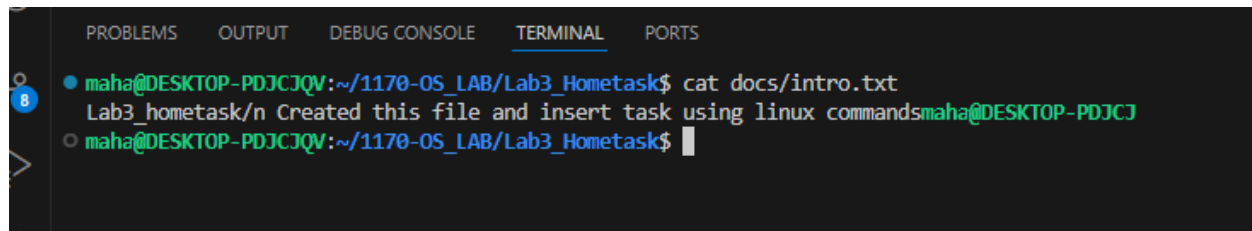
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ cd ~/1170-OS_LAB/Lab3_Hometask
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ pwd
/home/maha/1170-OS_LAB/Lab3_Hometask
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ whoami
maha
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$
```

### 3. touch extra.txt



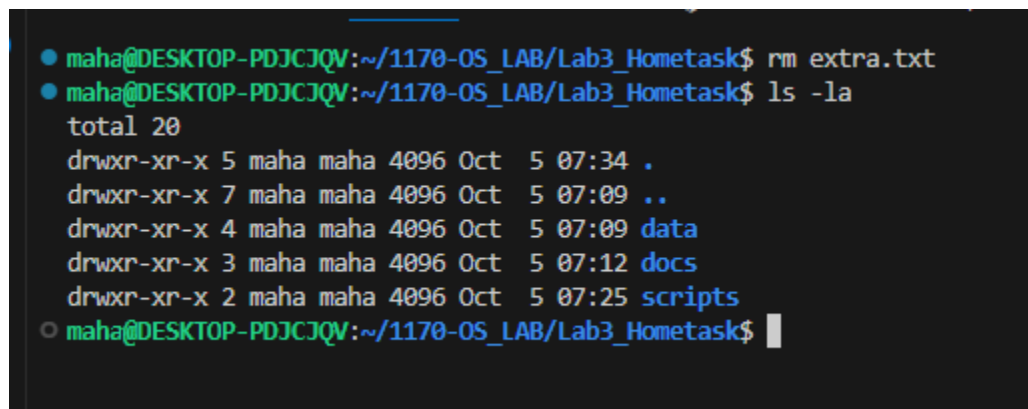
```
bash - Lab3_Hometask
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ touch extra.txt
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ ls -la
total 20
drwxr-xr-x 5 maha maha 4096 Oct  5 07:33 .
drwxr-xr-x 7 maha maha 4096 Oct  5 07:09 ..
drwxr-xr-x 4 maha maha 4096 Oct  5 07:09 data
drwxr-xr-x 3 maha maha 4096 Oct  5 07:12 docs
-rw-r--r-- 1 maha maha    0 Oct  5 07:33 extra.txt
drwxr-xr-x 2 maha maha 4096 Oct  5 07:25 scripts
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$
```

### 4. cat intro.txt



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ cat docs/intro.txt
Lab3_hometask/n Created this file and insert task using linux commands
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$
```

### 5. rm extra.txt



```
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ rm extra.txt
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ ls -la
total 20
drwxr-xr-x 5 maha maha 4096 Oct  5 07:34 .
drwxr-xr-x 7 maha maha 4096 Oct  5 07:09 ..
drwxr-xr-x 4 maha maha 4096 Oct  5 07:09 data
drwxr-xr-x 3 maha maha 4096 Oct  5 07:12 docs
drwxr-xr-x 2 maha maha 4096 Oct  5 07:25 scripts
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$
```

### 6. history | tail -n 5

```
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ history | tail -n 5
481 clear
482 rm extra.txt
483 ls -la
484 clear
485 history | tail -n 5
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$
```

## 7. clear

```
PROBLEMS OUTPUT TERMINAL ... bash - Lab3_Hometask + v [ ] [ ] ... [ ] x
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$
```

