

1. 3 child processes are created, given by the equation  $2^n - 1$ , with  $n = 2$  for the two forks.
2. It consumes 2.6% of total memory.

```

top - 20:17:18 up 7 min, 1 user, load average: 0.10, 0.13, 0.07
Tasks: 1 total, 0 running, 1 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.8 us, 0.2 sy, 0.0 ni, 99.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 10974.6 total, 8693.4 free, 1037.0 used, 1244.2 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 9645.2 avail Mem

  PID USER      PR  NI   VIRT    RES    SHR  S  %CPU  %MEM    TIME+  COMMAND
 3692 kat       20   0 3195368 288908 138284 S   0.0   2.6   0:04.57 firefox

```

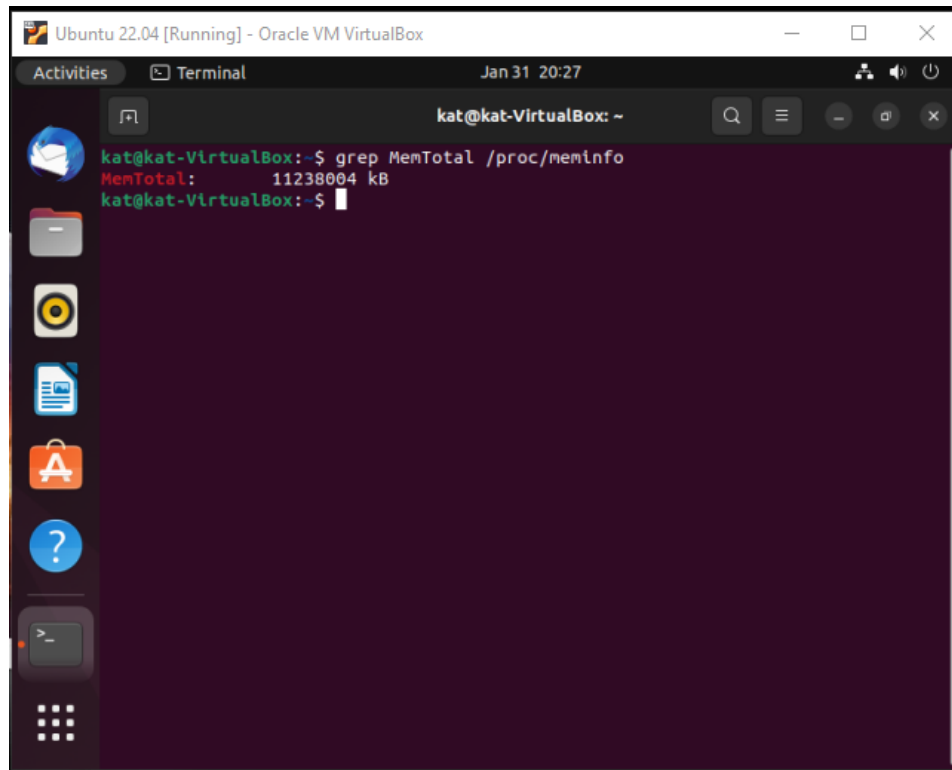
```

top - 20:24:11 up 14 min, 1 user, load average: 0.00, 0.02, 0.03
Tasks: 243 total, 1 running, 242 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.5 us, 0.3 sy, 0.0 ni, 99.1 id, 0.0 wa, 0.0 hi, 0.1 si, 0.0 st
MiB Mem : 10974.6 total, 8677.7 free, 1046.1 used, 1250.9 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 9637.5 avail Mem

  PID USER      PR  NI   VIRT    RES    SHR  S  %CPU  %MEM    TIME+  COMMAND
 1077 kat       20   0 5963396 327120 129468 S   4.6   2.9   0:37.58 gnome-+
 3692 kat       20   0 3197488 299396 139348 S   0.0   2.7   0:06.40 firefox
 3883 kat       20   0 2463448 116584 84872 S   0.0   1.0   0:02.01 Privill+
 4053 kat       20   0 2455312 89516 69180 S   0.0   0.8   0:00.29 WebExt+
 1737 kat       20   0 516020 70024 52772 S   0.0   0.6   0:00.13 gsd-xs+
 1409 kat       20   0 814088 66288 51432 S   0.0   0.6   0:00.21 evolut+
 4361 kat       20   0 2419996 64148 52032 S   0.0   0.6   0:00.07 Web Co+
 4347 kat       20   0 2419992 61872 49924 S   0.0   0.6   0:00.08 Web Co+
 4351 kat       20   0 2419996 61008 49092 S   0.0   0.5   0:00.07 Web Co+
 1611 kat       20   0 3200040 60948 43524 S   0.0   0.5   0:01.34 gjs
 1733 kat       20   0 190864 60044 46392 S   0.0   0.5   0:01.15 Xwayla+
 1799 kat       20   0 887472 59288 44892 S   0.0   0.5   0:00.20 gnome-+
 4478 kat       20   0 562296 52208 39880 S   1.3   0.5   0:01.30 gnome-+
 3853 kat       20   0 224432 40108 30788 S   0.0   0.4   0:00.05 Socket+
 755 root       20   0 1392640 39964 20840 S   0.0   0.4   0:01.75 snapd
 1201 kat       20   0 573236 39456 32336 S   0.0   0.4   0:00.06 goa-da+
 1803 kat       20   0 401840 39396 25404 S   0.0   0.4   0:00.21 seahor+
 309 root       19  -1 64984 31656 30208 S   0.0   0.3   0:00.25 system+
 1214 kat       20   0 849100 30192 26352 S   0.0   0.3   0:00.08 evolut+
 1593 kat       20   0 532292 29024 20828 S   0.0   0.3   0:00.19 xdg-de+
 1258 kat       20   0 680876 28740 25372 S   0.0   0.3   0:00.05 evolut+
 1415 kat       20   0 356472 28480 17688 S   0.0   0.3   0:01.12 ibus-e+

