



# National Textile University

*Department of Computer Science*

**Subject:**

Operating system

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**Registration No:**

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**Lab No:**

3

**Semester:**

5

## 2. Linux process commands:

### 2.1

```
itsgivingtech@DESKTOP-65N72IV: ~$ ps
  PID TTY          TIME CMD
   294 pts/0    00:00:00 bash
   435 pts/0    00:00:00 ps

itsgivingtech@DESKTOP-65N72IV:~$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root         1        0  0 04:49 ?        00:00:00 /sbin/init
root         2        1  0 04:49 ?        00:00:00 /init
root         7        2  0 04:49 ?        00:00:00 plan9 --control-socket 7 --log-level 4 --server-fd 8 --pipe-fd 10 --root
:00 /usr/lib/systemd/systemd-journald
root        93        1  0 04:49 ?        00:00:00 /usr/lib/systemd/systemd-udevd
systemd+   149        1  0 04:49 ?        00:00:00 /usr/lib/systemd/systemd-resolved
systemd+   150        1  0 04:49 ?        00:00:00 /usr/lib/systemd/systemd-timesyncd
root       159        1  0 04:49 ?        00:00:00 /usr/sbin/cron -f -P
message+   160        1  0 04:49 ?        00:00:00 @dbus-daemon --system --address=systemd: --nofork --nopidfile --systroot
:00 /usr/lib/systemd/systemd-logind
root       169        1  0 04:49 ?        00:00:00 /usr/libexec/wsl-pro-service -vv
root       171        1  0 04:49 hvc0    00:00:00 /sbin/agetty -o -p -- \u --noclear - linux
:00 /sbin/agetty -o -p -- \u --noclear - linux
syslog     176        1  0 04:49 ?        00:00:00 /usr/sbin/rsyslogd -n -iNONE
root       190        1  0 04:49 ?        00:00:00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-sroot
:00 /init
root       293       292  0 04:49 ?        00:00:00 /init
root       294       293  0 04:49 pts/0    00:00:00 -bash
itsgivi+   295        2  0 04:49 pts/1    00:00:00 /bin/login -f
itsgivi+   340        1  0 04:49 ?        00:00:00 /usr/lib/systemd/systemd --user
itsgivi+   341       340  0 04:49 ?        00:00:00 (sd-pam)
itsgivi+   370       295  0 04:49 pts/1    00:00:00 -bash
itsgivi+   438       294  0 04:52 pts/0    00:00:00 ps -ef

itsgivingtech@DESKTOP-65N72IV:~$
```

### 2.2 Monitoring Processes Interactively

```
Select itsgivingtech@DESKTOP-65N72IV: ~$ top
top - 04:54:30 up 5 min, 1 user, load average: 0.00, 0.00, 0.00
Tasks: 23 total, 1 running, 22 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 2.2 sy, 0.0 ni, 97.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 3857.2 total, 3165.3 free, 437.3 used, 388.0 buff/cache
MiB Swap: 1024.0 total, 1024.0 free, 0.0 used, 3420.0 avail Mem

  PID USER      PR  NI  VIRT  RES  SHR  S  %CPU  %MEM    TIME+  COMMAND
    1 root        20   0 21776 12252 9180  S   0.0   0.3   0:00.96 systemd
    2 root        20   0 30772 1792 1664  S   0.0   0.0   0:00.00 init-systemd(Ub
    7 root        20   0 30772 1792 1792  S   0.0   0.0   0:00.00 init
   43 root       19  -1 50364 15600 14576  S   0.0   0.4   0:00.30 systemd-journal
   93 root        20   0 25184 6400 4992  S   0.0   0.2   0:00.23 systemd-udevd
  149 systemd+   20   0 21456 12544 10368  S   0.0   0.3   0:00.13 systemd-resolve
  150 systemd+   20   0 91024 7552 6656  S   0.0   0.2   0:00.10 systemd-timesyn
  159 root        20   0 4236 2432 2304  S   0.0   0.1   0:00.00 cron
  160 message+    20   0 9596 4608 4224  S   0.0   0.1   0:00.08 dbus-daemon
  167 root        20   0 17960 8320 7424  S   0.0   0.2   0:00.10 systemd-logind
  169 root        20   0 1756096 12800 10752  S   0.0   0.3   0:00.14 wsl-pro-service
  171 root        20   0 3160 1920 1792  S   0.0   0.0   0:00.01 agetty
  175 root        20   0 3116 1792 1664  S   0.0   0.0   0:00.01 agetty
  176 syslog     20   0 222508 5504 4352  S   0.0   0.1   0:00.09 rsyslogd
  190 root        20   0 107016 22004 12800  S   0.0   0.6   0:00.19 unattended-upgr
  292 root        20   0 3076 1024 896  S   0.0   0.0   0:00.00 SessionLeader
  293 root        20   0 3092 1028 896  S   0.0   0.0   0:00.02 Relay(294)
  294 itsgivi+    20   0 6068 5248 3584  S   0.0   0.1   0:00.06 bash
  295 root        20   0 6664 4096 3584  S   0.0   0.1   0:00.02 login
  340 itsgivi+   20   0 20308 10880 8960  S   0.0   0.3   0:00.14 systemd
  341 itsgivi+   20   0 21152 3516 1792  S   0.0   0.1   0:00.00 (sd-pam)
  370 itsgivi+   20   0 6072 5120 3456  S   0.0   0.1   0:00.02 bash
  446 itsgivi+   20   0 9300 5248 3072  R   0.0   0.1   0:00.00 top
```

