

# Linux Lab 2

## 1. List the available shells in your system.

```
nada@nada-VirtualBox:~/docs$ cat /etc/shells
# /etc/shells: valid login shells
/bin/sh
/bin/bash
/usr/bin/bash
/bin/rbash
/usr/bin/rbash
/usr/bin/sh
/bin/dash
/usr/bin/dash
nada@nada-VirtualBox:~/docs$
```

## 2. List all of the environment variables in your current shell.

**Command:** nada@nada-VirtualBox:~\$ printenv

```
nada@nada-VirtualBox:~$ printenv
SHELL=/bin/bash
SESSION_MANAGER=local/nada-VirtualBox:@/tmp/.ICE-unix/1767,unix/nada-VirtualBox:/tmp/.ICE-unix/1767
QT_ACCESSIBILITY=1
COLORTERM=truecolor
XDG_CONFIG_DIRS=/etc/xdg/xdg-ubuntu:/etc/xdg
SSH_AGENT_LAUNCHER=gnome-keyring
XDG_MENU_PREFIX=gnome-
GNOME_DESKTOP_SESSION_ID=this-is-deprecated
LC_ADDRESS=ar_EG.UTF-8
GNOME_SHELL_SESSION_MODE=ubuntu
LC_NAME=ar_EG.UTF-8
SSH_AUTH_SOCK=/run/user/1000/keyring/ssh
XMODIFIERS=@im=ibus
DESKTOP_SESSION=ubuntu
LC_MONETARY=ar_EG.UTF-8
GTK_MODULES=gail:atk-bridge
PWD=/home/nada
LOGNAME=nada
XDG_SESSION_DESKTOP=ubuntu
XDG_SESSION_TYPE=wayland
SYSTEMD_EXEC_PID=1792
XAUTHORITY=/run/user/1000/.mutter-Xwaylandauth.1L9941
HOME=/home/nada
USERNAME=nada
IM_CONFIG_PHASE=1
LC_PAPER=ar_EG.UTF-8
LANG=en_US.UTF-8
LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;
2;ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:*.arc=01;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:*.lz4=01;31:*.lzh=01;31:*.lzma=01;31:*.t
z=01;31:*.txz=01;31:*.tzo=01;31:*.t7z=01;31:*.zip=01;31:*.z=01;31:*.dz=01;31:*.gz=01;31:*.lrz=01;31:*.lz=01;31:*.lzo=01;31:*.xz=01;31:*.zst=0
;31:*.tztst=01;31:*.bz2=01;31:*.tbz=01;31:*.tbz2=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar=01;31:*.war=01;31:*.ear=01;31:*.sar
01;31:*.rar=01;31:*.alz=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.sz=01;31:*.cab=01;31:*.wim=01;31:*.swm=01;31:*.dmg=01;31:*.ad
```