## Part 3:

### File Permissions and Ownerships

#### Step 1:

#### Commands:

- `cd ~/1170-OS_LAB/Lab3_Hometask/scripts`

#### Owner & Group → Read, Write

- `chmod 770 hello.sh`

#### verify

- `ls -l hello.sh`

#### run script

- `./hello.sh`



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask$ cd ~/1170-OS_LAB/Lab3_Hometask/scripts
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ chmod 770 hello.sh
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ ls -l hello.sh
-rwxrwx--- 1 maha maha 30 Oct  5 07:25 hello.sh
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ ./hello.sh
Hello World
/home/maha/1170-OS_LAB/Lab3_Hometask/scripts
total 4.0K
-rwxrwx--- 1 maha maha 30 Oct  5 07:25 hello.sh
❖ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$
```

Step 2:

Intro.txt permission

Commands:

- `cd ~/1170-OS_LAB/Lab3_Hometask/docs`

Owner → rw, Group → rw, Others → r

- `chmod 664 intro.txt`

verify

- `ls -l intro.txt`

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/scripts$ cd ~/1170-OS_LAB/Lab3_Hometask/docs
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ chmod 664 intro.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ ls -l intro.txt
-rw-rw-r-- 1 maha maha 70 Oct  5 07:13 intro.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Step 3:

Notes.txt permission:

Commands:

remove all permissions for others

- `chmod o= notes.txt`

verify

- `ls -l notes.txt`

```
Try 'chmod --help' for more information.
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ chmod o= notes.txt
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ ls -l notes.txt
-rw-r----- 1 maha maha 65 Oct  5 07:13 notes.txt
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Step 4:

Verify all changes

- `ls -l`

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  ...  bash - docs  + v  []
7
• maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ ls -l
total 16
drwxr-xr-x 2 maha maha 4096 Oct  5 07:14 drafts
-rw-rw-r-- 1 maha maha  70 Oct  5 07:13 intro.txt
-rw-r----- 1 maha maha  65 Oct  5 07:13 notes.txt
-rw-r--r-- 1 maha maha  60 Oct  5 07:14 summary.txt
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Part 4:

Reading and searching files:

Step 1:

Count lines, Words, Characters in summary.txt

Commands:

- `cd ~/1170-OS_LAB/Lab3_Hometask/docs`
- `wc summary.txt`

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ cd ~/1170-OS_LAB/Lab3_Hometask/docs
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ wc summary.txt
1 8 60 summary.txt
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Step 2:

Shows only first two lines of notes.txt

Command:

- Head -n 2 notes.txt

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL ... bash - docs + v [ ] [ ] [ ]
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ head -n 2 notes.txt
Inserted teaxt in notes.txt using commands of linux for practice
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Step 3:

Show the last line of summary.txt

Command:

- Tail -n 1 summary.txt

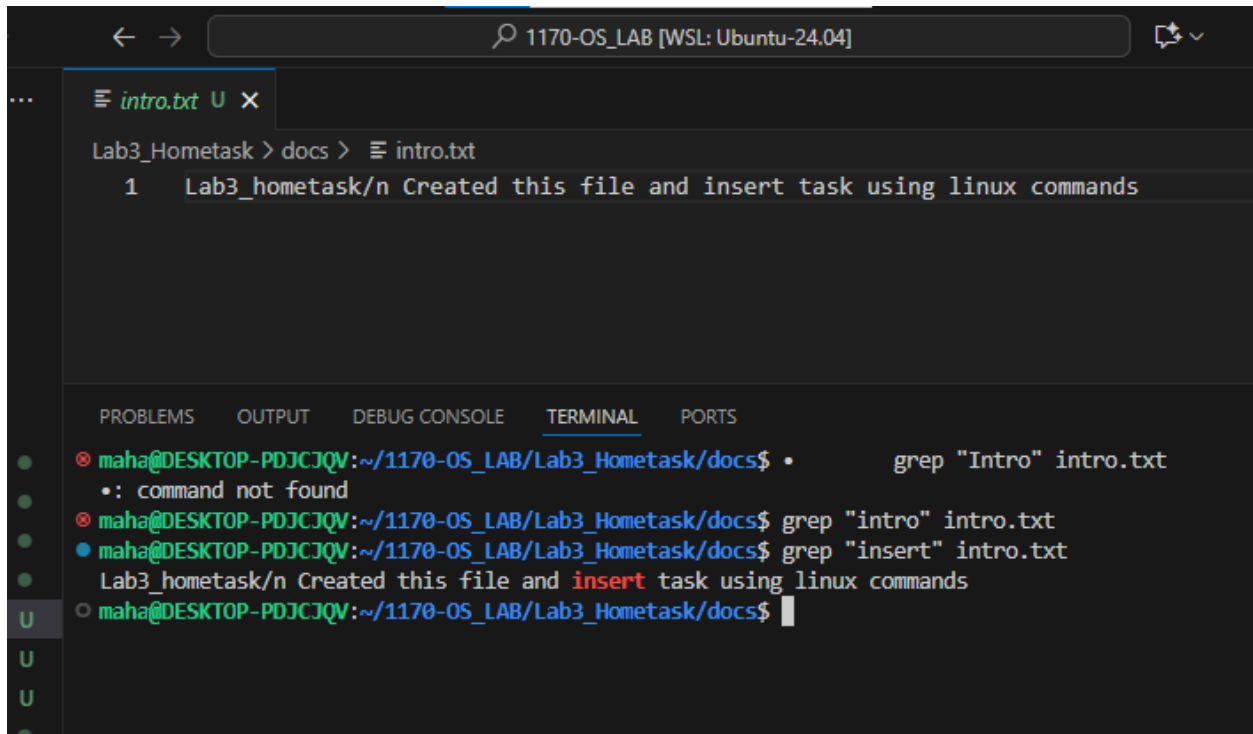
```
1 echo "Hello World"
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ tail -n 1 summary.txt
Text using commands into Summary.txt filemaha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

Step 4:

Search for a keyword in intro.txt

Command:

- `grep "insert" intro.txt`



