

**K. J. Somaiya College of Engineering, Mumbai-77**  
(A Constituent College of Somaiya Vidyavihar University)  
**Department of Computer Engineering**

**Batch:** D-2      **Roll No.:** 16010122151

**Experiment No. 01**

**Grade:** AA / AB / BB / BC / CC / CD / DD

**Signature of the Staff In-charge with date**

**TITLE: Exploring basic Commands of UNIX: Shell, Processes, Files**

**AIM:** To Explore basic commands for handling File system under Unix/Linux using shell scripts.(Creating groups, chown , chmod , directory name, tty , diff, umask).

**Expected Outcome of Experiment:**

**CO 1.** To introduce basic concepts and functions of operating systems.

**Books/ Journals/ Websites referred:**

1. Silberschatz A., Galvin P., Gagne G. “Operating Systems Principles”, Willey Eight edition.
2. Achyut S. Godbole , Atul Kahate “Operating Systems”, McGraw Hill Third Edition.
3. Sumitabha Das “ UNIX Concepts & Applications”, McGraw Hill Second Edition.

**Pre Lab/ Prior Concepts:**

An operating system (OS) is a resource manager. It takes the form of a set of software routines that allow users and application programs to access system resources (e.g. the CPU, memory, disks, modems, printers network cards etc.) in safe efficient and abstract way.

- The operating system kernel is in direct control of the underlying hardware. The kernel provides low-level device, memory and processor management functions (e.g.

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dealing with interrupts from hardware devices, sharing the processor among multiple programs, allocating memory for programs etc.)

- Basic hardware-independent kernel services are exposed to higher-level programs through a library of system calls (e.g. services to create a file, begin execution of a program, or open a logical network connection to another computer).
- Application programs (e.g. word processors, spreadsheets) and system utility programs (simple but useful application programs that come with the operating system, e.g. programs which find text inside a group of files) make use of system calls. Applications and system utilities are launched using a shell (a textual command line interface) or a graphical user interface that provides direct user interaction.

Operating systems can be distinguished from one another by the system calls, system utilities and user interface they provide, as well as by the resource scheduling policies implemented by the kernel.

UNIX has been a popular OS for more than two decades because of its multi-user, multi-tasking environment, stability, portability and powerful networking capabilities.

Linux is a free open source UNIX OS for PCs.

Linux has all of the components of a typical OS :

- **Kernel**

The Linux kernel includes device driver support for a large number of PC hardware devices (graphics cards, network cards, hard disks etc.), advanced processor and memory management features, and support for many different types of file systems. In terms of the services that it provides to application programs and system utilities, the kernel implements most BSD and SYSV system calls, as well as the system calls described in the POSIX.1 specification.

The kernel (in raw binary form that is loaded directly into memory at system startup time) is typically found in the file `/boot/vmlinuz`, while the source files can usually be found in `/usr/src/linux`.

- **Shells and GUIs**

Linux supports two forms of command input: through textual command line shells similar to those found on most UNIX systems (e.g. `sh` - the Bourne shell, `bash` - the Bourne again shell and `csh` - the C shell) and through graphical interfaces (GUIs) such as the KDE and GNOME window managers.

- **System Utilities**

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Virtually every system utility that you would expect to find on standard implementations of UNIX has been ported to Linux. This includes commands such as ls, cp, grep, awk, sed, bc, wc, more, and so on. These system utilities are designed to be powerful tools that do a single task extremely well (e.g. grep finds text inside files while wc counts the number of words, lines and bytes inside a file). Users can often solve problems by interconnecting these tools instead of writing a large monolithic application program.

- **Application programs**

Linux distributions typically come with several useful application programs as standard. Examples include the emacs editor, xv (an image viewer), gcc (a C compiler), g++ (a C++ compiler), xfig (a drawing package), latex (a powerful typesetting language) and soffice (StarOffice, which is an MS-Office style clone that can read and write Word, Excel and PowerPoint files).

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Description of Commands and options:

**DOS commands:** Attrib, dir, at, chkdsk, shutdown, tree, create a batch file, output and input redirection

**Windows utilities:** msconfig, defragmenter, performance monitor, task manager, registry editor, event viewer, process explorer

Unix Commands:

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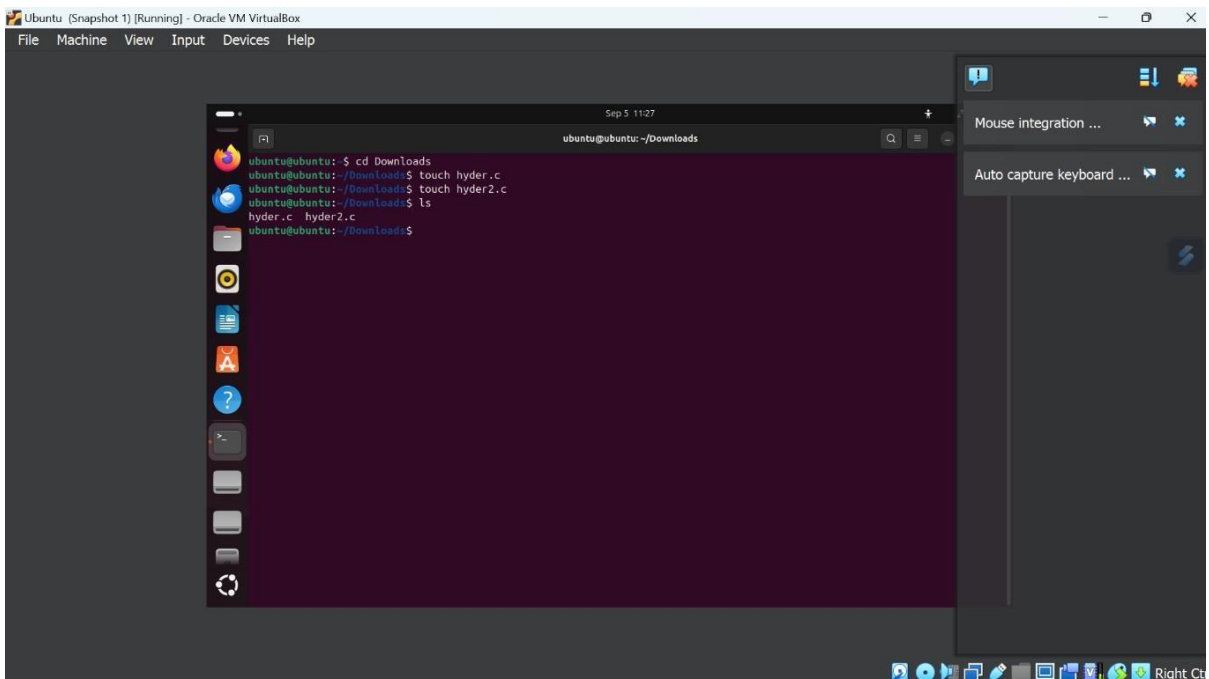
- 1) Unix file operations: ls, cp, rm, mv, chmod, chown, chgrp
  - 2) Text file operations in Unix : cat, more, less, head, tail, grep
  - 3) Unix directory management commands : cd, pwd, ln, mkdir, rmdir
  - 4) Unix system status commands: hostname, w, uname
  - 5) Process management: ps, top, kill
  - 6) Unix users commands: whoami, id, groups, passwd, who, last
-

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**Implementation details:**

**1. Unix File Operations**

**ls**        # Lists files and directories  
**ls -l**     # Lists in long format with permissions and other details  
**ls -a**     # Includes hidden files



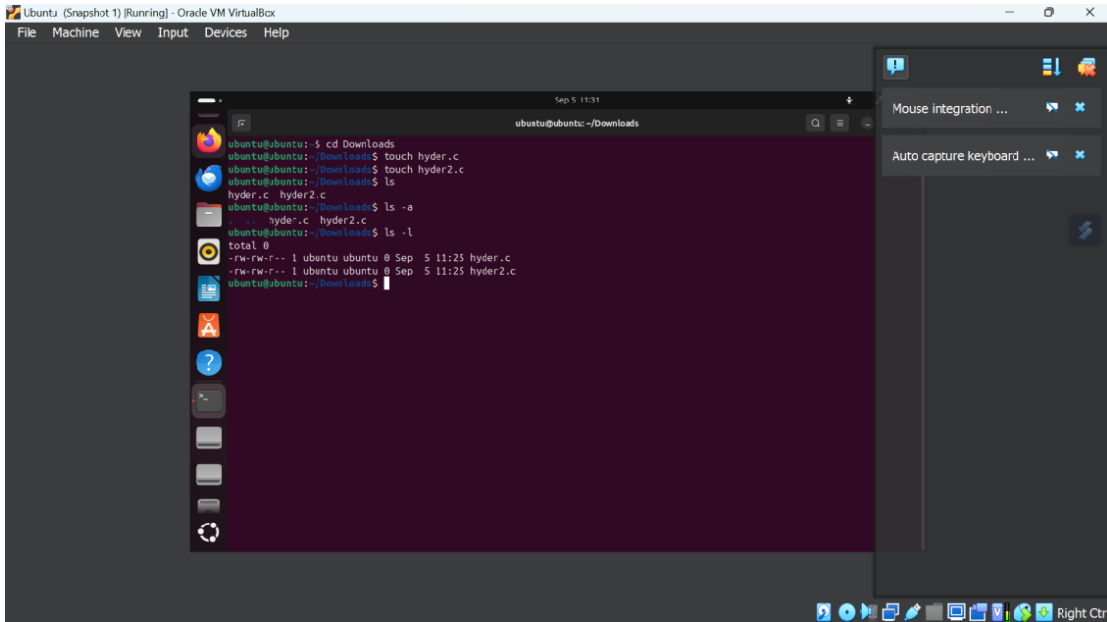
The screenshot shows a terminal window titled 'ubuntu@ubuntu: ~/Downloads' with the following commands and output:

```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu: ~/Downloads$ cd Downloads
ubuntu@ubuntu: ~/Downloads$ touch hyder.c
ubuntu@ubuntu: ~/Downloads$ touch hyder2.c
ubuntu@ubuntu: ~/Downloads$ ls
hyder.c  hyder2.c
ubuntu@ubuntu: ~/Downloads$
```

We made hyder.c & hyder2.c to show that ls Lists files and directories

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**ls-a** = # Includes hidden files



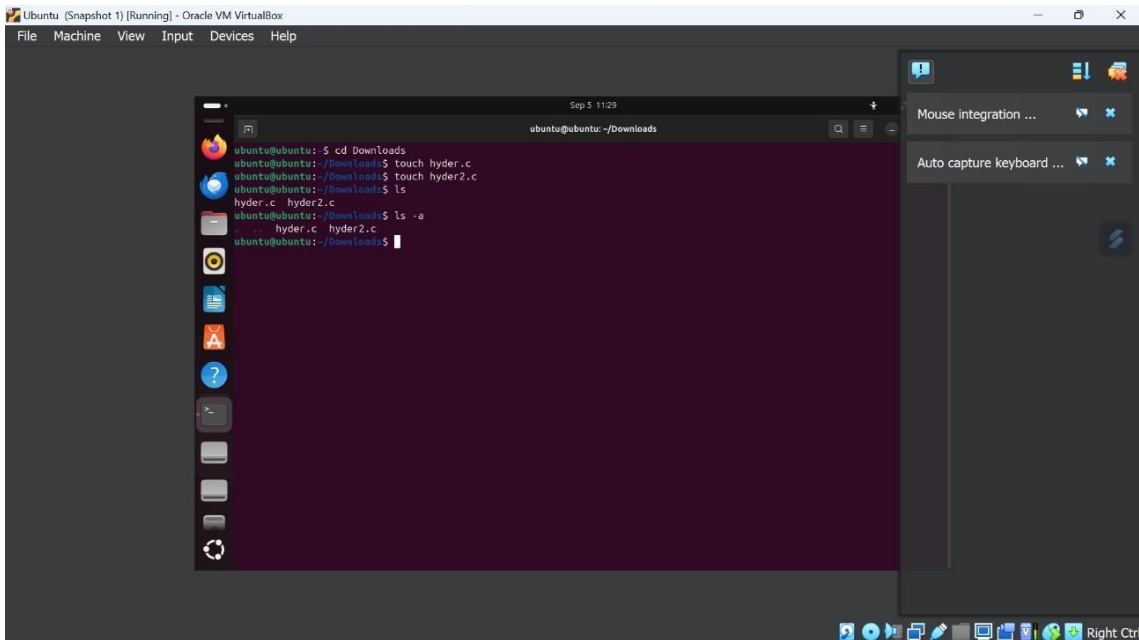
```
Ubuntu (Snapshot 1) [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Sep 5 11:31
ubuntu@ubuntu: ~/Downloads

ubuntu@ubuntu:~/Downloads$ cd Downloads
ubuntu@ubuntu:~/Downloads$ touch hyder.c
ubuntu@ubuntu:~/Downloads$ touch hyder2.c
ubuntu@ubuntu:~/Downloads$ ls
hyder.c  hyder2.c
ubuntu@ubuntu:~/Downloads$ ls -a
.        hyder.c  hyder2.c
ubuntu@ubuntu:~/Downloads$ ls -l
total 0
-rw-rw-r-- 1 ubuntu ubuntu 0 Sep  5 11:25 hyder.c
-rw-rw-r-- 1 ubuntu ubuntu 0 Sep  5 11:25 hyder2.c
ubuntu@ubuntu:~/Downloads$
```

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**ls-l** = # Lists in long format with permissions and other details

