



**SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF NETWORKING AND COMMUNICATIONS
21CSC202J-Operating Systems , Mini-Project Presentation**

PROCESS MONITOR

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Objective

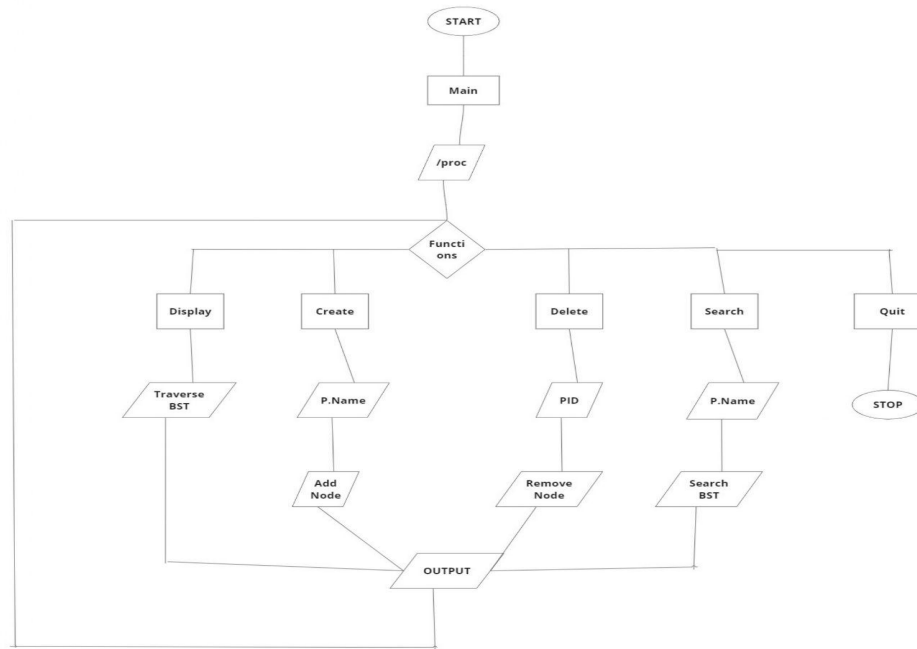
The process monitor is used to display a list of all running processes on the system. The user can use the s, d, and c keys to search for specific processes, kill processes, and start new processes, respectively.

This project will develop a useful tool for monitoring and managing processes on Linux systems. The process monitor will be easy to use and will provide users with valuable information about running processes.

Problem Statement

Process monitoring is an important task for system administrators. It allows them to identify and troubleshoot performance problems, detect and respond to security threats, and ensure that critical processes are running and available.

Architecture



Architecture

Here is a more detailed explanation of the flowchart:

The program starts by authenticating the user. If the authentication is successful, the program displays a menu to the user.

The user can then choose one of the following options:

Create a new process: The program creates a new process and adds it to a binary search tree (BST).

Delete a process: The program gets the PID of the process to delete and removes it from the BST.

Print the list of processes: The program prints a list of all the processes that are currently running.

Search for a process: The program gets the name of the process to search and searches for it in the BST. If the process is found, the program displays its details.

Quit the program: The program frees the BST and exits.

If the user enters an invalid choice, the program displays an error message.

The program repeats the loop until the user chooses to quit.

Hardware/Software requirement

Hardware requirements:

1. A computer with a Linux operating system
2. At least 2GB of RAM
3. At least 50GB of free hard disk space

Software requirements:

1. C compiler
2. GCC or Clang are recommended
3. Make utility
4. Libdirent library
5. Glibc library

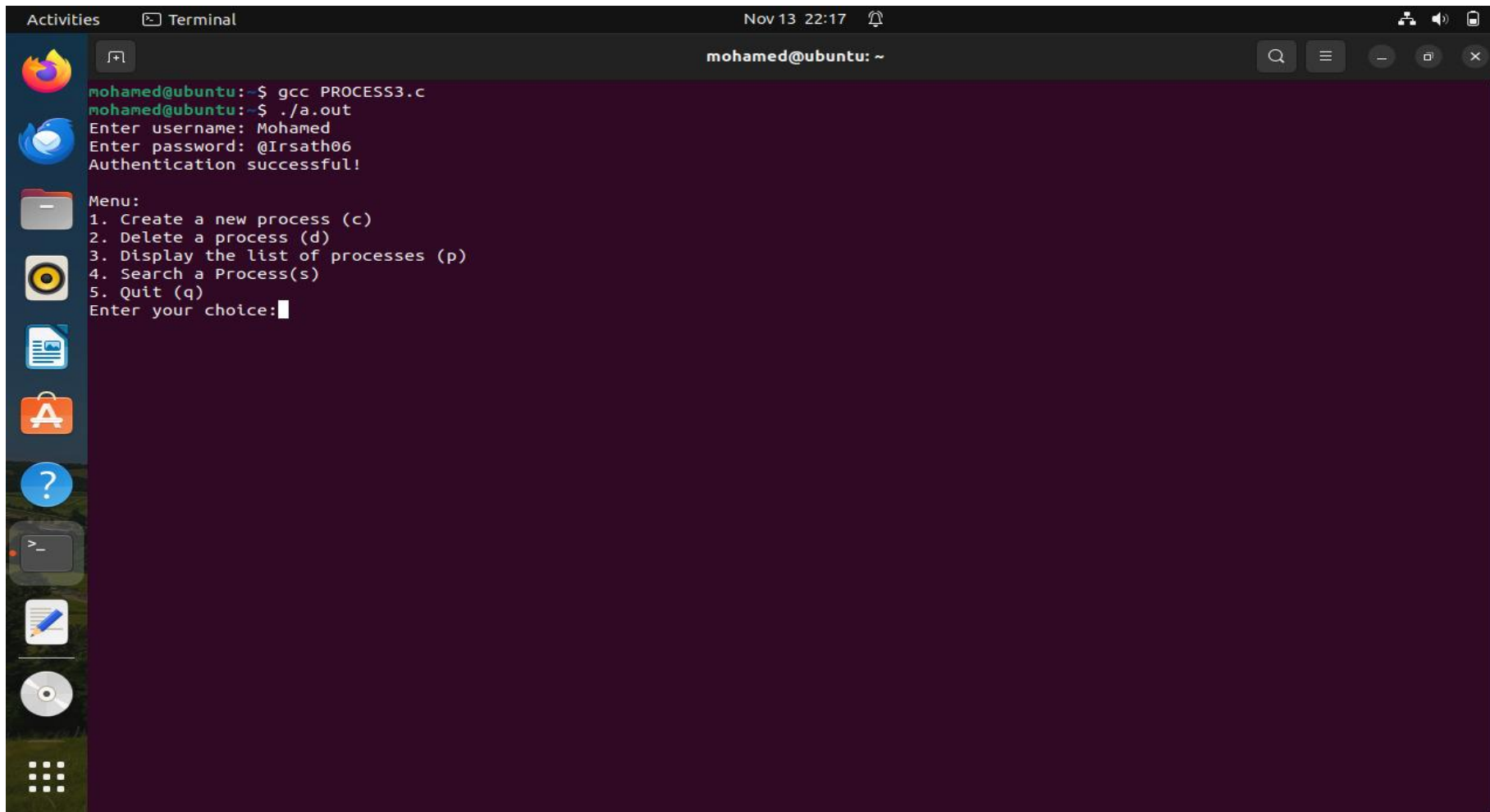
Implementation

Start

- > Authenticate user
- > If authentication successful:
 - > While True:
 - > Display menu
 - > Get user choice
 - > If choice == 'c':
 - > Create a new process
 - > Add the new process to the BST
 - > Else if choice == 'd':
 - > Get the PID of the process to delete
 - > Delete the process from the BST
 - > Else if choice == 'p':
 - > Print the list of processes in the BST
 - > Else if choice == 's':
 - > Get the name of the process to search
 - > Search for the process in the BST and display the details if found
 - > Else if choice == 'q':
 - > Free the BST and exit the program
 - > Else:
 - > Display error message
 - > End While
- > End If

Results

User authentication

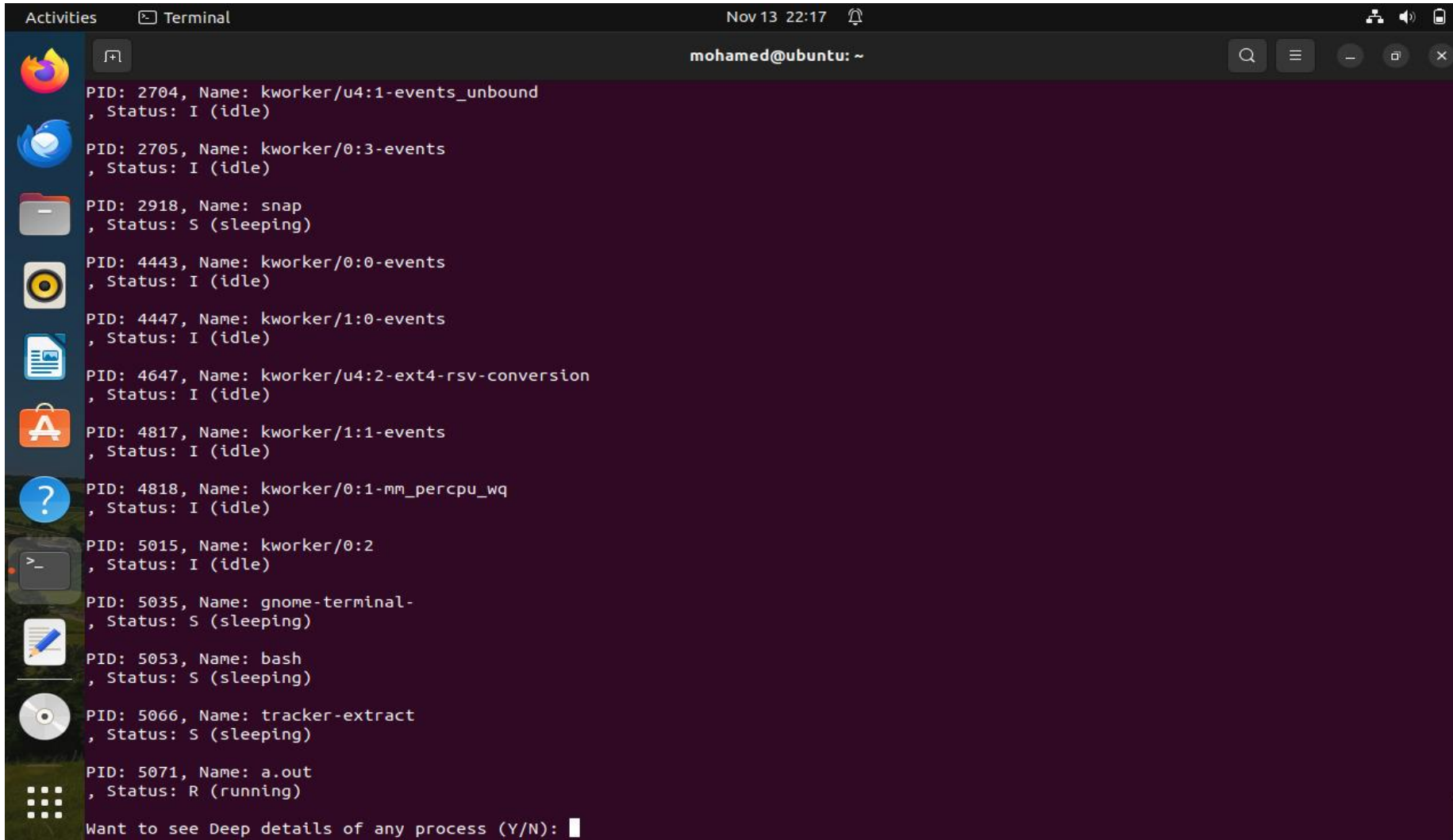
A screenshot of a Linux terminal window. The window title is "Terminal" and the user is "mohamed@ubuntu". The terminal shows the execution of a C program named "PROCESS3.c". The program prompts for a username and password. The user enters "Mohamed" and "@Irsath06", and the program outputs "Authentication successful!". Below this, a menu is displayed with five options: 1. Create a new process (c), 2. Delete a process (d), 3. Display the list of processes (p), 4. Search a Process(s), and 5. Quit (q). The program then prompts the user to enter their choice.

```
Activities  Terminal  Nov 13 22:17  mohamed@ubuntu: ~

mohamed@ubuntu:~$ gcc PROCESS3.c
mohamed@ubuntu:~$ ./a.out
Enter username: Mohamed
Enter password: @Irsath06
Authentication successful!

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:
```

