
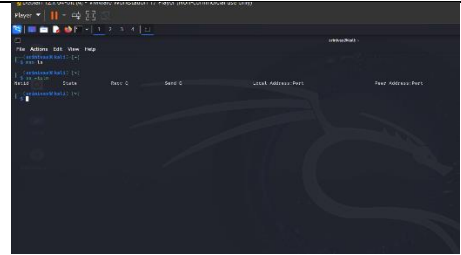


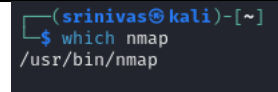
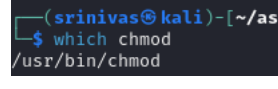
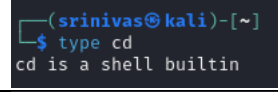
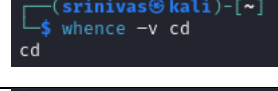
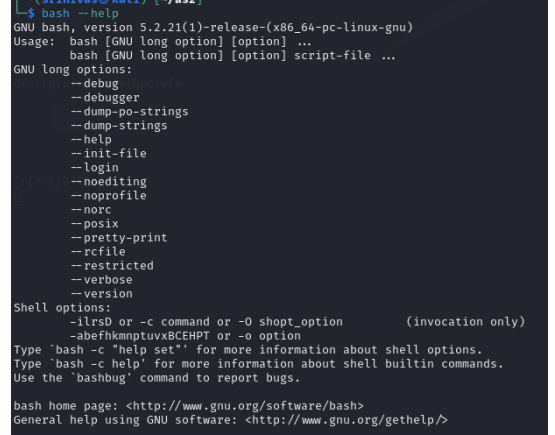

Topic Name:

The main aim of this lab session is to provide hands-on experience on

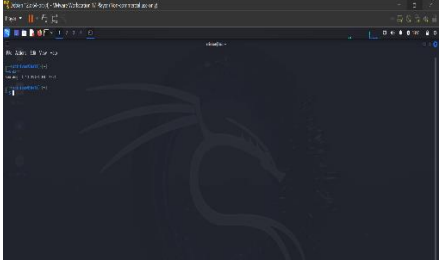
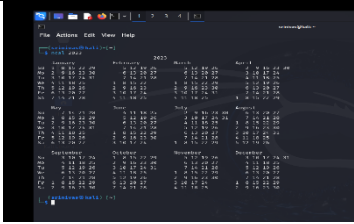
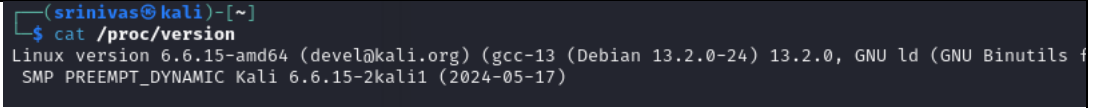
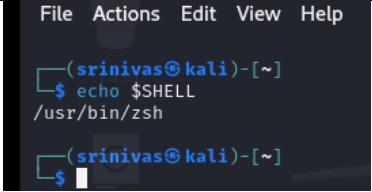
- Getting Help
- Basic Commands
- Navigation
- File System
- simple shell script

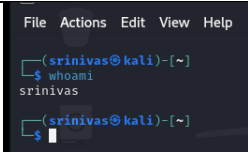

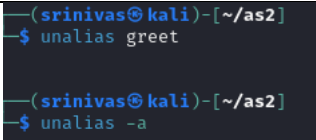
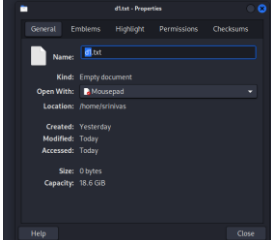
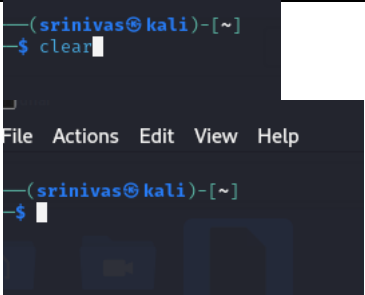
1. Getting Help