## 3. Display your current shell name.

```
nada@nada-VirtualBox:~$ echo $SHELL
/bin/bash
nada@nada-VirtualBox:~$
```

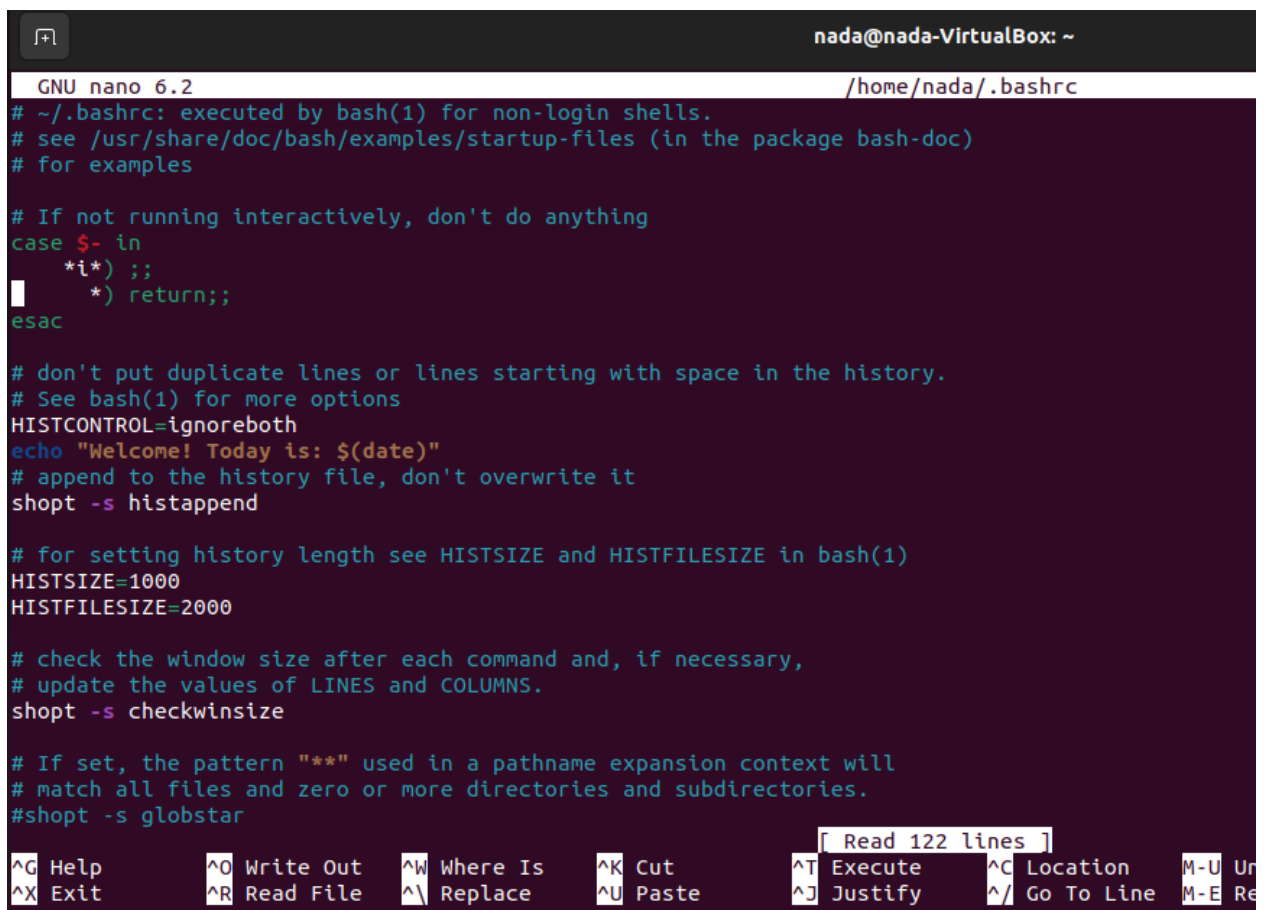
#### 4. List all of the environment variables for the Bash shell.

**Command:** nada@nada-VirtualBox:~\$ printenv (??)

#### 5. Edit your shell profile to display the date at login and change your prompt.

- Get into the bashrc using nano
- Type: echo "Welcome! Today is: \$(date) "
- Re-run .bashrc file in the current shell session.

```
nada@nada-VirtualBox:~$ nano ~/.bashrc
nada@nada-VirtualBox:~$ source ~/.bashrc
Welcome! Today is: 06 2025 أبر, EET 11:59:07 م
nada@nada-VirtualBox:~$
```



```
nada@nada-VirtualBox: ~
GNU nano 6.2 /home/nada/.bashrc
# ~/.bashrc: executed by bash(1) for non-login shells.
# see /usr/share/doc/bash/examples/startup-files (in the package bash-doc)
# for examples

# If not running interactively, don't do anything
case $- in
  *i*) ;;
  *) return;;
esac

# don't put duplicate lines or lines starting with space in the history.
# See bash(1) for more options
HISTCONTROL=ignoreboth
echo "Welcome! Today is: $(date)"
# append to the history file, don't overwrite it
shopt -s histappend

# for setting history length see HISTSIZE and HISTFILESIZE in bash(1)
HISTSIZE=1000
HISTFILESIZE=2000

# check the window size after each command and, if necessary,
# update the values of LINES and COLUMNS.
shopt -s checkwinsize

# If set, the pattern "*" used in a pathname expansion context will
# match all files and zero or more directories and subdirectories.
#shopt -s globstar

Read 122 lines
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute  ^C Location  M-U Un
^X Exit      ^R Read File ^\ Replace  ^U Paste     ^J Justify  ^_ Go To Line M-E Re
```

