OS_LAB_04_Assignment

CE_054

Aim : Study and implementation of ps command's basic functionality.

Theory :

TASK 1:

PS (Process Status) :-

- The ps command, short for Process Status, is a command line utility that is used to display or view information related to the processes running in a Linux system. As we all know, Linux is a multitasking and multiprocessing system. Therefore, multiple processes can run concurrently without affecting each other.

- Linux provides us a utility called p**s** for viewing information related with the processes on a system which stands as abbreviation for **"**Process Status**".** ps command is used to list the currently running processes and their PIDs along with some other information depends on different options. It reads the process information from the virtual files in /proc file-system. /proc contains virtual files, this is the reason it's referred as a virtual file system.

- ps provides numerous options for manipulating the output according to our need.

Some examples of ps command :

1 **Simple Process selection** :-
Syntax
$ ps
Result contains four columns of information.
Where,
PID – the unique process ID
TTY – terminal type that the user is logged into
TIME – amount of CPU in minutes and seconds that the process has been running
CMD – name of the command that launched the process.

2 **View Processes not associated with a terminal :-** View all processes except both session leaders and processes not associated with a terminal.
Syntax :-
$ ps -a

3 **View Processes :** View all the running processes use either of the following option with
Syntax :-
$ ps -A
$ ps -e

4 **View all processes except those that fulfill the specified conditions**

(negates the selection) :- If you want to see only session leader and processes not associated with a terminal. Then, run
Syntax :-
$ ps -a -N
$ ps -a -deselect

5 **View all processes owned by you :** Processes i.e same EUID as ps which means runner of the ps command, root in this case –
Syntax :-
$ ps -x

6 **View all processes associated with this terminal :-**
Syntax :-
$ ps -T

7 **$ ps aux :-**
a:- This option prints the running processes from all users.
u:- This option shows user or owner column in output.
x:- This option prints the processes those have not been executed from the terminal.
- Collectively the options "aux" print all the running process in system regardless from where they have been executed.

8 **$ ps -ejH :-**
It will gives us PID, PGID, SID, TTY, TIME, CMD.

9 **$ ps -eLf :-**
It will gives us UID, PID, PPID, LWP, C, NLWP, STIME, TTY, TIME, CMD.

TASK 2:

Proc file System :-

proc is very special in that it is also a virtual filesystem. It's sometimes referred to as a process information pseudo-file system. It doesn't contain 'real' files but runtime system information, For this reason it can be regarded as a control and information centre for the kernel. In fact quite a lot of system utilities are simply calls to files in this directory.

Inside the proc file there is a stat file inside this stat file there are all indormation about running processes of system.

Wakekill, Waiting and parked Status :

1. **Wakekill** :-
   A process will be waken up when any fatal or deadly signal is received.
2. **Waiting :-**
   To handle concurrent Wake-ups and release the rq-lock we put the process in this state, its guarantees that nobody will actually run it, and other external signal can not wake it up.

3. **Parked :-**

The process stays in the parked queue until the read request completes, and sometimes it stays there until the hardware or software error that prevented the request completion is repaired.