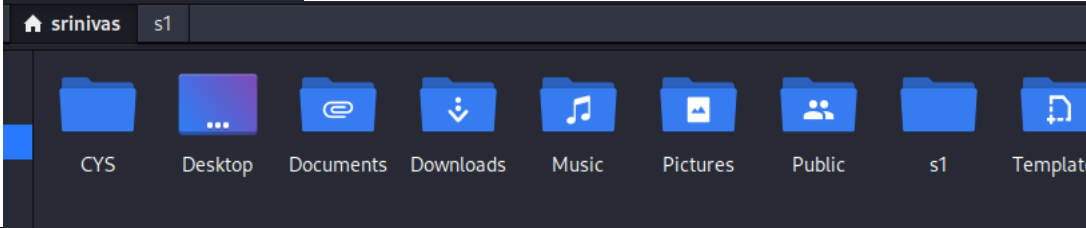
Task	Command Name	Syntax	Example	Screenshots
To get manual page for the known command	Command name is ' man '	man[command name]	man ls	
To get manual page for the unknown command	Command name is ' which '	which command_name	ss -tuln	

To know the source file binary	Command is 'where'	where command_name	which nmap		
To know the path of the command	Command is 'which'	which command_name	which chmod		
To know the command is external or internal	Command is 'type'	type command_type	type cd		
To get help for the internal command	Command is 'whence'	whence command_name	whence cd		
To list out bash commands	Command is 'help'	bash --help	Bash --help		
To know the usage of the command	Command is apropos	man command_name	man ls		

2. Basic Commands

Task	Command Name	Syntax	Example	Screenshots
To know today's date	date	date	date	
To print calendar	cal	ncal	ncal 2023	
To print kernel version	cat/proc/version	cat/proc/version	cat /proc/version	
To print default shell	echo \$SHELL	echo \$SHELL	echo \$SHELL	

To print currently logged in user	whoami	whoami	whoami	
To create shortcut for command	alias	alias shortcut_name=command	alias greet='echo Hello, World!'	
To delete shortcut	unalias	unalias shortcut_name	unalias ll	
To change the timestamp of the file	touch	touch -t <yearmonthdaytime >	touch -t 20230805223 s1	
To clear the screen	clear	clear	clear	

To create empty files	touch	touch.filename	touch d1.txt	<pre>(srinivas@kali)-[~] \$ touch d1.txt (srinivas@kali)-[~] \$</pre> 
To know disk usage	du	du [options][path]	du -h	<pre>(srinivas@kali)-[~] \$ du -h 8.0K ./java/.userPrefs/burp 12K ./java/.userPrefs 16K ./java 4.0K ./Documents 4.0K ./CYS/LS2 4.0K ./CYS/LS1 20K ./CYS 4.0K ./local/share/ristretto 8.0K ./local/share/gedit 4.0K ./local/share/nano 8.0K ./local/share/nautilus/scripts 12K ./local/share/nautilus 4.0K ./local/share/Mousepad 4.0K ./local/share/icc 12K ./local/share/keyrings</pre>
To know free space in the system	df	df[options]	df -h	<pre>(srinivas@kali)-[~] \$ df -h Filesystem Size Used Avail Use% Mounted on udev 929M 0 929M 0% /dev tmpfs 195M 1.2M 193M 1% /run /dev/sda1 19G 14G 4.4G 76% / tmpfs 971M 0 971M 0% /dev/shm tmpfs 5.0M 0 5.0M 0% /run/lock tmpfs 195M 132K 194M 1% /run/user/1000</pre>
To know about the Linux release	lsb_release	lsb_release -a	lsb_release -a	<pre>(srinivas@kali)-[/etc] \$ lsb_release -a No LSB modules are available. Distributor ID: Kali Description: Kali GNU/Linux Rolling Release: 2024.2 Codename: kali-rolling</pre>

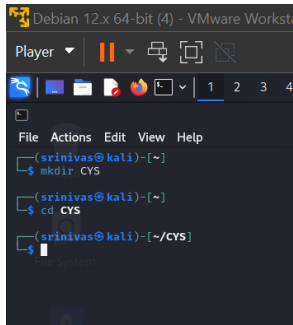
3. Navigation

Task	Command	Syntax	Screenshots
To navigate home directory	cd	cd	<pre>(srinivas@kali)~/Documents \$ cd</pre>
To navigate to the parent directory	cd ..	cd ..	<pre>(srinivas@kali)~ \$ cd .. (srinivas@kali)~/home \$</pre>
To navigate to the child directory	cd <directory name>	cd <directory name>	<pre>(srinivas@kali)~/home \$ cd srinivas (srinivas@kali)~ \$</pre>
Alternate command to cd	pushd	pushd <directory name>	<pre>(srinivas@kali)~ \$ pushd as2 ~/as2 ~</pre>
To go back to the previous directory	cd -	cd -	<pre>(srinivas@kali)~ \$ cd - /home (srinivas@kali)~/home \$</pre>
To go to the root directory	cd /	cd /	<pre>(srinivas@kali)~/home \$ cd / (srinivas@kali) [/] \$</pre>