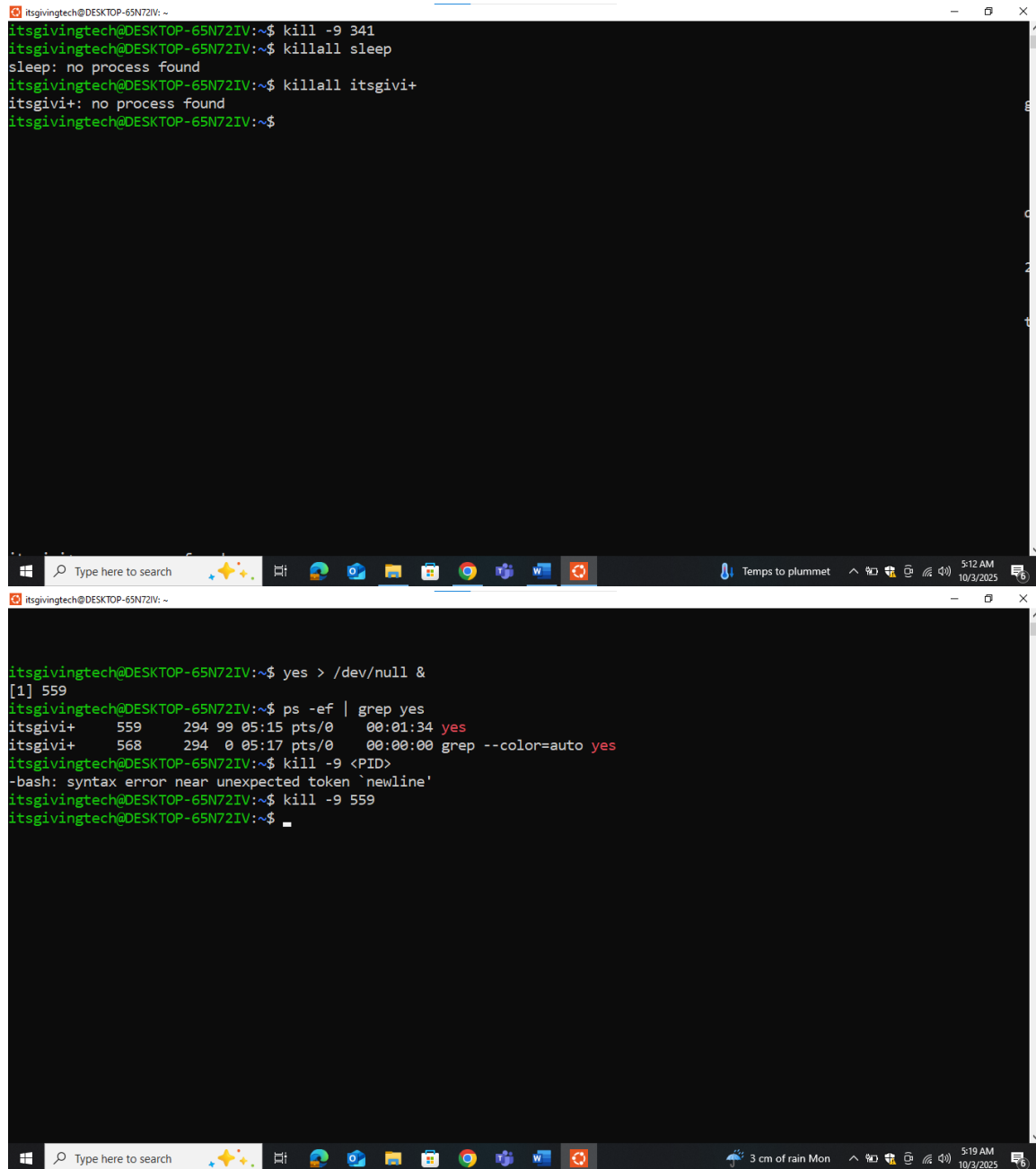
## 2.3 Foreground and Background Jobs

```
itsgivingtech@DESKTOP-65N72IV: ~  
itsgivingtech@DESKTOP-65N72IV:~$ sleep 30  
itsgivingtech@DESKTOP-65N72IV:~$ sleep 30 &  
[1] 457  
itsgivingtech@DESKTOP-65N72IV:~$ jobs  
[1]+  Running                  sleep 30 &  
itsgivingtech@DESKTOP-65N72IV:~$ fg %1  
sleep 30  
itsgivingtech@DESKTOP-65N72IV:~$ bg %1  
-bash: bg: %1: no such job  
itsgivingtech@DESKTOP-65N72IV:~$
```

