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Faculdade de Engenharia Mecânica  
Curso de Graduação em Engenharia Mecatrônica  
Disciplina de Sistemas Digitais para Mecatrônica



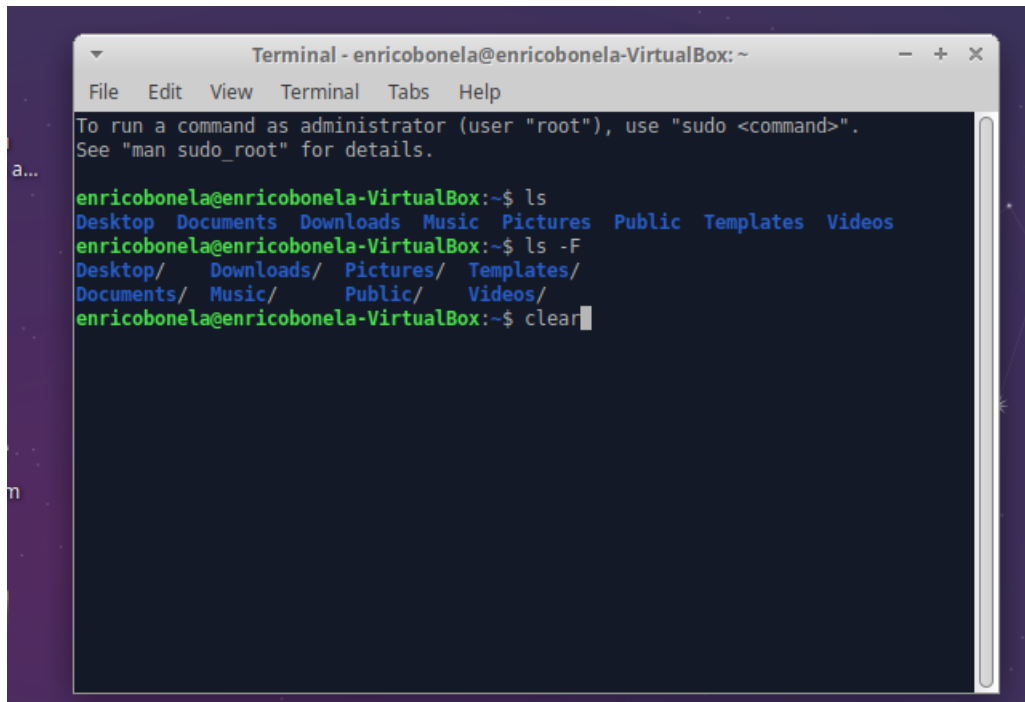
## **Semana 01 - Utilização do Linux**

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O comando *ls* lista todo o conteúdo do diretório atual, o comando possui algumas alternativas de uso, como:

- a: lista todos os arquivos (incluindo arquivos ocultos);
- h: usado junto com a opção *-l*, exibe o tamanho do arquivo.
- i: apresenta o índice de cada arquivo.

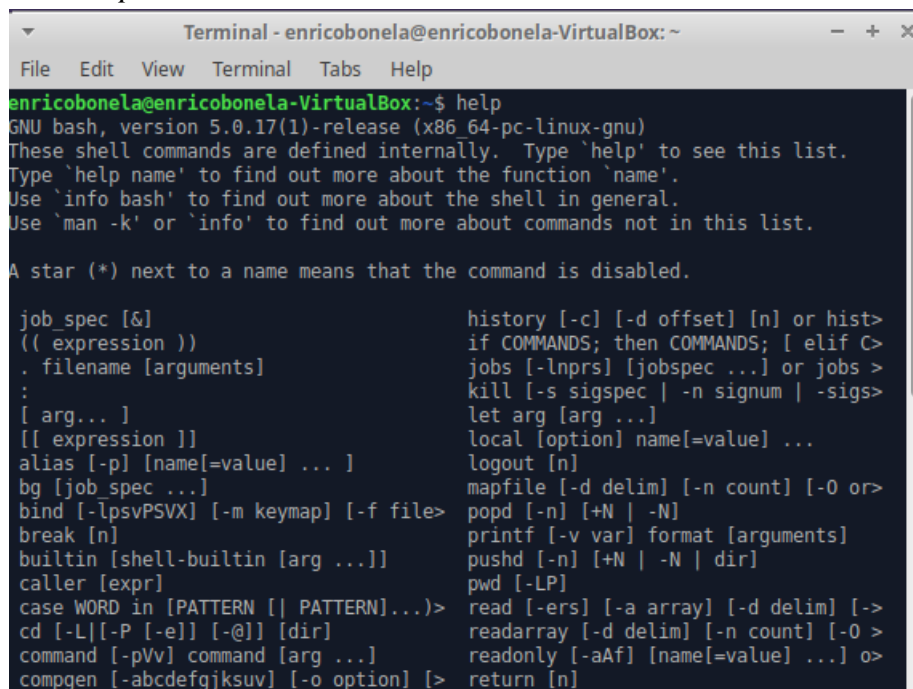


```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

enricobonela@enricobonela-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
enricobonela@enricobonela-VirtualBox:~$ ls -F
Desktop/ Downloads/ Pictures/ Templates/
Documents/ Music/ Public/ Videos/
enricobonela@enricobonela-VirtualBox:~$ clear
```

É possível obter ajuda sobre a sintaxe ou opções de um comando utilizando o complemento *- - help*.



