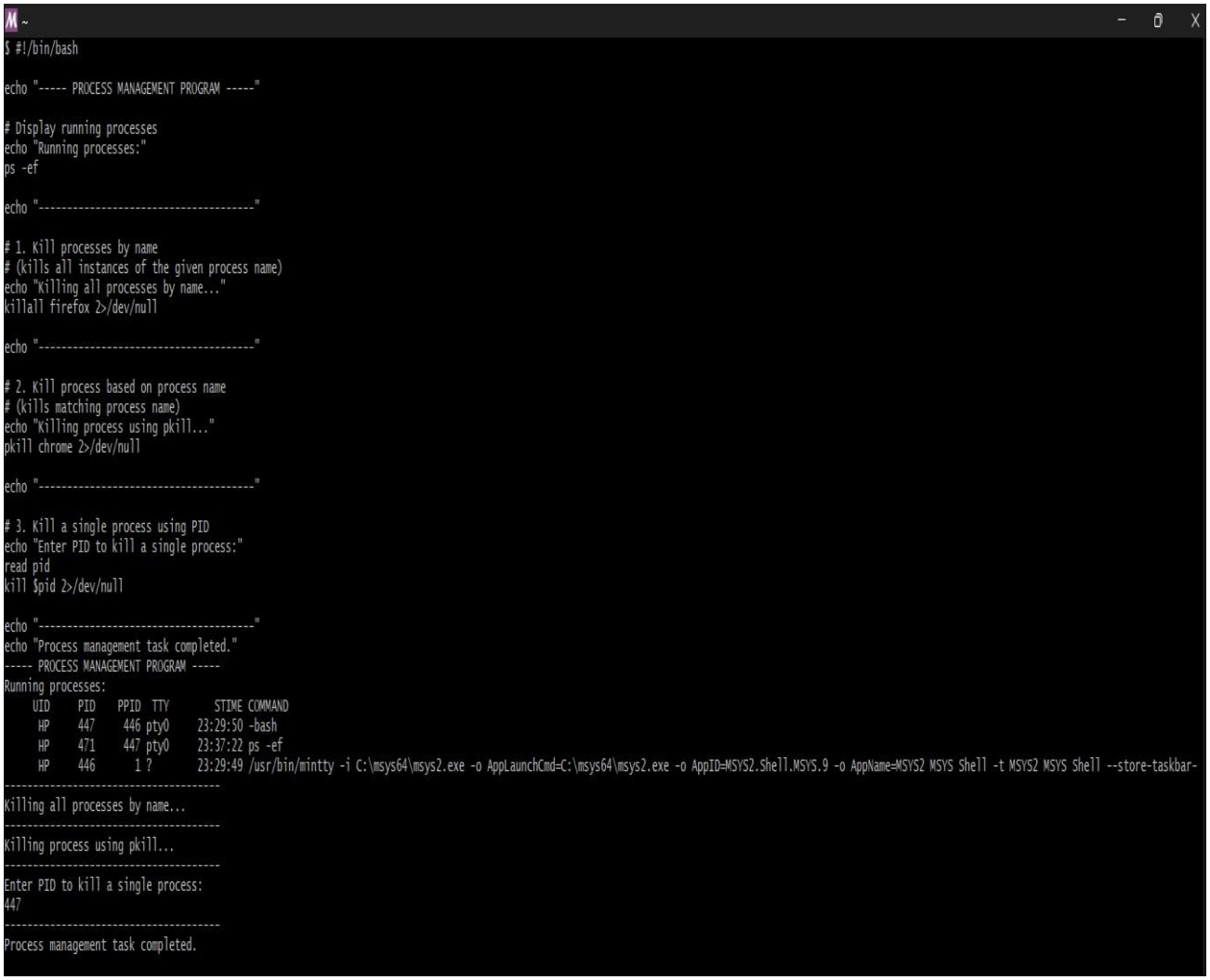
1. Adam is working in an IT company. He has been given a task to reduce the load of a system by killing some of the processes running in the LINUX operating system. Which commands will he use to complete the given task with the help of the following operation?

    - Kill processes by name
    - Kill a process based on the process name
    - Kill a single process at a time with the given process ID



```
~
$ #!/bin/bash

echo "----- PROCESS MANAGEMENT PROGRAM -----"

# Display running processes
echo "Running processes:"
ps -ef

echo "--------------------------------------"

# 1. Kill processes by name
# (kills all instances of the given process name)
echo "Killing all processes by name..."
killall firefox 2>/dev/null

echo "--------------------------------------"

# 2. Kill process based on process name
# (kills matching process name)
echo "Killing process using pkill..."
pkill chrome 2>/dev/null

echo "--------------------------------------"

# 3. Kill a single process using PID
echo "Enter PID to kill a single process:"
read pid
kill $pid 2>/dev/null

echo "--------------------------------------"
echo "Process management task completed."
----- PROCESS MANAGEMENT PROGRAM -----
Running processes:
     UID     PID    PPID  TTY        STIME COMMAND
      HP     447     446 pty0     23:29:50 -bash
      HP     471     447 pty0     23:37:22 ps -ef
      HP     446       1 ?        23:29:49 /usr/bin/mintty -i C:\msys64\msys2.exe -o AppLaunchCmd=C:\msys64\msys2.exe -o AppID=MSYS2.Shell.MSYS.9 -o AppName=MSYS2 MSYS Shell -t MSYS2 MSYS Shell --store-taskbar-
--------------------------------------
Killing all processes by name...
--------------------------------------
Killing process using pkill...
--------------------------------------
Enter PID to kill a single process:
447
--------------------------------------
Process management task completed.
```