```
1170-OS_LAB [WSL: Ubuntu-24.04]
intro.txt
Lab3_Hometask > docs > intro.txt
1 Lab3_hometask/n Created this file and insert task using linux commands

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ grep "Intro" intro.txt
•: command not found
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ grep "intro" intro.txt
Lab3_hometask/n Created this file and insert task using linux commands
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$
```

## Part 5:

### Linux Process Commands

#### Step 1:

commands:

show all processes with details

- `ps -ef`

```

maha@DESKTOP-PDJCQV:~/1170-05_LAB/Lab3_Hometask/docs$ ps -ef
UID          PID    PPID  C  STIME TTY          TIME CMD
root         1        0  0  07:07 ?        00:00:02 /sbin/init
root         2        1  0  07:07 ?        00:00:00 /init
root         7        2  0  07:07 ?        00:00:01 plan9 --control-socket 7 --log-level 4 --server-fd 8 --pipe-fd 10 --log-truncate
root        49        1  0  07:07 ?        00:00:01 /usr/lib/systemd/systemd-journald
root        98        1  0  07:07 ?        00:00:01 /usr/lib/systemd/systemd-udev
systemd+   127        1  0  07:07 ?        00:00:00 /usr/lib/systemd/systemd-resolved
systemd+   136        1  0  07:07 ?        00:00:00 /usr/lib/systemd/systemd-timesyncd
root       165        1  0  07:07 ?        00:00:00 /usr/sbin/cron -f -P
message+   166        1  0  07:07 ?        00:00:00 @dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --sys
root       182        1  0  07:07 ?        00:00:00 /usr/lib/systemd/systemd-logind
root       184        1  0  07:07 ?        00:00:00 /usr/libexec/wsl-pro-service -vv
root       186        1  0  07:07 hvc0    00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud - 115200,38400,9600 vt220
syslog     190        1  0  07:07 ?        00:00:00 /usr/sbin/rsyslogd -n -iNONE
root       202        1  0  07:07 tty1    00:00:00 /sbin/agetty -o -p -- \u --noclear - linux
root       212        1  0  07:07 ?        00:00:00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-s
root       316        2  0  07:07 pts/1   00:00:00 /bin/login -f
maha      366        1  0  07:07 ?        00:00:00 /usr/lib/systemd/systemd --user
maha      367       366  0  07:07 ?        00:00:00 (sd-pam)
maha      385       316  0  07:07 pts/1   00:00:00 -bash
root      548        1  0  07:07 ?        00:00:00 /init
root     1649        2  0  07:12 ?        00:00:00 /init
root     1650     1649  0  07:12 ?        00:00:00 /init
maha     1651     1650  0  07:12 pts/0    00:00:00 sh -c "$VSCODE_WSL_EXT_LOCATION/scripts/wslServer.sh" 385651c938df8a906869babee516bffd0d
maha     1652     1651  0  07:12 pts/0    00:00:00 sh /mnt/c/Users/hp/.vscode/extensions/ms-vscode-remote.remote-wsl-0.104.3/scripts/wslSer
maha     1658     1652  0  07:12 pts/0    00:00:00 sh /home/maha/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/bin/code-serve
maha     1662     1658  0  07:12 pts/0    00:00:25 /home/maha/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node /home/maha/.
root     1673        2  0  07:12 ?        00:00:00 /init
root     1674     1673  0  07:12 ?        00:00:02 /init
maha     1675     1674  0  07:12 pts/2    00:00:05 /home/maha/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node -e const net
root     1682        2  0  07:12 ?        00:00:00 /init
root     1683     1682  0  07:12 ?        00:00:01 /init
maha     1684     1683  0  07:12 pts/3    00:00:05 /home/maha/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node -e const net
maha     1690     1662  0  07:12 pts/0    00:00:24 /home/maha/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node /home/maha/.
maha     1706     1662  0  07:12 pts/0    00:00:01 /home/maha/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node /home/maha/.
maha     1733     1662  5  07:12 pts/0    00:02:33 /home/maha/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node --dns-result

```

interactive process monitor

- top