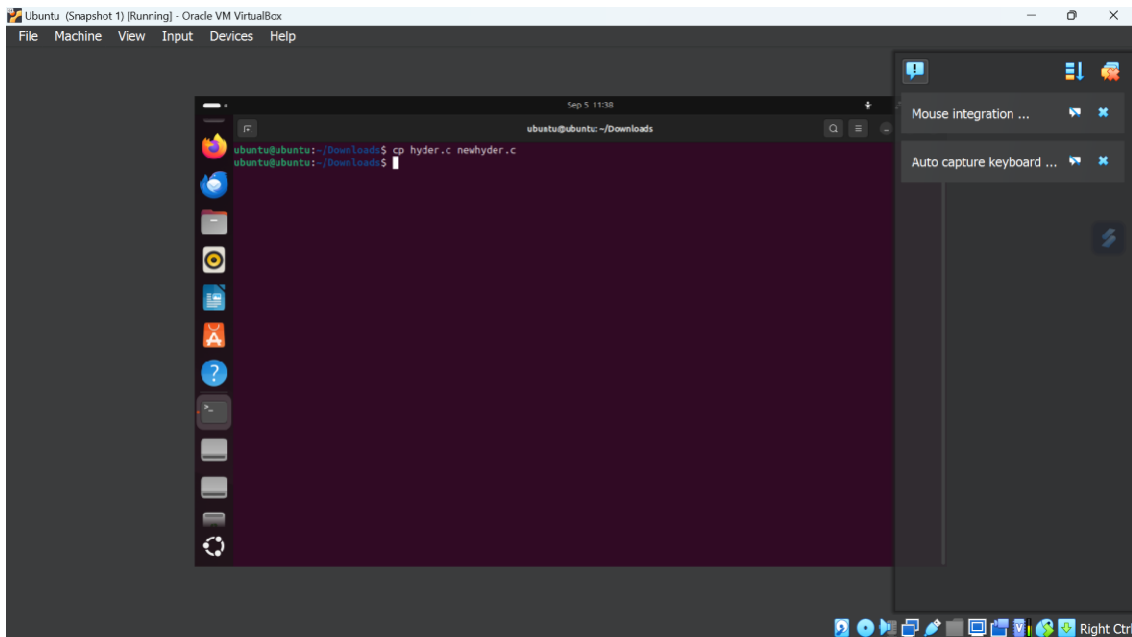


**cp**

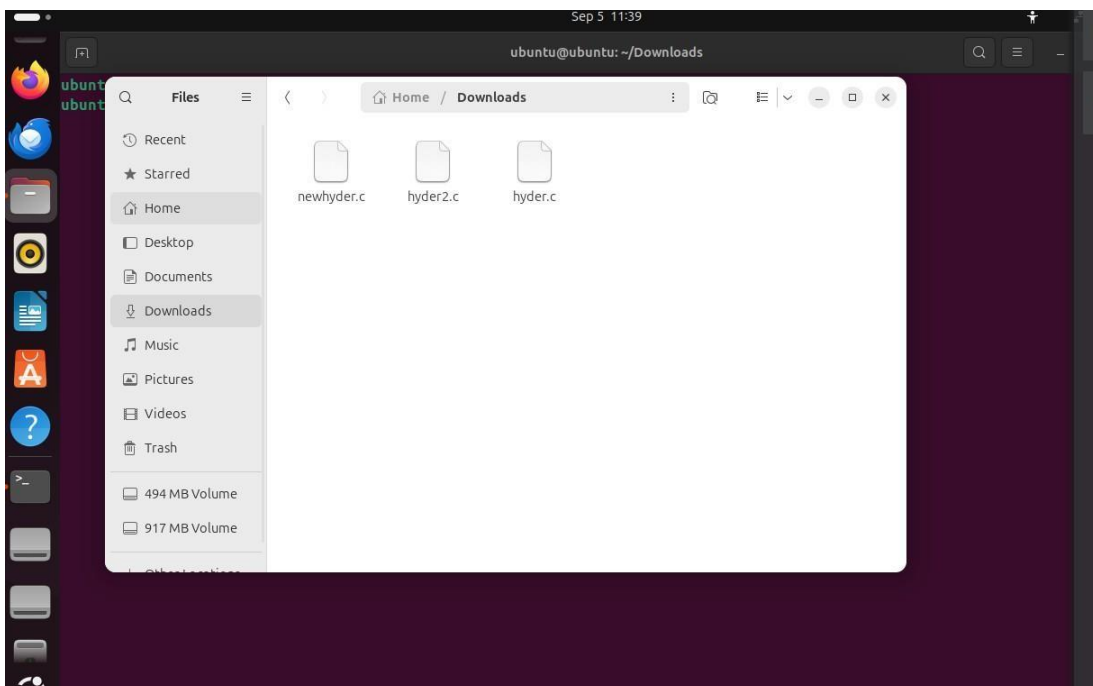
**cp source\_file destination\_file** # Copy a file

**cp -r source\_directory destination\_directory** # Copy a directory recursively

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Hyder.c was copied to newhyder.c



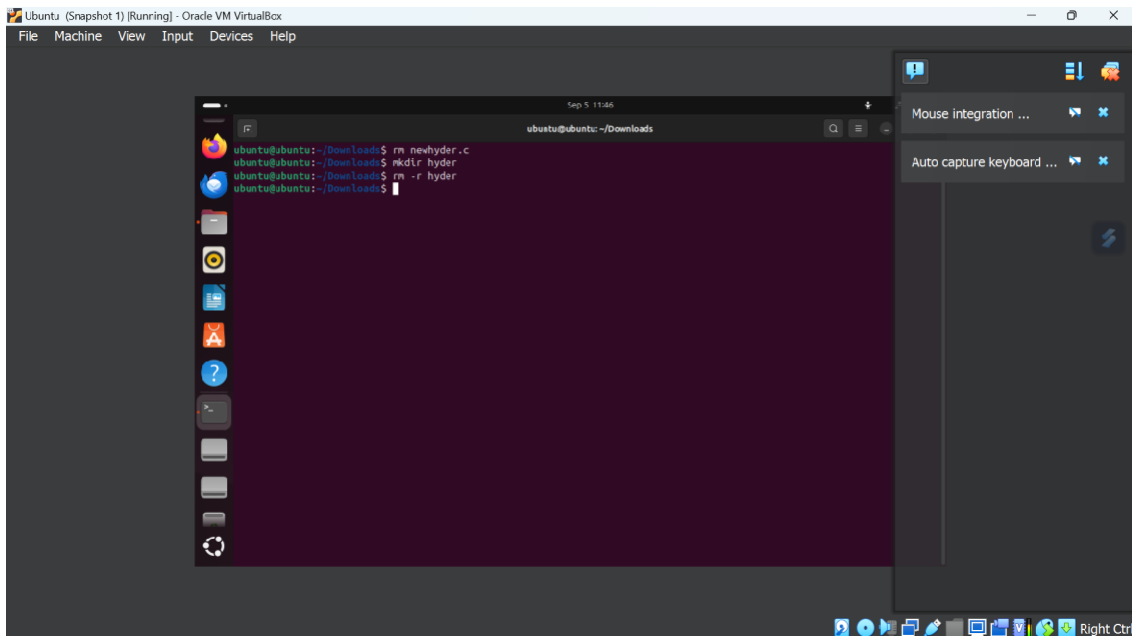
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**rm**