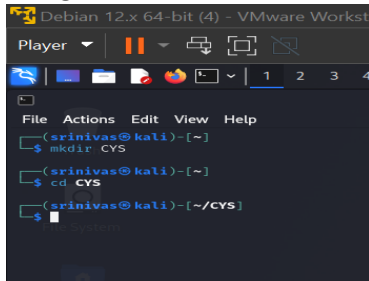
4. File System

Task	Syntax	Command
How to identify the file system	lsblk -f	lsblk -f

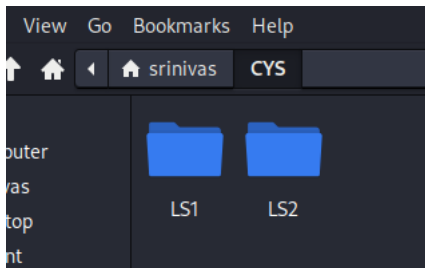
- a. Create Folder "CYS"



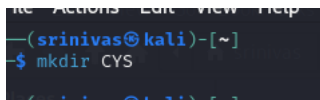
b. Navigate to CYS



c. Create folder LS1 and LS2 under CYS

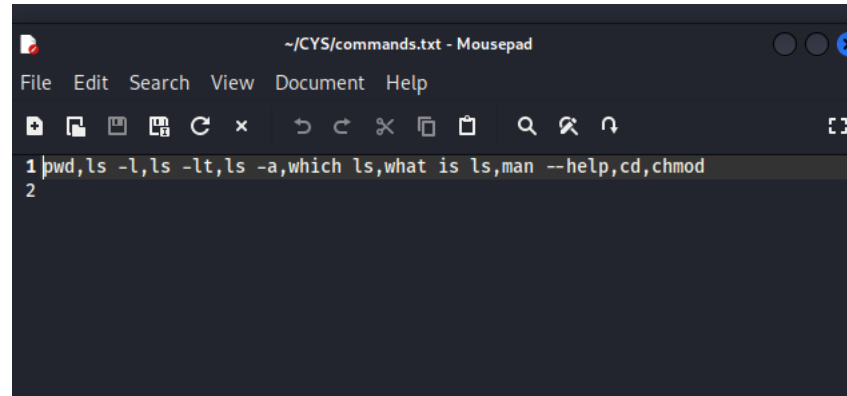


d. Go back to CYS



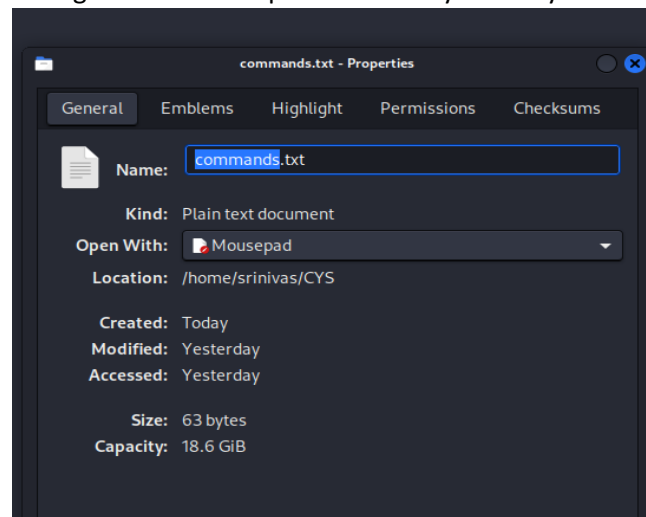
e. Working with Files

- i. Add commands which you learnt during lab session in the file commands.txt



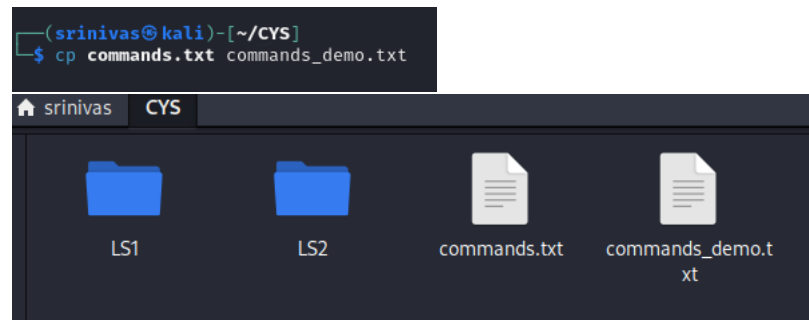
```
1 pwd,ls -l,ls -lt,ls -a,which ls,what is ls,man --help,cd,chmod
2
```

- ii. Change the timestamp of the file to yesterday

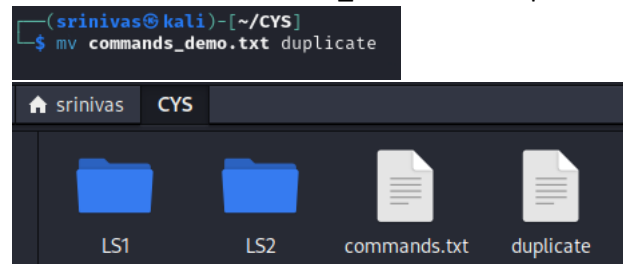


```
(srinivas@kali)-[~/CYS]
