



National Textile University

Department of Computer Science

Subject:

Operating System

Submitted to:

Nasir Mahmood

Submitted by:

Afia Maham

Reg number:

23-NTU-CS-1126

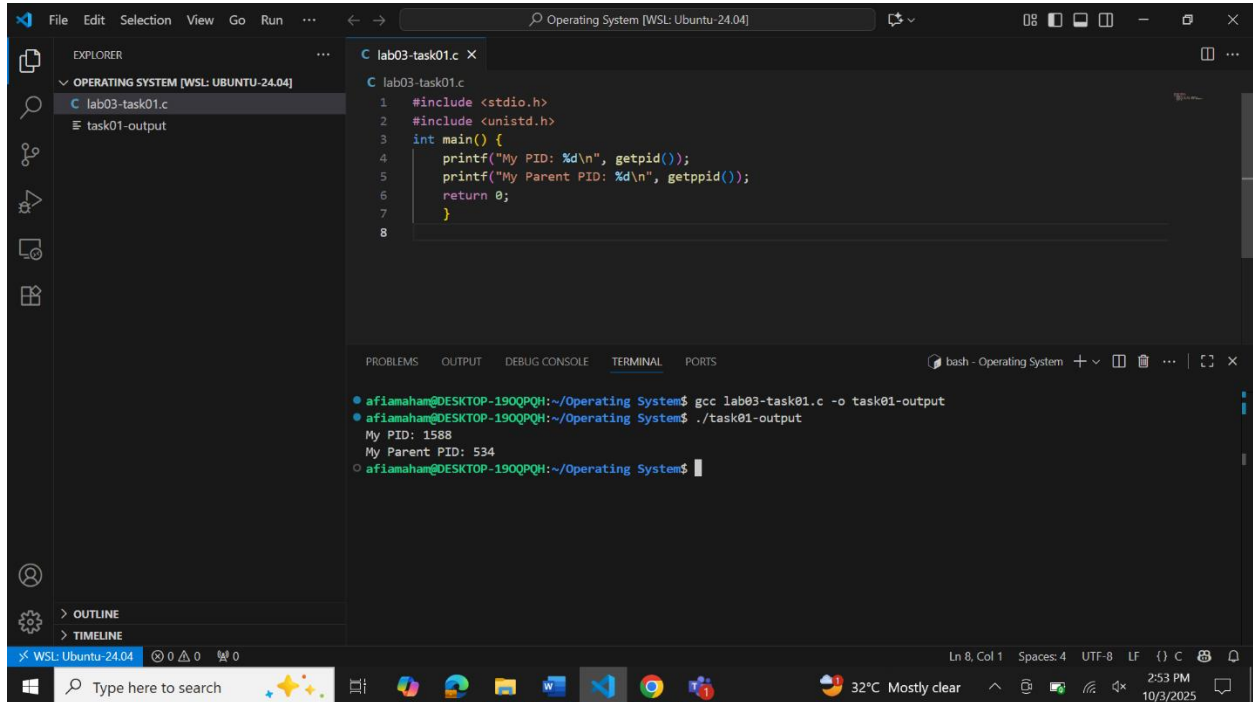
Lab no:

3

Semester:

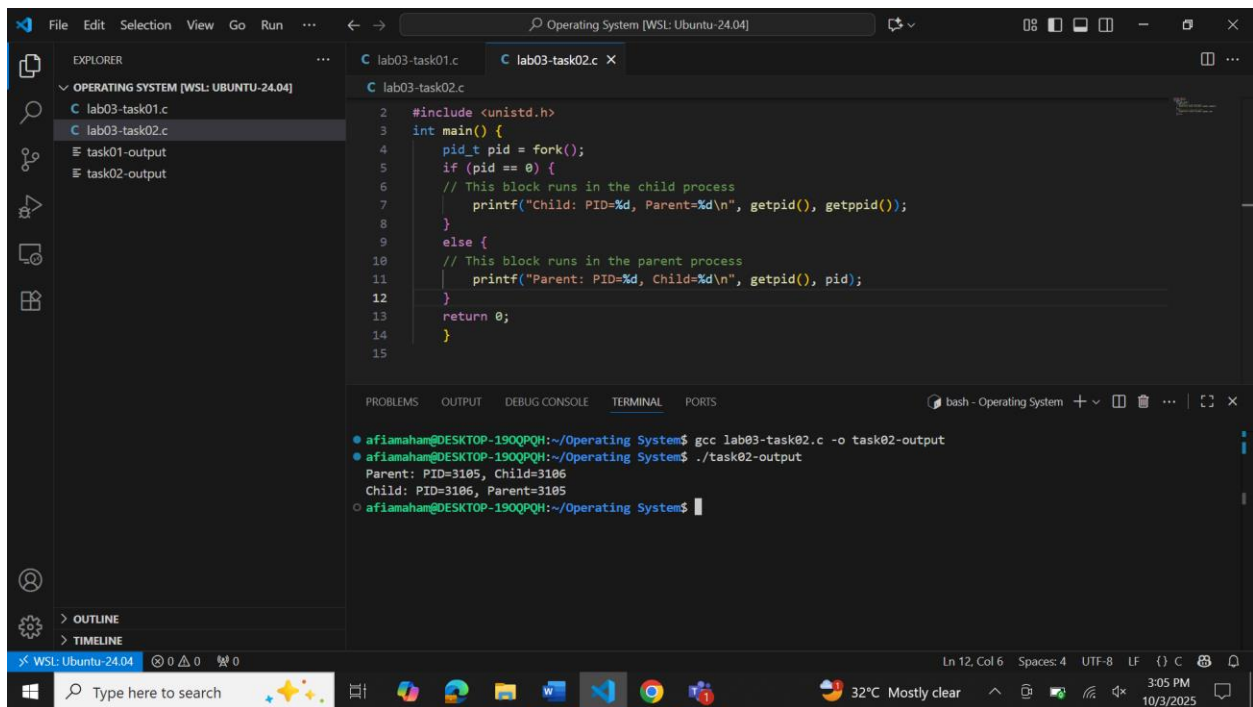
5th

Task 01:



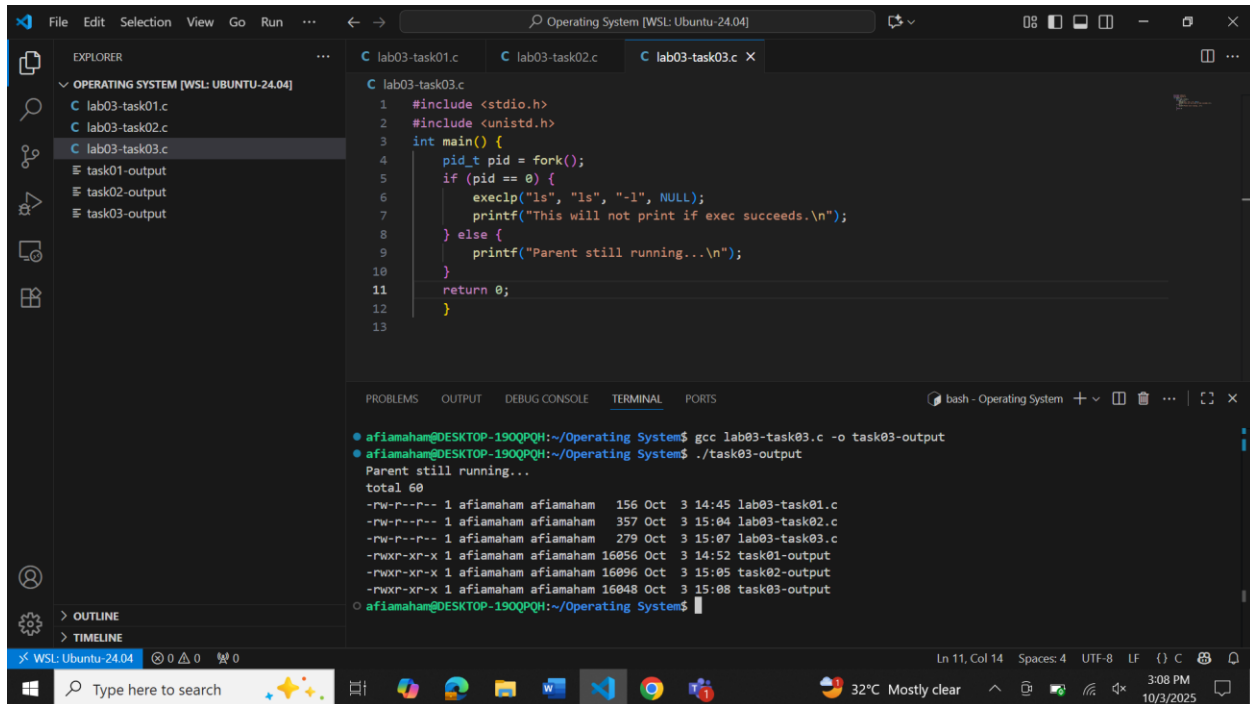
```
File Edit Selection View Go Run ...  
Operating System [WSL: Ubuntu-24.04]  
EXPLORER  
OPERATING SYSTEM [WSL: UBUNTU-24.04]  
lab03-task01.c  
task01-output  
Source Control  
lab03-task01.c  
task01-output  
OUTLINE  
TIMELINE  
WSL: Ubuntu-24.04  
Type here to search  
lab03-task01.c X  
lab03-task01.c  
1 #include <stdio.h>  
2 #include <unistd.h>  
3 int main() {  
4     printf("My PID: %d\n", getpid());  
5     printf("My Parent PID: %d\n", getppid());  
6     return 0;  
7 }  
8  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS  
bash - Operating System  
afiamaham@DESKTOP-190QPQH:~/Operating System$ gcc lab03-task01.c -o task01-output  
afiamaham@DESKTOP-190QPQH:~/Operating System$ ./task01-output  
My PID: 1588  
My Parent PID: 534  
afiamaham@DESKTOP-190QPQH:~/Operating System$  
Ln 8, Col 1 Spaces: 4 UTF-8 LF {} C  
32°C Mostly clear  
2:53 PM  
10/3/2025
```