```

3. 11238004 kB of memory is available in the system.



The screenshot shows a terminal window titled 'Ubuntu 22.04 [Running] - Oracle VM VirtualBox'. The terminal prompt is 'kat@kat-VirtualBox: ~'. The command 'grep MemTotal /proc/meminfo' has been executed, resulting in the output 'MemTotal: 11238004 kB'. The terminal window is part of a desktop environment with a sidebar on the left containing icons for Activities, Terminal, and various applications.

```
kat@kat-VirtualBox:~$ grep MemTotal /proc/meminfo
MemTotal: 11238004 kB
kat@kat-VirtualBox:~$
```

4. The gnome-+ (PID 1077) process consumes the most cpu at 4.6% in the screenshot above.
5. The gnome-+ (PID 1077) process consumes the most memory at 2.9% in the screenshot above.
- 6.

apt-get—let's the user search for, install, manage, update, and remove software from the Advanced Package Tool library.

yum—let's the user get, install, delete, query, and manage Red Hat Enterprise Linux software packages.

wget—let's user download files from the server.

gzip—command that compresses files.

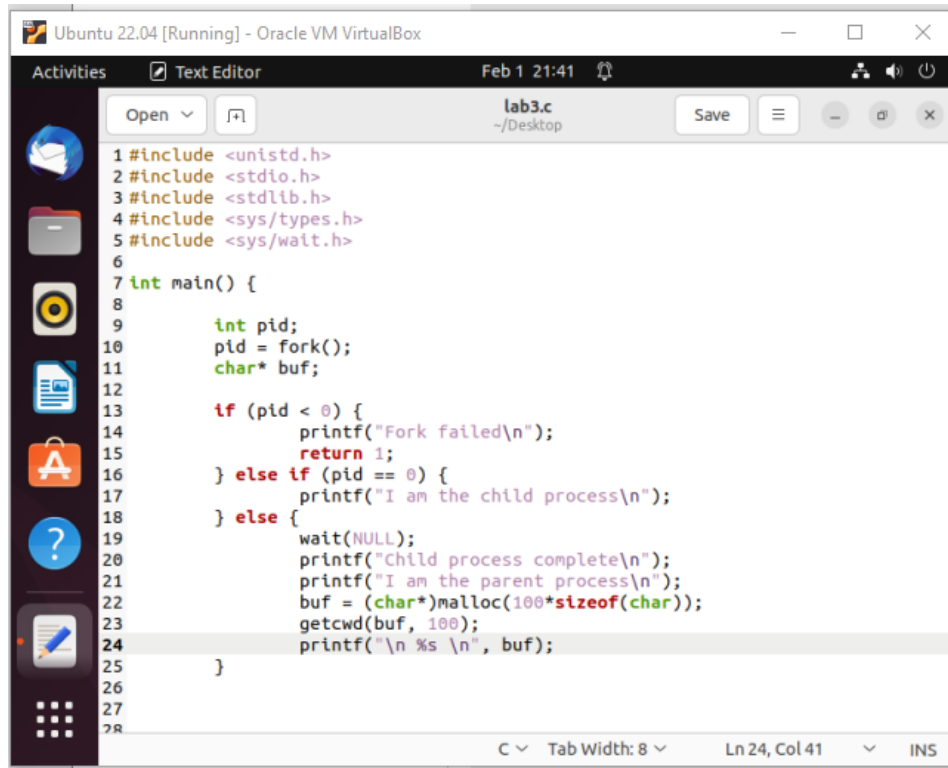
tar—command used to create and extract from Archive.

Rar—another Archive

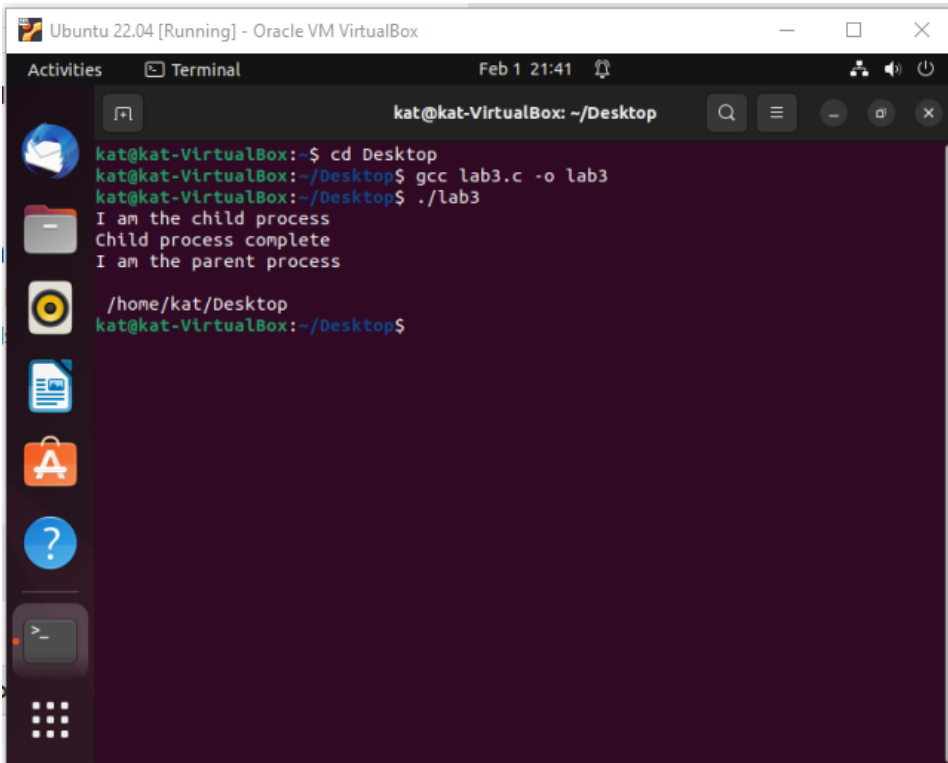
- 7.