**rm file\_to\_remove**      # Remove a file

**rm -r directory\_to\_remove** # Remove a directory and its contents

**rm -f file\_to\_remove**      # Force remove without prompting



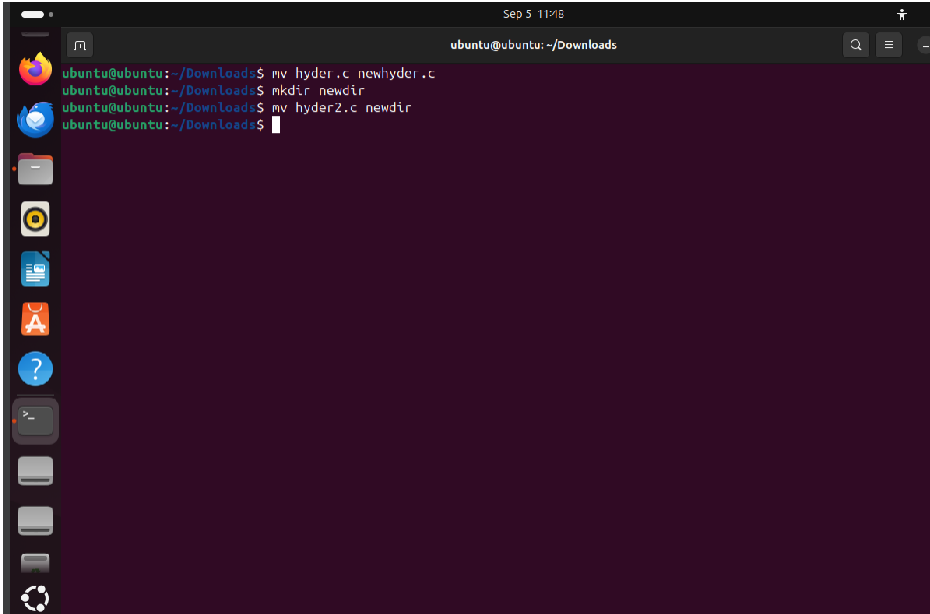
**mv**

**mv old\_name new\_name**      # Rename a file or directory

**mv file\_to\_move destination\_directory/** # Move a file to a directory



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```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ mv hyder.c newhyder.c
ubuntu@ubuntu:~/Downloads$ mkdir newdir
ubuntu@ubuntu:~/Downloads$ mv hyder2.c newdir
ubuntu@ubuntu:~/Downloads$
```

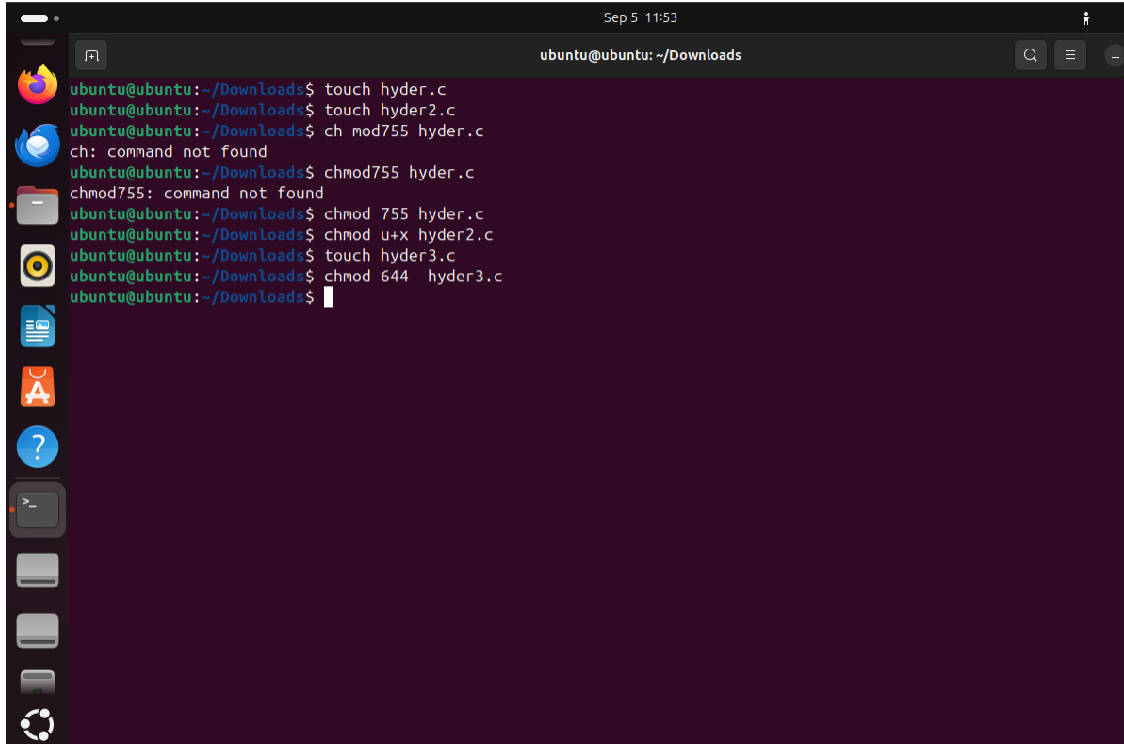
**chmod:** Changes file permissions.

**chmod 755 file**      **# Set permissions to rwxr-xr-x**

**chmod u+x file**      **# Add execute permission for the user**

**chmod 644 file**      **# Set permissions to rw-r--r--**

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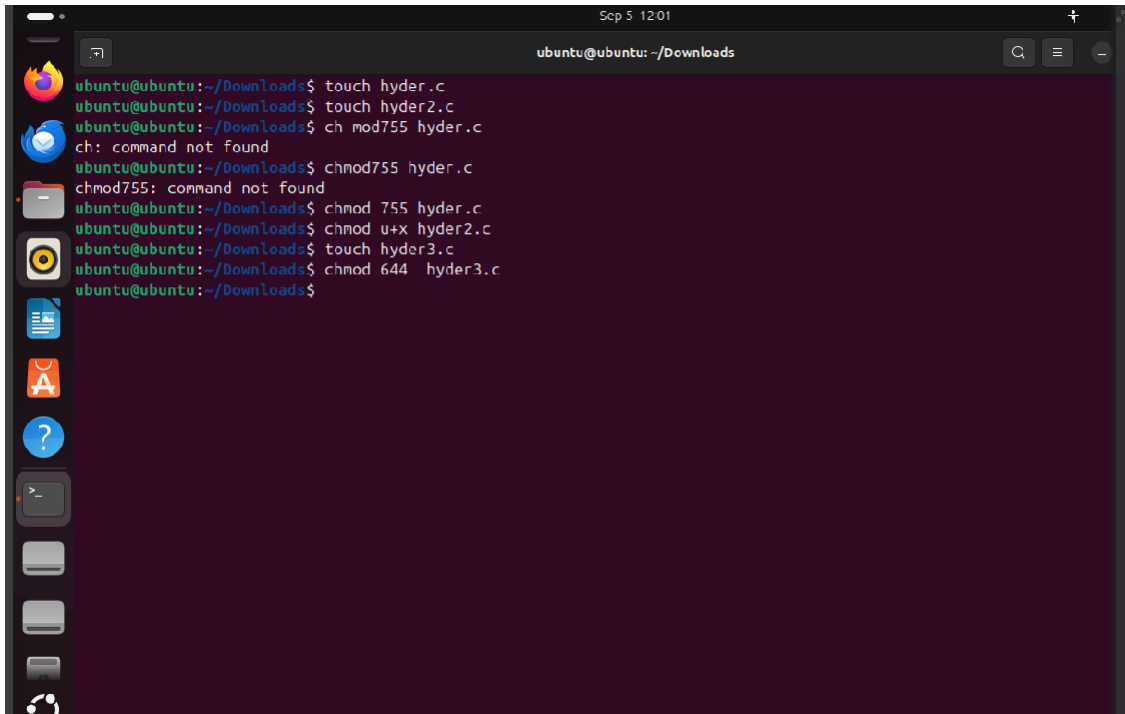
```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ touch hyder.c
ubuntu@ubuntu:~/Downloads$ touch hyder2.c
ubuntu@ubuntu:~/Downloads$ ch mod755 hyder.c
ch: command not found
ubuntu@ubuntu:~/Downloads$ chnod755 hyder.c
chnod755: command not found
ubuntu@ubuntu:~/Downloads$ chnod 755 hyder.c
ubuntu@ubuntu:~/Downloads$ chnod u+x hyder2.c
ubuntu@ubuntu:~/Downloads$ touch hyder3.c
ubuntu@ubuntu:~/Downloads$ chnod 644 hyder3.c
ubuntu@ubuntu:~/Downloads$
```

**chown: Changes file owner and group.**

**chown owner:group file      # Change the owner and group of a file**

**chown user file      # Change the owner of a file (group remains unchanged)**

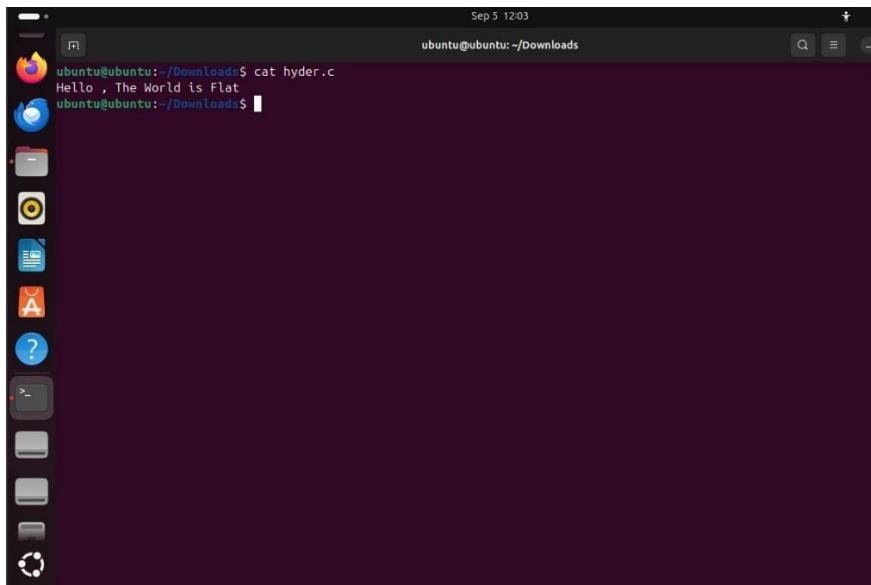
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```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ touch hyder.c
ubuntu@ubuntu:~/Downloads$ touch hyder2.c
ubuntu@ubuntu:~/Downloads$ ch mod755 hyder.c
ch: command not found
ubuntu@ubuntu:~/Downloads$ chmod755 hyder.c
chmod755: command not found
ubuntu@ubuntu:~/Downloads$ chmod 755 hyder.c
ubuntu@ubuntu:~/Downloads$ chmod u+x hyder2.c
ubuntu@ubuntu:~/Downloads$ touch hyder3.c
ubuntu@ubuntu:~/Downloads$ chmod 644 hyder3.c
ubuntu@ubuntu:~/Downloads$
```

## 2. Text File Operations

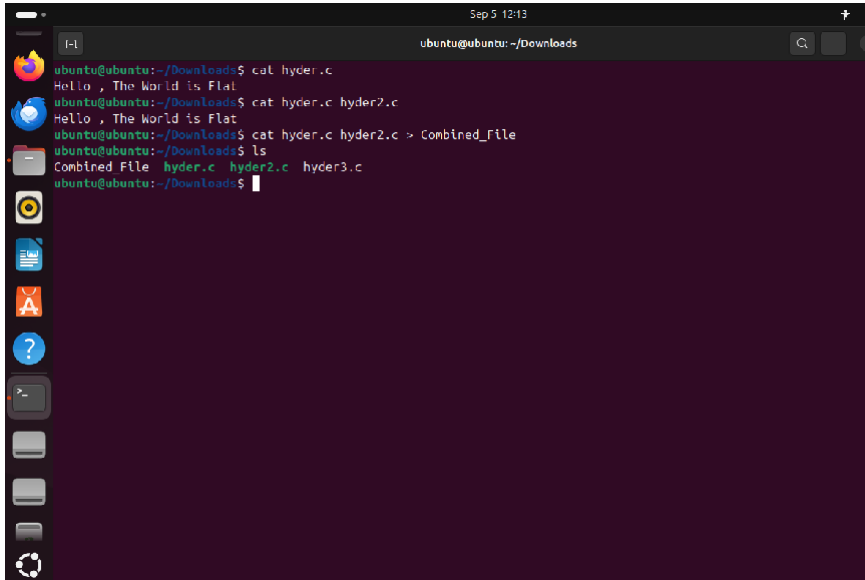
**cat:** Concatenates and displays file content.



```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ cat hyder.c
Hello , The World is Flat
ubuntu@ubuntu:~/Downloads$
```

Contents of hyder.c are displayed

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```
ubuntu@ubuntu:~/Downloads$ cat hyder.c
Hello , The World is Flat
ubuntu@ubuntu:~/Downloads$ cat hyder.c hyder2.c
Hello , The World is Flat
ubuntu@ubuntu:~/Downloads$ cat hyder.c hyder2.c > Combined_file
ubuntu@ubuntu:~/Downloads$ ls
Combined File  hyder.c  hyder2.c  hyder3.c
ubuntu@ubuntu:~/Downloads$
```

**more:** Views file content one screen at a time.

**\_more file**

**less:** Views file content with backward and forward navigation.

**less file**

**tail:** Displays the last part of a file.

**tail file** # Default shows the last 10 lines

**tail -n 20 file** # Show the last 20 lines

**grep:** Searches for patterns in files.

**grep pattern file** # Search for 'pattern' in 'file'

**grep -r pattern directory/** # Search recursively in a directory

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### **3. Unix Directory Management Commands**

**cd:** Changes the current directory.

`cd /path/to/directory` # Change to the specified directory

`cd ..` # Go up one level

`cd ~` # Go to the home directory

**pwd:** Prints the current working directory.

`Pwd`

**ln:** Creates links between files.

`ln source_file link_name` # Create a hard link

`ln -s source_file symlink_name` # Create a symbolic link

**mkdir:** Creates a new directory.

`mkdir new_directory`

`mkdir -p parent_directory/child_directory` # Create parent and child directories

**rmdir:** Removes empty directories.

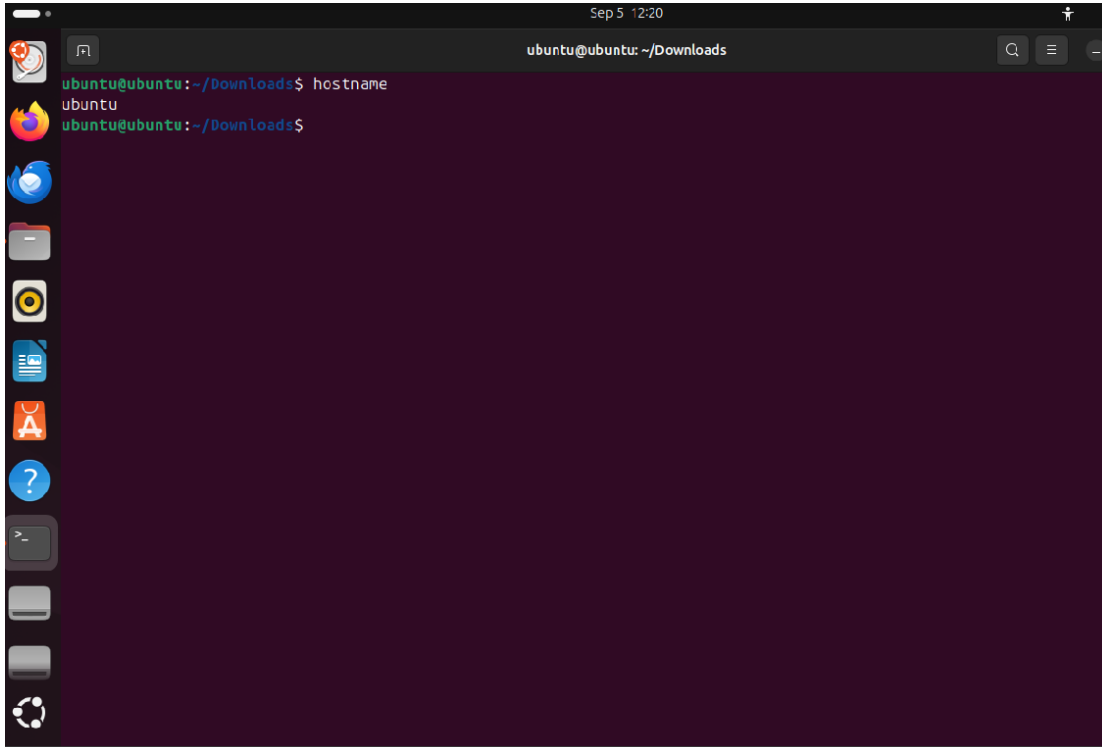
`rmdir empty_directory`

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**4) Unix System Status Commands**

**hostname:** Shows or sets the system's hostname.

hostname



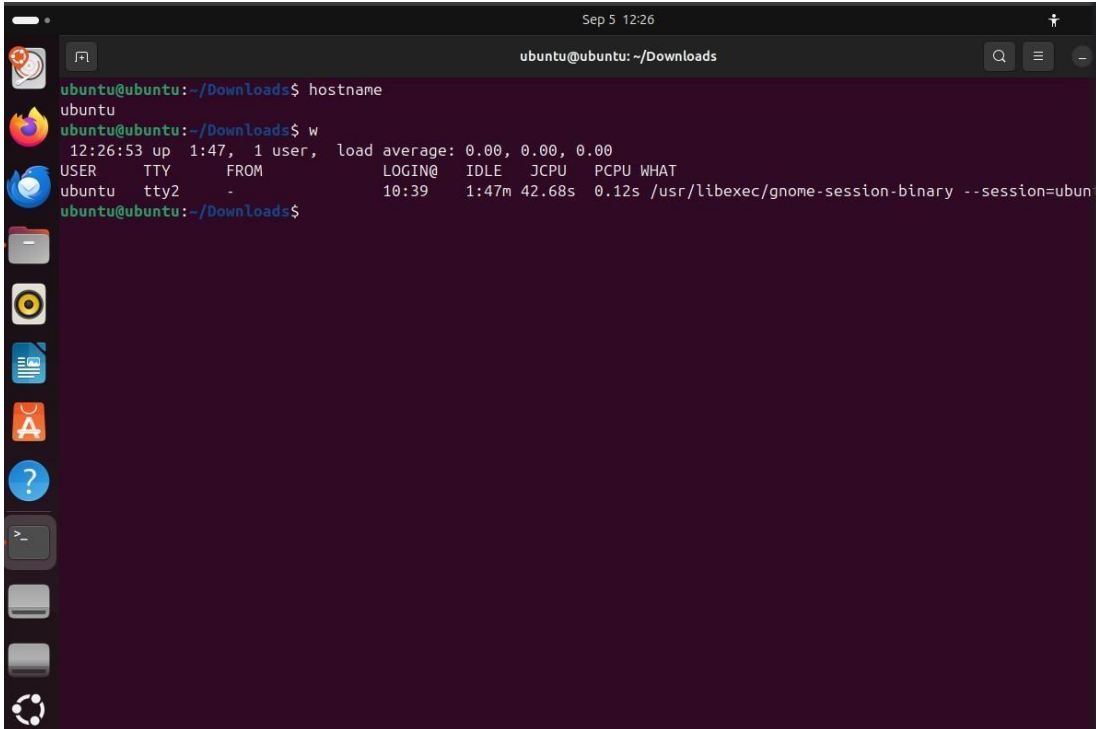
The screenshot shows a terminal window titled 'ubuntu@ubuntu: ~/Downloads' with a dark background. The command 'hostname' has been entered and executed, resulting in the output 'ubuntu'. The terminal window is part of a desktop environment with a sidebar on the left containing various application icons.