Task 02:



```
File Edit Selection View Go Run ...  
Operating System [WSL: Ubuntu-24.04]  
EXPLORER  
OPERATING SYSTEM [WSL: UBUNTU-24.04]  
lab03-task01.c  
lab03-task02.c  
task01-output  
task02-output  
Source Control  
lab03-task01.c  
lab03-task02.c  
task01-output  
task02-output  
OUTLINE  
TIMELINE  
WSL: Ubuntu-24.04  
Type here to search  
lab03-task01.c X  
lab03-task02.c X  
lab03-task02.c  
2 #include <unistd.h>  
3 int main() {  
4     pid_t pid = fork();  
5     if (pid == 0) {  
6         // This block runs in the child process  
7         printf("Child: PID=%d, Parent=%d\n", getpid(), getppid());  
8     }  
9     else {  
10        // This block runs in the parent process  
11        printf("Parent: PID=%d, Child=%d\n", getpid(), pid);  
12    }  
13    return 0;  
14 }  
15  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS  
bash - Operating System  
afiamaham@DESKTOP-190QPQH:~/Operating System$ gcc lab03-task02.c -o task02-output  
afiamaham@DESKTOP-190QPQH:~/Operating System$ ./task02-output  
Parent: PID=3105, Child=3106  
Child: PID=3106, Parent=3105  
afiamaham@DESKTOP-190QPQH:~/Operating System$  
Ln 12, Col 6 Spaces: 4 UTF-8 LF {} C  
32°C Mostly clear  
3:05 PM  
10/3/2025
```

Task 03:

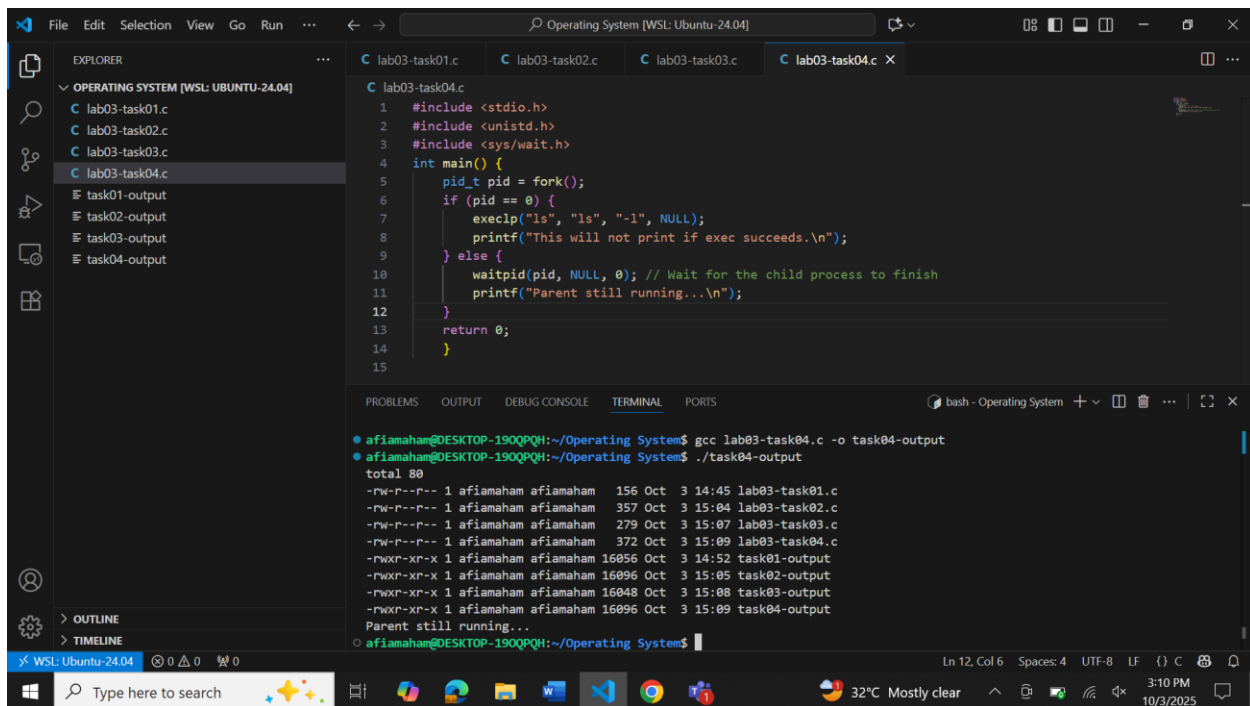


```
1 #include <stdio.h>
2 #include <unistd.h>
3 int main() {
4     pid_t pid = fork();
5     if (pid == 0) {
6         execlp("ls", "ls", "-l", NULL);
7         printf("This will not print if exec succeeds.\n");
8     } else {
9         printf("Parent still running...\n");
10    }
11    return 0;
12 }
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
afiamaham@DESKTOP-190QPQH:~/Operating System$ gcc lab03-task03.c -o task03-output
afiamaham@DESKTOP-190QPQH:~/Operating System$ ./task03-output
Parent still running...
total 60
-rw-r--r-- 1 afiamaham afiamaham 156 Oct 3 14:45 lab03-task01.c
-rw-r--r-- 1 afiamaham afiamaham 357 Oct 3 15:04 lab03-task02.c
-rw-r--r-- 1 afiamaham afiamaham 279 Oct 3 15:07 lab03-task03.c
-rwxr-xr-x 1 afiamaham afiamaham 16056 Oct 3 14:52 task01-output
-rwxr-xr-x 1 afiamaham afiamaham 16096 Oct 3 15:05 task02-output
-rwxr-xr-x 1 afiamaham afiamaham 16048 Oct 3 15:08 task03-output
afiamaham@DESKTOP-190QPQH:~/Operating System$
```