Displaying running process

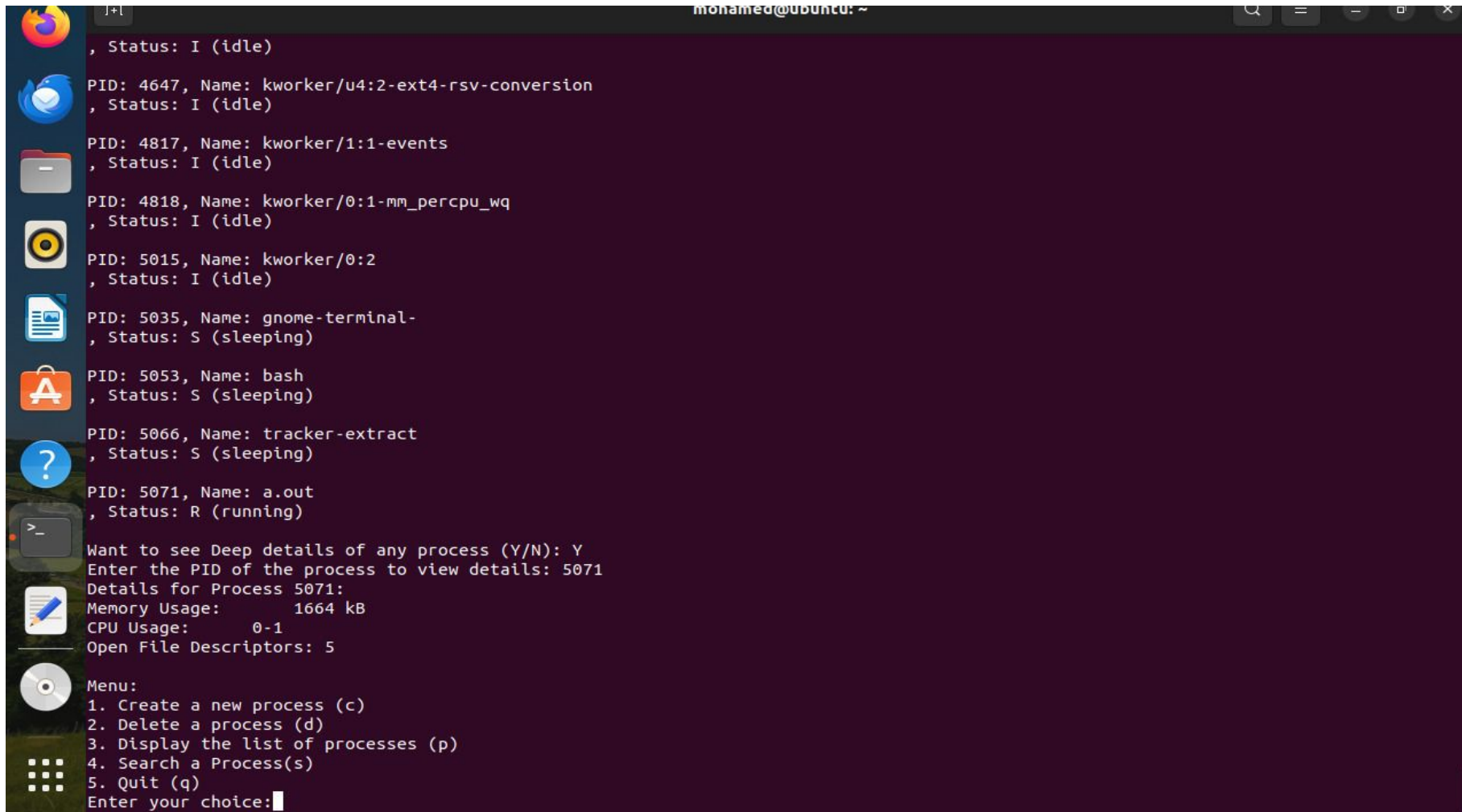


The screenshot shows a terminal window titled "Terminal" with the username "mohamed@ubuntu: ~". The window displays a list of running processes with their PIDs, names, and statuses. The processes are listed as follows:

- PID: 2704, Name: kworker/u4:1-events_unbound, Status: I (idle)
- PID: 2705, Name: kworker/0:3-events, Status: I (idle)
- PID: 2918, Name: snap, Status: S (sleeping)
- PID: 4443, Name: kworker/0:0-events, Status: I (idle)
- PID: 4447, Name: kworker/1:0-events, Status: I (idle)
- PID: 4647, Name: kworker/u4:2-ext4-rsv-conversion, Status: I (idle)
- PID: 4817, Name: kworker/1:1-events, Status: I (idle)
- PID: 4818, Name: kworker/0:1-mm_percpu_wq, Status: I (idle)
- PID: 5015, Name: kworker/0:2, Status: I (idle)
- PID: 5035, Name: gnome-terminal-, Status: S (sleeping)
- PID: 5053, Name: bash, Status: S (sleeping)
- PID: 5066, Name: tracker-extract, Status: S (sleeping)
- PID: 5071, Name: a.out, Status: R (running)

The terminal prompt "Want to see Deep details of any process (Y/N):" is visible at the bottom.

