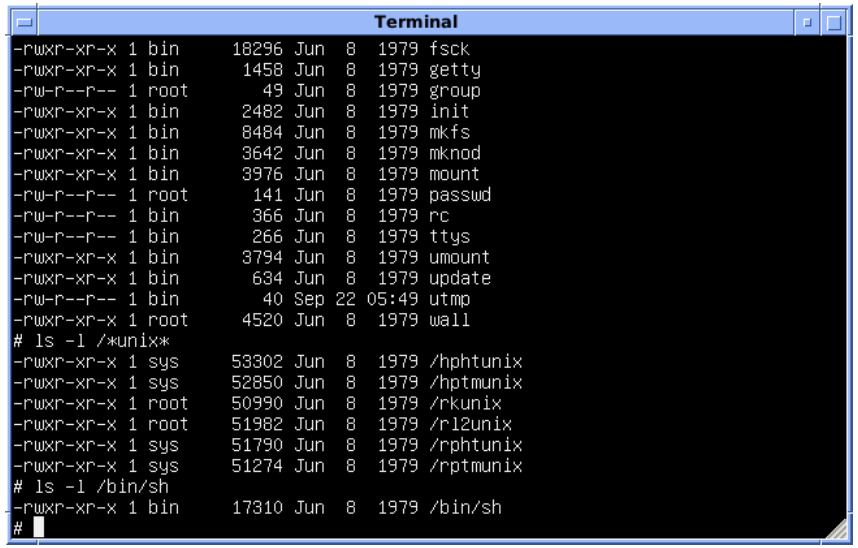

The CLI
ccc

What is a CLI?

- CLI stands for the “Command Line Interface”
- It’s the “Green Terminal Screen” you’ve seen in movies used by “Hackers”.
- It used to be the only way to interact with your computer. (Until the Beginning in 1979 with Apple Lisa from Steve Jobs and his team.
- CLIs began with UNIX in the early 1960’s/1970’s

Unix CLI

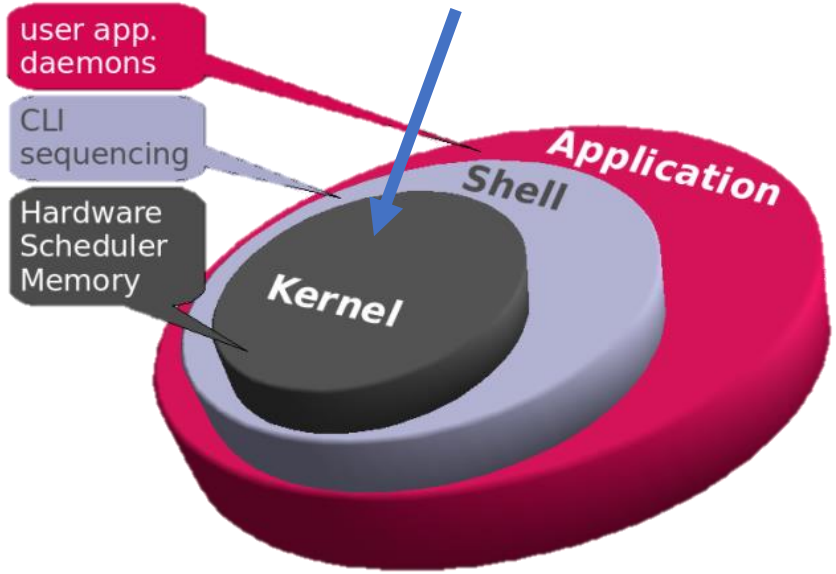
- One of the earliest and most influential command-line interfaces was the one used by Unix, developed in the late 1960s and early 1970s at AT&T Bell Labs. Unix introduced many of the concepts and commands that are still used in modern CLIs today. It featured a text-based shell that allowed users to interact with the operating system by entering commands and receiving text-based output.