## 2.4 Process Identification

```
itsgivingtech@DESKTOP-65N72IV: ~  
itsgivingtech@DESKTOP-65N72IV:~$ pidof sleep  
itsgivingtech@DESKTOP-65N72IV:~$ ps -ef | grep firefox  
itsgivi+  481    294  0 05:00 pts/0    00:00:00 grep --color=auto firefox  
itsgivingtech@DESKTOP-65N72IV:~$
```

## 2.5 Killing Processes



The image shows two screenshots of a Windows terminal window. The top screenshot shows the user running `kill -9 341`, `killall sleep`, and `killall itsgivi+`. The bottom screenshot shows the user running `yes > /dev/null &`, checking the process list with `ps -ef | grep yes`, and then killing the process with `kill -9 559`.

```
itsgivingtech@DESKTOP-65N72IV: ~  
itsgivingtech@DESKTOP-65N72IV:~$ kill -9 341  
itsgivingtech@DESKTOP-65N72IV:~$ killall sleep  
sleep: no process found  
itsgivingtech@DESKTOP-65N72IV:~$ killall itsgivi+  
itsgivi+: no process found  
itsgivingtech@DESKTOP-65N72IV:~$  
  
itsgivingtech@DESKTOP-65N72IV:~$ yes > /dev/null &  
[1] 559  
itsgivingtech@DESKTOP-65N72IV:~$ ps -ef | grep yes  
itsgivi+ 559 294 99 05:15 pts/0 00:01:34 yes  
itsgivi+ 568 294 0 05:17 pts/0 00:00:00 grep --color=auto yes  
itsgivingtech@DESKTOP-65N72IV:~$ kill -9 <PID>  
-bash: syntax error near unexpected token `newline'  
itsgivingtech@DESKTOP-65N72IV:~$ kill -9 559  
itsgivingtech@DESKTOP-65N72IV:~$
```

### Program 1:

```
File Edit Selection View Go Run ...
Operating system_files [WSL: Ubuntu]

EXPLORER
  OPERATING_SYSTEM_FILES [WSL: UBUNTU]
    task1.c
    task1.out

C task1.c > ...
1
2 #include <stdio.h>
3 #include <unistd.h>
4 int main() {
5     printf("My PID: %d\n", getpid());
6     printf("My Parent PID: %d\n", getppid());
7     return 0;
8 }
9

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
bash - Operating system_files
itsgivingtech@DESKTOP-65N7ZIV:~/Operating system_files$ gcc task1.c -o task1.out
itsgivingtech@DESKTOP-65N7ZIV:~/Operating system_files$ ./task1.out
My PID: 3197
My Parent PID: 2948
itsgivingtech@DESKTOP-65N7ZIV:~/Operating system_files$
```