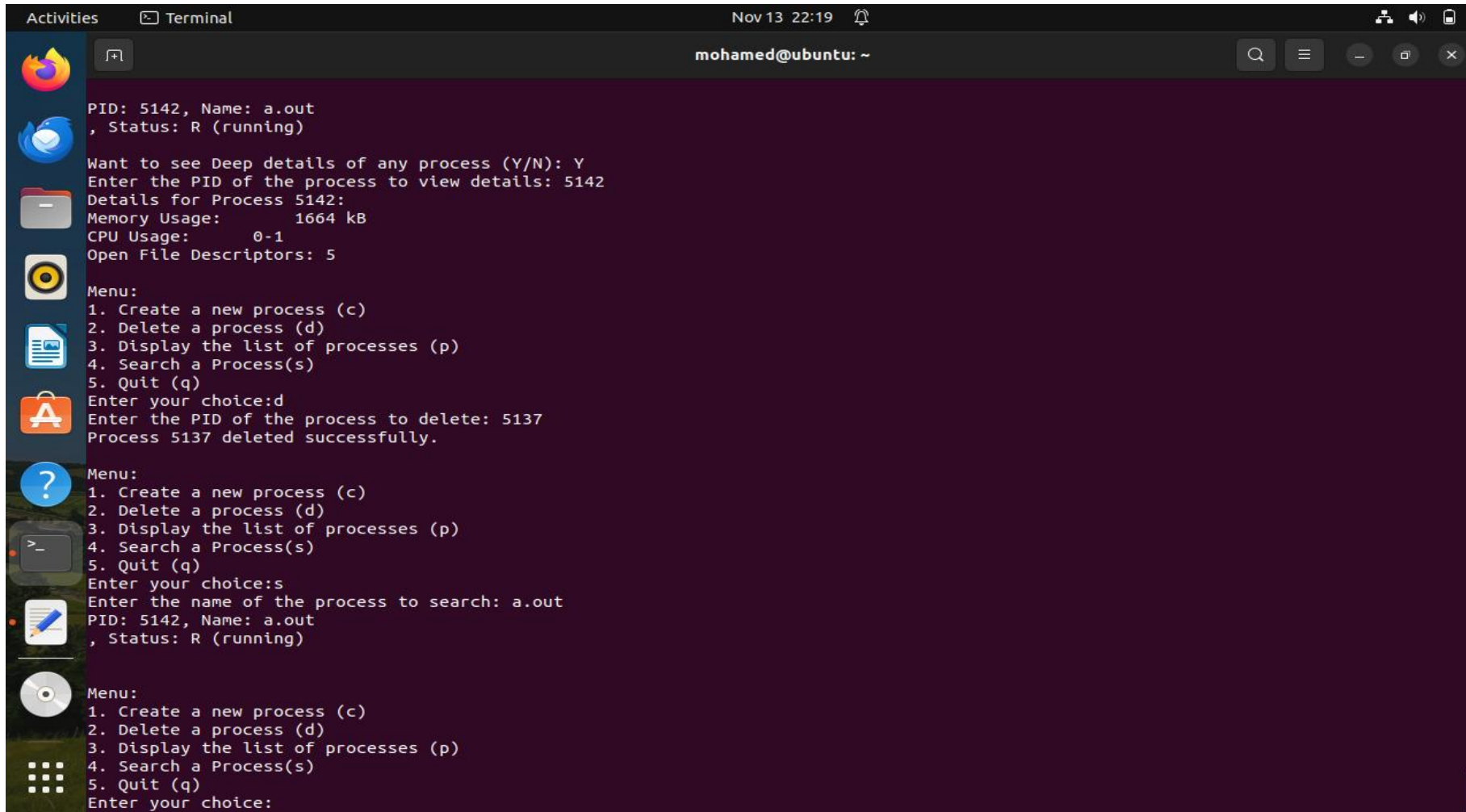
Deep details of specific process



The screenshot shows a terminal window with a dark purple background. On the left side, there is a vertical dock with icons for various applications: Firefox, Telegram, a file manager, a music player, a document viewer, a shopping bag, a question mark, a terminal, a notepad, and a CD icon. The terminal text is as follows:

```
monamed@ubuntu: ~  
, Status: I (idle)  
PID: 4647, Name: kworker/u4:2-ext4-rsv-conversion  
, Status: I (idle)  
PID: 4817, Name: kworker/1:1-events  
, Status: I (idle)  
PID: 4818, Name: kworker/0:1-mm_percpu_wq  
, Status: I (idle)  
PID: 5015, Name: kworker/0:2  
, Status: I (idle)  
PID: 5035, Name: gnome-terminal-  
, Status: S (sleeping)  
PID: 5053, Name: bash  
, Status: S (sleeping)  
PID: 5066, Name: tracker-extract  
, Status: S (sleeping)  
PID: 5071, Name: a.out  
, Status: R (running)  
Want to see Deep details of any process (Y/N): Y  
Enter the PID of the process to view details: 5071  
Details for Process 5071:  