```
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ top
Tasks: 46 total, 1 running, 45 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.5 us, 1.0 sy, 0.0 ni, 98.5 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 3865.2 total, 2127.4 free, 1306.0 used, 567.9 buff/cache
MiB Swap: 1024.0 total, 1024.0 free, 0.0 used. 2559.2 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM    TIME+  COMMAND
 1733 maha      20   0   52.6g  744620 55680 S   2.7   18.8   2:35.24 node
 1662 maha      20   0   11.3g  126028 51968 S   0.7    3.2   0:25.41 node
 1674 root       20   0    3088   1168   1024 S   0.7    0.0   0:02.09 Relay(1675)
 1690 maha      20   0  1071328 80988 47232 S   0.7    2.0   0:24.45 node
 1675 maha      20   0  1017088 59444 43008 S   0.3    1.5   0:05.53 node
 1684 maha      20   0  1013496 55852 42880 S   0.3    1.4   0:05.21 node
 9700 maha      20   0    9284   5504   3328 R   0.3    0.1   0:00.05 top
    1 root       20   0   21844  12464  9264 S   0.0    0.3   0:02.60 systemd
    2 root       20   0    3072   1920  1792 S   0.0    0.0   0:00.09 init-systemd(Ub
    7 root       20   0    3120   2068  1792 S   0.0    0.1   0:01.30 init
   49 root      19  -1   66748  16900 16004 S   0.0    0.4   0:01.14 systemd-journal
   98 root       20   0   25008   6016  4864 S   0.0    0.2   0:01.19 systemd-udevd
  127 systemd+   20   0   21456  12544 10368 S   0.0    0.3   0:00.27 systemd-resolve
  136 systemd+   20   0   91024   7552  6784 S   0.0    0.2   0:00.39 systemd-timesyn
  165 root       20   0    4236   2432  2304 S   0.0    0.1   0:00.02 cron
  166 message+   20   0    9632   5120  4480 S   0.0    0.1   0:00.78 dbus-daemon
  182 root       20   0   17964   8320  7424 S   0.0    0.2   0:00.39 systemd-logind
  184 root       20   0  1682108 12800 10752 S   0.0    0.3   0:00.42 wsl-pro-service
  186 root       20   0    3160   1920  1792 S   0.0    0.0   0:00.01 agetty
  190 syslog     20   0  222508   5120  4224 S   0.0    0.1   0:00.27 rsyslogd
  202 root       20   0    3116   1792  1664 S   0.0    0.0   0:00.01 agetty
  212 root       20   0  107012  22272 13056 S   0.0    0.6   0:00.32 unattended-upgr
  316 root       20   0    6820   4096  3584 S   0.0    0.1   0:00.02 login
  366 maha      20   0   20312  11136  9088 S   0.0    0.3   0:00.31 systemd
  367 maha      20   0   21152   3496  1792 S   0.0    0.1   0:00.00 (sd-pam)
  385 maha      20   0    6072   5120  3584 S   0.0    0.1   0:00.08 bash
  548 root       20   0    3088   1296  1152 S   0.0    0.0   0:00.00 Relay(549)
 1649 root       20   0    3076   1032    896 S   0.0    0.0   0:00.00 SessionLeader
 1650 root       20   0    3092   1164   1024 S   0.0    0.0   0:00.00 Relay(1651)
 1651 maha      20   0    2800   1536   1536 S   0.0    0.0   0:00.01 sh
```

## Step 2:

Practice with infinite process

Commands:

Start infinite process

- `yes > /dev/null &`

Check process id of “yes”

- `ps -ef | grep yes`

kill the process

- `kill <Pid>`

- kill

verify killing

- ps -ef | grep yes