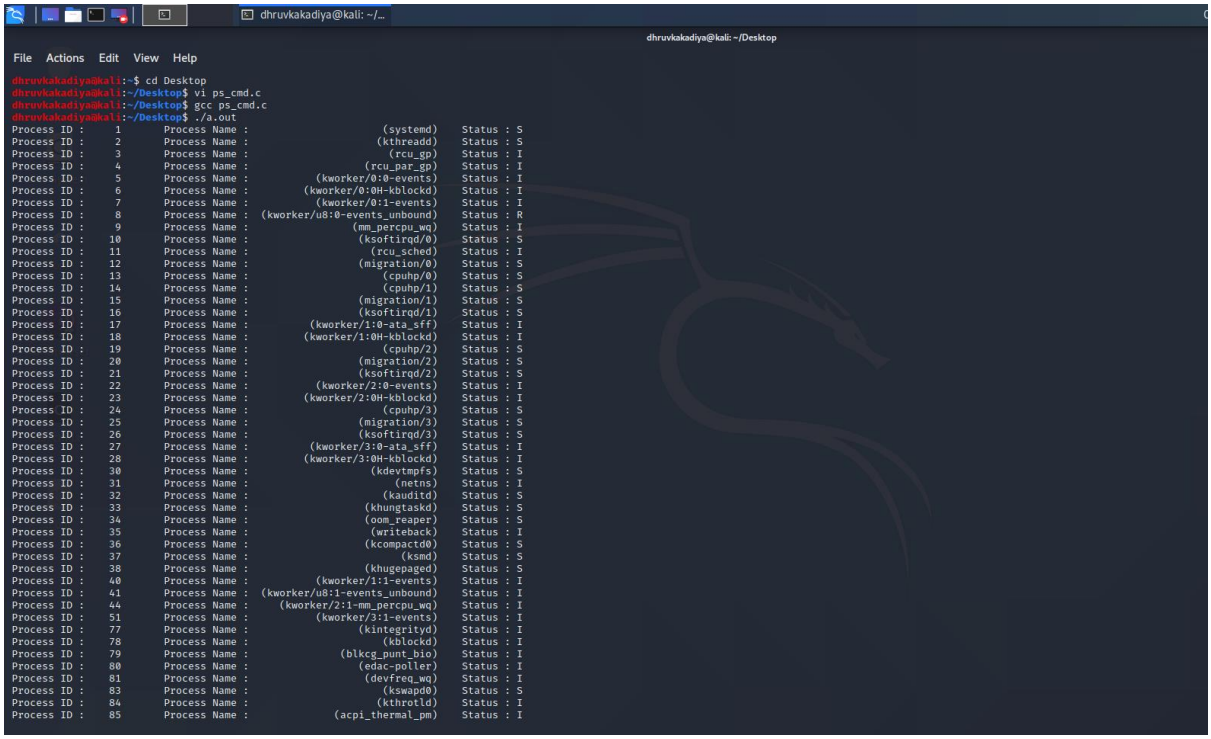
PROGRAMS :-

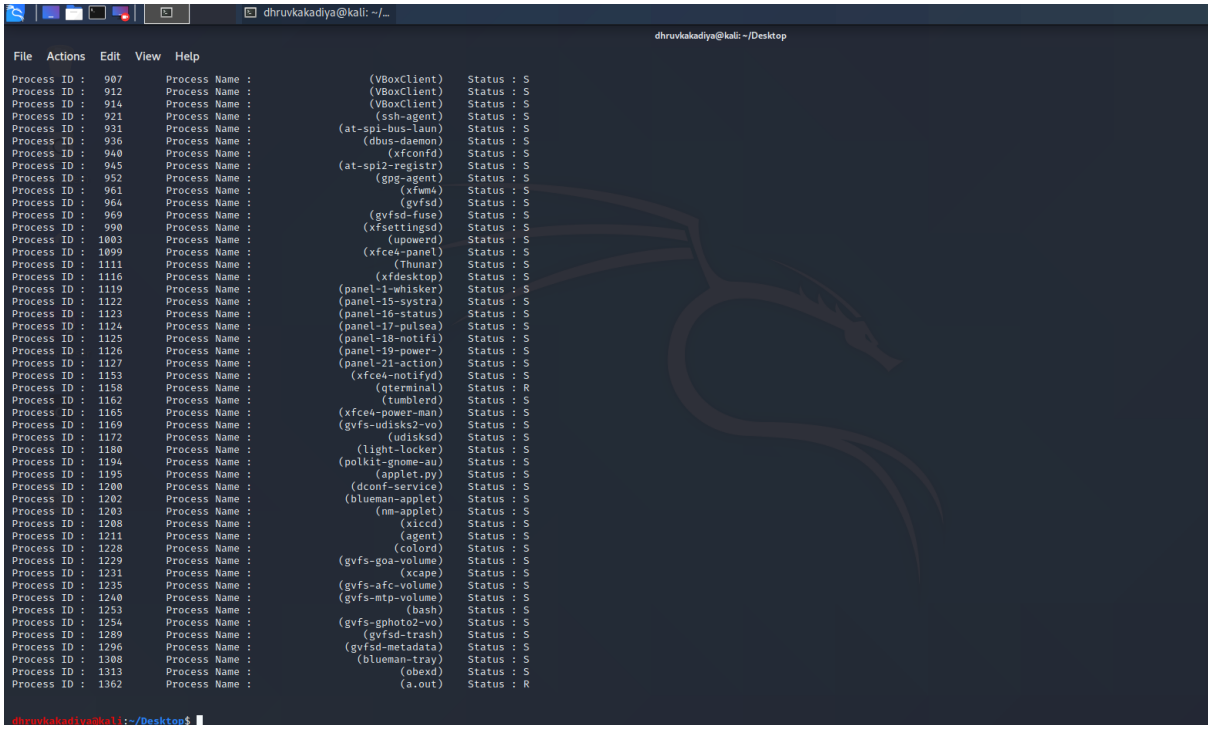
Write a program to print process id and process name of all current processes in the system.
CODE:-

```
/*Author : Dhruv B Kakadiya
 * Implementation of Basic ps command using c language
 */

#include<unistd.h>
#include<dirent.h>
#include<stdio.h>
#include<sys/types.h>
#include<string.h>
#include<stdlib.h>
#include<sys/stat.h>
#include<ctype.h>
#define FORMAT "Process ID : %5d\t Process Name : %30s\t Status : %c\n"

void execution_of_ps(char *main_dir, DIR *dir, struct dirent *dirp);

// function for ps command
void execution_of_ps(char *main_dir, DIR *dir, struct dirent *dirp)
{
	char main_path[100000];
	char process_name[100000];
	int pid;
	char status;
	if((dir = opendir(main_dir)) == NULL)
	{
		fprintf(stderr, "cannot open directory : %s\n", main_dir);
		return;
	}
	while(dirp = readdir(dir))
	{
		if(strcmp(dirp->d_name, ".") != 0 && strcmp(dirp->d_name, "..") != 0)
		{
			if(dirp->d_type == DT_DIR && atoi(dirp->d_name) > 0)
			{
				strcpy(main_path, main_dir);
				strcat(strcat(main_path, dirp->d_name), "/stat");
				FILE *fp;
				if (fp = fopen(main_path, "r"))
				{
					fscanf(fp, "%d %s %c", &pid, process_name, &status);
					printf(FORMAT, pid, process_name, status);

				}
				else
					continue;
```

```
                        }
                }
        }
        closedir(dir);
        return;
}

int main()
{
        DIR *dir;
        struct dirent *dirp;
        execution_of_ps("/proc/", dir, dirp);
        printf("\n\n");
        exit(0);
}
```