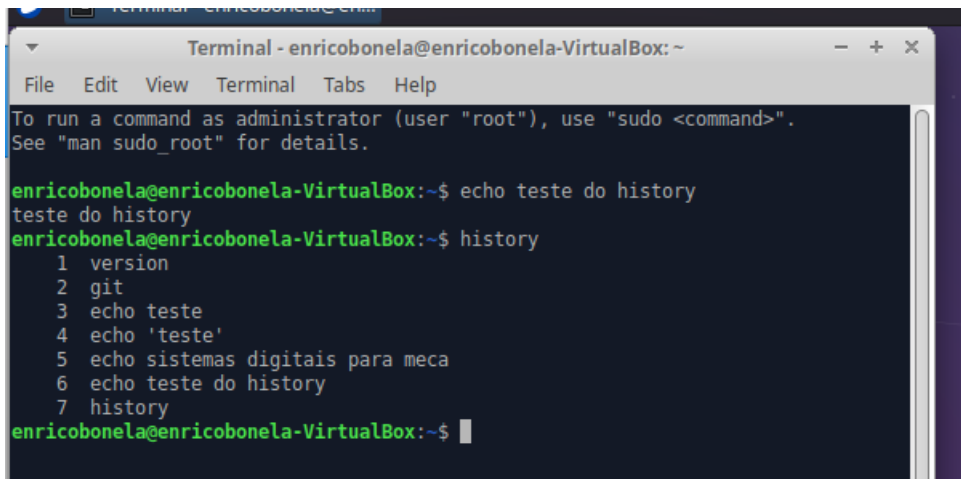
```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help

enricobonela@enricobonela-VirtualBox:~$ help
GNU bash, version 5.0.17(1)-release (x86_64-pc-linux-gnu)
These shell commands are defined internally. Type 'help' to see this list.
Type 'help name' to find out more about the function 'name'.
Use 'info bash' to find out more about the shell in general.
Use 'man -k' or 'info' to find out more about commands not in this list.

A star (*) next to a name means that the command is disabled.

job_spec [&]
(( expression ))
. filename [arguments]
:
[ arg... ]
[[ expression ]]
alias [-p] [name[=value] ... ]
bg [job_spec ...]
bind [-lpsvPSVX] [-m keymap] [-f file]
break [n]
builtin [shell-builtin [arg ...]]
caller [expr]
case WORD in [PATTERN] [PATTERN]...)>
cd [-L][-P [-e]] [-@]] [dir]
command [-pVv] command [arg ...]
compgen [-abcdefgjkuv] [-o option] [>
history [-c] [-d offset] [n] or hist>
if COMMANDS; then COMMANDS; [ elif C>
jobs [-lnprs] [job_spec ...] or jobs >
kill [-s sigspec | -n signum | -sigs>
let arg [arg ...]
local [option] name[=value] ...
logout [n]
mapfile [-d delim] [-n count] [-O or>
popd [-n] [+N | -N]
printf [-v var] format [arguments]
pushd [-n] [+N | -N | dir]
pwd [-LP]
read [-ers] [-a array] [-d delim] [->
readarray [-d delim] [-n count] [-O >
readonly [-aAf] [name[=value] ...] o>
return [n]
```

O comando *history* exibe os comandos utilizados pelo usuário, também possibilitando sua formatação de tamanho e ordem.