Task04:



```
1 #include <stdio.h>
2 #include <unistd.h>
3 #include <sys/wait.h>
4 int main() {
5     pid_t pid = fork();
6     if (pid == 0) {
7         execlp("ls", "ls", "-l", NULL);
8         printf("This will not print if exec succeeds.\n");
9     } else {
10        waitpid(pid, NULL, 0); // Wait for the child process to finish
11        printf("Parent still running...\n");
12    }
13    return 0;
14 }
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
afiamaham@DESKTOP-190QPQH:~/Operating System$ gcc lab03-task04.c -o task04-output
afiamaham@DESKTOP-190QPQH:~/Operating System$ ./task04-output
total 80
-rw-r--r-- 1 afiamaham afiamaham 156 Oct 3 14:45 lab03-task01.c
-rw-r--r-- 1 afiamaham afiamaham 357 Oct 3 15:04 lab03-task02.c
-rw-r--r-- 1 afiamaham afiamaham 279 Oct 3 15:07 lab03-task03.c
-rw-r--r-- 1 afiamaham afiamaham 372 Oct 3 15:09 lab03-task04.c
-rwxr-xr-x 1 afiamaham afiamaham 16056 Oct 3 14:52 task01-output
-rwxr-xr-x 1 afiamaham afiamaham 16096 Oct 3 15:05 task02-output
-rwxr-xr-x 1 afiamaham afiamaham 16048 Oct 3 15:08 task03-output
-rwxr-xr-x 1 afiamaham afiamaham 16096 Oct 3 15:09 task04-output
Parent still running...
afiamaham@DESKTOP-190QPQH:~/Operating System$
```