```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ hostname
ubuntu
ubuntu@ubuntu:~/Downloads$
```

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w: Displays information about users currently logged in.

w



```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ hostname
ubuntu
ubuntu@ubuntu:~/Downloads$ w
12:26:53 up 1:47, 1 user, load average: 0.00, 0.00, 0.00
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
ubuntu    tty2     -                10:39    1:47m 42.68s  0.12s /usr/libexec/gnome-session-binary --session=ubun
ubuntu@ubuntu:~/Downloads$
```

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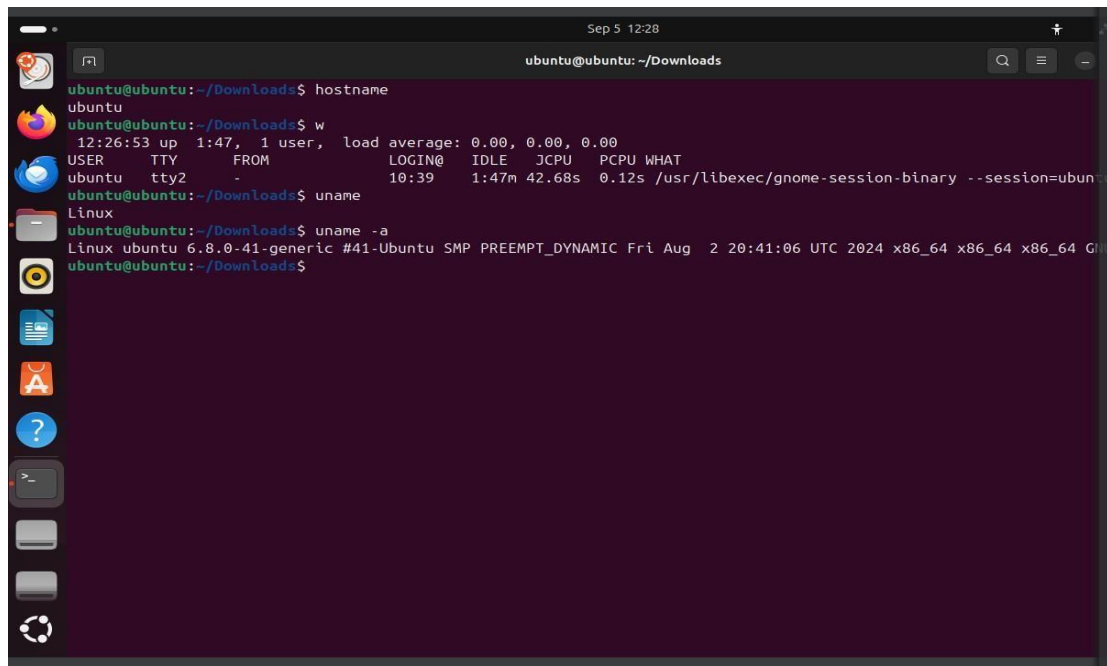
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**uname:** Shows system information.

**uname** # Show kernel name

**uname -a** # Show all available system information



```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ hostname
ubuntu
ubuntu@ubuntu:~/Downloads$ w
12:26:53 up 1:47, 1 user, load average: 0.00, 0.00, 0.00
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
ubuntu    tty2     -               10:39    1:47m  42.68s  0.12s /usr/libexec/gnome-session-binary --session=ubuntu
ubuntu@ubuntu:~/Downloads$ uname
Linux
ubuntu@ubuntu:~/Downloads$ uname -a
Linux ubuntu 6.8.0-41-generic #41-Ubuntu SMP PREEMPT_DYNAMIC Fri Aug 2 20:41:06 UTC 2024 x86_64 x86_64 x86_64 GNU/Linux
ubuntu@ubuntu:~/Downloads$
```



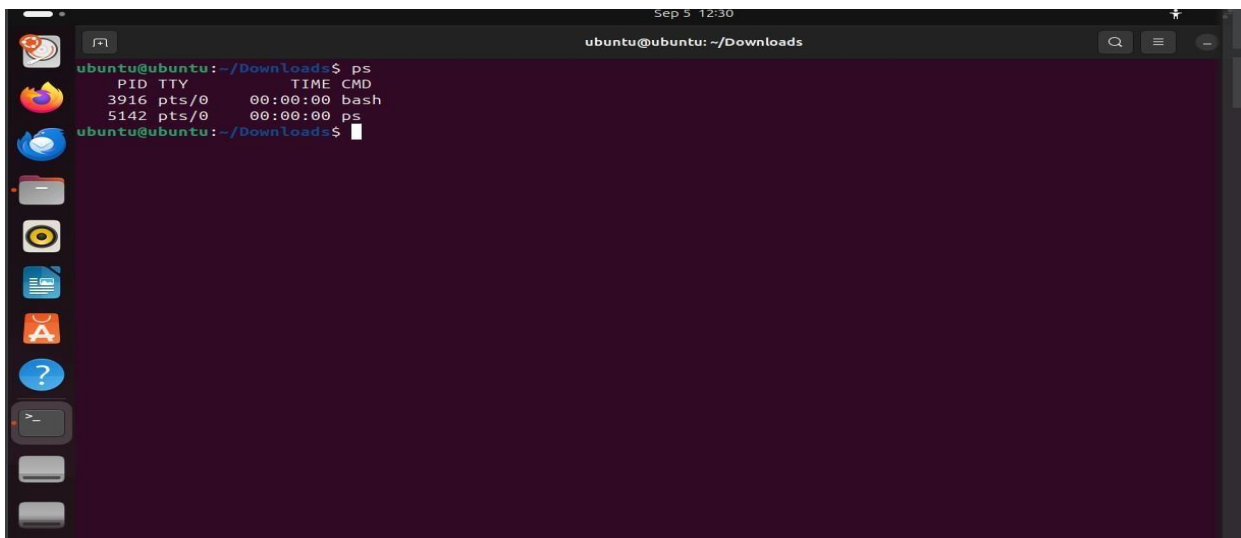
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**5. Process Management**

**ps:** Shows current processes.

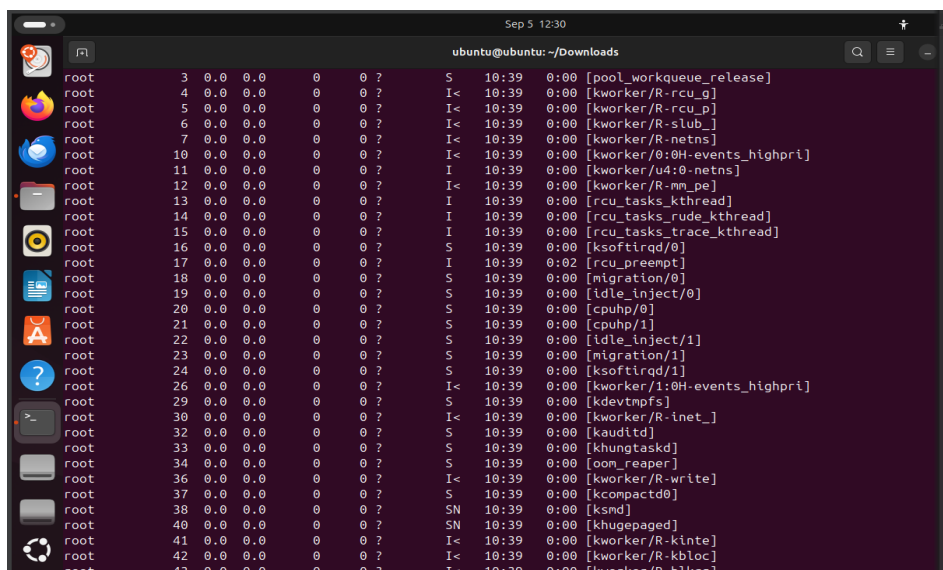
**ps** # Show processes for the current shell

**ps aux** # Show all processes with detailed information



```

ubuntu@ubuntu: ~/Downloads$ ps
  PID TTY          TIME CMD
 3916 pts/0    00:00:00 bash
 5142 pts/0    00:00:00 ps
ubuntu@ubuntu: ~/Downloads$
  
```



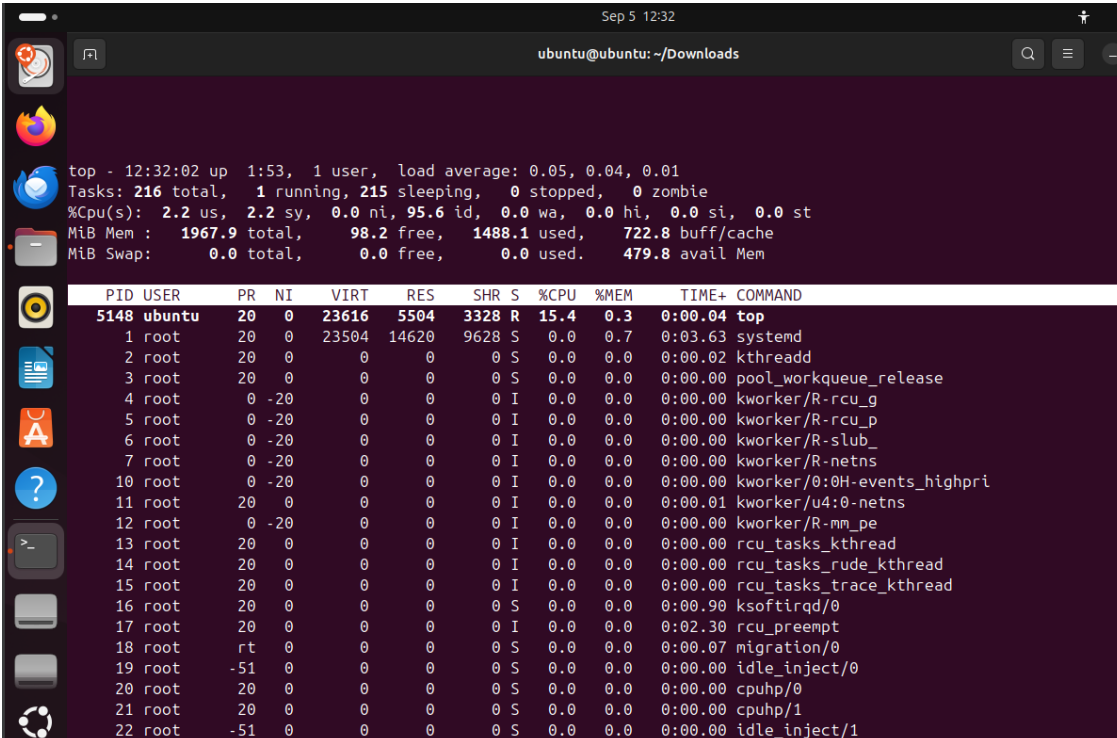
```

root      3  0.0  0.0  0 0 ?    S   10:39   0:00 [pool_workqueue_release]
root      4  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-rcu_g]
root      5  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-rcu_p]
root      6  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-slub_]
root      7  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-netns]
root     10  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/0:0H-events_highpri]
root     11  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/u4:0-netns]
root     12  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-mm_pe]
root     13  0.0  0.0  0 0 ?    I<  10:39   0:00 [rcu_tasks_kthread]
root     14  0.0  0.0  0 0 ?    I<  10:39   0:00 [rcu_tasks_rude_kthread]
root     15  0.0  0.0  0 0 ?    I<  10:39   0:00 [rcu_tasks_trace_kthread]
root     16  0.0  0.0  0 0 ?    S   10:39   0:00 [ksoftirqd/0]
root     17  0.0  0.0  0 0 ?    I<  10:39   0:02 [rcu_preempt]
root     18  0.0  0.0  0 0 ?    S   10:39   0:00 [migration/0]
root     19  0.0  0.0  0 0 ?    S   10:39   0:00 [idle_inject/0]
root     20  0.0  0.0  0 0 ?    S   10:39   0:00 [cpuhp/0]
root     21  0.0  0.0  0 0 ?    S   10:39   0:00 [cpuhp/1]
root     22  0.0  0.0  0 0 ?    S   10:39   0:00 [idle_inject/1]
root     23  0.0  0.0  0 0 ?    S   10:39   0:00 [migration/1]
root     24  0.0  0.0  0 0 ?    S   10:39   0:00 [ksoftirqd/1]
root     26  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/1:0H-events_highpri]
root     29  0.0  0.0  0 0 ?    S   10:39   0:00 [kdevtmpfs]
root     30  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-inet_]
root     32  0.0  0.0  0 0 ?    S   10:39   0:00 [kauditd]
root     33  0.0  0.0  0 0 ?    S   10:39   0:00 [khungtaskd]
root     34  0.0  0.0  0 0 ?    S   10:39   0:00 [oom_reaper]
root     36  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-write]
root     37  0.0  0.0  0 0 ?    S   10:39   0:00 [kcompactd0]
root     38  0.0  0.0  0 0 ?    SN  10:39   0:00 [ksmd]
root     40  0.0  0.0  0 0 ?    SN  10:39   0:00 [khugepaged]
root     41  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-kint]
root     42  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-kbloc]
root     43  0.0  0.0  0 0 ?    I<  10:39   0:00 [kworker/R-blkcg]
  
```

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**top:** Provides a real-time view of system processes.

top