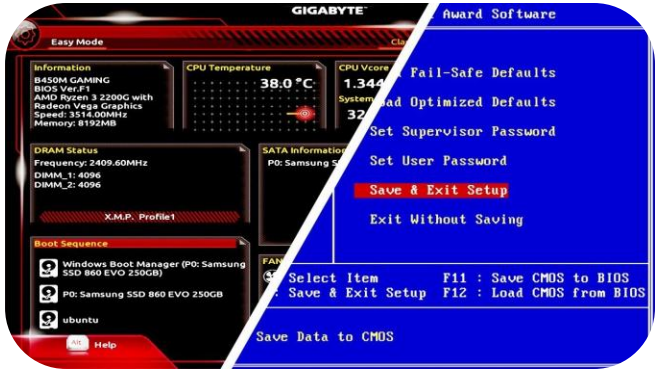


Kernal vs Shell vs Application

Kernal vs Shell vs Application

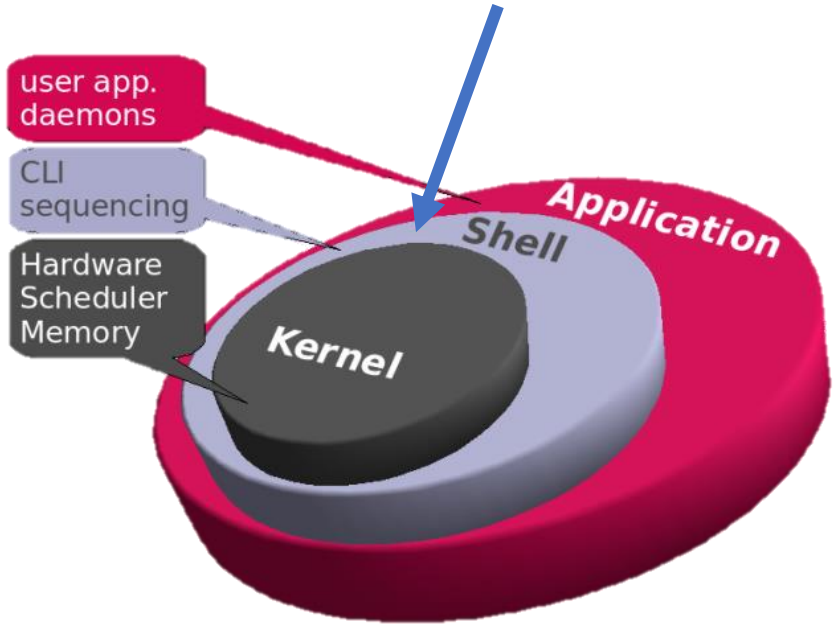
- **Kernal**: The core component of an operating system. It is responsible for managing the hardware resources of the computer, such as CPU, memory, input/output devices, and system calls.
- *Intermediary* between ***the hardware and the software*** running on a computer.
- The Kernel enforces security and access control policies, ensuring that different processes and users can't interfere with or harm each other.





Kernal vs Shell vs Application

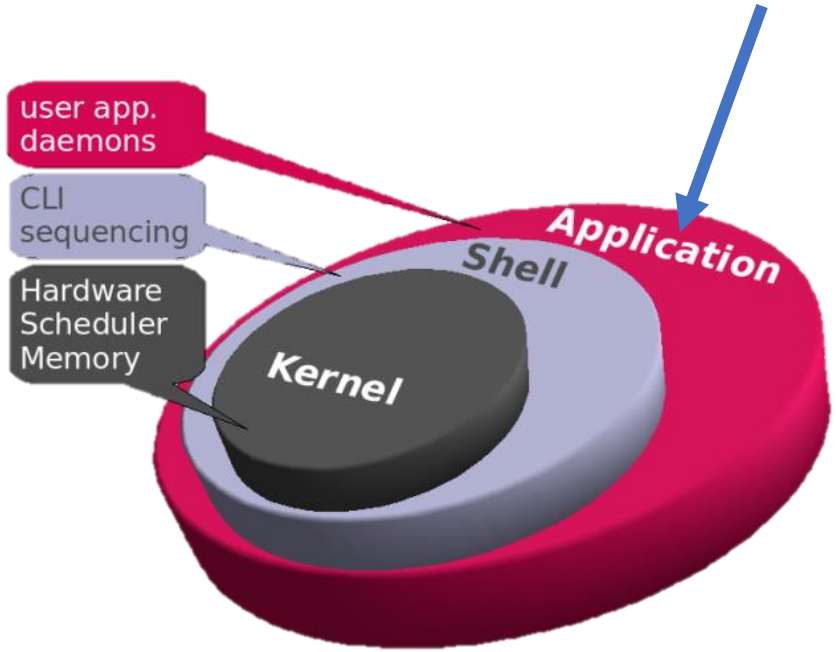
- **Shell**: User interface that allows users to interact with the operating system and **run commands**. It serves as an intermediary between the user and the kernel.
- Interprets user commands, whether *typed in manually or executed from scripts*, and then communicates with the kernel to perform the requested operations.