Memory Usage:      1664 kB  
CPU Usage:          0-1  
Open File Descriptors: 5  
  
Menu:  
1. Create a new process (c)  
2. Delete a process (d)  
3. Display the list of processes (p)  
4. Search a Process(s)  
5. Quit (q)  
Enter your choice:
```

Searching a Process



The screenshot shows a terminal window titled "Terminal" with the user "mohamed@ubuntu: ~". The terminal displays a process management menu with the following options:

- 1. Create a new process (c)
- 2. Delete a process (d)
- 3. Display the list of processes (p)
- 4. Search a Process(s)
- 5. Quit (q)

The user enters "d" to delete a process. The terminal prompts for the PID of the process to delete, and the user enters "5137". The terminal confirms: "Process 5137 deleted successfully."

The user then enters "s" to search for a process. The terminal prompts for the name of the process to search, and the user enters "a.out". The terminal displays the search results:

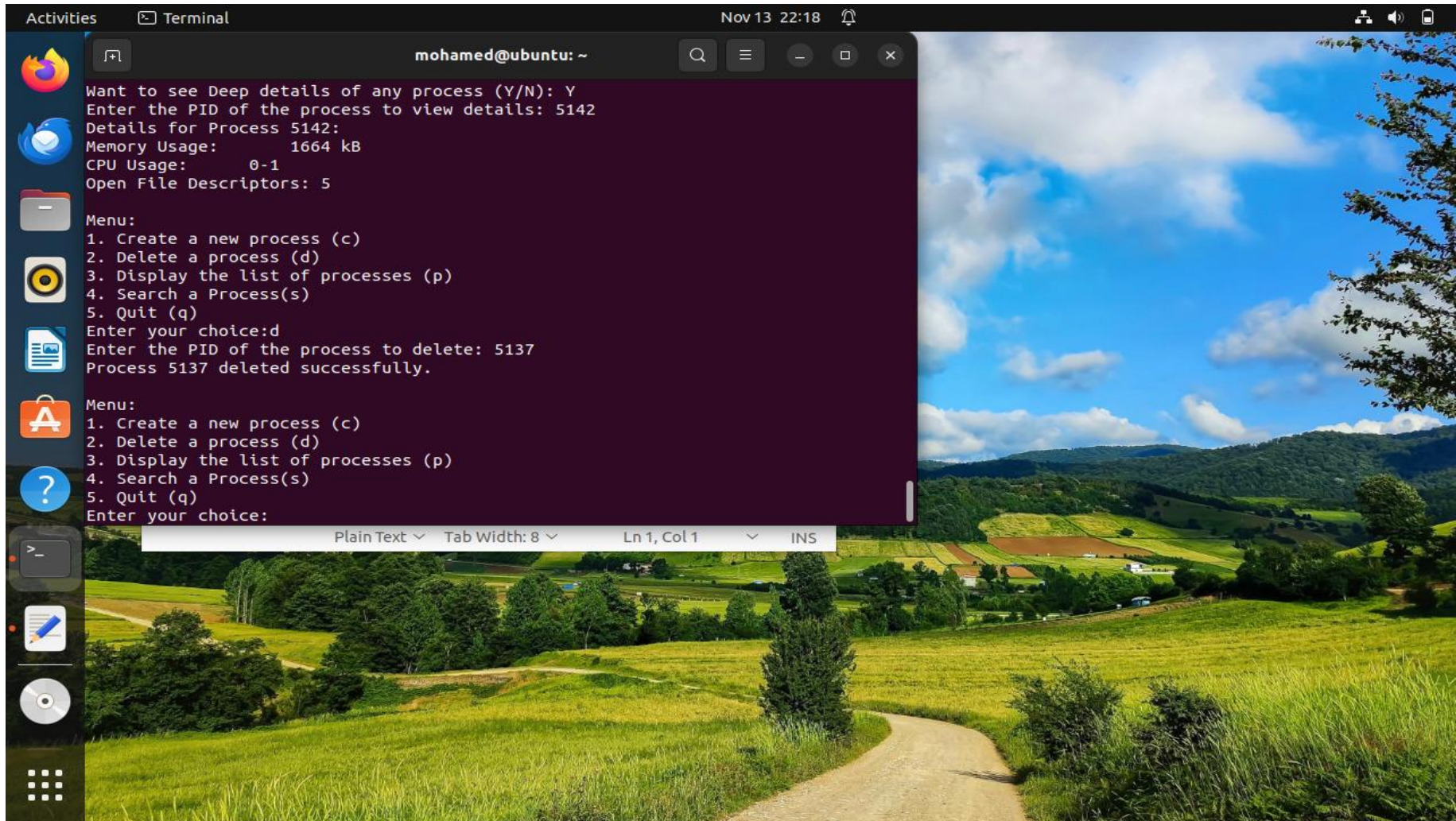
```
PID: 5142, Name: a.out
, Status: R (running)
```