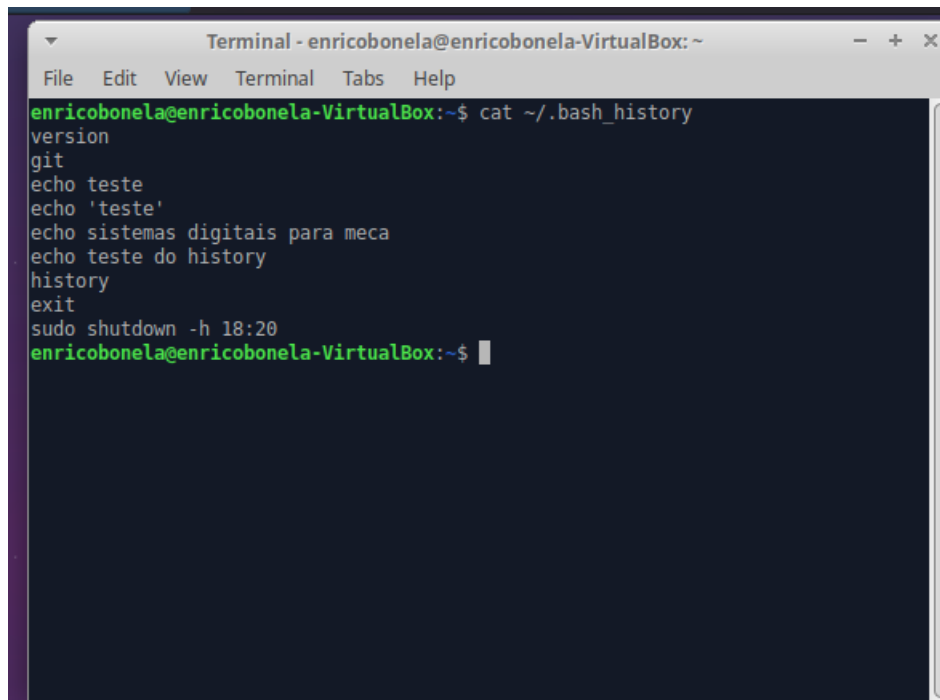
A terminal window titled "Terminal - enricobonela@enricobonela-VirtualBox: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). It displays instructions for using 'sudo' and then shows the execution of 'echo teste do history' and 'history'. The 'history' command output lists seven commands: 'version', 'git', 'echo teste', 'echo 'teste'', 'echo sistemas digitais para meca', 'echo teste do history', and 'history'.

```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

enricobonela@enricobonela-VirtualBox:~$ echo teste do history
teste do history
enricobonela@enricobonela-VirtualBox:~$ history
 1 version
 2 git
 3 echo teste
 4 echo 'teste'
 5 echo sistemas digitais para meca
 6 echo teste do history
 7 history
enricobonela@enricobonela-VirtualBox:~$
```

O comando `cat` permite a criação de novos arquivos de texto de forma rápida, também possibilitando a leitura de arquivos existentes. Seguindo o padrão `cat [opção] [arquivo]`. O comando `cat` possibilita também visualizar vários arquivos, manipulá-los, concatenar arquivos, e exibir conteúdo na tela do terminal.

A terminal window titled "Terminal - enricobonela@enricobonela-VirtualBox: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). It shows the execution of 'cat ~/.bash\_history', which displays the contents of the bash history file, including commands like 'version', 'git', 'echo teste', 'echo 'teste'', 'echo sistemas digitais para meca', 'echo teste do history', 'history', 'exit', and 'sudo shutdown -h 18:20'.

```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help

enricobonela@enricobonela-VirtualBox:~$ cat ~/.bash_history
version
git
echo teste
echo 'teste'
echo sistemas digitais para meca
echo teste do history
history
exit
sudo shutdown -h 18:20
enricobonela@enricobonela-VirtualBox:~$
```

As imagens a seguir seguem os comandos apresentados anteriormente sobre o `ls`. O comando `ls -l` lista o conteúdo do diretório adicionando uma entrada (diretório e/ou arquivos) por linha. Este comando imprime informações adicionais como permissões, dono, data de criação, data de modificação, etc.

```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help

enricobonela@enricobonela-VirtualBox:~$ ls -l
total 32
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Desktop
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Documents
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Downloads
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Music
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Pictures
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Public
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 10:00 Templates
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Videos
enricobonela@enricobonela-VirtualBox:~$ ls ld
ls: cannot access 'ld': No such file or directory
enricobonela@enricobonela-VirtualBox:~$ ls -ld
drwxr-xr-x 14 enricobonela enricobonela 4096 out 6 17:03 .
enricobonela@enricobonela-VirtualBox:~$
```

Para exibir diretórios e arquivos ocultos pode-se utilizar os comandos *ls -a* ou *ls -all*.

```
enricobonela@enricobonela-VirtualBox:~$ ls -all
total 100
drwxr-xr-x 14 enricobonela enricobonela 4096 out 6 17:03 .
drwxr-xr-x 3 root root 4096 out 6 09:39 ..
-rw-r--r-- 1 enricobonela enricobonela 139 out 6 17:28 .bash_history
-rw-r--r-- 1 enricobonela enricobonela 220 out 6 09:39 .bash_logout
-rw-r--r-- 1 enricobonela enricobonela 3771 out 6 09:39 .bashrc
drwxrwxr-x 9 enricobonela enricobonela 4096 out 6 17:03 .cache
drwxr-xr-x 11 enricobonela enricobonela 4096 out 6 10:00 .config
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Desktop
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Documents
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Downloads
drwx----- 3 enricobonela enricobonela 4096 out 6 09:59 .gnupg
-rw-r--r-- 1 enricobonela enricobonela 0 out 6 09:59 .ICEauthority
drwxrwxr-x 3 enricobonela enricobonela 4096 out 6 09:59 .local
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Music
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Pictures
-rw-r--r-- 1 enricobonela enricobonela 807 out 6 09:39 .profile
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Public
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 10:00 Templates
drwxr-xr-x 2 enricobonela enricobonela 4096 out 6 09:59 Videos
-rw-r--r-- 1 enricobonela enricobonela 68 out 6 17:03 .Xauthority
-rw-r--r-- 1 enricobonela enricobonela 1600 out 6 09:39 .Xdefaults
-rw-r--r-- 1 enricobonela enricobonela 14 out 6 09:39 .xscreensaver
-rw-r--r-- 1 enricobonela enricobonela 6454 out 6 17:03 .xsession-errors
-rw-r--r-- 1 enricobonela enricobonela 6454 out 6 17:00 .xsession-errors.old
enricobonela@enricobonela-VirtualBox:~$
```