```

top - 12:32:02 up 1:53, 1 user, load average: 0.05, 0.04, 0.01
Tasks: 216 total, 1 running, 215 sleeping, 0 stopped, 0 zombie
%Cpu(s): 2.2 us, 2.2 sy, 0.0 ni, 95.6 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 1967.9 total, 98.2 free, 1488.1 used, 722.8 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used, 479.8 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR  S  %CPU  %MEM     TIME+ COMMAND
 5148 ubuntu    20   0  23616  5504  3328  R   15.4   0.3   0:00.04 top
     1 root      20   0   23504  14620 9628  S   0.0   0.7   0:03.63 systemd
     2 root      20   0         0      0      0  S   0.0   0.0   0:00.02 kthreadd
     3 root      20   0         0      0      0  S   0.0   0.0   0:00.00 pool_workqueue_release
     4 root      0 -20         0      0      0  I   0.0   0.0   0:00.00 kworker/R-rcu_g
     5 root      0 -20         0      0      0  I   0.0   0.0   0:00.00 kworker/R-rcu_p
     6 root      0 -20         0      0      0  I   0.0   0.0   0:00.00 kworker/R-slub_
     7 root      0 -20         0      0      0  I   0.0   0.0   0:00.00 kworker/R-netns
    10 root      0 -20         0      0      0  I   0.0   0.0   0:00.00 kworker/0:0H-events_highpri
    11 root      20   0         0      0      0  I   0.0   0.0   0:00.01 kworker/u4:0-netns
    12 root      0 -20         0      0      0  I   0.0   0.0   0:00.00 kworker/R-mm_pe
    13 root      20   0         0      0      0  I   0.0   0.0   0:00.00 rcu_tasks_kthread
    14 root      20   0         0      0      0  I   0.0   0.0   0:00.00 rcu_tasks_rude_kthread
    15 root      20   0         0      0      0  I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
    16 root      20   0         0      0      0  S   0.0   0.0   0:00.90 ksoftirqd/0
    17 root      20   0         0      0      0  I   0.0   0.0   0:02.30 rcu_preempt
    18 root      rt   0         0      0      0  S   0.0   0.0   0:00.07 migration/0
    19 root     -51   0         0      0      0  S   0.0   0.0   0:00.00 idle_inject/0
    20 root      20   0         0      0      0  S   0.0   0.0   0:00.00 cpuhp/0
    21 root      20   0         0      0      0  S   0.0   0.0   0:00.00 cpuhp/1
    22 root     -51   0         0      0      0  S   0.0   0.0   0:00.00 idle_inject/1
  
```

**kill:** Sends a signal to a process (usually to terminate it).

**kill PID** # Terminate the process with the specified PID

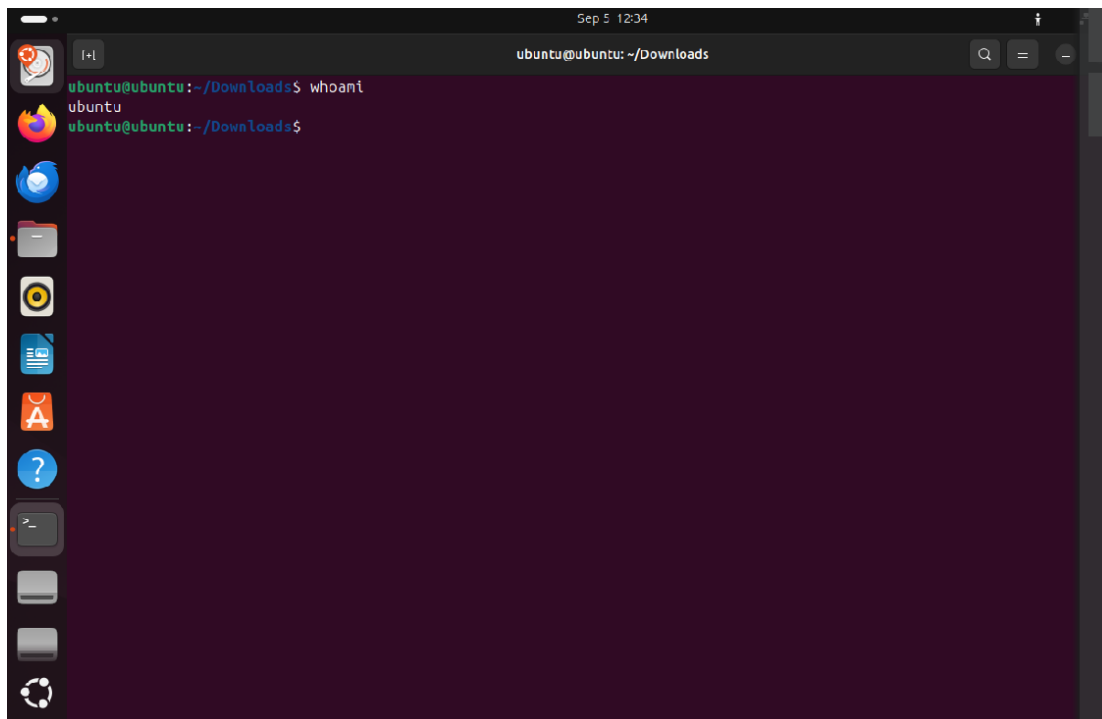
**kill -9 PID** # Force terminate the process (more aggressive)

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**6. Unix User Commands**

**whoami:** Shows the current user

whoami

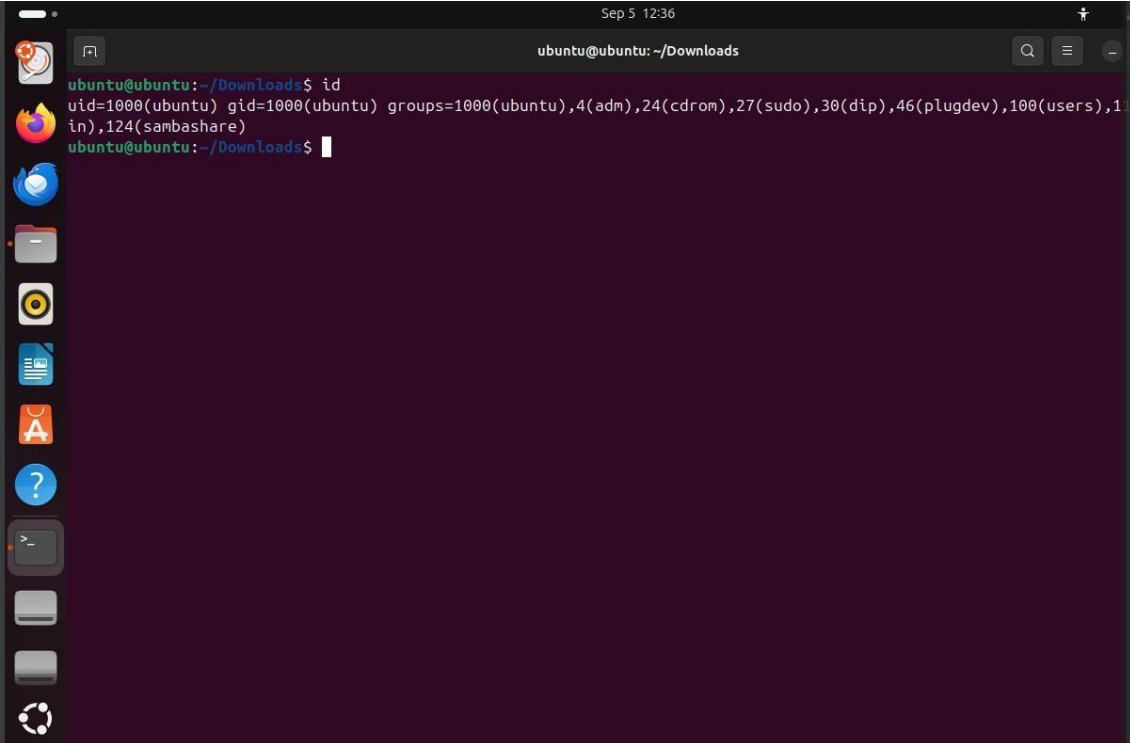


The screenshot shows a terminal window titled 'Sep 5 12:34' and 'ubuntu@ubuntu: ~/Downloads'. The prompt is 'ubuntu@ubuntu:~/Downloads\$'. The command 'whoami' has been entered, and the output 'ubuntu' is displayed on the next line. The terminal has a dark purple background and a light blue prompt. The window's title bar includes standard Ubuntu window controls (minimize, maximize, close) and a search icon.

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**id:** Displays user and group information.

id

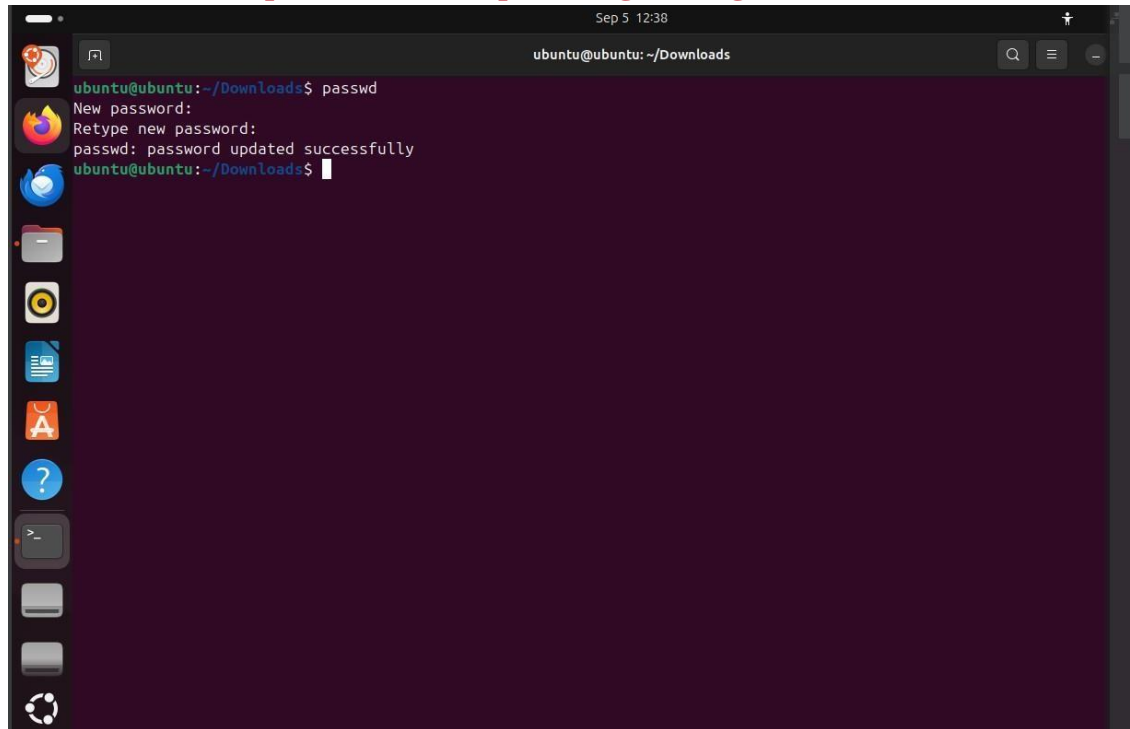


```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ id
uid=1000(ubuntu) gid=1000(ubuntu) groups=1000(ubuntu),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),100(users),101(lp),124(sambashare)
ubuntu@ubuntu:~/Downloads$
```

**passwd:** Changes the user's password.

**passwd** # Prompt to enter a new password

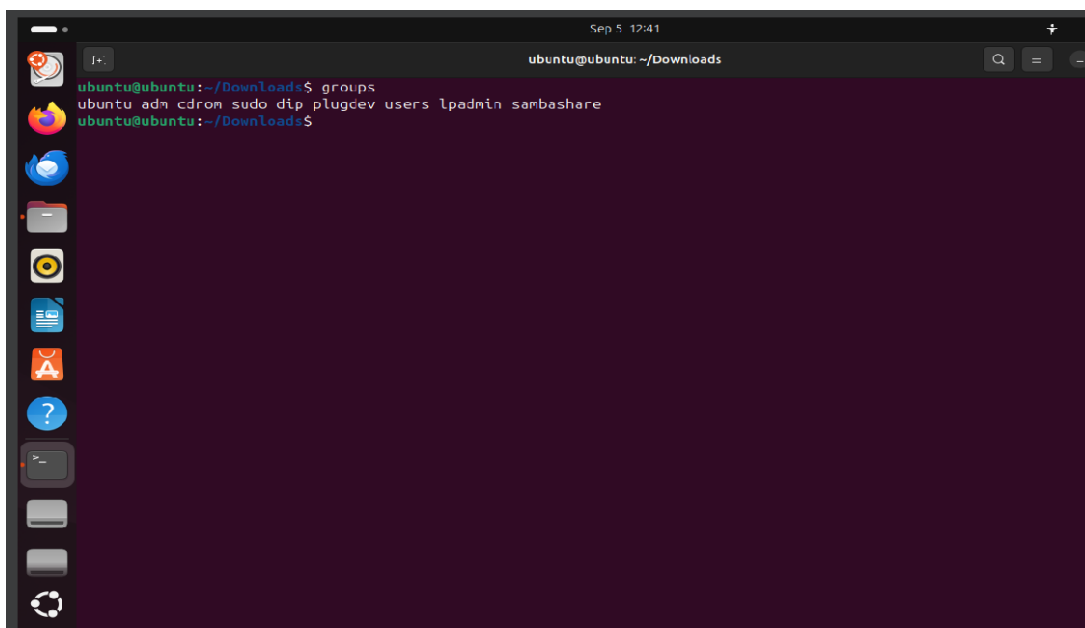
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```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ passwd
New password:
Retype new password:
passwd: password updated successfully
ubuntu@ubuntu:~/Downloads$
```