The terminal then displays the details for process 5142:

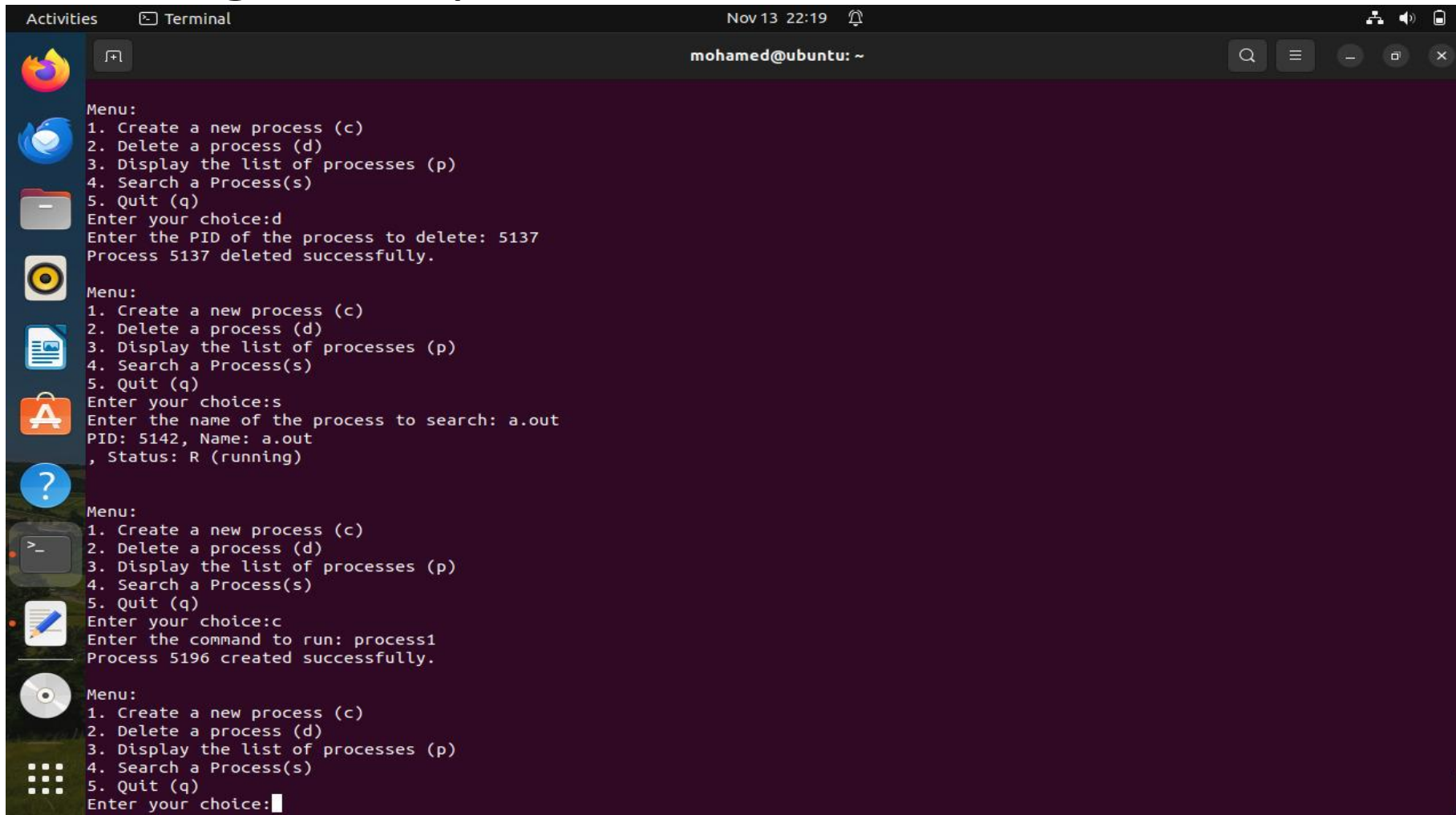
```
Details for Process 5142:
Memory Usage:      1664 kB
CPU Usage:         0-1
Open File Descriptors: 5
```

The terminal then displays the menu again, and the user enters "q" to quit.