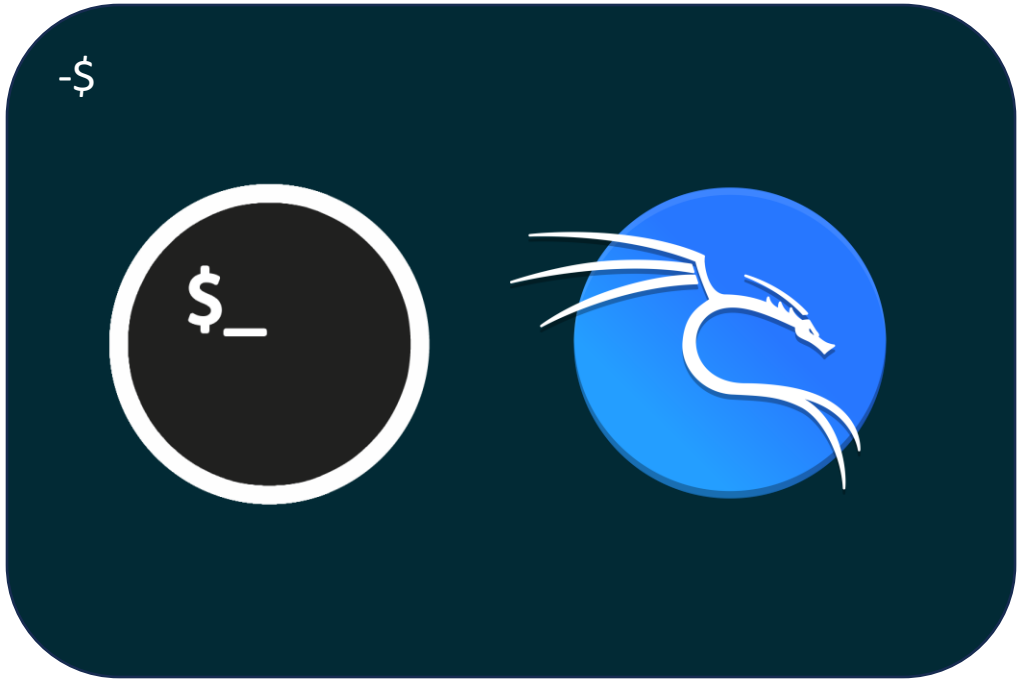

```
┌──(kali㉿kali)-[~]
└─$ cd Desktop

┌──(kali㉿kali)-[~/Desktop]
└─$ cd Files

┌──(kali㉿kali)-[~/Desktop/Files]
└─$ ls
image1.png  java.png  pics.png  picture.png  pp.png  screen.png

┌──(kali㉿kali)-[~/Desktop/Files]
└─$ rm pics.png

┌──(kali㉿kali)-[~/Desktop/Files]
└─$ ls
mage1.png  java.png  picture.png  pp.png  screen.png
```