**groups:** Lists the groups a user belongs to.

groups

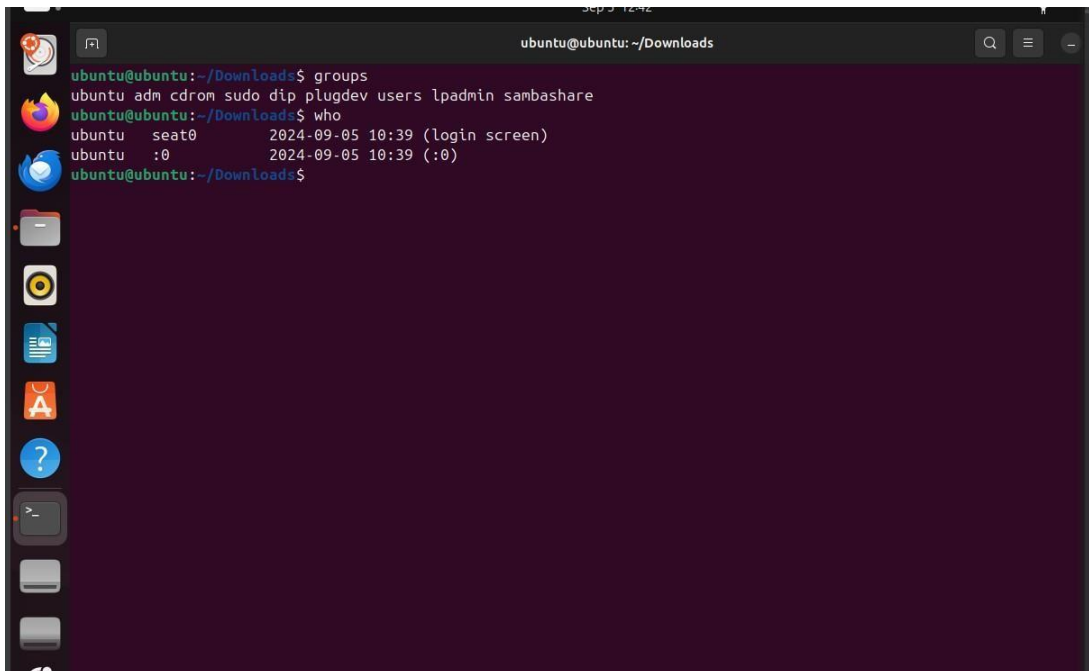


```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ groups
ubuntu adm cdrom sudo dip plugdev users lpadmin sambashare
ubuntu@ubuntu:~/Downloads$
```

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**who:** Shows who is currently logged in.

who

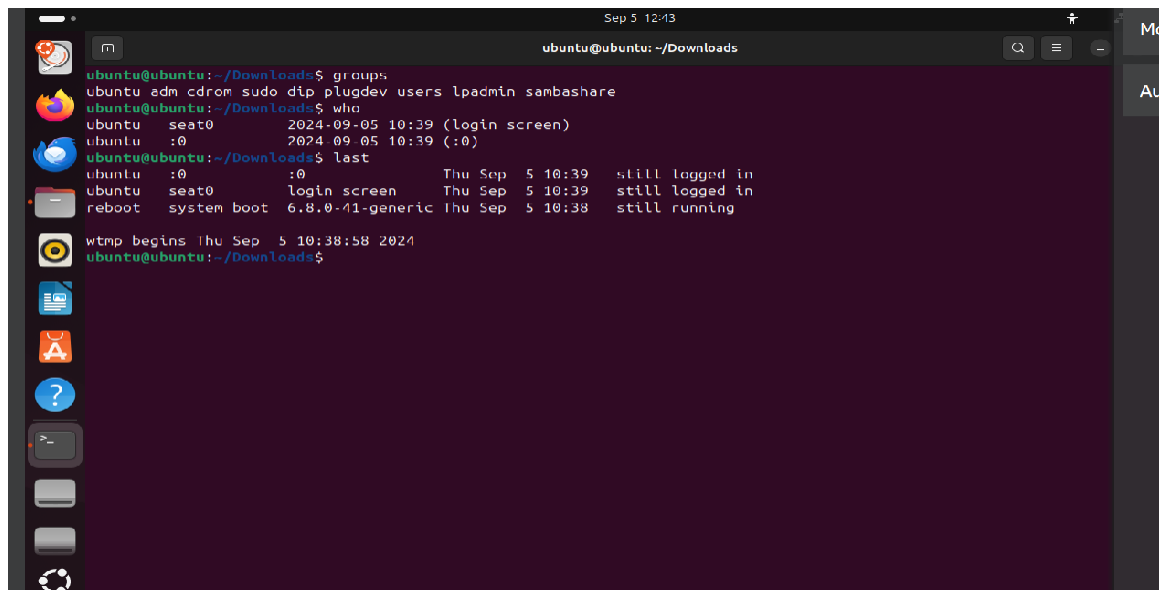


```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ groups
ubuntu adm cdrom sudo dip plugdev users lpadmin sambashare
ubuntu@ubuntu:~/Downloads$ who
ubuntu  seat0      2024-09-05 10:39 (login screen)
ubuntu  :0         2024-09-05 10:39 (:0)
ubuntu@ubuntu:~/Downloads$
```

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**last:** Shows a list of recent logins.

last



```
ubuntu@ubuntu: ~/Downloads
ubuntu@ubuntu:~/Downloads$ groups
ubuntu adm cdrom sudo dip plugdev users lpadmin sambashare
ubuntu@ubuntu:~/Downloads$ who
ubuntu  seat0      2024-09-05 10:39 (login screen)
ubuntu  :0         2024-09-05 10:39 (:0)
ubuntu@ubuntu:~/Downloads$ last
ubuntu  :0         :0                Thu Sep  5 10:39   still logged in
ubuntu  seat0      login screen      Thu Sep  5 10:39   still logged in
reboot  system boot   6.8.0-41-generic  Thu Sep  5 10:38   still running

wtmp begins Thu Sep  5 10:38:58 2024
ubuntu@ubuntu:~/Downloads$
```

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**Disk Operating System (DOS) commands**

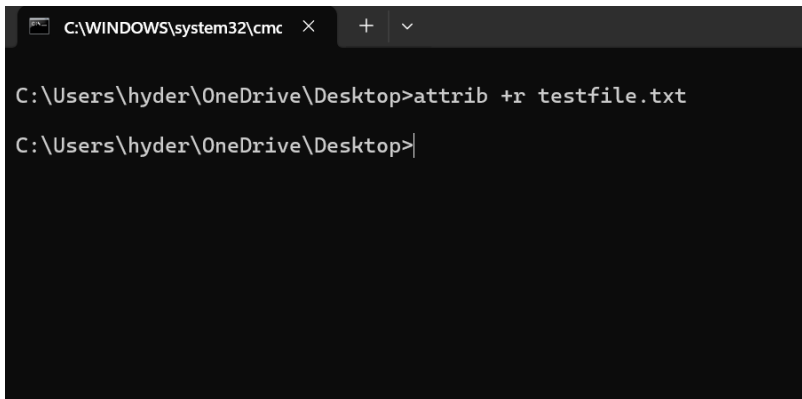
**1. Attrib**

**Purpose:** Change file attributes.

**Example:** To make a file read-only.

I have created a text file in desktop

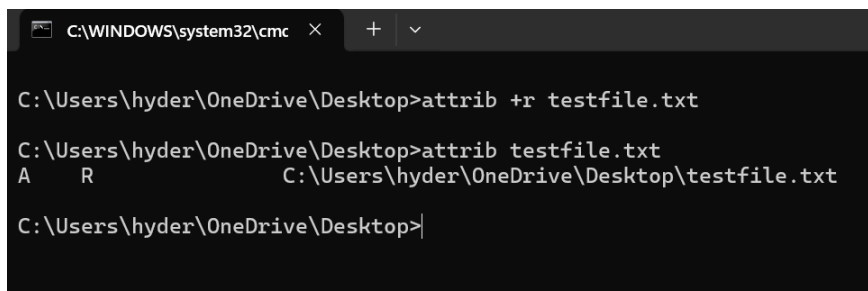
Now we will make the file read only file by changing the attribute



```
C:\WINDOWS\system32\cmd  x  +  v

C:\Users\hyder\OneDrive\Desktop>attrib +r testfile.txt

C:\Users\hyder\OneDrive\Desktop>
```



```
C:\WINDOWS\system32\cmd  x  +  v

C:\Users\hyder\OneDrive\Desktop>attrib +r testfile.txt

C:\Users\hyder\OneDrive\Desktop>attrib testfile.txt
A      R               C:\Users\hyder\OneDrive\Desktop\testfile.txt

C:\Users\hyder\OneDrive\Desktop>
```

Here A means Archive and r means read-only file



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2) dir

Purpose: List the contents of a directory.

```
Command Prompt
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hyder>dir
Volume in drive C is OS
Volume Serial Number is 1EB5-00CC

Directory of C:\Users\hyder

24-10-2024  08:44    <DIR>          .
23-10-2024  13:35    <DIR>          ..
30-10-2022  15:33             6,895  -1.14-windows.xml
04-04-2024  15:52    <DIR>          .cache
05-07-2023  18:26    <DIR>          .conda
04-07-2023  22:21             25  .condarc
04-07-2023  22:19    <DIR>          .continuum
11-01-2024  15:30    <DIR>          .dia
29-06-2024  13:25             212  .gitconfig
05-07-2023  06:40    <DIR>          .ipynb_checkpoints
05-07-2023  06:40    <DIR>          .ipython
05-07-2023  06:39    <DIR>          .jupyter
09-08-2024  22:42    <DIR>          .matplotlib
05-08-2024  16:31             176  .packetracer
26-07-2024  14:13    <DIR>          .thumbnails
10-09-2024  20:14    <DIR>          .VirtualBox
15-01-2024  13:26    <DIR>          .vscode
04-07-2023  22:14    <DIR>          anaconda3
05-08-2024  16:32    <DIR>          Cisco Packet Tracer 8.2.2
07-03-2023  17:11    <DIR>          Contacts
24-10-2024  08:44    <DIR>          CrossDevice
09-08-2024  13:43    <DIR>          C_Prog
04-10-2022  22:12    <DIR>          Documents
03-11-2024  20:24    <DIR>          Downloads
07-03-2023  17:11    <DIR>          Favorites
09-08-2024  13:42    <DIR>          Hyder
07-03-2023  17:11    <DIR>          Links
12-08-2024  14:55    <DIR>          Music
19-02-2024  12:56    <DIR>          OneDrive
07-03-2023  17:11    <DIR>          Saved Games
07-03-2023  17:11    <DIR>          Searches
05-07-2023  06:46             779  Untitled.ipynb
31-10-2024  23:56    <DIR>          Videos
06-09-2024  18:22    <DIR>          VirtualBox VMs
                    5 File(s)          8,087 bytes
                    29 Dir(s) 108,836,388 bytes free

C:\Users\hyder>
```

3. At

**Purpose:** Schedule commands to run at a specific time

**Example:** To schedule a command

```
C:\WINDOWS\system32\cmd
C:\Users\hyder\OneDrive\Desktop>at 15:00 /every:M,T,W,Th,F notepad.exe
The AT command has been deprecated. Please use schtasks.exe instead.

The request is not supported.

C:\Users\hyder\OneDrive\Desktop>
```

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#### 4. Chkdsk

**Purpose:** Check the disk for errors.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>chkdsk c:
The type of the file system is NTFS.
Volume label is OS.

WARNING! /F parameter not specified.
Running CHKDSK in read-only mode.

Stage 1: Examining basic file system structure ...
1032960 file records processed.
File verification completed.
Phase duration (File record verification): 18.15 seconds.
30104 large file records processed.
Phase duration (Orphan file record recovery): 26.45 milliseconds.
0 bad file records processed.
Phase duration (Bad file record checking): 0.40 milliseconds.

Stage 2: Examining file name linkage ...
Progress: 541203 of 1457518 done; Stage: 37%; Total: 41%; ETA: 0:00:33
C:\Windows\System32>
```

#### 5. Shutdown

**Purpose:** Shut down or restart the computer.