Commands on Ubuntu:

```
afiamaham@DESKTOP-190QPQH: ~  
afiamaham@DESKTOP-190QPQH:~$ ps  
  PID TTY          TIME CMD  
  4253 pts/5    00:00:00 bash  
  4596 pts/5    00:00:00 ps  
afiamaham@DESKTOP-190QPQH:~$
```

```
afiamaham@DESKTOP-190QPQH: ~  
afiamaham@DESKTOP-190QPQH:~$ ps -ef  
UID          PID    PPID  C STIME TTY          TIME CMD  
root           1      0  0  14:25 ?        00:00:00 /init  
root          10      1  0  14:25 ?        00:00:00 /init  
afiamah+     11     10  0  14:25 pts/0    00:00:00 sh -c "$VS_CODE_WSL_EXT_LOCATION/scripts/wslSer  
afiamah+     12     11  0  14:25 pts/0    00:00:00 sh /mnt/c/Users/tech_explorer/.vscode/extension  
afiamah+     15     12  0  14:25 pts/0    00:00:00 /bin/sh /mnt/c/Users/tech_explorer/.vscode/ext  
afiamah+     31     15  0  14:30 pts/0    00:00:04 wget -O /home/afiamaham/.vscode-server/bin/385  
root          342      1  0  14:44 ?        00:00:00 /init  
root          343     342  0  14:44 ?        00:00:00 /init  
afiamah+     344     343  0  14:44 pts/1    00:00:00 sh -c "$VS_CODE_WSL_EXT_LOCATION/scripts/wslSer  
afiamah+     345     344  0  14:44 pts/1    00:00:00 sh /mnt/c/Users/tech_explorer/.vscode/extension  
afiamah+     350     345  0  14:44 pts/1    00:00:00 sh /home/afiamaham/.vscode-server/bin/385651c9  
afiamah+     354     350  0  14:44 pts/1    00:00:21 /home/afiamaham/.vscode-server/bin/385651c938d  
root          365      1  0  14:44 ?        00:00:00 /init  
root          366     365  0  14:44 ?        00:00:01 /init  
afiamah+     367     366  0  14:44 pts/2    00:00:05 /home/afiamaham/.vscode-server/bin/385651c938d  
root          387      1  0  14:44 ?        00:00:00 /init  
root          388     387  0  14:44 ?        00:00:01 /init  
afiamah+     389     388  0  14:44 pts/3    00:00:03 /home/afiamaham/.vscode-server/bin/385651c938d  
afiamah+     401     354  0  14:44 pts/1    00:00:01 /home/afiamaham/.vscode-server/bin/385651c938d  
afiamah+     416     354  6  14:44 pts/1    00:02:32 /home/afiamaham/.vscode-server/bin/385651c938d  
afiamah+     523     354  0  14:45 pts/1    00:00:13 /home/afiamaham/.vscode-server/bin/385651c938d
```

```
afiamaham@DESKTOP-190QPQH: ~$ ps -ef | grep afiamaham
afiamah+ 15 12 0 14:25 pts/0 00:00:00 /bin/sh /mnt/c/Users/tech_explorer/.vscode/extensions/ms-vscode-remote.remote-wsl-0.104.3/scripts/wslDownload.sh 385651c938df8a906869babee516bffd0ddb9829 stable /home/afiamaham/.vscode-server/bin
afiamah+ 31 15 0 14:30 pts/0 00:00:04 wget -O /home/afiamaham/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829-1759483543.tar.gz https://update.code.visualstudio.com/commit:385651c938df8a906869babee516bffd0ddb9829/server-linux-x64/stable
afiamah+ 350 345 0 14:44 pts/1 00:00:00 sh /home/afiamaham/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/bin/code-server --host=127.0.0.1 --port=0 --connection-token=196157985-3277288610-3329183501-2613001082 --use-host-proxy --without-browser-env-var --disable-websocket-compression --accept-server-license-terms --telemetry-level=all
afiamah+ 354 350 0 14:44 pts/1 00:00:21 /home/afiamaham/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node /home/afiamaham/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/out/server-main.js --host=127.0.0.1 --port=0 --connection-token=196157985-3277288610-3329183501-2613001082 --use-host-proxy --without-browser-env-var --disable-websocket-compression --accept-server-license-terms --telemetry-level=all
afiamah+ 367 366 0 14:44 pts/2 00:00:05 /home/afiamaham/.vscode-server/bin/385651c938df8a906869babee516bffd0ddb9829/node -e const net = require('net'); process.stdin.pause(); const client = net.createConnection({ host: '127.0.0.1', port: 34507 }, () => { client.pipe(process.stdout); process.stdin.pipe(client); }); client.on('close', function (hadError) { console.error(hadError ? 'Remote close with error' : 'Remote close'); process.exit(hadError ? 1 : 0); }); client.on('error', function (err) { process.stderr.write(err && (err.stack || err.message) || String(err)); });
```

```
afiamaham@DESKTOP-190QPQH: ~$ top
top - 15:30:01 up 1:04, 0 user, load average: 0.12, 0.09, 0.08
Tasks: 26 total, 2 running, 24 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.6 us, 1.4 sy, 0.0 ni, 97.7 id, 0.1 wa, 0.0 hi, 0.2 si, 0.0 st