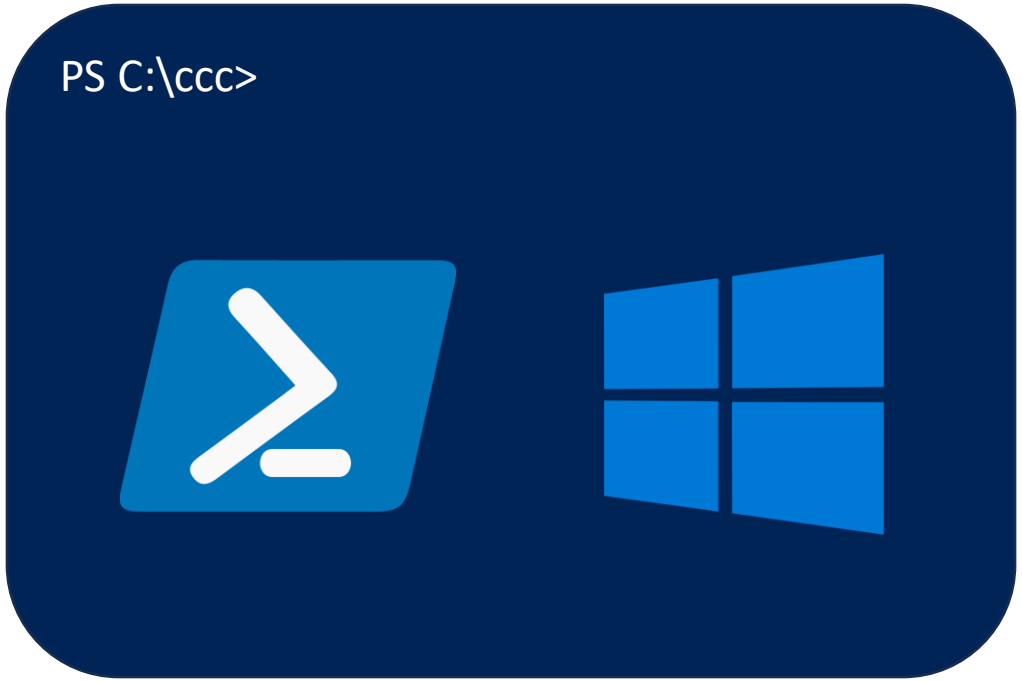
Kernal vs Shell vs Application

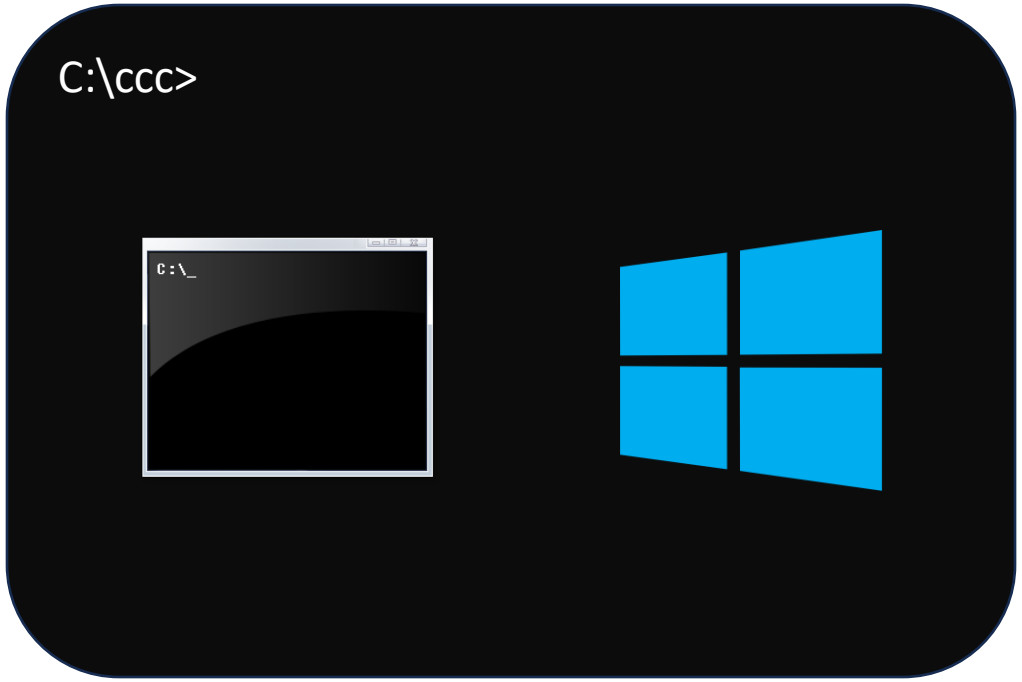
- **Application**: the highest level in the software stack of an operating system.
- Consists of **user-level applications** and software that run on top of the operating system.
- Applications can include *web browsers, word processors, email clients, games*, and many other types of software.