```

● maha@DESKTOP-PDJCJQV:~/1170-05_LAB/Lab3_Hometask/docs$ yes > /dev/null &
[1] 10377
● maha@DESKTOP-PDJCJQV:~/1170-05_LAB/Lab3_Hometask/docs$ ps -ef | grep yes
maha      10377      1856  99  08:05 pts/5      00:00:11 yes
maha      10440      1856   0  08:06 pts/5      00:00:00 grep --color=auto yes
⊗ maha@DESKTOP-PDJCJQV:~/1170-05_LAB/Lab3_Hometask/docs$ kill 1
bash: kill: (1) - Operation not permitted
● maha@DESKTOP-PDJCJQV:~/1170-05_LAB/Lab3_Hometask/docs$ kill 10377
[1]+  Terminated                  yes > /dev/null
● maha@DESKTOP-PDJCJQV:~/1170-05_LAB/Lab3_Hometask/docs$ ps -ef | grep yes
maha      10543      1856   0  08:06 pts/5      00:00:00 grep --color=auto yes
○ maha@DESKTOP-PDJCJQV:~/1170-05_LAB/Lab3_Hometask/docs$

```

Step 3:

Foreground & Background Jobs

Commands:

Foreground:

- Sleep 60

```

○ maha@DESKTOP-PDJCJQV:~/1170-05_LAB/Lab3_Hometask/docs$ sleep 60

```

background

- Sleep 60 &

```

● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ sleep 60
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ sleep 60 &
  [1] 10991
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ █

```

Bring it to foreground

- Fg

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL ... sleep - docs + v []
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ sleep 60
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ sleep 60 &
  [1] 10991
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ fg
  sleep 60
  █

```

Send it to background

- Bg

```

● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ sleep 10 &
  [1] 11238
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ bg
  bash: bg: job 1 already in background
○ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB/Lab3_Hometask/docs$ █

```

## Part 6:

Program 1:

Commands:

Create new c file

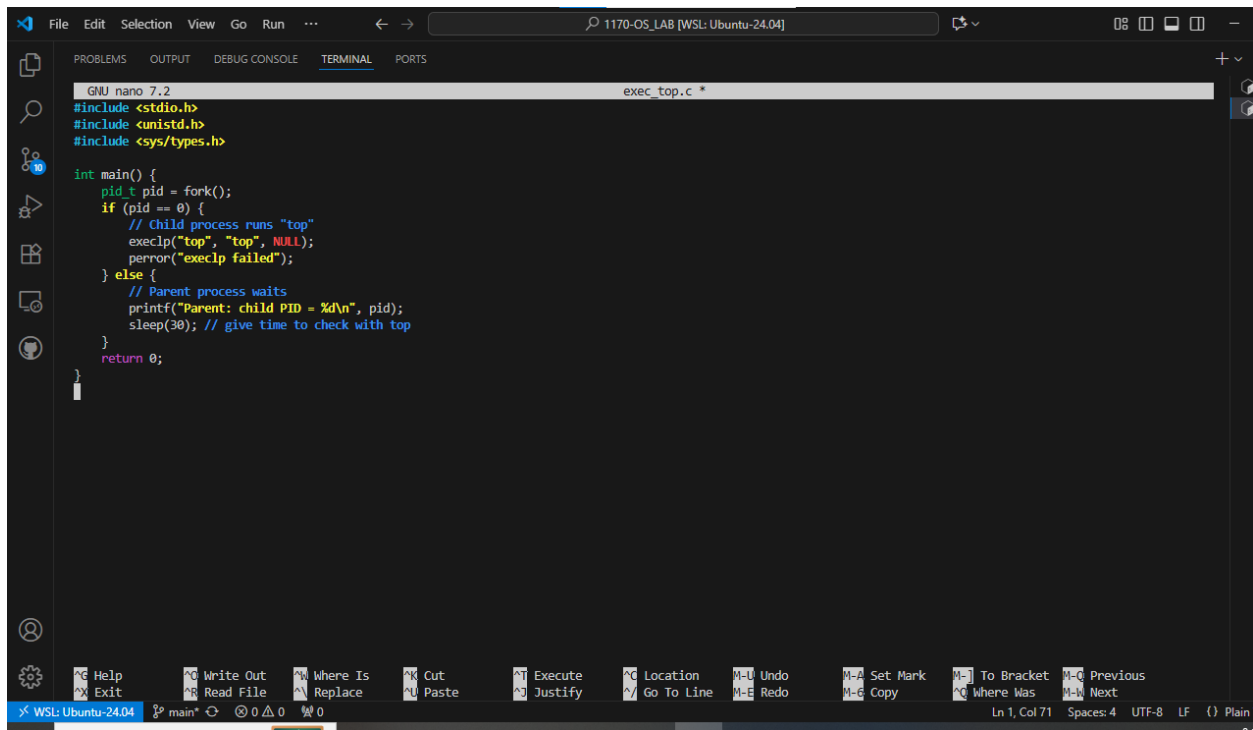
- cd ~/1170-OS\_LAB/Lab3\_Hometask
- nano exec\_top.c