Deleting a process



Creating a new process



The screenshot shows an Ubuntu terminal window with the title bar "Activities Terminal" and the date/time "Nov 13 22:19". The user is logged in as "mohamed@ubuntu: ~". The terminal displays a menu-driven application for process management. The menu options are: 1. Create a new process (c), 2. Delete a process (d), 3. Display the list of processes (p), 4. Search a Process(s), and 5. Quit (q). The application has been run multiple times, demonstrating the delete and search functionality. The current state shows the menu with the cursor on option 5.

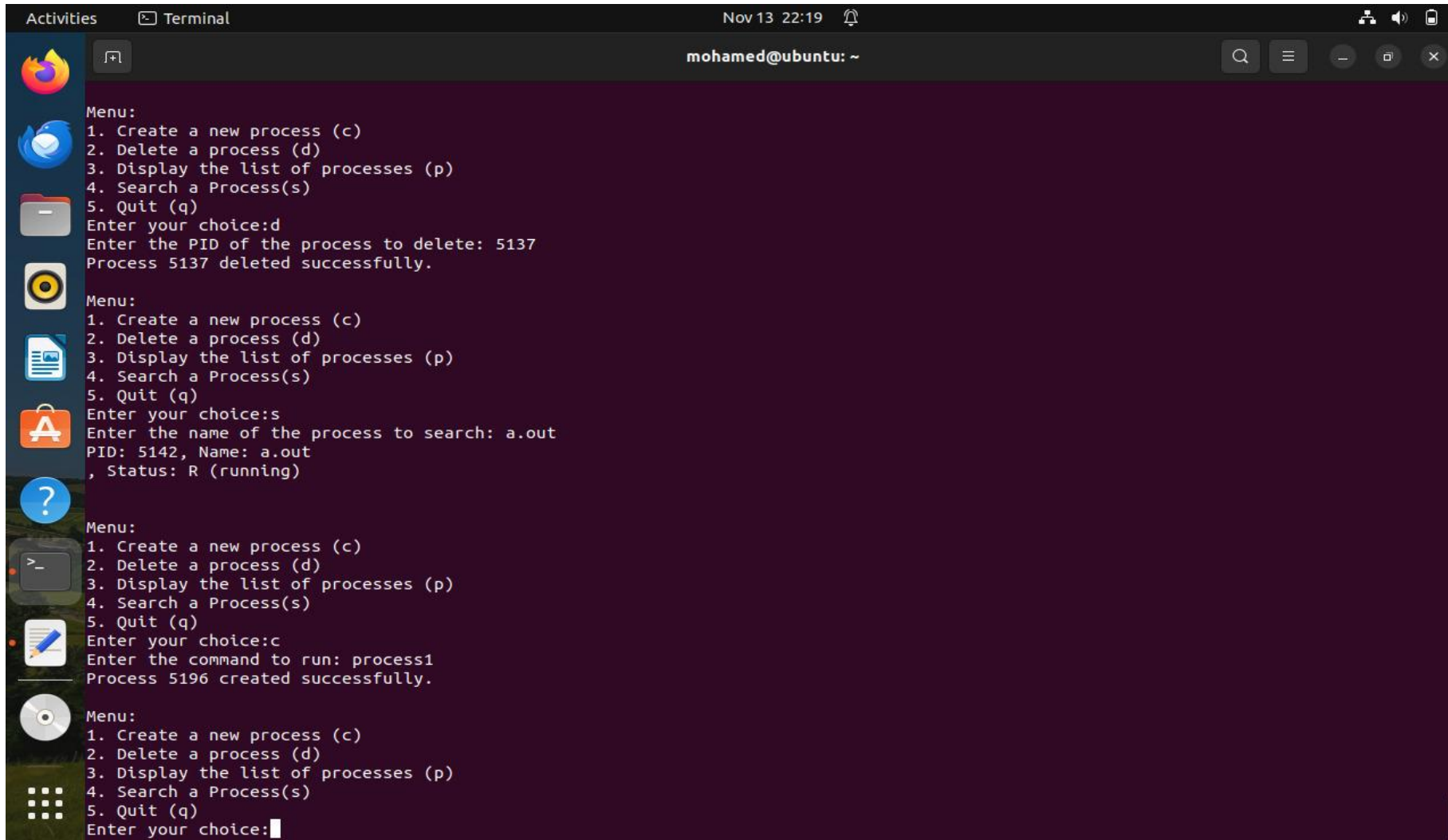
```
Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:d
Enter the PID of the process to delete: 5137
Process 5137 deleted successfully.

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:s
Enter the name of the process to search: a.out
PID: 5142, Name: a.out
, Status: R (running)

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:c
Enter the command to run: process1
Process 5196 created successfully.

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:
```