Modern CLIs







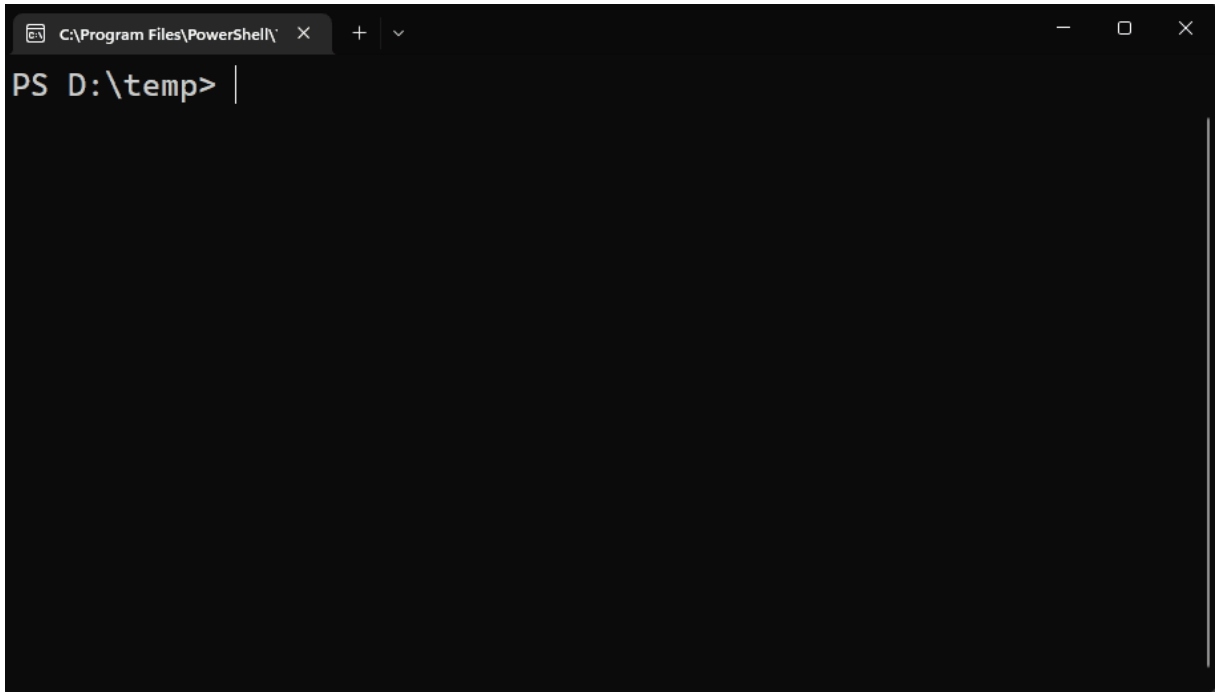
Terminal Apps

Windows Terminal

Mac iTerm2

Command Line Tips

- Use **Tab** key to auto complete commands
- Use **Up arrow** key to sort through previously used commands
- Use **CTRL-C** to end a command early
- **Right Click** to copy and paste



List File Command

```
-$  ls

Desktop  Documents  Downloads  Music
Pictures  Public  Templates  Videos
```

```
PS C:\ccc>  ls

Directory of C:\

12/07/2019  02:14 AM    <DIR>     PerfLogs
09/19/2023  09:05 PM    <DIR>     Program Files
11/19/2020  12:33 AM    <DIR>     Program Files (x86)
09/19/2023  09:07 PM    <DIR>     Users
09/19/2023  08:57 PM    <DIR>     Windows
               0 File(s)              0 bytes
               5 Dir(s)  41,916,641,280 bytes free
```

```
C:\ccc>  dir

Directory of C:\

12/07/2019  02:14 AM    <DIR>     PerfLogs
09/19/2023  09:05 PM    <DIR>     Program Files
11/19/2020  12:33 AM    <DIR>     Program Files (x86)
09/19/2023  09:07 PM    <DIR>     Users
09/19/2023  08:57 PM    <DIR>     Windows
               0 File(s)              0 bytes
               5 Dir(s)  41,916,641,280 bytes free
```

```
mac@ccc ~ %  ls

Desktop     Downloads   Movies      Pictures
Documents   Library     Music       Public
```