code for c file:

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

int main() {
    pid_t pid = fork();
    if (pid == 0) {
        // Child process runs "top"
        execlp("top", "top", NULL);
        perror("execlp failed");
    } else {
        // Parent process waits
        printf("Parent: child PID = %d\n", pid);
        sleep(30); // give time to check with top
    }
    return 0;
}
```

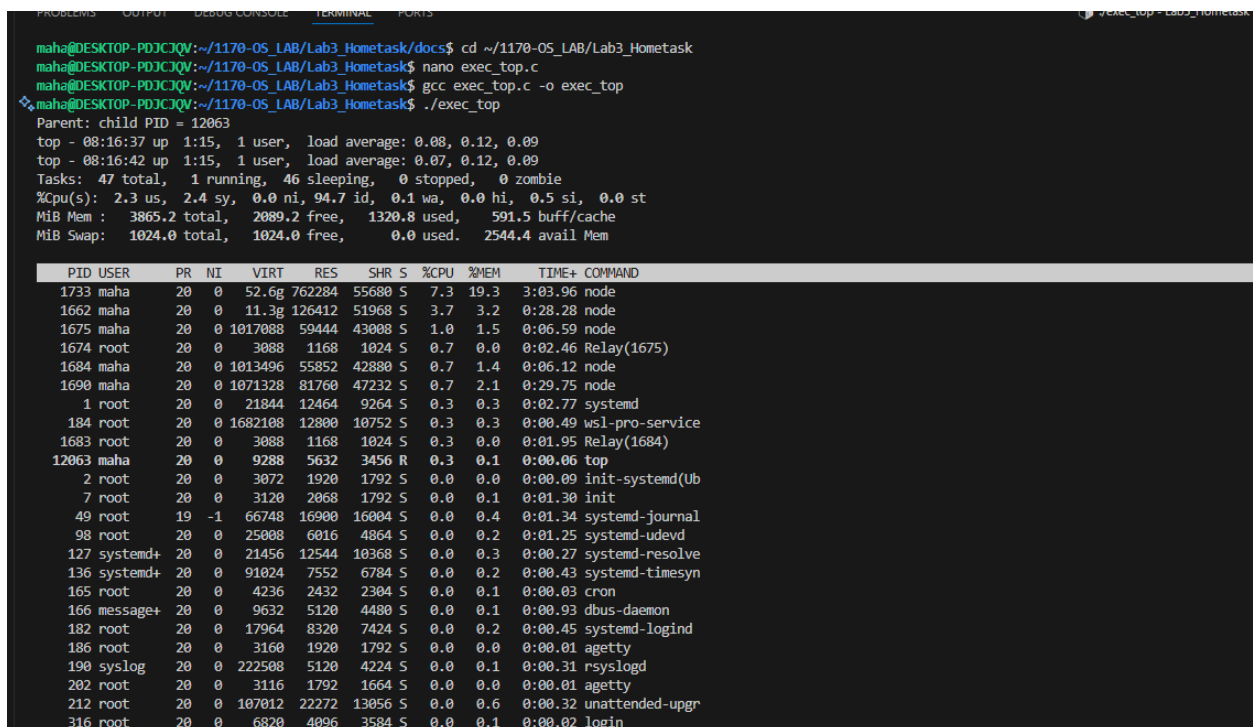


