

PRACTICAL NO: 4

AIM:

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

2. Write a program for process creation using C

- Orphan Process
- Zombie Process

3. Create the process using fork () system call

- Child Process creation
- Parent Process creation
- PPID and PID THEORY:

This practical focuses on understanding process management in the linux operating system. It involves in the linux studying how processes are created, identified, executed and terminated using system calls and commands. The experiment demonstrates the use of process identifiers such as PID and PPID, creation of parent and child processes using fork () system call and processes like orphan & zombie.

PERFORMANCE

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

COMMAND:

```
m309@m309-BY-OEM:~$ ps -ef
Feb 2 5:03 PM
m309@m309-BY-OEM:~
```

UID	PID	PPID	C	S TIME	TTY	TIME	CMD
root	1	0	0	15:52	?	00:00:06	/sbin/init splash
root	2	0	0	15:52	?	00:00:00	[kthreadd]
root	3	2	0	15:52	?	00:00:00	[pool_workqueue_release]
root	4	2	0	15:52	?	00:00:00	[kworker/R-rcu_g]
root	5	2	0	15:52	?	00:00:00	[kworker/R-rcu_p]
root	6	2	0	15:52	?	00:00:00	[kworker/R-slub_]
root	7	2	0	15:52	?	00:00:00	[kworker/R-netns]
root	9	2	0	15:52	?	00:00:00	[kworker/0:0H-events_highpri]
root	10	2	0	15:52	?	00:00:00	[kworker/0:1-events]
root	12	2	0	15:52	?	00:00:00	[kworker/R-mm_pe]
root	13	2	0	15:52	?	00:00:00	[rcu_tasks_kthread]
root	14	2	0	15:52	?	00:00:00	[rcu_tasks_rude_kthread]
root	15	2	0	15:52	?	00:00:00	[rcu_tasks_trace_kthread]
root	16	2	0	15:52	?	00:00:00	[ksoftirqd/0]
root	17	2	0	15:52	?	00:00:00	[rcu_preempt]
root	18	2	0	15:52	?	00:00:00	[migration/0]
root	19	2	0	15:52	?	00:00:00	[idle_inject/0]
root	20	2	0	15:52	?	00:00:00	[cpuhp/0]
root	21	2	0	15:52	?	00:00:00	[cpuhp/1]
root	22	2	0	15:52	?	00:00:00	[idle_inject/1]
root	23	2	0	15:52	?	00:00:00	[migration/1]
root	24	2	0	15:52	?	00:00:00	[ksoftirqd/1]
root	26	2	0	15:52	?	00:00:00	[kworker/1:0H-events_highpri]
root	27	2	0	15:52	?	00:00:00	[cpuhp/2]
root	28	2	0	15:52	?	00:00:00	[idle_inject/2]
root	29	2	0	15:52	?	00:00:00	[migration/2]
root	30	2	0	15:52	?	00:00:00	[kworker/1:1-events]


```
m309@m309-BY-OEM:~$ ps -ef |grep firefox
m309@m309-BY-OEM:~$ ps -ef | grep --color=auto firefox
m309@m309-BY-OEM:~$ ps -ef | grep firefox
m309@m309-BY-OEM:~$ kill 9407
bash: kill: (9407) - No such process
```



```
m309@m309-BY-OEM:~$ KILL 9407
bash: kill: (9407) - No such process
m309@m309-BY-OEM:~$ pkill firefox
```

2. Write a program for process creation using C

- Orphan Process:

• *Orphan Process*

An orphan process is a child process whose parent process terminates before the child finishes execution. The orphan process is adopted by the init or system process.

➤ orphan.c :

```
m309@m309-BY-OEM:~$ nano orphan.c
m309@m309-BY-OEM:~$ gcc orphan.c -o orphan
m309@m309-BY-OEM:~$ ./orphan
```

```
GNU nano 7.2                                     orphan.c
#include <stdio.h>
#include <unistd.h>

int main() {
    if (fork() == 0) {
        sleep(5);
        printf("Child PID: %d\n", getpid());
        printf("New Parent PID: %d\n", getppid());
    } else {
        printf("Parent exiting\n");
    }
    return 0;
}
```

○ Output:

```
m309@m309-BY-OEM:~$ nano orphan.c
m309@m309-BY-OEM:~$ gcc orphan.c -o orphan
m309@m309-BY-OEM:~$ ./orphan
Parent exiting
m309@m309-BY-OEM:~$ Child PID: 9506
New Parent PID: 6892
```

- Zombie Process

Zombie Process

A zombie process is a child process that has completed execution but still remains in the process table because its parent has not read its exit status.

➤ Zombie.c :

```
m309@m309-BY-OEM:~$ nano zombie3.c
```

```
GNU nano 7.2                                     zombie3.c
#include <stdio.h>
#include <unistd.h>

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

    if (pid > 0) {
        sleep(10); // Parent wait nahi kar raha
        printf("Parent process\n");
    } else {
        printf("Child process exiting\n");
    }
    return 0;
}
```

➤ Output:

```
m309@m309-BY-OEM:~$ nano zombie3.c
m309@m309-BY-OEM:~$ gcc zombie3.c -o zombie3
m309@m309-BY-OEM:~$ ./zombie3
Child process exiting
Parent process
```

3. Create the process using fork () system call

- Child Process creation
- Parent Process creation
- PPID and PID

Process

A process is an instance of a program that is currently being executed in the operating system. It includes program code, data, stack and system resources.

Process ID (PID)

Process ID (PID) is a unique numerical identifier assigned by the operating system to each running process for identification and management.

Parent Process

A parent process is a process that creates one or more child processes using system calls such as fork().

Child Process

A child process is a newly created process that is generated by a parent process and executes independently.

Parent process ID (PPID)

PPID shows the process ID of the parent of a running process.

```
m309@m309-BY-OEM: $ nano fork_demo.c
```

○ fork_demo:

```
GNU nano 7.2                                     fork_demo.c
#include <stdio.h>
#include <unistd.h>

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

    if (pid == 0) {
        printf("Child Process\n");
        printf("Child PID: %d\n", getpid());
        printf("Parent PID: %d\n", getppid());
    } else {
        printf("Parent Process\n");
        printf("Parent PID: %d\n", getpid());
    }
    return 0;
}
```

○ Output:

```
m309@m309-BY-OEM: $ nano fork_demo.c
m309@m309-BY-OEM: $ gcc fork_demo.c -o fork_demo
m309@m309-BY-OEM: $ ./fork_demo
Parent Process
Parent PID: 9465
Child Process
Child PID: 9466
Parent PID: 9465
```

4. Infinite loop process:

• Infinite loop Process -

An infinite loop process is a process that runs continuously without termination until it is manually stopped by the user or system.

```
m309@m309-BY-OEM:~$ nano loop.c
m309@m309-BY-OEM:~$ gcc loop.c -o loop
m309@m309-BY-OEM:~$ ./loop
Running...
Running...
Running...
Running...
Running...
Running...
```

```
GNU nano 7.2                                     loop.c *
#include <stdio.h>
#include <unistd.h>

int main() {
    while (1) {
        printf("Running...\n");
        sleep(1);
    }
    return 0;
}
```

Stopped the infinite loop:

```
m309@m309-BY-OEM:~$ q
Command 'q' not found, but can be installed with:
sudo snap install q                      # version 1.6.3-1, or
sudo apt  install python3-q-text-as-data  # version 3.1.6-3
See 'snap info q' for additional versions.
m309@m309-BY-OEM:~$ █
```