## Program 2:

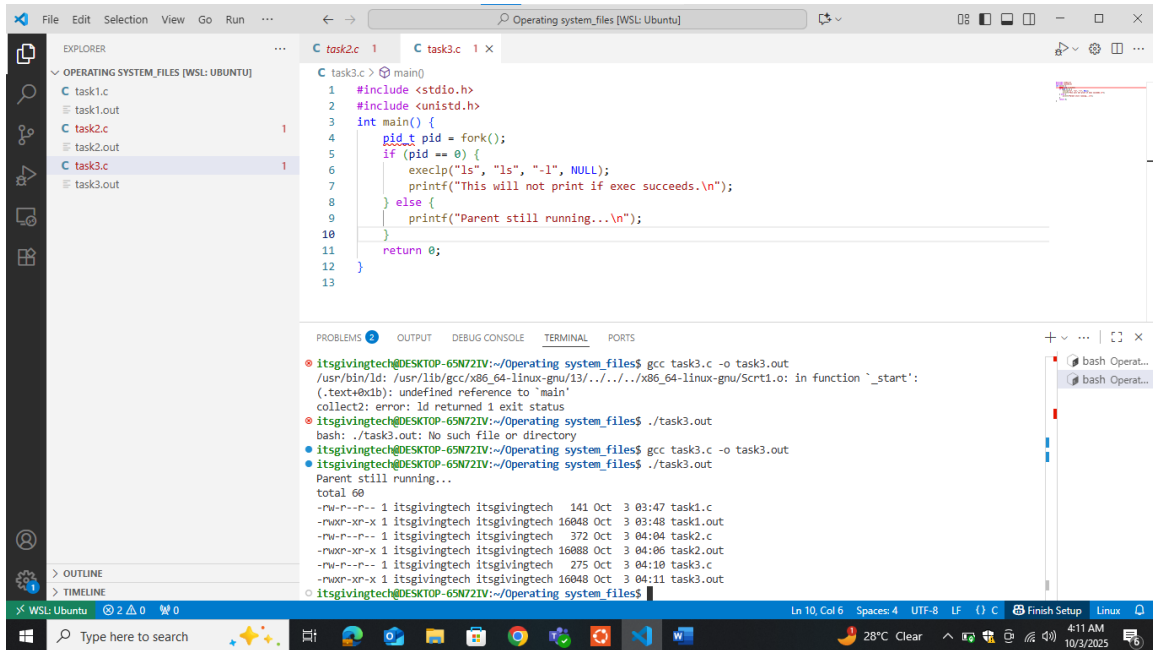
```
File Edit Selection View Go Run ...
Operating system_files [WSL: Ubuntu]

EXPLORER
  OPERATING_SYSTEM_FILES [WSL: UBUNTU]
    task1.c
    task1.out
    task2.c
    task2.out

C task2.c 1 X
C task2.c > main()
1 #include <stdio.h>
2 #include <unistd.h>
3 int main()
4 {
5     pid_t pid = fork();
6
7     if (pid == 0)
8     {
9         // This block runs in the child process
10        printf("Child: PID=%d, Parent=%d\n", getpid(), getppid());
11    }
12    else
13    {
14        // This block runs in the parent process
15        printf("Parent: PID=%d, Child=%d\n", getpid(), pid);
16    }
17 }

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
bash - Operating system_files
itsgivingtech@DESKTOP-65N7ZIV:~/Operating system_files$ ./task2.out
Parent: PID=5184, Child=5185
Child: PID=5185, Parent=2687
itsgivingtech@DESKTOP-65N7ZIV:~/Operating system_files$
```