O comando *cd* é utilizado para navegar entre diretórios. Pode-se percorrer toda a árvore de diretórios utilizando o comando *cd*. Onde:

- O acesso ao diretório pai é feito pelo “*cd ..*”;
- Diretório pessoal “*~*”. O comando *cd* é muito utilizado com os comandos, *ls*, *pwd*, *mkdir*, *rm*, entre outros.

O comando *cp* permite copiar um ou vários arquivos para um diretório. Seguindo as estruturas:

- *cp* [opção] [arquivo] [diretório]
- *cp* [opção] [arquivo1] [arquivo2] [arquivo-n] [diretório]

```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help
enricobonela@enricobonela-VirtualBox:~$ cd Desktop
enricobonela@enricobonela-VirtualBox:~/Desktop$ ls
enricobonela@enricobonela-VirtualBox:~/Desktop$ ls
arquivo.txt
enricobonela@enricobonela-VirtualBox:~/Desktop$ cd Desktop
bash: cd: Desktop: No such file or directory
enricobonela@enricobonela-VirtualBox:~/Desktop$ cp /Desktop/arquivo.txt
cp: missing destination file operand after '/Desktop/arquivo.txt'
Try 'cp --help' for more information.
enricobonela@enricobonela-VirtualBox:~/Desktop$ cd
enricobonela@enricobonela-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
enricobonela@enricobonela-VirtualBox:~$ cp /home/enricobonela/Desktop/arquivo.tx
t /home/enricobonela/Downloads
enricobonela@enricobonela-VirtualBox:~$ cd Downloads
enricobonela@enricobonela-VirtualBox:~/Downloads$ ls
arquivo.txt
enricobonela@enricobonela-VirtualBox:~/Downloads$ cd
enricobonela@enricobonela-VirtualBox:~$
```

O comando *touch* pode ser utilizado para criar arquivos de texto, com a possibilidade de criá-los com a extensão desejada, e também manipular registros de arquivos ou diretórios. Seguindo a estrutura básica, *touch* [opções] [arquivo].

Ao tentar criar um arquivo já existente, o comando *touch* irá atualizar o registro de informações do arquivo anterior. Também é possível criar vários arquivos utilizando uma única instrução, como: *touch* file1.txt file2.txt file3.txt.

O comando *rm* pode ser utilizado para deletar arquivos ou diretórios. Segue a estrutura *rm* [opções] arquivo/diretório. Alguns argumentos são:

- -r: deleta arquivos e subdiretórios;
- -v: cria uma lista dos arquivos deletados.

```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help
enricobonela@enricobonela-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
enricobonela@enricobonela-VirtualBox:~$ touch arquivo.txt
enricobonela@enricobonela-VirtualBox:~$ ls
arquivo.txt Documents Music Public Videos
Desktop Downloads Pictures Templates
enricobonela@enricobonela-VirtualBox:~$ rm arquivo.txt
enricobonela@enricobonela-VirtualBox:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
enricobonela@enricobonela-VirtualBox:~$ clear
```

Ao contrário do *rm*, o comando *mkdir* cria diretórios, seguindo a estrutura: *mkdir* diretório. Alguns argumentos são:

- -m: define as permissões do diretório.
- -p: cria hierarquia de diretórios

Apagando um diretório com o comando *rm -R*.

```
Terminal - enricobonela@enricobonela-VirtualBox: ~
File Edit View Terminal Tabs Help

enricobonela@enricobonela-VirtualBox:~$ mkdir Nova
enricobonela@enricobonela-VirtualBox:~$ ls
Desktop Documents Downloads Music Nova Pictures Public Templates Videos
enricobonela@enricobonela-VirtualBox:~$ mkdir -p SEII Bancos
enricobonela@enricobonela-VirtualBox:~$ ls
Bancos Documents Music Pictures SEII Videos
Desktop Downloads Nova Public Templates
enricobonela@enricobonela-VirtualBox:~$ rm Nova
rm: cannot remove 'Nova': Is a directory
enricobonela@enricobonela-VirtualBox:~$ rmdir Nova
enricobonela@enricobonela-VirtualBox:~$ ls
Bancos Documents Music Public Templates
Desktop Downloads Pictures SEII Videos
enricobonela@enricobonela-VirtualBox:~$
```