$ touch -d "yesterday" commands.txt
```

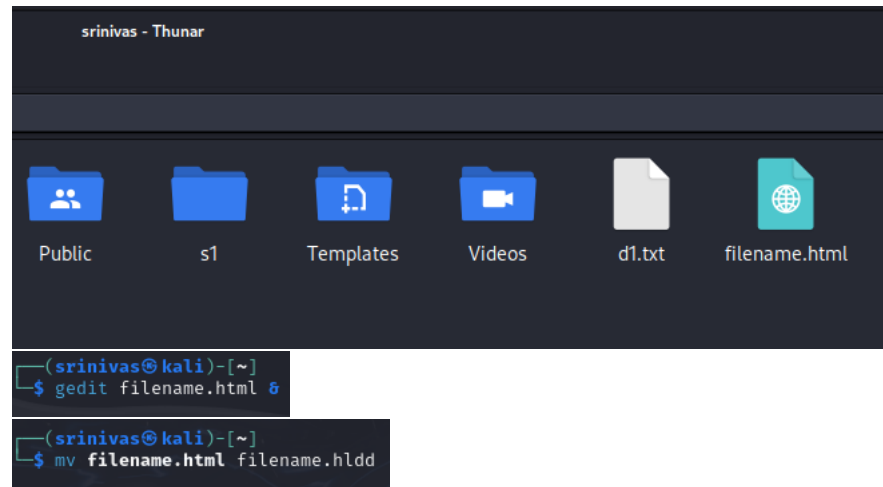
- iii. Copy the contents from the file commands.txt to commands_demo.txt

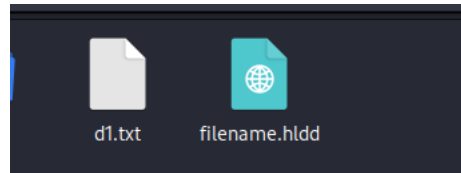


- iv. Rename the file `commands_demo.txt` to `duplicate`



- v. Rename all `.html` to `.hldd`





- vi. Delete the file duplicate

```
(srinivas@kali) - [~/CYS]  
$ rm duplicate
```

- vii. Copy the contents commands.txt to unit4 and unit5 (using relative path)

```
(srinivas@kali) - [~/CYS]  
$ cp commands.txt ../LS1/unit4.txt  
(srinivas@kali) - [~/CYS]  
$ cp commands.txt ../LS2/unit5.txt
```

- viii. Delete the contents from unit5 (using absolute path)

```
(srinivas@kali) - [~/CYS]  
$ cp commands.txt ../LS2/unit5.txt
```