Current Working Path Command

```
-$   pwd

/home/kali
```

```
PS C:\ccc>   pwd

Path
----
C:\Users\Public
```

```
C:\ccc>   cd

C:\Users\Public
```

```
mac@ccc ~ %   pwd

/Users/TimApple
```

Switching Directory Command

-$ cd Downloads

***In Downloads Directory**
-$ cd ..
***Back to Parent Directory**
-$ cd /
***Back to Root Directory**
-$ *cd /home/kali/Downloads*
***Back to Downloads Directory**

PS C:\ccc> cd .*Downloads*\

***In Downloads Directory**
PS C:\ccc\...> cd ..
***Back to Parent Directory**
PS C:\ccc\...> cd C://
***Back to Root Directory**
PS C:\ccc\...> cd Users\Public\Downloads
***Back to Downloads Directory**

C:\ccc> cd *Downloads*

***In Downloads Directory**
C:\ccc\...> cd ..
***Back to Parent Directory**
C:\ccc\...> cd C://
***Back to Root Directory**
C:\ccc\...> cd Users\Public\Downloads
***Back to Downloads Directory**

mac@ccc ~ % cd Downloads

***In Downloads Directory**
mac@ccc ~ % cd ..
***Back to Parent Directory**
mac@ccc ~ % cd /
***Back to Root Directory**
mac@ccc ~ % /Users/TimApple/Downloads
***Back to Downloads Directory**

New File Command

```
-$  touch demo.txt

-$  ls
-$  demo.txt
```

```
PS C:\ccc>  ni demo.txt

PS C:\ccc\...> dir

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----         9/30/2023  12:33 PM              0 demo.txt
```

```
C:\ccc>  copy nul demo.txt

        1 file(s) copied.

C:\ccc\...> dir
09/30/2023  12:29 PM    <DIR>          .
09/30/2023  12:29 PM    <DIR>          ..
09/30/2023  12:29 PM                 0 demo.txt
               1 File(s)              0 bytes
               2 Dir(s)  34,306,015,232 bytes free
```

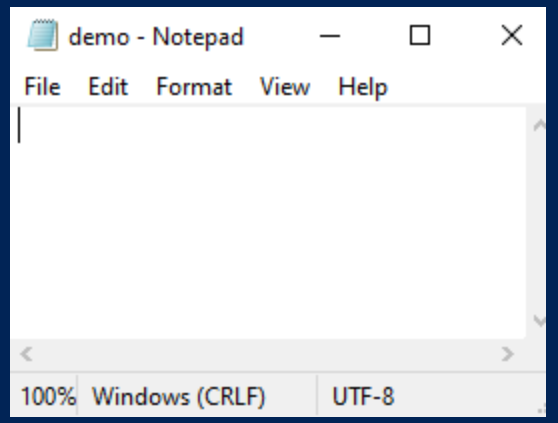
```
mac@ccc ~ %  touch demo.txt

mac@ccc ~ %  ls
demo.txt
```

Edit a File Command

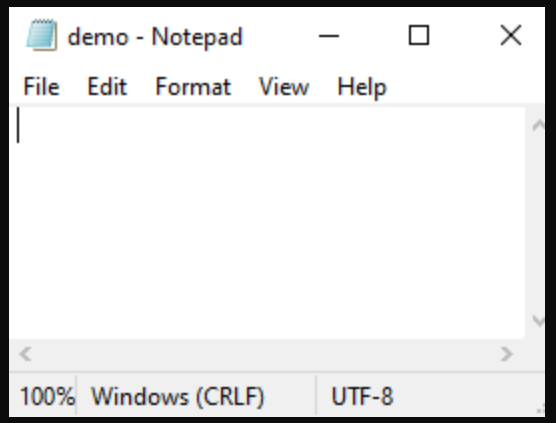
-$ vim *demo.txt*

~
~
“demo.txt” 0L, 0B 0,0-1 All
***Inside of the VIM editor**
(*Shiftkey + :) + wq
:wq
***Exited vim**

