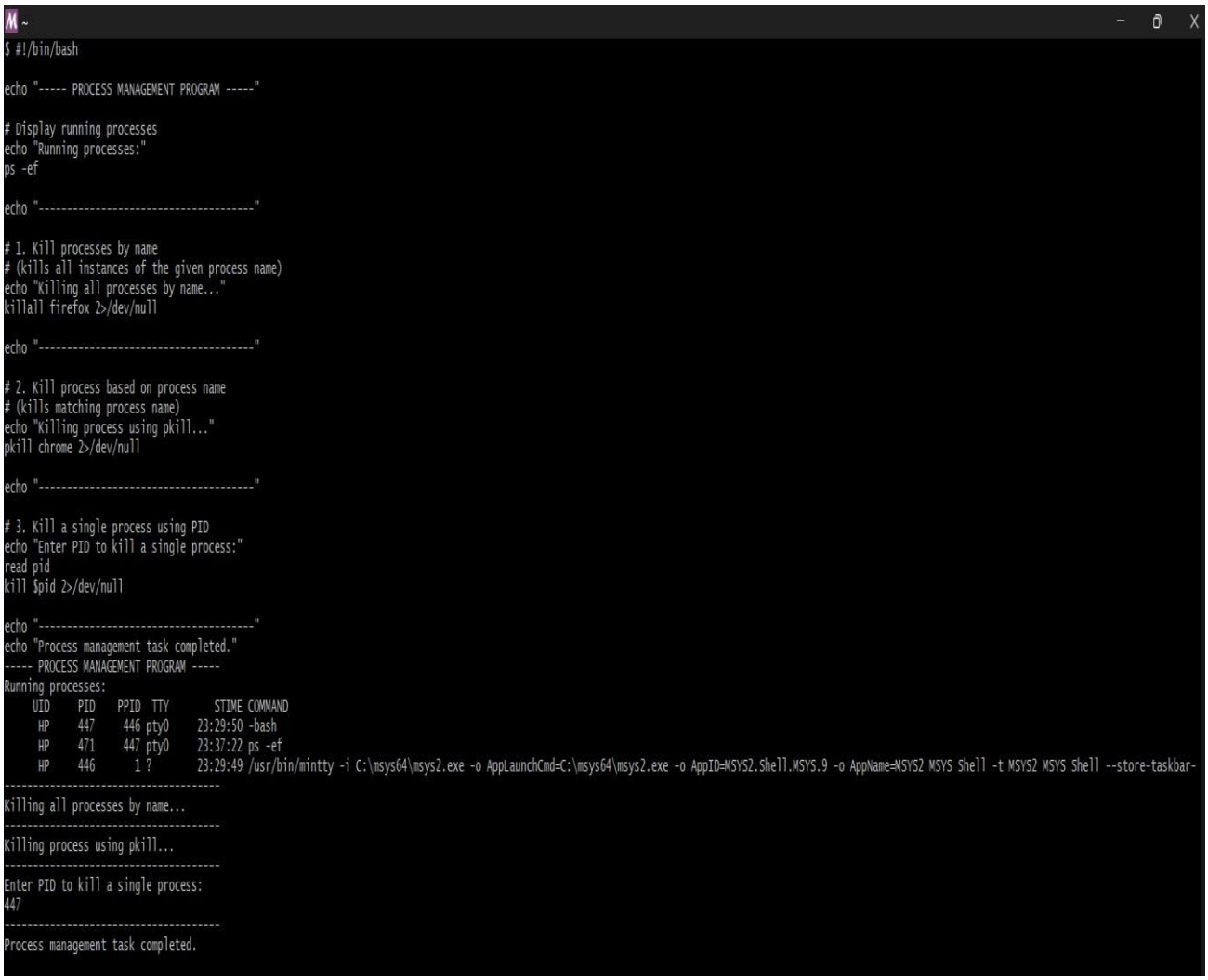
1. Adam is working in an IT company. He has been given a task to reduce the load of a system by killing some of the processes running in the LINUX operating system. Which commands will he use to complete the given task with the help of the following operation?

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

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

    if (pid < 0) {
        printf("Fork failed\n");
    }
    else if (pid == 0) {
        sleep(5);   // Child waits so parent terminates
        printf("\nChild Process (Orphan)\n");
        printf("PID  = %d\n", getpid());
        printf("PPID = %d\n", getppid()); // Will change after parent exits
    }
    else {
        printf("Parent Process exiting...\n");
    }

    return 0;
}
```

OUTPUT :

```
HP@LAPTOP-9M3IBDT5 MSYS ~
$ ./orphan
Parent Process exiting...

HP@LAPTOP-9M3IBDT5 MSYS ~
$
Child Process (Orphan)
PID  = 1131
PPID = 1
```

- 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 :

```
~

HP@Hiteshri MSYS ~
$ nano zombie.c

HP@Hiteshri MSYS ~
$ gcc zombie.c -o zombie

HP@Hiteshri MSYS ~
$ ./zombie
Parent Process ID: 378
Child Process ID: 379
Child exiting...
Parent exiting...

HP@Hiteshri MSYS ~
$
```

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

INPUT :

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

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

    if (pid < 0) {
        printf("Fork failed\n");
    }
    else if (pid == 0) {
        printf("Child Process\n");
        printf("PID = %d\n", getpid());
        printf("PPID = %d\n", getppid());
    }
    else {
        printf("Parent Process\n");
        printf("PID = %d\n", getpid());
        printf("Child PID = %d\n", pid);
    }

    return 0;
}
```

OUTPUT :