As figuras a seguir fazem referência à uso dos comandos echo e cat que já foram apresentados anteriormente.

```
Terminal - enricobonela@enricobonela-VirtualBox: ~/Desktop
File Edit View Terminal Tabs Help

enricobonela@enricobonela-VirtualBox:~$ cd Desktop
enricobonela@enricobonela-VirtualBox:~/Desktop$ cat escrita.txt
cat: escrita.txt: No such file or directory
enricobonela@enricobonela-VirtualBox:~/Desktop$ touch escrita
enricobonela@enricobonela-VirtualBox:~/Desktop$ ls
arquivo.txt escrita
enricobonela@enricobonela-VirtualBox:~/Desktop$ cat escrita
enricobonela@enricobonela-VirtualBox:~/Desktop$ seq 1 4 > escrita
enricobonela@enricobonela-VirtualBox:~/Desktop$ cat escrita
1
2
3
4
enricobonela@enricobonela-VirtualBox:~/Desktop$ cat escrita2
cat: escrita2: No such file or directory
enricobonela@enricobonela-VirtualBox:~/Desktop$ touch escrita2
enricobonela@enricobonela-VirtualBox:~/Desktop$ seq 4 7 > escrita2
enricobonela@enricobonela-VirtualBox:~/Desktop$ cat escrita2
4
5
6
7
enricobonela@enricobonela-VirtualBox:~/Desktop$ cat escrita escrita2
1
2
3
4
4
5
6
7
enricobonela@enricobonela-VirtualBox:~/Desktop$
```

```
Terminal - enricobonela@enricobonela-VirtualBox: ~/Desktop
File Edit View Terminal Tabs Help

enricobonela@enricobonela-VirtualBox:~/Desktop$ ls
arquivo.txt escrita escrita2
enricobonela@enricobonela-VirtualBox:~/Desktop$ head escrita
1
2
3
4
enricobonela@enricobonela-VirtualBox:~/Desktop$ head -1 escrita
1
enricobonela@enricobonela-VirtualBox:~/Desktop$ tail escrita
1
2
3
4
enricobonela@enricobonela-VirtualBox:~/Desktop$ tail -1 escrita
4
enricobonela@enricobonela-VirtualBox:~/Desktop$
```

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ nl escrita
1 1
2 2
3 3
4 4
enricobonela@enricobonela-VirtualBox:~/Desktop$ nl escrita2
1 4
2 5
3 6
4 7
enricobonela@enricobonela-VirtualBox:~/Desktop$ nl arquivo
1 VW PARATI
2 CHEVY S10
3 FIAT UNO
enricobonela@enricobonela-VirtualBox:~/Desktop$ paste arquivo escrita
VW PARATI      1
CHEVY S10      2
FIAT UNO       3
               4
enricobonela@enricobonela-VirtualBox:~/Desktop$ S

```

O comando `wc [opções] [arquivo]` retorna uma contagem da quantidade de linhas, palavras, caracteres de arquivos

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ ls
arquivo escrita escrita2
enricobonela@enricobonela-VirtualBox:~/Desktop$ cat arquivo
VW PARATI
CHEVY S10
FIAT UNO
enricobonela@enricobonela-VirtualBox:~/Desktop$ wc -l arquivo
4 arquivo
enricobonela@enricobonela-VirtualBox:~/Desktop$ wc -w arquivo
6 arquivo
enricobonela@enricobonela-VirtualBox:~/Desktop$ wc -c arquivo
30 arquivo
enricobonela@enricobonela-VirtualBox:~/Desktop$ wc arquivo
4 6 30 arquivo
enricobonela@enricobonela-VirtualBox:~/Desktop$

```

O comando `whoami` apresenta o nome de usuário atual.

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ whoami
enricobonela
enricobonela@enricobonela-VirtualBox:~/Desktop$ pwd
/home/enricobonela/Desktop
enricobonela@enricobonela-VirtualBox:~/Desktop$ users
enricobonela
enricobonela@enricobonela-VirtualBox:~/Desktop$ S

```

O comando `free` pode ser utilizado para monitorar a memória utilizada do sistema.

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ free
              total        used        free      shared  buff/cache   available
Mem:           4969792       496472       3177136          1552       1296184       4214044
Swap:           459260           0         459260
enricobonela@enricobonela-VirtualBox:~/Desktop$

```

O comando `uname`, exibe as seguintes informações do sistema.