- ix. Navigate to root

```
(srinivas@kali) - [~/CYS]  
$ cd /
```

- x. List all the files under root

```

(srinivas@kali)-[/]
└─$ ls -la
total 80
drwxr-xr-x 19 root root 4096 Aug  3 11:25 .
drwxr-xr-x 19 root root 4096 Aug  3 11:25 ..
drwx----- 2 root root 4096 Aug  3 11:25 .cache
lrwxrwxrwx 1 root root 7 Aug  3 11:13 bin → usr/bin
drwxr-xr-x 3 root root 4096 Aug  3 11:45 boot
drwxr-xr-x 17 root root 3480 Aug  5 09:32 dev
drwxr-xr-x 185 root root 12288 Aug  5 10:11 etc
drwxr-xr-x 3 root root 4096 Aug  3 11:44 home
lrwxrwxrwx 1 root root 28 Aug  3 11:14 initrd.img → boot/initrd.img-6.6.15-amd64
lrwxrwxrwx 1 root root 28 Aug  3 11:14 initrd.img.old → boot/initrd.img-6.6.15-amd64
lrwxrwxrwx 1 root root 7 Aug  3 11:13 lib → usr/lib
lrwxrwxrwx 1 root root 9 Aug  3 11:22 lib32 → usr/lib32
lrwxrwxrwx 1 root root 9 Aug  3 11:13 lib64 → usr/lib64
drwx----- 2 root root 16384 Aug  3 11:13 lost+found
drwxr-xr-x 3 root root 4096 Aug  3 11:13 media
drwxr-xr-x 2 root root 4096 Aug  3 11:13 mnt
drwxr-xr-x 3 root root 4096 Aug  3 11:22 opt
dr-xr-xr-x 318 root root 0 Aug  5 06:33 proc
drwx----- 4 root root 4096 Aug  3 11:46 root
drwxr-xr-x 34 root root 840 Aug  5 06:33 run
lrwxrwxrwx 1 root root 8 Aug  3 11:13/sbin → usr/sbin
drwxr-xr-x 3 root root 4096 Aug  3 11:24 srv
dr-xr-xr-x 13 root root 0 Aug  5 06:33 sys
drwxrwxrwt 16 root root 4096 Aug  5 10:09 tmp
drwxr-xr-x 16 root root 4096 Aug  3 11:22 usr
drwxr-xr-x 12 root root 4096 Aug  3 11:46 var
lrwxrwxrwx 1 root root 25 Aug  3 11:14 vmlinuz → boot/vmlinuz-6.6.15-amd64
lrwxrwxrwx 1 root root 25 Aug  3 11:14 vmlinuz.old → boot/vmlinuz-6.6.15-amd64

```

- xi. Explore all the folders (Do not delete any folder)

```

(srinivas@kali)-[/]
└─$ ls -la
total 80
drwxr-xr-x 19 root root 4096 Aug  3 11:25 .
drwxr-xr-x 19 root root 4096 Aug  3 11:25 ..
drwx----- 2 root root 4096 Aug  3 11:25 .cache
lrwxrwxrwx 1 root root 7 Aug  3 11:13 bin → usr/bin
drwxr-xr-x 3 root root 4096 Aug  3 11:45 boot
drwxr-xr-x 17 root root 3480 Aug  5 09:32 dev
drwxr-xr-x 185 root root 12288 Aug  5 10:11 etc
drwxr-xr-x 3 root root 4096 Aug  3 11:44 home
lrwxrwxrwx 1 root root 28 Aug  3 11:14 initrd.img → boot/initrd.img-6.6.15-amd64
lrwxrwxrwx 1 root root 28 Aug  3 11:14 initrd.img.old → boot/initrd.img-6.6.15-amd64
lrwxrwxrwx 1 root root 7 Aug  3 11:13 lib → usr/lib
lrwxrwxrwx 1 root root 9 Aug  3 11:22 lib32 → usr/lib32
lrwxrwxrwx 1 root root 9 Aug  3 11:13 lib64 → usr/lib64
drwx----- 2 root root 16384 Aug  3 11:13 lost+found
drwxr-xr-x 3 root root 4096 Aug  3 11:13 media
drwxr-xr-x 2 root root 4096 Aug  3 11:13 mnt
drwxr-xr-x 3 root root 4096 Aug  3 11:22 opt
dr-xr-xr-x 318 root root 0 Aug  5 06:33 proc
drwx----- 4 root root 4096 Aug  3 11:46 root
drwxr-xr-x 34 root root 840 Aug  5 06:33 run
lrwxrwxrwx 1 root root 8 Aug  3 11:13/sbin → usr/sbin
drwxr-xr-x 3 root root 4096 Aug  3 11:24 srv
dr-xr-xr-x 13 root root 0 Aug  5 06:33 sys
drwxrwxrwt 16 root root 4096 Aug  5 10:09 tmp
drwxr-xr-x 16 root root 4096 Aug  3 11:22 usr
drwxr-xr-x 12 root root 4096 Aug  3 11:46 var
lrwxrwxrwx 1 root root 25 Aug  3 11:14 vmlinuz → boot/vmlinuz-6.6.15-amd64
lrwxrwxrwx 1 root root 25 Aug  3 11:14 vmlinuz.old → boot/vmlinuz-6.6.15-amd64