MiB Mem : 6247.3 total, 5524.9 free, 558.5 used, 383.1 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 5688.8 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM    TIME+  COMMAND
  416 afiamah+  20   0   31.9g  155240  55388 R   10.3   2.4   3:01.30 node
  523 afiamah+  20   0 1069312  83756  48264 S    0.3   1.3   0:14.38 node
 4252 root        20   0    1192    368    20 S    0.3   0.0   0:00.04 init
 5257 afiamah+  20   0    9288    5412  3272 R    0.3   0.1   0:00.01 top
    1 root        20   0    1192    768    476 S    0.0   0.0   0:00.75 init
   10 root        20   0     908     84    20 S    0.0   0.0   0:00.98 init
   11 afiamah+  20   0    2796   1040   948 S    0.0   0.0   0:00.02 sh
   12 afiamah+  20   0    2796   1068   976 S    0.0   0.0   0:00.01 sh
   15 afiamah+  20   0    2796   1852  1700 S    0.0   0.0   0:00.01 wslDownload.sh
   31 afiamah+  20   0   13760   9516  7152 S    0.0   0.1   0:05.36 wget
  342 root        20   0    1192    368    20 S    0.0   0.0   0:00.00 init
  343 root        20   0    1192    368    20 S    0.0   0.0   0:00.00 init
  344 afiamah+  20   0    2796   1172  1080 S    0.0   0.0   0:00.00 sh
  345 afiamah+  20   0    2796   1112  1016 S    0.0   0.0   0:00.00 sh
  350 afiamah+  20   0    2796   1104  1012 S    0.0   0.0   0:00.00 sh
```

```
afiamaham@DESKTOP-190QPQH: ~$ sleep 10
```

```
afiamaham@DESKTOP-190QPQH:~$ sleep 10
afiamaham@DESKTOP-190QPQH:~$ sleep 10 &
[1] 5470
afiamaham@DESKTOP-190QPQH:~$
```

```
afiamaham@DESKTOP-19OQPQH: ~  
afiamaham@DESKTOP-19OQPQH:~$ sleep 10 &  
[1] 5581  
afiamaham@DESKTOP-19OQPQH:~$ jobs  
[1]+  Running                  sleep 10 &  
afiamaham@DESKTOP-19OQPQH:~$
```

```
afiamaham@DESKTOP-19OQPQH: ~  
afiamaham@DESKTOP-19OQPQH:~$ sleep 10 &  
[1] 5685  
afiamaham@DESKTOP-19OQPQH:~$ fg 1  
sleep 10  
_
```



```
afiamaham@DESKTOP-19OQPQH: ~$ sleep 15 &
[1] 5798
afiamaham@DESKTOP-19OQPQH:~$ pidof sleep
5798
afiamaham@DESKTOP-19OQPQH:~$
```

```
afiamaham@DESKTOP-19OQPQH:~$ sleep 30 &
[1] 25
afiamaham@DESKTOP-19OQPQH:~$ kill -9 25
afiamaham@DESKTOP-19OQPQH:~$ top
top - 17:09:15 up 12 min,  0 user,  load average: 0.00, 0.00, 0.00
Tasks:  5 total,   1 running,  4 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,   0.0 sy,   0.0 ni,100.0 id,   0.0 wa,   0.0 hi,   0.0 si,   0.0 st
MiB Mem :  6247.3 total,  6154.6 free,   199.3 used,   32.1 buff/cache
MiB Swap:  2048.0 total,  2048.0 free,    0.0 used.  6048.1 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM     TIME+ COMMAND
    1 root        20   0    908    532   472  S   0.0   0.0   0:00.03 init
     9 root        20   0    908     80    20  S   0.0   0.0   0:00.00 init
    10 root        20   0    908     80    20  S   0.0   0.0   0:00.02 init
    11 afiamah+   20   0   6068   5148  3428  S   0.0   0.1   0:00.07 bash
    26 afiamah+   20   0   9284   5404  3280  R   0.0   0.1   0:00.05 top
```



```
afiamaham@DESKTOP-19OQPQH: ~  
top - 17:12:07 up 15 min,  0 user,  load average: 0.28, 0.07, 0.02  
Tasks:  6 total,   2 running,  4 sleeping,   0 stopped,   0 zombie  
%Cpu(s): 15.4 us,  9.6 sy,   0.0 ni, 74.9 id,   0.0 wa,   0.0 hi,   0.2 si,   0.0 st  
MiB Mem : 6247.3 total, 6153.8 free,   199.9 used,   32.2 buff/cache  
MiB Swap: 2048.0 total, 2048.0 free,    0.0 used. 6047.4 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
30	afiamah+	20	0	3120	1100	1012	R	100.0	0.0	0:19.39	yes
1	root	20	0	908	532	472	S	0.0	0.0	0:00.03	init
9	root	20	0	908	80	20	S	0.0	0.0	0:00.00	init
10	root	20	0	908	80	20	S	0.0	0.0	0:00.08	init
11	afiamah+	20	0	6584	5676	3428	S	0.0	0.1	0:00.08	bash
31	afiamah+	20	0	9284	5412	3280	R	0.0	0.1	0:00.00	top

Windows taskbar: 32°C Mostly clear, 5:12 PM 10/3/2025

```
afiamaham@DESKTOP-19OQPQH: ~  
%Cpu(s):  0.0 us,  0.0 sy,  0.0 ni,100.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st  
MiB Mem : 6247.3 total, 6154.6 free,   199.3 used,   32.1 buff/cache  
MiB Swap: 2048.0 total, 2048.0 free,    0.0 used. 6048.1 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
1	root	20	0	908	532	472	S	0.0	0.0	0:00.03	init
9	root	20	0	908	80	20	S	0.0	0.0	0:00.00	init
10	root	20	0	908	80	20	S	0.0	0.0	0:00.02	init
11	afiamah+	20	0	6068	5148	3428	S	0.0	0.1	0:00.07	bash
26	afiamah+	20	0	9284	5404	3280	R	0.0	0.1	0:00.05	top

[1]+ Killed sleep 30
afiamaham@DESKTOP-19OQPQH:~\$

Windows taskbar: 32°C Mostly clear, 5:09 PM 10/3/2025