- -a: todas as informações;
- -m: tipo de máquina (ou, hardware);
- -p: características do processador (CPU);
- -r: versão do sistema operacional;
- -s: nome do sistema operacional.



```

enricobonela@enricobonela-VirtualBox:~/Desktop$ uname -s
Linux
enricobonela@enricobonela-VirtualBox:~/Desktop$ uname -r
5.15.0-48-generic
enricobonela@enricobonela-VirtualBox:~/Desktop$ uname -m
x86_64
enricobonela@enricobonela-VirtualBox:~/Desktop$ uname -n
enricobonela-VirtualBox
enricobonela@enricobonela-VirtualBox:~/Desktop$ uname -a
Linux enricobonela-VirtualBox 5.15.0-48-generic #54~20.04.1-Ubuntu SMP Thu Sep 1 16:17:26 UTC 2022 x86_64 x86_64
4 x86_64 GNU/Linux
enricobonela@enricobonela-VirtualBox:~/Desktop$

```

O comando *uptime* exibe informações sobre o período em que o sistema está operando. O comando *which* localiza o arquivo executável que está associado à algum programa. O comando *who* exibe os usuários que estão conectados no sistema.

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ uptime
16:52:20 up 30 min, 1 user, load average: 0,06, 0,32, 0,22
enricobonela@enricobonela-VirtualBox:~/Desktop$ which ls
/usr/bin/ls
enricobonela@enricobonela-VirtualBox:~/Desktop$ which gcc
enricobonela@enricobonela-VirtualBox:~/Desktop$ which python
enricobonela@enricobonela-VirtualBox:~/Desktop$ which python3
/usr/bin/python3
enricobonela@enricobonela-VirtualBox:~/Desktop$ who
enricobonela tty7          2022-10-08 16:22 (:0)
enricobonela@enricobonela-VirtualBox:~/Desktop$

```

O comando *ps* exibe informações sobre os processos que estão em execução na máquina. Sendo algumas opções:

- -a : processos de todos os usuários.
- -e : mostra todos os processos.
- -f : mostra a árvore de execução de comandos.
- -u : fornece o nome do usuário e a hora de início do processo.

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ ps -a
  PID TTY          TIME CMD
 15436 pts/0    00:00:00 ps
enricobonela@enricobonela-VirtualBox:~/Desktop$ ps -af
  UID      PID  PPID  C STIME TTY          TIME CMD
enricob+  15437   1135  0 17:01 pts/0    00:00:00 ps -af
enricobonela@enricobonela-VirtualBox:~/Desktop$ ps -au
  USER      PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
  root         716   0.2  1.4 261360 74196 tty7      Rsl+  16:21   0:05 /usr/lib/xorg/Xorg -core :0 -seat seat0 -aut
  root         717   0.0  0.0  18776  1804 tty1      Ss+   16:21   0:00 /sbin/agetty -o -p -- \u --noclear tty1 linu
enricob+   1135   0.0  0.1  20960  4980 pts/0    Ss    16:23   0:00 bash
enricob+  15439   0.0  0.0  21836  3388 pts/0    R+    17:01   0:00 ps -au
enricobonela@enricobonela-VirtualBox:~/Desktop$

```



```

enricobonela@enricobonela-VirtualBox:~/Desktop$ pstree
systemd--ModemManager--2*[{ModemManager}]
systemd--NetworkManager--2*[{NetworkManager}]
systemd--accounts-daemon--2*[{accounts-daemon}]
systemd--acpid
systemd--agetty
systemd--avahi-daemon--avahi-daemon
systemd--blueman-tray--2*[{blueman-tray}]
systemd--colord--2*[{colord}]
systemd--cron
systemd--cups-browsed--2*[{cups-browsed}]
systemd--cupsd
systemd--dbus-daemon
systemd--gnome-keyring-d--3*[{gnome-keyring-d}]
systemd--2*[{kerneloops}]
systemd--lightdm--Xorg--{Xorg}
systemd--lightdm--lightdm--xfce4-session--Thunar--2*[{Thunar}]
systemd--lightdm--lightdm--lightdm--xfce4-session--aplet.py
systemd--lightdm--lightdm--lightdm--xfce4-session--blueman-applet--3*[{blueman-applet}]
systemd--lightdm--lightdm--lightdm--xfce4-session--nm-applet--3*[{nm-applet}]
systemd--lightdm--lightdm--lightdm--xfce4-session--polkit-gnome-au--2*[{polkit-gnome-au}]
systemd--lightdm--lightdm--lightdm--xfce4-session--ssh-agent
systemd--lightdm--lightdm--lightdm--xfce4-session--update-notifier--3*[{update-notifier}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfce4-panel--panel-1-whisker--2*[{panel-1-whisker}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfce4-panel--panel-10-pulsea--2*[{panel-10-pulsea}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfce4-panel--panel-5-systray--2*[{panel-5-systray}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfce4-panel--panel-6-notific--2*[{panel-6-notific}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfce4-panel--panel-7-indicat--2*[{panel-7-indicat}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfce4-panel--panel-8-statusn--2*[{panel-8-statusn}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfce4-panel--panel-9-power-m--2*[{panel-9-power-m}]
systemd--lightdm--lightdm--lightdm--xfce4-session--2*[{xfce4-panel}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfdesktop--2*[{xfdesktop}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xfwm4--3*[{xfwm4}]
systemd--lightdm--lightdm--lightdm--xfce4-session--xicc--2*[{xicc}]
systemd--lightdm--lightdm--lightdm--2*[{xfce4-session}]
systemd--lightdm--2*[{lightdm}]
systemd--2*[{lightdm}]
systemd--networkd-dispat