## Program 3:

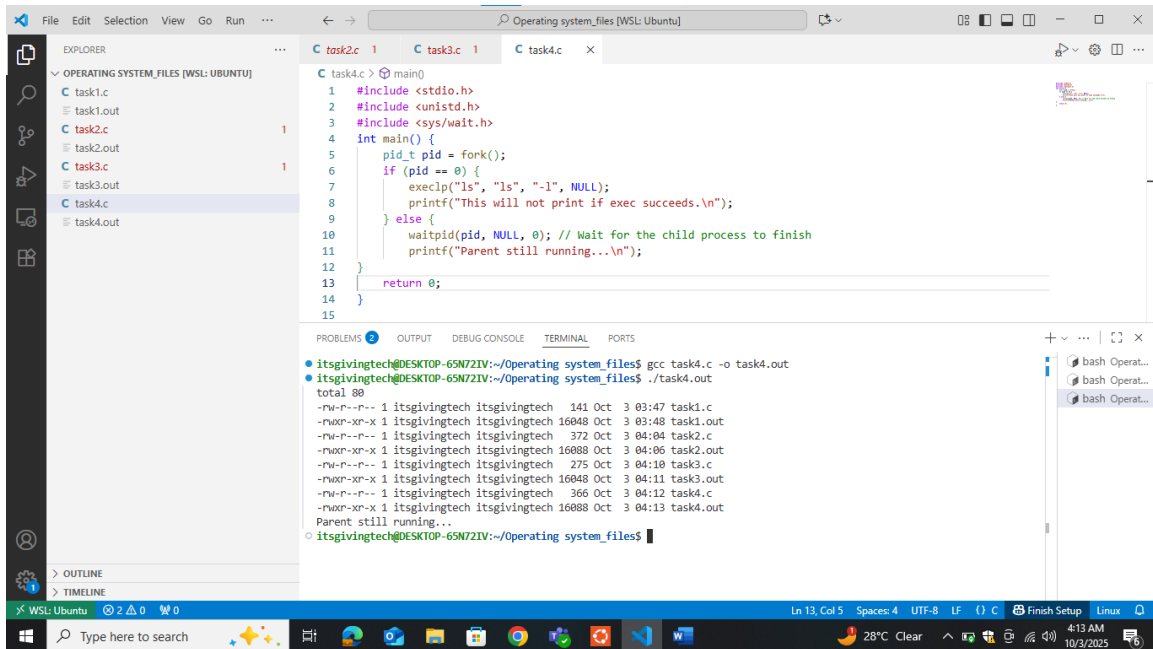


```
1 #include <stdio.h>
2 #include <unistd.h>
3 int main() {
4     pid_t pid = fork();
5     if (pid == 0) {
6         execvp("ls", "ls", "-l", NULL);
7         printf("This will not print if exec succeeds.\n");
8     } else {
9         printf("Parent still running...\n");
10    }
11    return 0;
12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

Problems:

- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$ gcc task3.c -o task3.out
- ./usr/bin/ld: ./usr/lib/gcc/x86\_64-linux-gnu/13/../../../../x86\_64-linux-gnu/Scrt1.o: in function '\_start': (.text+0x1b): undefined reference to 'main'
- collect2: error: ld returned 1 exit status
- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$ ./task3.out
- bash: ./task3.out: No such file or directory
- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$ gcc task3.c -o task3.out
- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$ ./task3.out
- Parent still running...
- total 60
- rw-r--r-- 1 itsgivingtech itsgivingtech 141 Oct 3 03:47 task1.c
- rwxr-xr-x 1 itsgivingtech itsgivingtech 16048 Oct 3 03:48 task1.out
- rw-r--r-- 1 itsgivingtech itsgivingtech 372 Oct 3 04:04 task2.c
- rwxr-xr-x 1 itsgivingtech itsgivingtech 16088 Oct 3 04:06 task2.out
- rw-r--r-- 1 itsgivingtech itsgivingtech 275 Oct 3 04:10 task3.c
- rwxr-xr-x 1 itsgivingtech itsgivingtech 16048 Oct 3 04:11 task3.out
- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$

## Program 4:



```
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         execvp("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:

- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$ gcc task4.c -o task4.out
- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$ ./task4.out
- total 80
- rw-r--r-- 1 itsgivingtech itsgivingtech 141 Oct 3 03:47 task1.c
- rwxr-xr-x 1 itsgivingtech itsgivingtech 16048 Oct 3 03:48 task1.out
- rw-r--r-- 1 itsgivingtech itsgivingtech 372 Oct 3 04:04 task2.c
- rwxr-xr-x 1 itsgivingtech itsgivingtech 16088 Oct 3 04:06 task2.out
- rw-r--r-- 1 itsgivingtech itsgivingtech 275 Oct 3 04:10 task3.c
- rwxr-xr-x 1 itsgivingtech itsgivingtech 16048 Oct 3 04:11 task3.out
- rw-r--r-- 1 itsgivingtech itsgivingtech 366 Oct 3 04:12 task4.c
- rwxr-xr-x 1 itsgivingtech itsgivingtech 16088 Oct 3 04:13 task4.out
- Parent still running...
- itsgivingtech@DESKTOP-65N72IV:~/Operating system\_files\$