Displaying after creating new process



```
Activities  Terminal  Nov 13 22:19  mohamed@ubuntu: ~

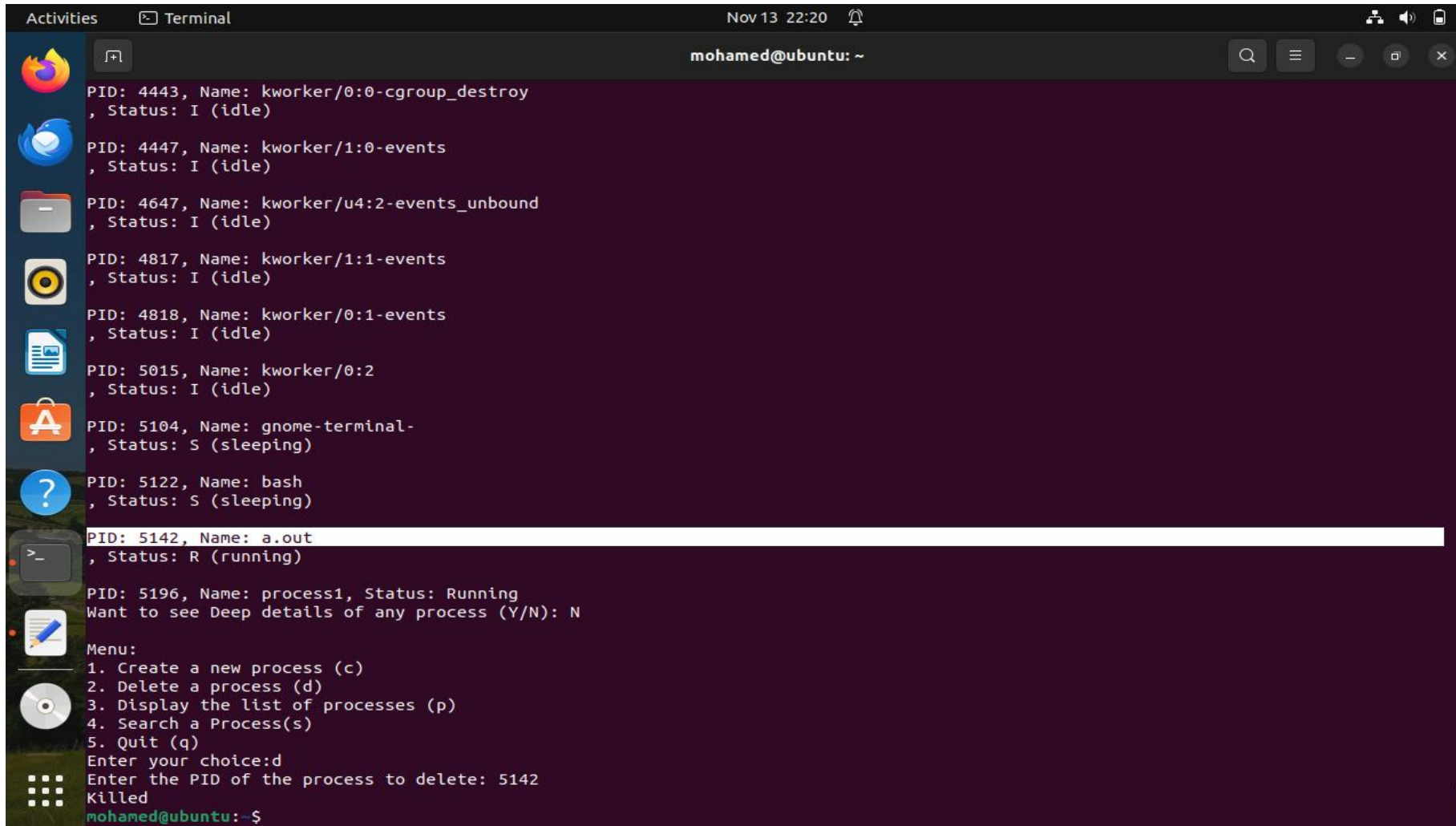
Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:d
Enter the PID of the process to delete: 5137
Process 5137 deleted successfully.

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:s
Enter the name of the process to search: a.out
PID: 5142, Name: a.out
, Status: R (running)

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:c
Enter the command to run: process1
Process 5196 created successfully.

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:
```


Deleting the same process



```
Activities  Terminal  Nov 13 22:20  mohamed@ubuntu: ~

PID: 4443, Name: kworker/0:0-cgroup_destroy
, Status: I (idle)

PID: 4447, Name: kworker/1:0-events
, Status: I (idle)

PID: 4647, Name: kworker/u4:2-events_unbound
, Status: I (idle)

PID: 4817, Name: kworker/1:1-events
, Status: I (idle)

PID: 4818, Name: kworker/0:1-events
, Status: I (idle)

PID: 5015, Name: kworker/0:2
, Status: I (idle)

PID: 5104, Name: gnome-terminal-
, Status: S (sleeping)

PID: 5122, Name: bash
, Status: S (sleeping)

PID: 5142, Name: a.out
, Status: R (running)

PID: 5196, Name: process1, Status: Running
Want to see Deep details of any process (Y/N): N

Menu:
1. Create a new process (c)
2. Delete a process (d)
3. Display the list of processes (p)
4. Search a Process(s)
5. Quit (q)
Enter your choice:d
Enter the PID of the process to delete: 5142
Killed
mohamed@ubuntu:~$
```


Conclusion

In conclusion, the project provides a foundational implementation of a process management system with user authentication. It demonstrates fundamental concepts of process handling in a Unix environment and serves as a starting point for further development and refinement. The inclusion of an authentication mechanism adds a layer of security, making the system suitable for practical use in controlled environments. Further development could expand its functionality and usability.



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Thanks