```
Command Prompt
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hyder>shutdown /s /t 0
```

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**6. Tree**

**Purpose:** Display the folder structure in a tree format.

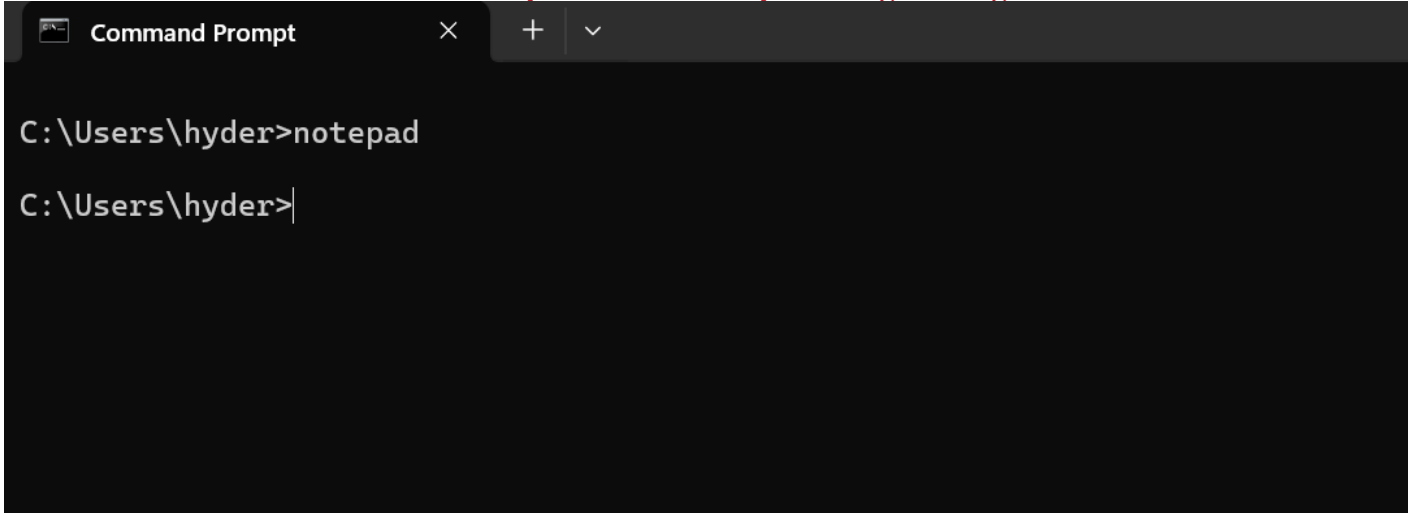
```
Command Prompt
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

C:\Users\hyder>tree
Folder PATH listing for volume OS
Volume serial number is 1EB5-00CC
C:.
├── .cache
│   └── tooling
│       └── gradle
├── .conda
├── .continuum
│   └── anaconda-client
├── .dia
│   ├── objects
│   ├── shapes
│   └── sheets
├── .ipynb_checkpoints
├── .ipython
│   └── profile_default
│       ├── db
│       ├── log
│       ├── pid
│       ├── security
│       └── startup
├── .jupyter
├── .matplotlib
├── .thumbnails
│   ├── fail
│   │   └── blender
│   └── large
├── .VirtualBox
├── .vscode
│   └── cli
└── .
```

**7. Creating a Batch File**

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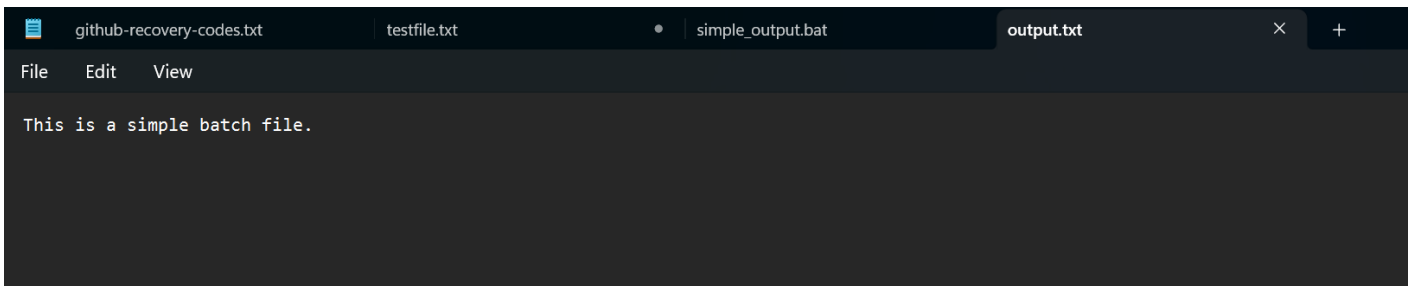


```
C:\Users\hyder>notepad
C:\Users\hyder>|
```



```
@echo off
echo This is a simple batch file. > output.txt
notepad output.txt
|
```

Now when we just double-click on the file the output it give is



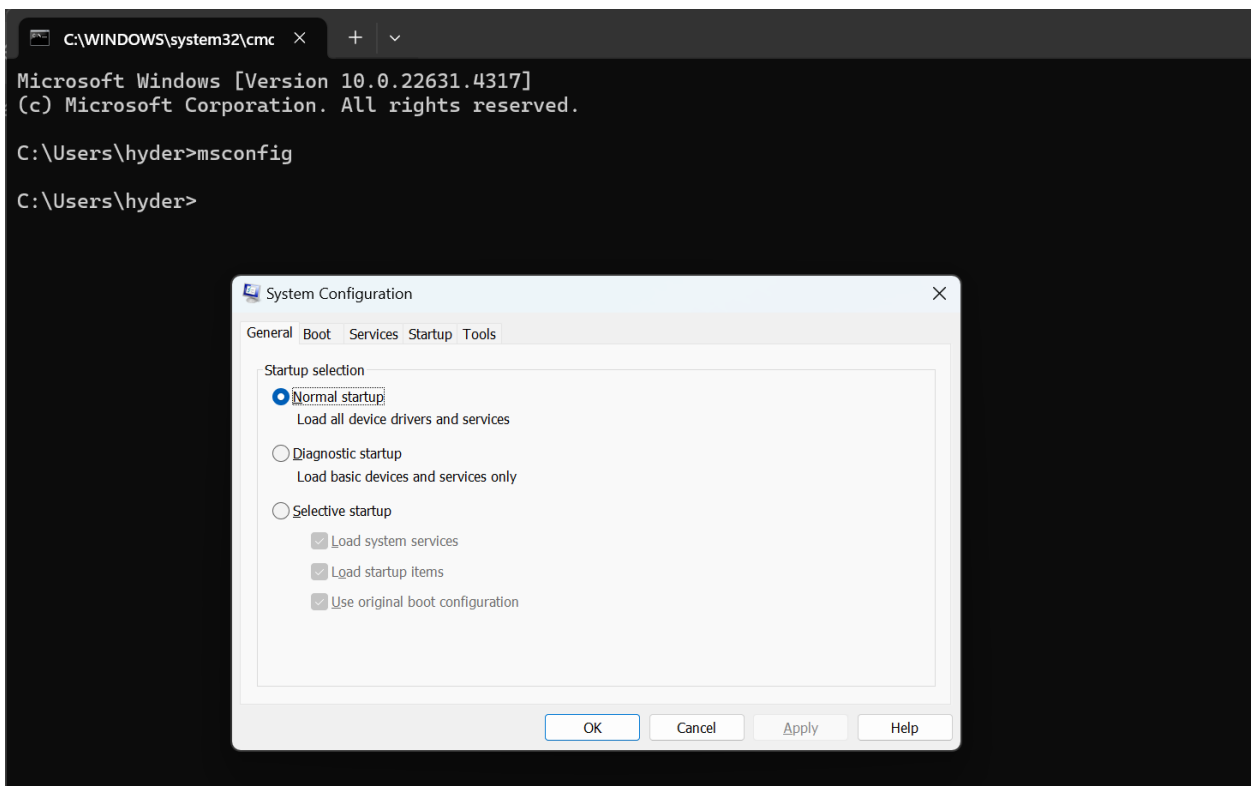
```
This is a simple batch file.
```

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## Windows utilities

### 1. MSConfig

**Purpose:** Used to troubleshoot Windows startup & startup programs & services.



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## 2. Defragmenter

**Purpose:** Helps optimize the performance of your hard drives by defragmenting them.

```
C:\WINDOWS\system32\cmdc  x  +  v

C:\Users\hyder>defrag

Defrag <Volumes> <Operations> [<Options>]

Volumes:
/C | /AllVolumes      On each volume run only the preferred operations from
                        the given list of operations.
/E | /VolumesExcept <volume paths>
                        Perform all the given operations on each volume except.
                        those specified. If the exception list is empty, this
                        behaves as /AllVolumes.
volume paths          Specifies the drive letter followed by a colon, mount point
                        or volume name. More than one volume can be specified. Run
                        all the given operations on each specified volume..