```

- xii. Navigate to /etc/passwd

```

(srinivas@kali)-[/]
└─$ cd /etc

```

- xiii. Open the file passwd

```
(srinivas@kali)-[~/CYS]
$ cat passwd
```

- xiv. Explore the file passwd

```
(srinivas@kali)-[~/CYS]
$ less passwd
```

- xv. Navigate to /etc/group and explore

```
(srinivas@kali)-[~/CYS]
$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:11:
proxy:x:12:
kmem:x:13:
dialout:x:14:
fax:x:15:
voice:x:16:
cdrom:x:17:
floppy:x:18:
tape:x:19:
sudo:x:20:
audio:x:21:
dip:x:22:
www-data:x:23:
backup:x:24:
operator:x:25:
irc:x:26:
shadow:x:27:
utmp:x:28:
video:x:29:
plugdev:x:30:
staff:x:31:
users:x:32:
nogroup:x:33:
systemd-journal:x:34:
systemd-network:x:35:
cron:x:36:
```

f. Difference between

- i. GUI vs. CLI

Graphical User Interface (GUI)

1. User Interaction:

- **GUI:** Interaction is through graphical elements like windows, icons, buttons, and menus using a mouse or touchscreen.
- **CLI:** Interaction is through text commands typed on a keyboard.

2. Ease of Use:

- **GUI:** Generally easier for beginners as it provides a visual interface that is more intuitive and user-friendly.
- **CLI:** Can be more challenging for beginners due to the need to memorize and type commands, but very powerful for experienced users.

3. Speed and Efficiency:

- **GUI:** May be slower and less efficient for experienced users, especially for repetitive tasks.
- **CLI:** Often faster and more efficient for experienced users, especially for complex and repetitive tasks, as commands can be scripted and automated.

4. Resource Usage:

- **GUI:** Consumes more system resources (RAM and CPU) because it requires graphical processing.
- **CLI:** Consumes fewer system resources, making it ideal for low-power systems or remote server management.

5. Remote Access:

- **GUI:** Requires more bandwidth and may need additional setup (e.g., VNC, Remote Desktop Protocol) to access remotely.
- **CLI:** Can be accessed easily over low-bandwidth connections using tools like SSH.

6. Customization:

- **GUI:** Customization is usually limited to the themes, icons, and window behavior provided by the desktop environment.
- **CLI:** Highly customizable through various shell configurations, scripts, and aliases.

7. Error Handling:

- **GUI:** Provides visual feedback and often more user-friendly error messages.
- **CLI:** Error messages are text-based and may be less intuitive, requiring the user to understand and troubleshoot based on the output.

Command Line Interface (CLI)

1. Flexibility:

- **GUI:** Limited to the functionalities provided by the graphical applications.

- **CLI:** Highly flexible; users can combine commands and create scripts to perform a wide range of tasks.

2. Learning Curve:

- **GUI:** Easier learning curve due to visual interaction.
- **CLI:** Steeper learning curve as it requires learning and remembering various commands and their syntax.

3. Task Complexity:

- **GUI:** Suitable for simple to moderately complex tasks; complex tasks may be cumbersome.
- **CLI:** Suitable for both simple and highly complex tasks; can handle complex tasks more efficiently.

4. Automation:

- **GUI:** Limited automation capabilities; some automation is possible with tools like macros.
- **CLI:** Excellent for automation; scripts and cron jobs can automate virtually any task.

5. Multi-tasking:

- **GUI:** Supports multitasking with multiple windows and tabs.
- **CLI:** Supports multitasking through terminal multiplexers like `tmux` or `screen`, and background processes.