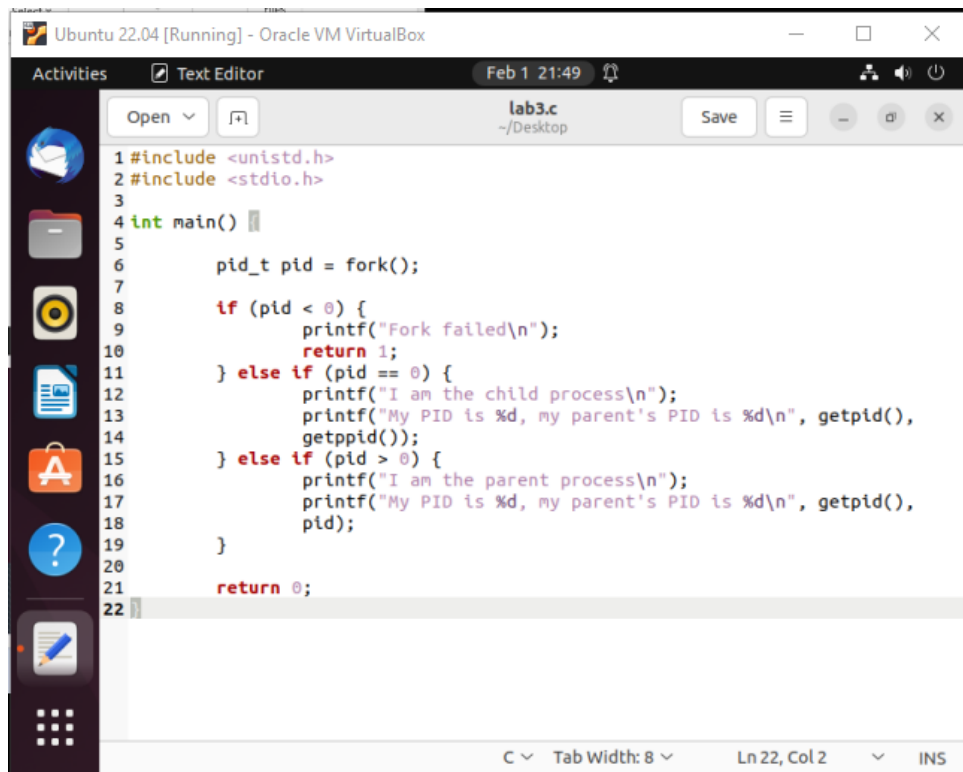


```
1 #include <unistd.h>
2 #include <stdio.h>
3 #include <stdlib.h>
4 #include <sys/types.h>
5 #include <sys/wait.h>
6
7 int main() {
8
9     int pid;
10    pid = fork();
11    char* buf;
12
13    if (pid < 0) {
14        printf("Fork failed\n");
15        return 1;
16    } else if (pid == 0) {
17        printf("I am the child process\n");
18    } else {
19        wait(NULL);
20        printf("Child process complete\n");
21        printf("I am the parent process\n");
22        buf = (char*)malloc(100*sizeof(char));
23        getcwd(buf, 100);
24        printf("\n %s \n", buf);
25    }
26
27 }
```



```
kat@kat-VirtualBox: ~/Desktop
kat@kat-VirtualBox:~$ cd Desktop
kat@kat-VirtualBox:~/Desktop$ gcc lab3.c -o lab3
kat@kat-VirtualBox:~/Desktop$ ./lab3
I am the child process
Child process complete
I am the parent process

/home/kat/Desktop
kat@kat-VirtualBox:~/Desktop$
```