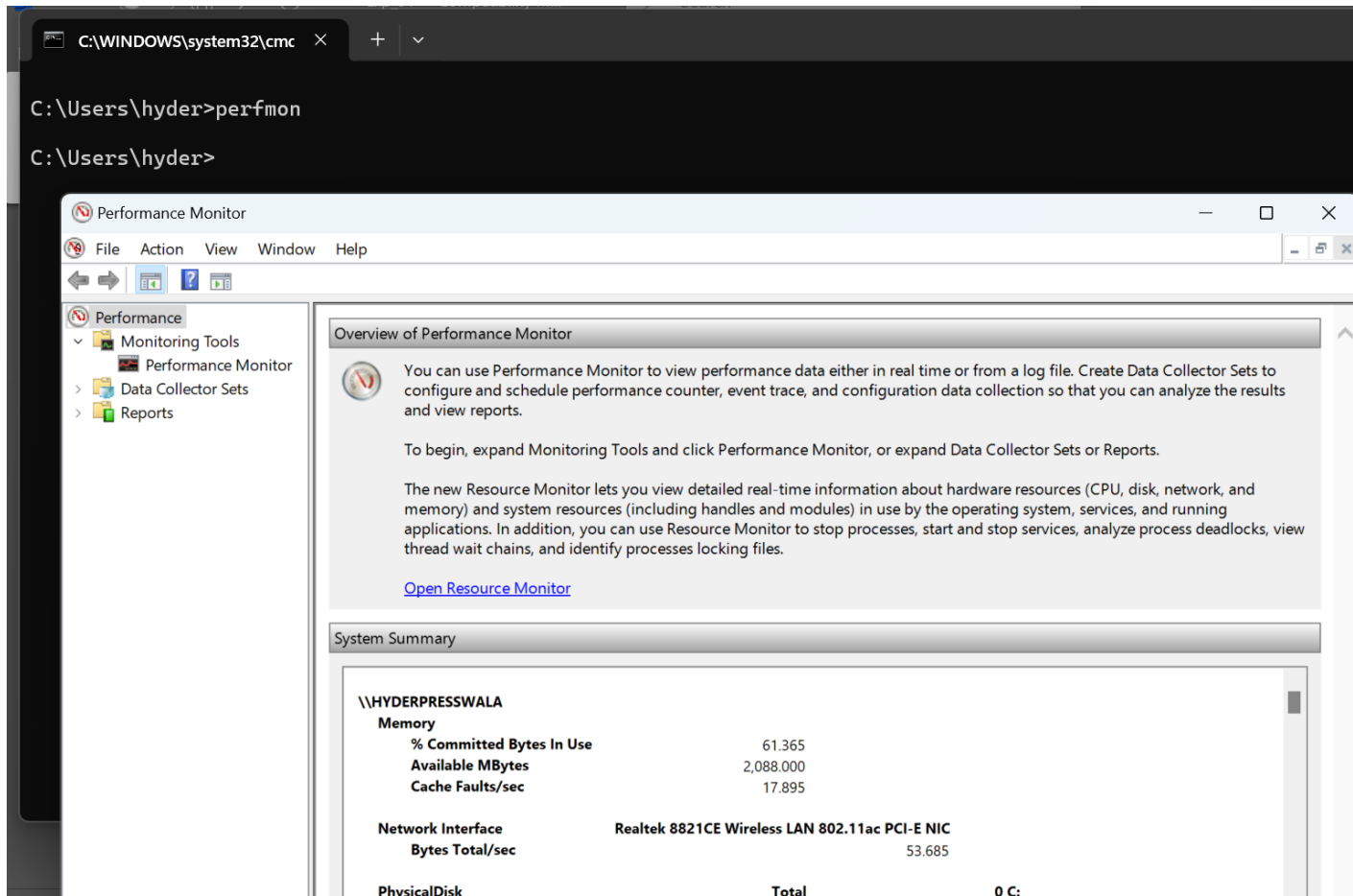
Operations:
/A | /Analyze         Perform analysis.
/B | /BootOptimize    Perform boot optimization to increase boot performance.
/D | /Defrag          Perform traditional defrag (this is the default). On a tiered
                        volume, traditional defrag is performed only on the Capacity
                        tier.
/G | /TierOptimize    On tiered volumes, optimize files to reside on the appropriate
                        storage tier.
/K | /SlabConsolidate On thinly provisioned volumes, perform slab consolidation to
                        increase slab usage efficiency.
/L | /Retrim          On thinly provisioned volumes, perform retrim to release free
                        slabs. On SSDs perform retrim to improve write performance.
/O | /Optimize        Perform the proper optimization for each media type.
/T | /TrackProgress   Track progress of a running operation for a given volume. An
```

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**3. Performance Monitor**

**Purpose:** Provides information about the performance of your computer, including resource usage.

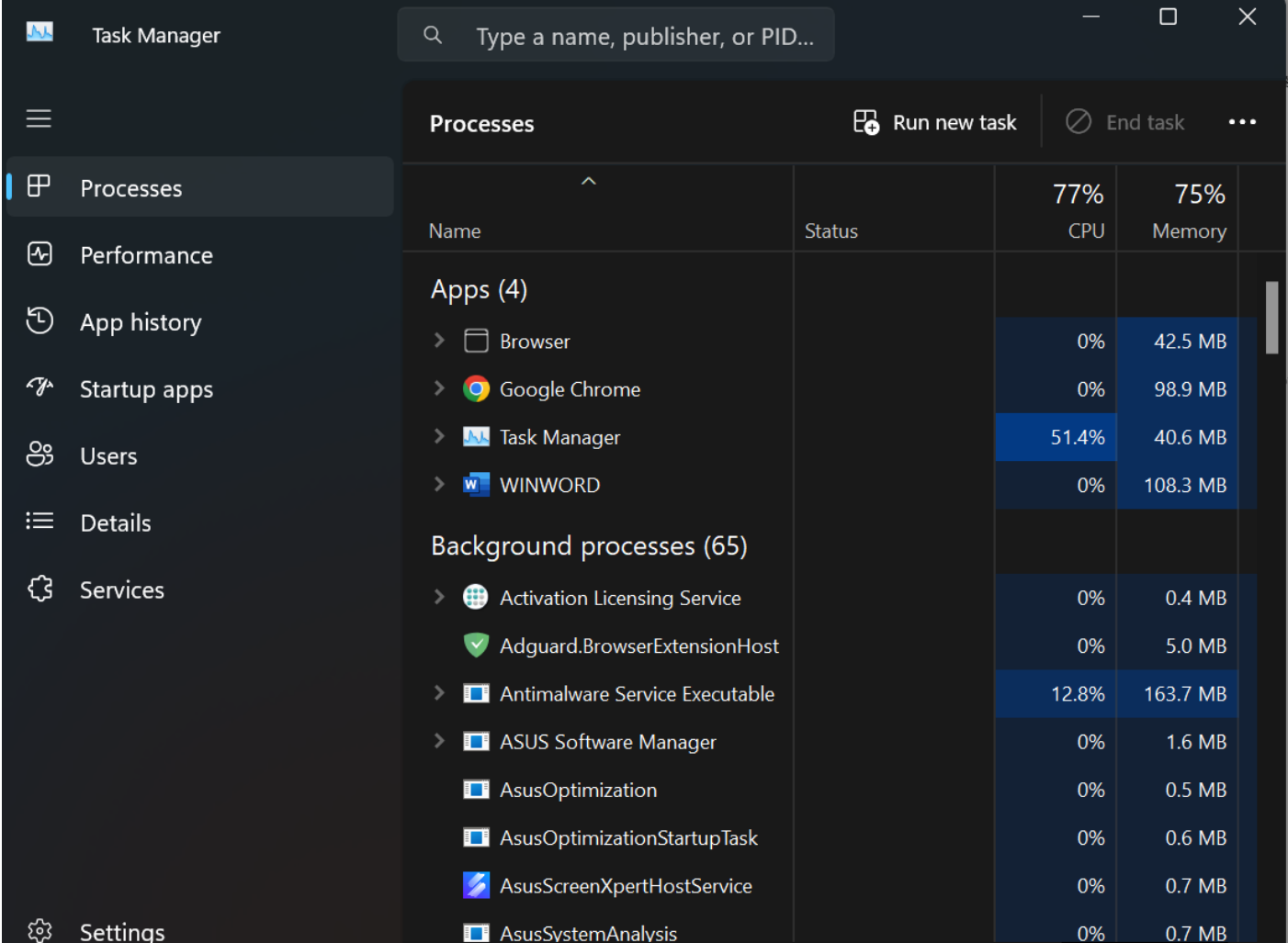


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**4.Task Manager**

**Purpose:** Allows you to view and manage running applications, processes, and system performance.



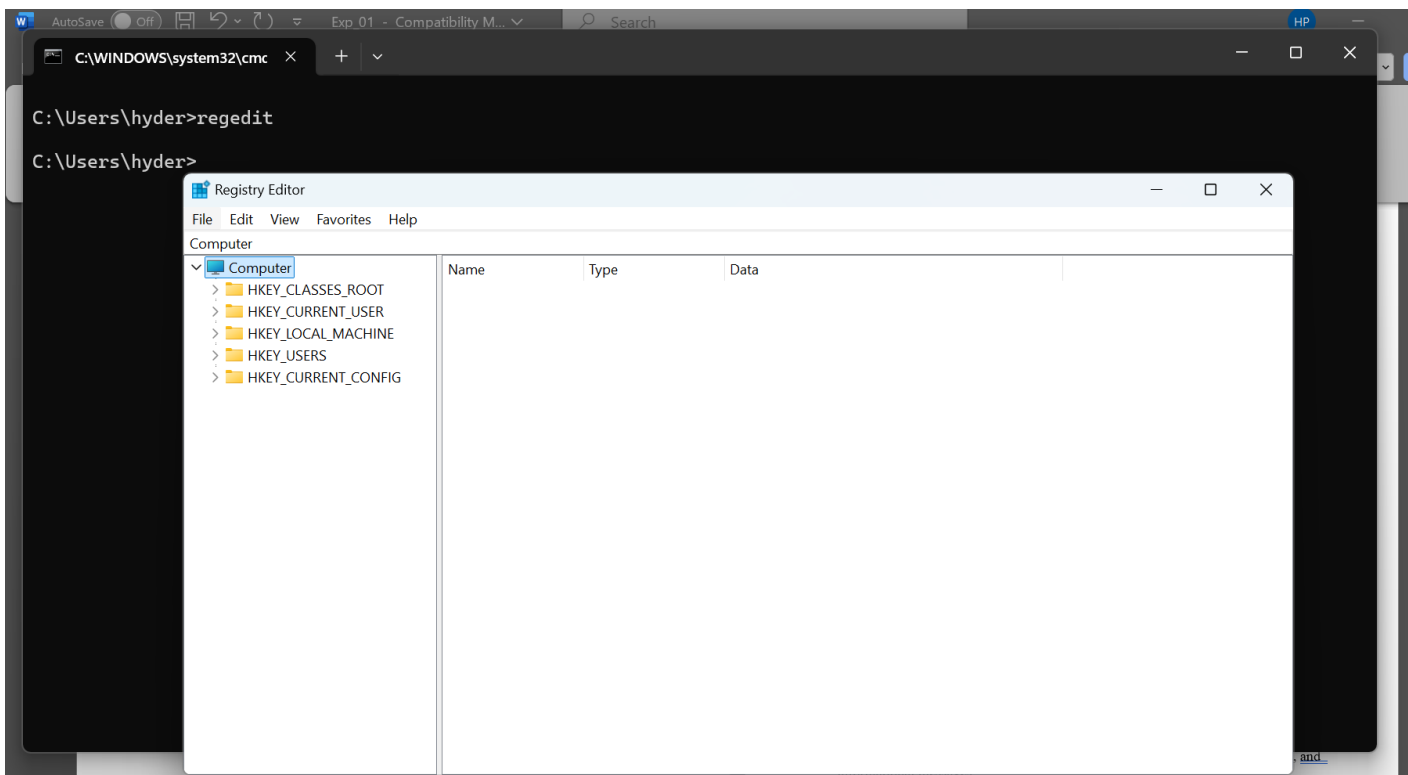
Task Manager				
Type a name, publisher, or PID...				
Processes		Run new task	End task	
Name	Status	77% CPU	75% Memory	
<b>Apps (4)</b>				
> Browser		0%	42.5 MB	
> Google Chrome		0%	98.9 MB	
> Task Manager		51.4%	40.6 MB	
> WINWORD		0%	108.3 MB	
<b>Background processes (65)</b>				
> Activation Licensing Service		0%	0.4 MB	
> Adguard.BrowserExtensionHost		0%	5.0 MB	
> Antimalware Service Executable		12.8%	163.7 MB	
> ASUS Software Manager		0%	1.6 MB	
> AsusOptimization		0%	0.5 MB	
> AsusOptimizationStartupTask		0%	0.6 MB	
> AsusScreenXpertHostService		0%	0.7 MB	
> AsusSystemAnalysis		0%	0.7 MB	



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## 5. Registry Editor

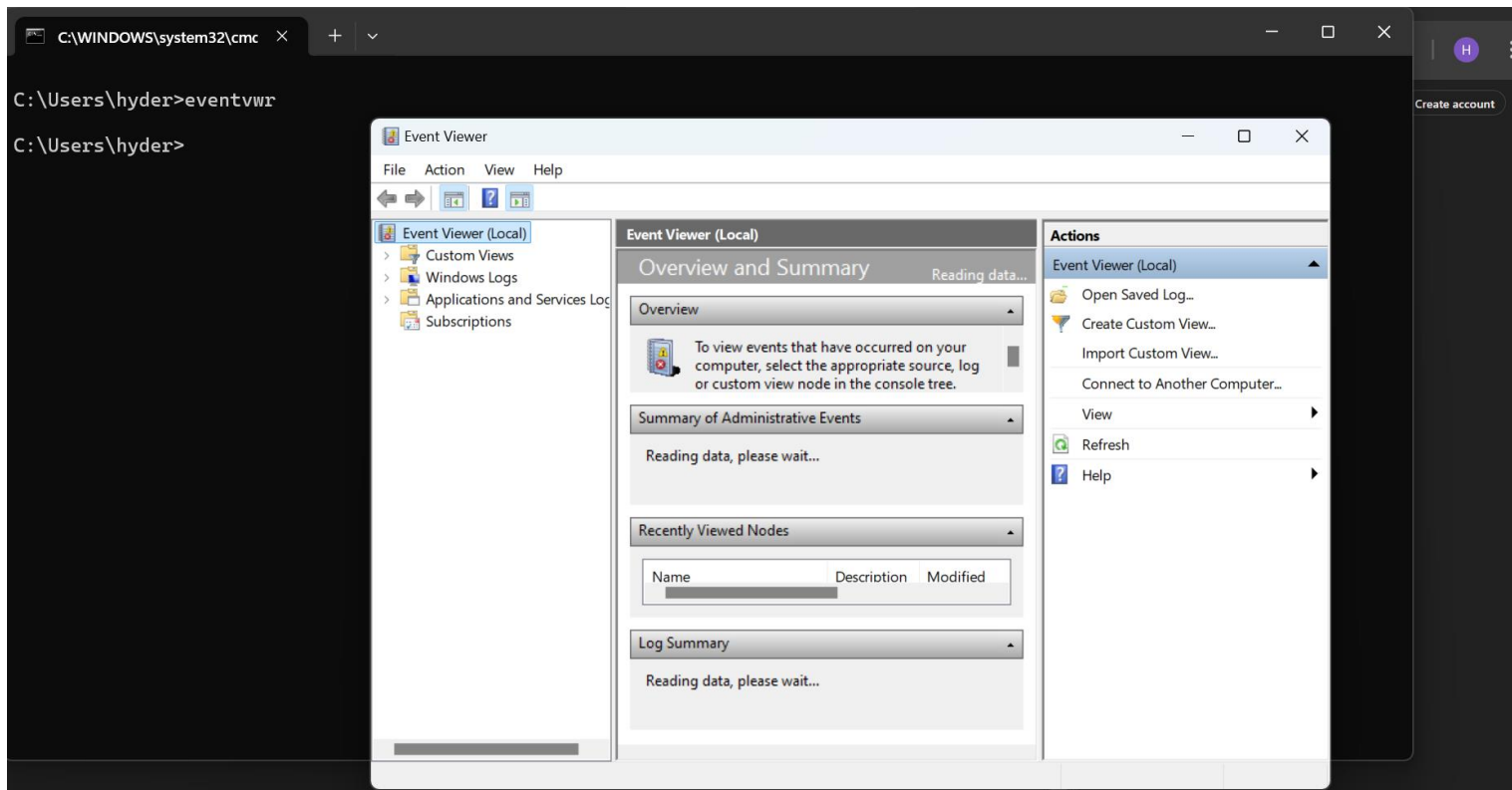
**Purpose:** Allows you to view and edit the Windows registry, which contains settings and options for the operating system and installed applications.



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## 6. Event Viewer

**Purpose:** Displays detailed logs about system events, including errors, warnings, and informational messages.



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**Conclusion:** Explored basic Commands of UNIX: Shell, Processes, Files.

**Post Lab Descriptive Questions**

1. Explain how do you read and interpret syntax of any OS command.

Reading and interpreting the syntax of any OS command involves understanding the structure and format of the command and its parameters. In most operating systems, commands follow a specific pattern: the command itself is typically followed by options or flags that modify its behavior, and these options are often preceded by a hyphen or double hyphen. Additionally, the command may require arguments that provide specific inputs or targets for the operation. To interpret a command, one must refer to the OS documentation or use the built-in help command (e.g., "man" in Unix-like systems or "help" in Windows) to understand the purpose and proper usage of each command, along with its available options and argument syntax

2. Explain different functions of the operating systems.

Operating systems serve various functions to manage computer resources efficiently and provide a user-friendly environment. Some key functions include process management, memory management, file system management, device management, and user interface. Process management involves scheduling and controlling processes to ensure efficient utilization of the CPU. Memory management handles the allocation and deallocation of memory to running processes. File system management handles file organization and storage. Device management ensures proper communication with hardware devices like printers and disk drives. User interface allows users to interact with the system through a graphical or command-line interface, making it easier to access and manage resources.

3. What are the default permissions assigned by Unix for Directory.

In Unix-like systems, the default permissions assigned for directories are usually "rwxr-xr-x" or 755 in octal notation. This means the owner of the directory has read (r), write (w), and execute (x) permissions, while the group and others have only read and execute permissions. The read permission allows viewing the contents of the directory, write permission allows creating or deleting files within the directory, and execute permission enables access to the contents of the directory, such as listing its files.

4. Give the difference between DOS and WINDOWS.

DOS (Disk Operating System) and Windows are both operating systems, but they differ significantly in terms of architecture, features, and capabilities. DOS was a single-tasking, command-line-based operating system developed by Microsoft, primarily used during

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the early days of personal computing. It lacked multitasking support and a graphical user interface (GUI). Windows, on the other hand, is a multitasking, multi-user operating system with a GUI. It provides a more sophisticated and user-friendly environment, allowing users to run multiple programs simultaneously and access various hardware devices more efficiently. Windows also supports networking, making it easier to connect computers and share resources.

5. Explain Booting Process.

The booting process is the sequence of events that occur when a computer is powered on, leading to the loading of the operating system. When the computer is turned on, the Basic Input/Output System (BIOS) or Unified Extensible Firmware Interface (UEFI) performs a Power-On Self-Test (POST) to check the hardware's integrity. Afterward, the BIOS/UEFI searches for the boot loader in the system's boot devices (usually the hard drive). The boot loader (e.g., GRUB for Linux or NTLDR for older versions of Windows) then loads the kernel or core components of the operating system into memory. The kernel takes control and initializes necessary drivers and services. Finally, the user interface or desktop environment is presented, and the computer is ready for user interaction.

**Date:- 05-09-2024**

**Signature of faculty in-charge**

**Department of Computer Engineering**