Examples

GUI Example:

- Using a file manager (like Nautilus or Dolphin) to copy files by dragging and dropping.

ii. man vs info

man (Manual Pages):

- **Purpose:** Provides concise reference documentation for commands, system calls, library functions, file formats, games, and more.
- **Structure:** Each man page is a single, self-contained document, often divided into sections like NAME, SYNOPSIS, DESCRIPTION, OPTIONS, EXAMPLES, and SEE ALSO.
- **Usage:** Primarily used for quick look-up of command syntax, options, and basic descriptions.

info (Info Pages):

- **Purpose:** Provides more comprehensive and detailed documentation, often with more explanation, background information, and examples.
- **Structure:** Organized as a hypertext system with nodes, allowing for navigation through different sections and chapters using links.
- **Usage:** Used for more in-depth study and understanding of a topic, often including tutorials and extensive examples.

iii. which vs. whereis

The which command is used to locate the executable file associated with the given command by searching the directories listed in the PATH environment variable.

Key Points:

- It only searches for executable files.
- It looks through the directories specified in the PATH environment variable.
- It returns the path of the first match it finds.
- Useful for determining the actual location of the executable that will be run when a command is entered.

The `whereis` command is used to locate the binary, source, and manual page files for a command.

iv. Terminal vs shell

A terminal is an interface that allows users to interact with the system by entering text-based commands. It emulates a traditional text terminal within a graphical environment.

Key Points:

- **Hardware/Software Interface:** Originally, terminals were hardware devices, but now they are usually software applications that provide a text input/output interface.
- **Examples:** GNOME Terminal, Konsole, xterm, Terminal (macOS).
- **Function:** The terminal serves as a container for the shell. It captures user input (commands) and displays output from the shell and other command-line programs.
- **Graphical Environment:** In a graphical desktop environment, the terminal is a window that provides access to the command line.
- **Features:** Terminals can support multiple tabs, color schemes, font customization, and other graphical features.

Example: Opening a terminal in GNOME might involve searching for "Terminal" in the applications menu and launching it. This opens a window where you can type commands.

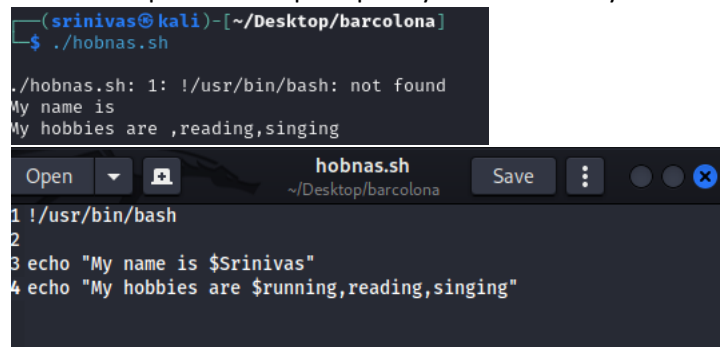
A shell is a command-line interpreter that provides a user interface for accessing the services of the operating system. It interprets and executes the commands entered by the user.

Key Points:

- **Command-Line Interpreter:** The shell processes and executes user commands, scripts, and programs.
- **Examples:** Bash (Bourne Again SHell), Zsh (Z Shell), Ksh (Korn Shell), Fish (Friendly Interactive SHell).
- **Function:** The shell provides features like scripting, command history, job control, aliases, and environment variables.
- **Text-Based Interface:** The shell operates entirely in a text-based interface, taking input from the user and providing text output.
- **Scripting:** Shells allow users to write and execute shell scripts for automating tasks.

Example: When you open a terminal and see a prompt like \$, you are interacting with a shell (e.g., Bash). Typing echo "Hello, World!" and pressing Enter will execute the command in the shell.

- g. Write a simple shell script to print your name and your hobbies!



The image shows two overlapping windows. The top window is a terminal with the prompt `(srinivas@kali) - [~/Desktop/barcelona]`. The user has entered `./hobnas.sh`, and the output is:
`./hobnas.sh: 1: !/usr/bin/bash: not found`
`My name is`
`My hobbies are ,reading,singing`
The bottom window is a code editor titled `hobnas.sh` with the path `~/Desktop/barcelona`. It contains the following script:
`1 !/usr/bin/bash`
`2`
`3 echo "My name is $Srinivas"`
`4 echo "My hobbies are $running,reading,singing"`

Interesting commands to Explore

Banner

History

Note: Include your screenshots

Evaluation :

Marks : 10 (Deadline : 4 – Originality :3 – Completeness :3)

Deadline: 06.08.2024

“All our dreams can come true if we have the courage to pursue them.”

- Walt Disney