```

Através do comando *dig* é possível acessar informações de DNS do endereço fornecido

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ dig www.ufu.br

; <<>> DiG 9.16.1-Ubuntu <<>> www.ufu.br
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 37696
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;www.ufu.br.                IN      A

;; ANSWER SECTION:
www.ufu.br.                 31      IN      A      200.19.145.55

;; Query time: 20 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: sáb out 08 17:08:37 -03 2022
;; MSG SIZE rcvd: 55

enricobonela@enricobonela-VirtualBox:~/Desktop$ nslookup www.ufu.br
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   www.ufu.br
Address: 200.19.145.55

enricobonela@enricobonela-VirtualBox:~/Desktop$

```

O comando *traceroute* exibe a rota que algum determinado pacote percorre até encontrar o outro host. Este comando é bastante útil para identificar onde está ocorrendo algum problema na conexão entre os hosts. O comando *tracert* rastreia um caminho para um endereço de rede designado, relatando o "tempo de vida" ou o atraso TTL.

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ traceroute www.ufu.br

Command 'traceroute' not found, but can be installed with:

sudo apt install inetutils-traceroute # version 2:1.9.4-11ubuntu0.1, or
sudo apt install traceroute          # version 1:2.1.0-2

enricobonela@enricobonela-VirtualBox:~/Desktop$ tracepath www.ufu.br
 17: [LOCALHOST] pmtu 1500
 1: _gateway 0.522ms
 1: _gateway 0.621ms
 2: _gateway 4.380ms reached
Resume: pmtu 1500 hops 2 back 1
enricobonela@enricobonela-VirtualBox:~/Desktop$ █

```

Uma prática importante para o desenvolvimento é gerenciar e manter os pacotes do sistema atualizados. O comando *apt update* muitas vezes requer acesso de superusuário, através da instrução *sudo*.

```

dsudo: 3 incorrect password attempts
enricobonela@enricobonela-VirtualBox:~/Desktop$ sudo apt update
[sudo] password for enricobonela:
[sudo] password for enricobonela:
Sorry, try again.
[sudo] password for enricobonela:
Hit:1 http://br.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1.752 kB]
Get:4 http://br.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:5 http://br.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:6 http://br.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [2.129 kB]
Get:7 http://br.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [728 kB]
Get:8 http://br.archive.ubuntu.com/ubuntu focal-updates/main amd64 DEP-11 Metadata [277 kB]
Get:9 http://br.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [16,0 kB]
Get:10 http://br.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [964 kB]
Get:11 http://br.archive.ubuntu.com/ubuntu focal-updates/universe i386 Packages [695 kB]
Get:12 http://br.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [391 kB]
Get:13 http://br.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [21,6 kB]
Get:14 http://br.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 DEP-11 Metadata [944 B]
Get:15 http://br.archive.ubuntu.com/ubuntu focal-backports/main amd64 DEP-11 Metadata [7.992 B]
Get:16 http://br.archive.ubuntu.com/ubuntu focal-backports/universe amd64 DEP-11 Metadata [30,5 kB]
Get:17 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [498 kB]
Get:18 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [40,8 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [11,1 kB]
Get:20 http://security.ubuntu.com/ubuntu focal-security/universe i386 Packages [564 kB]
Get:21 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [735 kB]
Get:22 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [77,4 kB]
Get:23 http://security.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [15,2 kB]
Get:24 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [2.468 B]
Fetched 9.293 kB in 9s (989 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
41 packages can be upgraded. Run 'apt list --upgradable' to see them.
enricobonela@enricobonela-VirtualBox:~/Desktop$ █