PS C:\ccc> notepad *demo.txt*



C:\ccc> notepad *demo.txt*



mac@ccc ~ % vim demo.txt

~
~
"demo.txt<200b>" [New]
***Inside of the VIM editor**
(*Shiftkey + :) + wq
:wq
***Exited vim**

File Quick View Command

```
-$    cat demo.txt

Hello World!
```

```
PS C:\ccc>    gc demo.txt

Hello World!
```

```
C:\ccc>    type demo.txt

Hello World!
```

```
mac@ccc ~ %    cat demo.txt

Hello World!
```

New Directory/ Folder Command

```
-$    mkdir DemoFolder

-$    ls
DemoFolder  demo.txt

-$    cd DemoFolder
-$    pwd
/home/kali/Documents/DemoFolder
```

```
PS C:\ccc>    mkdir DemoFolder

PS C:\ccc\...> dir

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        9/30/2023   6:50 PM                DemoFolder
```

```
C:\ccc>    mkdir DemoFolder

C:\ccc\...>dir
09/30/2023  06:47 PM    <DIR>          .
09/30/2023  06:47 PM    <DIR>          ..
09/30/2023  01:02 PM                12 demo.txt
09/30/2023  06:47 PM    <DIR>          DemoFolder
               1 File(s)             12 bytes
               3 Dir(s)  34,302,484,480 bytes free
```

```
mac@ccc ~ %    mkdir DemoFolder

mac@ccc ~ %    ls
DemoFolder  demo.txt

mac@ccc ~ %    cd DemoFolder
mac@ccc ~ %    pwd
/home/kali/Documents/DemoFolder
```

Delete Commands

```
-$   ls

DemoFolder  demo.txt
-$   rm demo.txt
-$   rmdir DemoFolder
-$   ls
*Empty
```

```
PS C:\ccc>   dir

d-----        9/30/2023   6:50 PM            DemoFolder
-a----        9/30/2023   1:02 PM         12 demo.txt

PS C:\ccc\...>  rm demo.txt
PS C:\ccc\...>  rmdir DemoFolder
PS C:\ccc\...>  dir
*Empty
```

```
C:\ccc>   dir

09/30/2023  07:00 PM               0 demo.txt
09/30/2023  06:59 PM    <DIR>          DemoFolder

C:\ccc\...>del demo.txt
C:\ccc\...>rmdir DemoFolder
C:\ccc\...>dir
*Empty
```

```
mac@ccc ~ %   ls

DemoFolder  demo.txt
mac@ccc ~ %    rm demo.txt
mac@ccc ~ %    rmdir DemoFolder
mac@ccc ~ %    ls
*Empty
```

Chmod

The "**chmod**" command, short for "change mode," is a command used in Unix-like operating systems

Used change the permissions (mode) of files and directories. It allows users to specify who can read, write, and execute a file or directory.