```
GNU nano 7.2 exec_top.c *
#include <stdio.h>
#include <unistd.h>
#include <sys/types.h>

int main() {
    pid_t pid = fork();
    if (pid == 0) {
        // Child process runs "top"
        execlp("top", "top", NULL);
        perror("execlp failed");
    } else {
        // Parent process waits
        printf("Parent: child PID = %d\n", pid);
        sleep(30); // give time to check with top
    }
    return 0;
}
```

Compile and run commands:

- `gcc exec_top.c -o exec_top`
- `./exec_top`



```
maha@DESKTOP-PDJCQV:~/1170-OS_LAB/Lab3_Hometask/docs$ cd ~/1170-OS_LAB/Lab3_Hometask
maha@DESKTOP-PDJCQV:~/1170-OS_LAB/Lab3_Hometask$ nano exec_top.c
maha@DESKTOP-PDJCQV:~/1170-OS_LAB/Lab3_Hometask$ gcc exec_top.c -o exec_top
maha@DESKTOP-PDJCQV:~/1170-OS_LAB/Lab3_Hometask$ ./exec_top
Parent: child PID = 12063
top - 08:16:37 up 1:15, 1 user, load average: 0.08, 0.12, 0.09
top - 08:16:42 up 1:15, 1 user, load average: 0.07, 0.12, 0.09
Tasks: 47 total, 1 running, 46 sleeping, 0 stopped, 0 zombie
%Cpu(s): 2.3 us, 2.4 sy, 0.0 ni, 94.7 id, 0.1 wa, 0.0 hi, 0.5 si, 0.0 st
MiB Mem : 3865.2 total, 2089.2 free, 1320.8 used, 591.5 buff/cache
MiB Swap: 1024.0 total, 1024.0 free, 0.0 used, 2544.4 avail Mem