```

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ uname -a
Linux enricobonela-VirtualBox 5.15.0-48-generic #54~20.04.1-Ubuntu SMP Thu Sep 1 16:17:26 UTC 2022 x86_64 x86_6
4 x86_64 GNU/Linux
enricobonela@enricobonela-VirtualBox:~/Desktop$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
Address sizes:         39 bits physical, 48 bits virtual
CPU(s):                1
On-line CPU(s) list:   0
Thread(s) per core:    1
Core(s) per socket:    1
Socket(s):             1
NUMA node(s):         1
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 142
Model name:            Intel(R) Core(TM) i7-8565U CPU @ 1.80GHz
Stepping:              12
CPU MHz:               1992.003
BogoMIPS:              3984.00
Hypervisor vendor:     KVM
Virtualization type:   full
L1d cache:             32 KiB
L1i cache:             32 KiB
L2 cache:              256 KiB
L3 cache:              8 MiB
NUMA node0 CPU(s):    0
Vulnerability Itlb multihit: KVM: Mitigation: VMX unsupported
Vulnerability L1tf:     Not affected
Vulnerability Mds:      Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Mitigation; Clear CPU buffers; SMT Host state unknown
Vulnerability Retbleed: Vulnerable
Vulnerability Spec store bypass: Vulnerable
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Retpolines, STIBP disabled, RSB filling
Vulnerability Srbds:     Unknown: Dependent on hypervisor status

```

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ lsusb
Bus 001 Device 002: ID 80ee:0021 VirtualBox USB Tablet
Bus 001 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
enricobonela@enricobonela-VirtualBox:~/Desktop$ lspci
00:00.0 Host bridge: Intel Corporation 440FX - 82441FX PMC [Natoma] (rev 02)
00:01.0 ISA bridge: Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
00:01.1 IDE interface: Intel Corporation 82371AB/EB/MB PIIX4 IDE (rev 01)
00:02.0 VGA compatible controller: VMware SVGA II Adapter
00:03.0 Ethernet controller: Intel Corporation 82540EM Gigabit Ethernet Controller (rev 02)
00:04.0 System peripheral: InnoTek Systemberatung GmbH VirtualBox Guest Service
00:05.0 Multimedia audio controller: Intel Corporation 82801AA AC'97 Audio Controller (rev 01)
00:06.0 USB controller: Apple Inc. KeyLargo/Intrepid USB
00:07.0 Bridge: Intel Corporation 82371AB/EB/MB PIIX4 ACPI (rev 08)
00:0d.0 SATA controller: Intel Corporation 82801HM/HEM (ICH8M/ICH8M-E) SATA Controller [AHCI mode] (rev 02)
enricobonela@enricobonela-VirtualBox:~/Desktop$ lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
sda 8:0 0 10G 0 disk
├─sda1 8:1 0 512M 0 part /boot/efi
├─sda2 8:2 0 1K 0 part
└─sda5 8:5 0 9,5G 0 part /
sr0 11:0 1 1024M 0 rom
sr1 11:1 1 1024M 0 rom
sr2 11:2 1 1,8G 0 rom
enricobonela@enricobonela-VirtualBox:~/Desktop$

```

```

enricobonela@enricobonela-VirtualBox:~/Desktop$ sudo fdisk -l
Disk /dev/sda: 10 GiB, 10737418240 bytes, 20971520 sectors
Disk model: VBOX HARDDISK
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x70583d54

Device Boot Start End Sectors Size Id Type
/dev/sda1 * 2048 1050623 1048576 512M b W95 FAT32
/dev/sda2 1052670 20969471 19916802 9,5G 5 Extended
/dev/sda5 1052672 20969471 19916800 9,5G 83 Linux
enricobonela@enricobonela-VirtualBox:~/Desktop$ free
              total        used        free      shared  buff/cache   available
Mem:      4969792       490824       2920564         1552       1558404       4215348
Swap:      459260           0         459260
enricobonela@enricobonela-VirtualBox:~/Desktop$ s

```

```
enricobonela@enricobonela-VirtualBox:~/Desktop$  
enricobonela@enricobonela-VirtualBox:~/Desktop$ vmstat -s  
4969792 K total memory  
490820 K used memory  
400020 K active memory  
1384572 K inactive memory  
2920564 K free memory  
86204 K buffer memory  
1472204 K swap cache  
459260 K total swap  
0 K used swap  
459260 K free swap  
9277 non-nice user cpu ticks  
4338 nice user cpu ticks  
4716 system cpu ticks  
364849 idle cpu ticks  
9582 IO-wait cpu ticks  
0 IRQ cpu ticks  
184 softirq cpu ticks  
0 stolen cpu ticks  
1015144 pages paged in  
994857 pages paged out  
0 pages swapped in  
0 pages swapped out  
1590847 interrupts  
1463053 CPU context switches  
1665256887 boot time  
15892 forks  
enricobonela@enricobonela-VirtualBox:~/Desktop$ lsman  
Command 'lsman' not found, did you mean:  
  
  command 'lsmem' from deb util-linux (2.34-0.1ubuntu9.3)  
Try: sudo apt install <deb name>  
enricobonela@enricobonela-VirtualBox:~/Desktop$
```