2. Write a program for process creation using C

    - Orphan Process

INPUT:

~

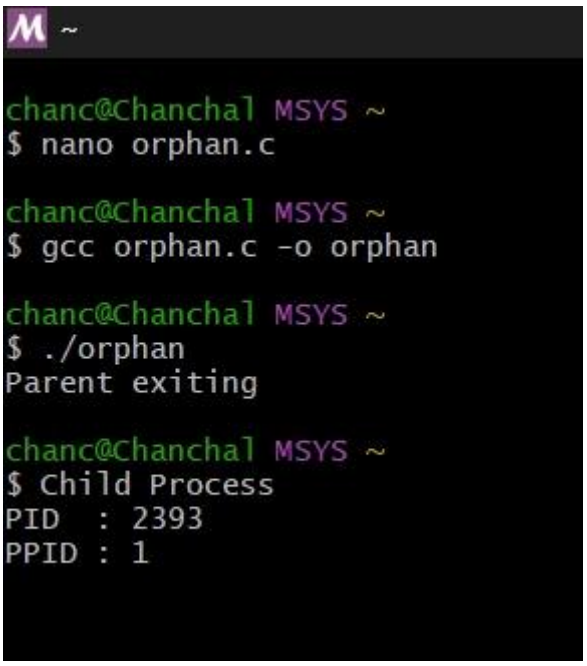
GNU nano 8.7 orphan.c

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

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

    if (pid > 0)
    {
        printf("Parent Process ID: %d\n", getpid());
        printf("Parent exiting...\n");
    }
    else if (pid == 0)
    {
        sleep(5);
        printf("Child Process ID: %d\n", getpid());
        printf("New Parent Process ID (init): %d\n", getppid());
    }
    else
    {
        printf("Fork failed\n");
    }
    return 0;
}
```

OUTPUT :



- Zombie Process

INPUT :

~

GNU nano 8.7 zombie.c

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

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

    if (pid > 0)
    {
        printf("Parent Process ID: %d\n", getpid());
        sleep(10);
        printf("Parent exiting...\n");
    }
    else if (pid == 0)
    {
        printf("Child Process ID: %d\n", getpid());
        printf("Child exiting...\n");
    }
    else
    {
        printf("Fork failed\n");
    }

    return 0;
}
```

OUTPUT :

~

```
chanc@Chanchal MSYS ~
$ nano zombie.c

chanc@Chanchal MSYS ~
$ gcc zombie.c -o zombie

chanc@Chanchal MSYS ~
$ ./zombie
Child exiting
Parent running

chanc@Chanchal MSYS ~
$ ps -el
      PID    PPID    PGID     WINPID   TTY         UID    STIME COMMAND
     1959       1    1959      19544  ?        197610 14:49:23 /usr/bin/mintty
     1960    1959    1960      18476  pty0     197610 14:49:23 /usr/bin/bash
     2410    1960    2410      19408  pty0     197610 15:07:27 /usr/bin/ps

chanc@Chanchal MSYS ~
$
```

3. Create the process using fork () system call.
   - Child Process creation
   - Parent process creation
     PPID and PID

INPUT :

~

GNU nano 8.7 fork.c

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

int main()
{
    pid_t pid;

    pid = fork();

    if (pid > 0)
    {
        // Parent process
        printf("Parent Process\n");
        printf("PID  : %d\n", getpid());
        printf("Child PID : %d\n", pid);
    }
    else if (pid == 0)
    {
        // Child process
        printf("Child Process\n");
        printf("PID  : %d\n", getpid());
        printf("Parent PID (PPID) : %d\n", getppid());
    }
    else
    {
        printf("Process creation failed\n");
    }

    return 0;
}
```

OUTPUT :

```
chanc@Chanchal MSYS ~
$ gcc --version
gcc (GCC) 15.2.0
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This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.


chanc@Chanchal MSYS ~
$ nano fork.c

chanc@Chanchal MSYS ~
$ gcc fork.c -o fork

chanc@Chanchal MSYS ~
$ ./fork
Child Process
PID  : 2384
PPID : 2383
Parent Process
PID  : 2383
Child PID : 2384

chanc@Chanchal MSYS ~
$
```