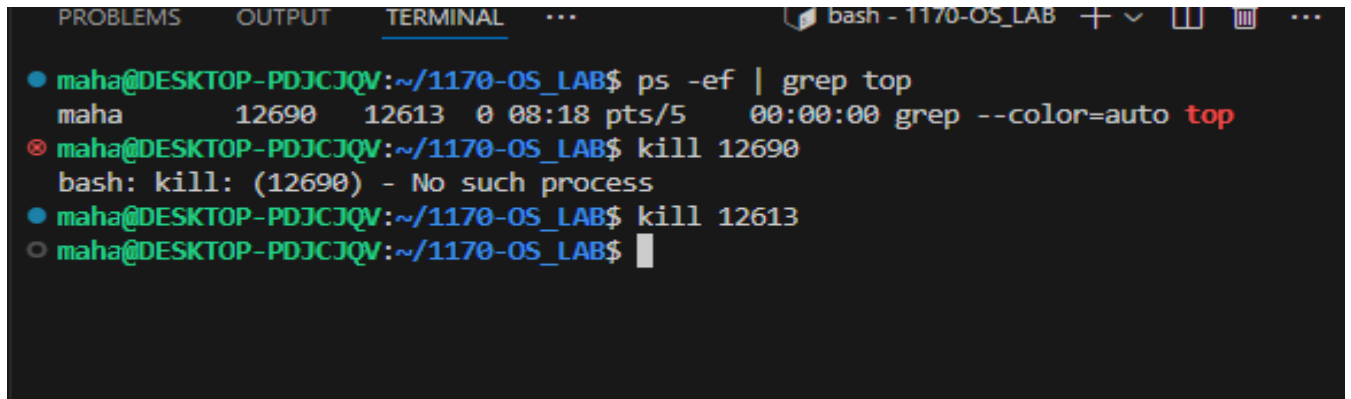
  PID USER      PR  NI   VIRT   RES   SHR S  %CPU  %MEM    TIME+  COMMAND
 1733 maha      20   0   52.6g 762284 55680 S   7.3   19.3   3:03.96 node
 1662 maha      20   0   11.3g 126412 51968 S   3.7    3.2   0:28.28 node
 1675 maha      20   0 1017088 59444 43008 S   1.0    1.5   0:06.59 node
 1674 root       20   0   3088   1168   1024 S   0.7    0.0   0:02.46 Relay(1675)
 1684 maha      20   0 1013496 55852 42880 S   0.7    1.4   0:06.12 node
 1690 maha      20   0 1071328 81760 47232 S   0.7    2.1   0:29.75 node
    1 root       20   0   21844 12464  9264 S   0.3    0.3   0:02.77 systemd
  184 root      20   0 1682108 12800 10752 S   0.3    0.3   0:00.49 wsl-pro-service
 1683 root      20   0   3088   1168   1024 S   0.3    0.0   0:01.95 Relay(1684)
12063 maha      20   0   9288   5632  3456 R   0.3    0.1   0:00.06 top
    2 root      20   0   3072   1920  1792 S   0.0    0.0   0:00.09 init-systemd(Ub
    7 root      20   0   3120   2068  1792 S   0.0    0.1   0:01.30 init
   49 root      19  -1  66748 16900 16004 S   0.0    0.4   0:01.34 systemd-journal
   98 root      20   0   25008  6016  4864 S   0.0    0.2   0:01.25 systemd-udev
  127 systemd+  20   0   21456 12544 10368 S   0.0    0.3   0:00.27 systemd-resolve
  136 systemd+  20   0   91024  7552  6784 S   0.0    0.2   0:00.43 systemd-timesyn
  165 root      20   0   4236   2432  2304 S   0.0    0.1   0:00.03 cron
  166 message+  20   0   9632   5120  4480 S   0.0    0.1   0:00.93 dbus-daemon
  182 root      20   0   17964  8320  7424 S   0.0    0.2   0:00.45 systemd-logind
  186 root      20   0   3160   1920  1792 S   0.0    0.0   0:00.01agetty
  190 syslog    20   0  222508  5120  4224 S   0.0    0.1   0:00.31 rsyslogd
  202 root      20   0   3116   1792  1664 S   0.0    0.0   0:00.01agetty
  212 root      20   0 107012 22272 13056 S   0.0    0.6   0:00.32 unattended-upgr
  316 root      20   0   6820   4096  3584 S   0.0    0.1   0:00.02 login
```

Open new terminal and run:

- `ps -ef | grep top`

kill child manually:

- `kill <PID>`
- `kill 12613`

A terminal window with a dark background and light-colored text. The terminal shows the following commands and output:

```
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ ps -ef | grep top
maha      12690   12613   0  08:18 pts/5    00:00:00 grep --color=auto top
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ kill 12690
bash: kill: (12690) - No such process
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ kill 12613
maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$
```

Step 2:

Incomplete Program

Commands:

Create new file:

- `nano fork_date.c`

code:

```
#include <stdio.h>

#include <unistd.h>

#include <sys/wait.h>

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

```
if (pid == 0) {  
    // Child process runs "date"  
    execlp("date", "date", NULL);  
    perror("execlp failed");  
} else {  
    // Parent waits for child  
    wait(NULL);  
    printf("Child finished\n");  
}  
return 0;  
}
```

```
PROBLEMS OUTPUT TERMINAL ... nano - 1170-OS_LAB + v [ ] [ ] ... [ ] [ ] X
GNU nano 7.2 fork_date.c *
#include <stdio.h>
#include <unistd.h>
#include <sys/wait.h>

int main() {
    pid_t pid = fork();
    if (pid == 0) {
        // Child process runs "date"
        execlp("date", "date", NULL);
        perror("execlp failed");
    } else {
        // Parent waits for child
        wait(NULL);
        printf("Child finished\n");
    }
    return 0;
}

^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line
• Ubuntu-24.04 2 main* ↵ 0 0 0 0 0 Spaces: 4 UTF-8 LF { } Plain Text [ ] [ ]
```

Compile and run

- gcc fork\_date.c -o fork\_date
- ./fork\_date

```
PROBLEMS  OUTPUT  TERMINAL  ...  bash - 1170-OS_LAB + v
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ nano fork_date.c
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ gcc fork_date.c -o fork_date
⊗ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ ./forl_date
bash: ./forl_date: No such file or directory
● maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$ ./fork_date
Sun Oct  5 08:22:53 PDT 2025
Child finished
❖ maha@DESKTOP-PDJCJQV:~/1170-OS_LAB$
```

.....