Output :-




dhruvkakadiya@kali: ~/...
dhruvkakadiya@kali: ~/Desktop
File Actions Edit View Help
Process ID : 907 Process Name : (VBoxClient) Status : S
Process ID : 912 Process Name : (VBoxClient) Status : S
Process ID : 916 Process Name : (VBoxClient) Status : S
Process ID : 921 Process Name : (ssh-agent) Status : S
Process ID : 931 Process Name : (at-spi-bus-laun) Status : S
Process ID : 936 Process Name : (dbus-daemon) Status : S
Process ID : 940 Process Name : (xfconfd) Status : S
Process ID : 945 Process Name : (at-spi2-registr) Status : S
Process ID : 952 Process Name : (gpg-agent) Status : S
Process ID : 961 Process Name : (xfwm4) Status : S
Process ID : 964 Process Name : (gvfsd) Status : S
Process ID : 969 Process Name : (gvfsd-fuse) Status : S
Process ID : 990 Process Name : (xfsettingsd) Status : S
Process ID : 1003 Process Name : (upowerd) Status : S
Process ID : 1099 Process Name : (xfce4-panel) Status : S
Process ID : 1111 Process Name : (Thunar) Status : S
Process ID : 1116 Process Name : (xfdesktop) Status : S
Process ID : 1119 Process Name : (panel-1-whisker) Status : S
Process ID : 1122 Process Name : (panel-15-systra) Status : S
Process ID : 1123 Process Name : (panel-16-status) Status : S
Process ID : 1124 Process Name : (panel-17-pulsea) Status : S
Process ID : 1125 Process Name : (panel-18-notifi) Status : S
Process ID : 1126 Process Name : (panel-19-power-) Status : S
Process ID : 1127 Process Name : (panel-21-action) Status : S
Process ID : 1153 Process Name : (xfce4-notifyd) Status : S
Process ID : 1158 Process Name : (qterminal) Status : R
Process ID : 1162 Process Name : (tumblerd) Status : S
Process ID : 1165 Process Name : (xfce4-power-man) Status : S
Process ID : 1169 Process Name : (gvfs-udisks2-vo) Status : S
Process ID : 1172 Process Name : (udisksd) Status : S
Process ID : 1180 Process Name : (light-locker) Status : S
Process ID : 1194 Process Name : (polkit-gnome-au) Status : S
Process ID : 1195 Process Name : (applet.py) Status : S
Process ID : 1200 Process Name : (dconf-service) Status : S
Process ID : 1202 Process Name : (blueman-applet) Status : S
Process ID : 1203 Process Name : (nm-applet) Status : S
Process ID : 1208 Process Name : (xiccd) Status : S
Process ID : 1211 Process Name : (agent) Status : S
Process ID : 1228 Process Name : (colord) Status : S
Process ID : 1229 Process Name : (gvfs-goa-volume) Status : S
Process ID : 1231 Process Name : (xcape) Status : S
Process ID : 1235 Process Name : (gvfs-afc-volume) Status : S
Process ID : 1240 Process Name : (gvfs-mtp-volume) Status : S
Process ID : 1253 Process Name : (bash) Status : S
Process ID : 1254 Process Name : (gvfs-gphoto2-vo) Status : S
Process ID : 1289 Process Name : (gvfsd-trash) Status : S
Process ID : 1296 Process Name : (gvfsd-metadata) Status : S
Process ID : 1308 Process Name : (blueman-tray) Status : S
Process ID : 1313 Process Name : (obexd) Status : S
Process ID : 1362 Process Name : (a.out) Status : R
dhruvkakadiya@kali:~/Desktop$