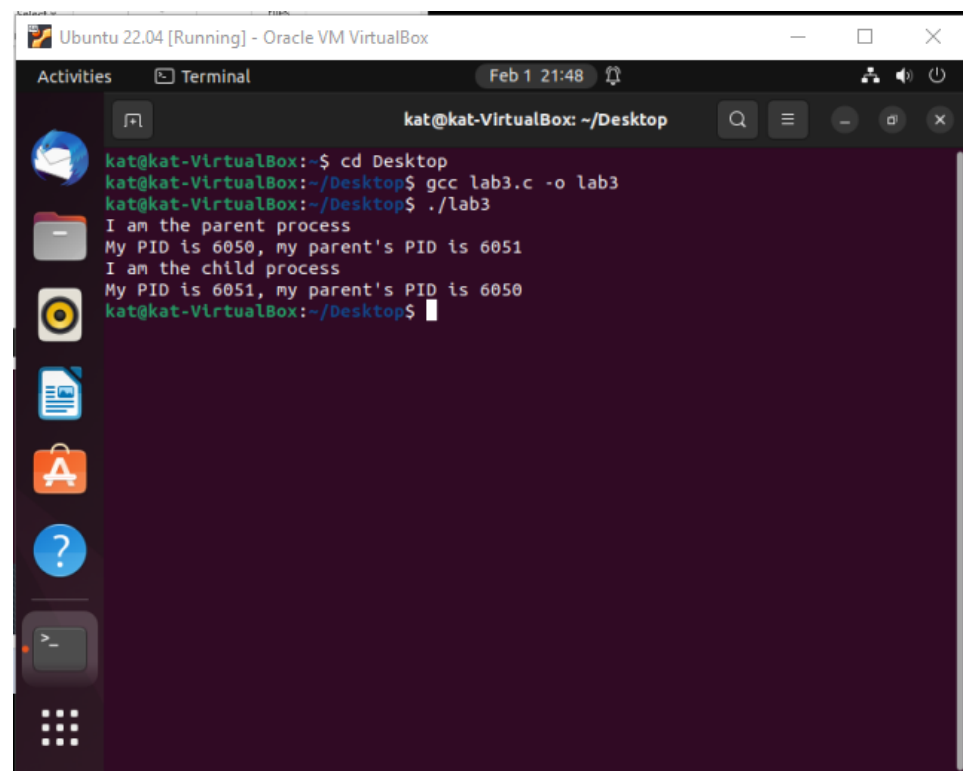
Ubuntu 22.04 [Running] - Oracle VM VirtualBox

Activities Text Editor Feb 1 21:49

lab3.c  
~/Desktop

```
1 #include <unistd.h>
2 #include <stdio.h>
3
4 int main() {
5     pid_t pid = fork();
6
7     if (pid < 0) {
8         printf("Fork failed\n");
9         return 1;
10    } else if (pid == 0) {
11        printf("I am the child process\n");
12        printf("My PID is %d, my parent's PID is %d\n", getpid(),
13              getppid());
14    } else if (pid > 0) {
15        printf("I am the parent process\n");
16        printf("My PID is %d, my parent's PID is %d\n", getpid(),
17              pid);
18    }
19
20    return 0;
21
22 }
```

C Tab Width: 8 Ln 22, Col 2 INS



Ubuntu 22.04 [Running] - Oracle VM VirtualBox

Activities Terminal Feb 1 21:48

kat@kat-VirtualBox: ~/Desktop

```
kat@kat-VirtualBox:~$ cd Desktop
kat@kat-VirtualBox:~/Desktop$ gcc lab3.c -o lab3
kat@kat-VirtualBox:~/Desktop$ ./lab3
I am the parent process
My PID is 6050, my parent's PID is 6051
I am the child process
My PID is 6051, my parent's PID is 6050
kat@kat-VirtualBox:~/Desktop$
```