User | Groups | Others

-$ chmod 764 demo.txt

***This changes the permissions on the file using a binary number system**

1 = execute

2 = write

4 = read

the first number in the set represents the user

the second number represent the group

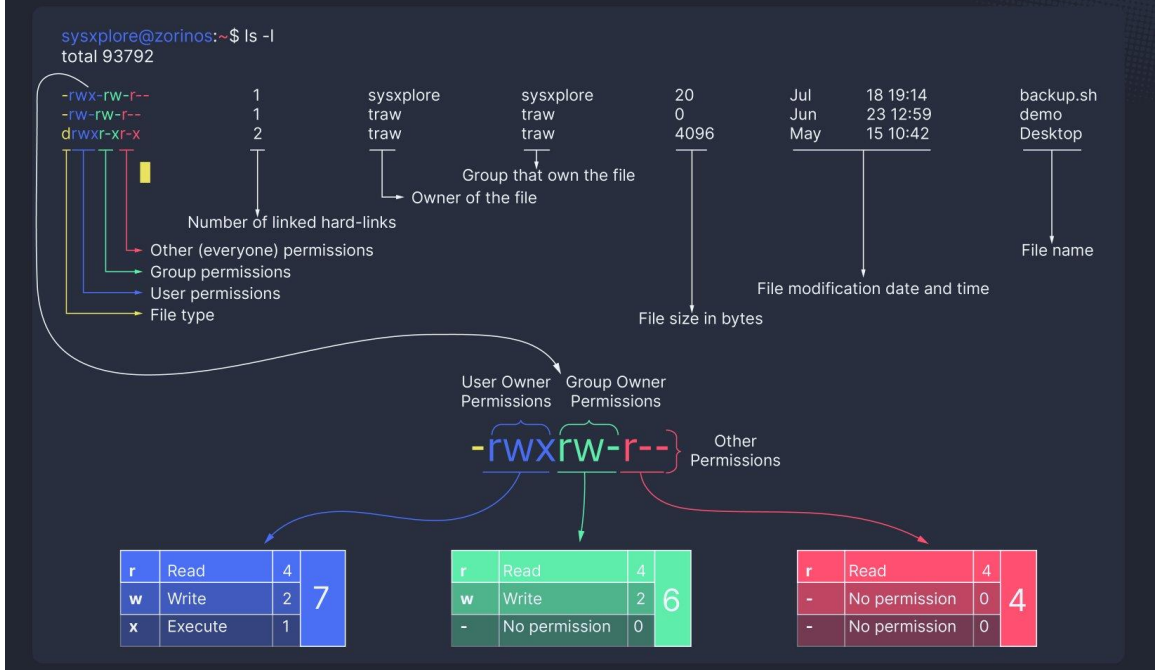
the third number represents others*

Chmod Chart

Octal	Binary	File Mode
0	000	---
1	001	--x
2	010	-w-
3	011	-wx
4	100	r--
5	101	r-x
6	110	rw-
7	111	rwx

Linux file permissions cheatsheet

@sysxplore



Binary	Octal	Permissions	Representation
000	0 (0+0+0)	No Permission	---
001	1 (0+0+1)	Execute	--x
010	2 (0+2+0)	Write	-w-
011	3 (0+2+1)	Write + Execute	-wx
100	4 (4+0+0)	Read	r--
101	5 (4+0+1)	Read + Execute	r-x
110	6 (4+2+0)	Read + Write	rw-
111	7 (4+2+1)	Read + Write + Execute	rwx

Capital S is an error it occurs if you set SUID bit or SGID bit to a file without execute (x) bit set

Capital T is an error it occurs if you set Stick bit to a file without execute (x) bit set

@sysxplore

```
–$ chmod 764 demo.txt

-$  ls –l

total 0
-rwxrw-r--  1 kali kali 0 Oct  2 23:20 demo.txt

-$ chmod 432 demo.txt

-$ ls –l

total 0
-r---wx-w-  1 kali kali 0 Oct  2 23:20 demo.txt
```

SSH

```
-$    ssh StarID@199.17.28.80

StarID@199.17.28.80's password: ****
```

```
PS C:\ccc>    ssh StarID@199.17.28.80

StarID@199.17.28.80's password: ****
```

```
C:\ccc>    ssh StarID@199.17.28.80

StarID@199.17.28.80's password: ****
```

```
mac@ccc ~ %    ssh StarID@199.17.28.80

StarID@199.17.28.80's password: ****
```

Practice

Live Activity

- Make two folders inside of the Downloads directory
  - CCC
  - CCDC
- Make a new txt file in both
  - Ccc.txt
  - Ccdc.txt
- Use notepad or VIM to add text to the files
- Cat the files data to the screen
- Give custom permissions to ccc.txt
  - User = rwx
  - Group = rw
  - Other = r
- Show updated permissions in terminal