## 6. Redirect the output of the ls command to a file called file\_list.txt.

Use > to redirect to a file.

```
nada@nada-VirtualBox:~$ ls > file_list.txt
nada@nada-VirtualBox:~$ cat file_list.txt
Desktop
docs
Documents
Downloads
file_list.txt
Music
oldpasswd
Pictures
Public
snap
Templates
Videos
x-tools
nada@nada-VirtualBox:~$ ls
Desktop docs Documents Downloads file_list.txt Music oldpasswd Pictures Pub
nada@nada-VirtualBox:~$
```

## 7. Use file globbing to list all .txt files in the current directory.

```
nada@nada-VirtualBox:~$ ls *.txt
file_list.txt
nada@nada-VirtualBox:~$
```

## 8. Redirect the output of the ls command to a file and append it.

Use >> to redirect to a file and append to it.

```
nada@nada-VirtualBox:~$ echo "Hello Ubuntu!" > file_list2.txt
nada@nada-VirtualBox:~$ ls >> file_list2.txt
nada@nada-VirtualBox:~$ cat file_list2.txt
Hello Ubuntu!
Desktop
docs
Documents
Downloads
file_list2.txt
file_list.txt
Music
oldpasswd
Pictures
Public
snap
Templates
Videos
x-tools
nada@nada-VirtualBox:~$
```

9. Use a pipe to send the output of `ls` to the `grep` command to filter for files containing the word "report".

```
nada@nada-VirtualBox:~$ touch report1.txt report2
nada@nada-VirtualBox:~$ ls | grep "report"
report1.txt
report2
nada@nada-VirtualBox:~$ rm report1.txt report2
nada@nada-VirtualBox:~$
```

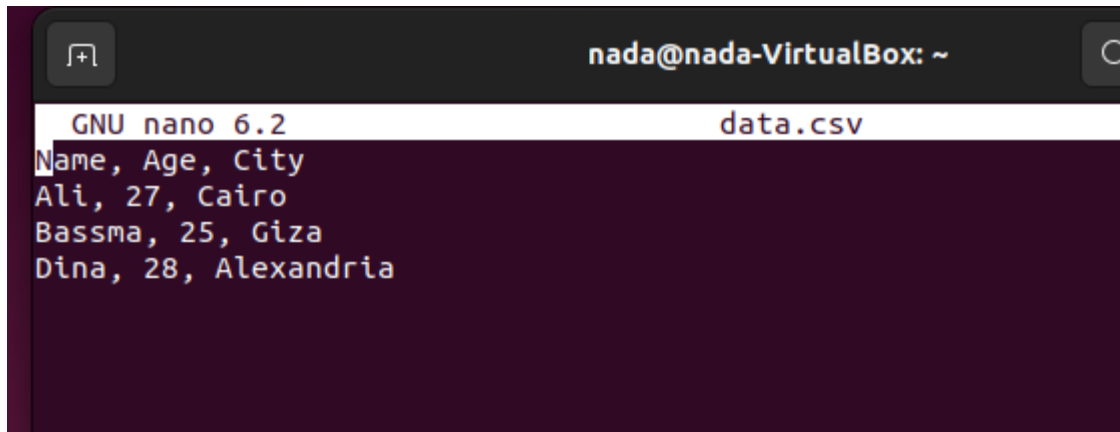
10. Use `head` to view the first 10 lines of a file, and `tail` to view the last 10 lines.

```
nada@nada-VirtualBox:~$ head -n 10 file_list2.txt
Hello Ubuntu!
Desktop
docs
Documents
Downloads
file_list2.txt
file_list.txt
Music
oldpasswd
Pictures
nada@nada-VirtualBox:~$ tail -n 10 file_list2.txt
file_list2.txt
file_list.txt
Music
oldpasswd
Pictures
Public
snap
Templates
Videos
x-tools
nada@nada-VirtualBox:~$
```

11. Use `cut` to extract the second column of a file called `data.csv`.

- Create the file using `touch`
- Get into it using `nano`
- Fill it with some content of rows and columns (then: `ctrl x`, `y`, `enter`)
- Extract using `cut` command

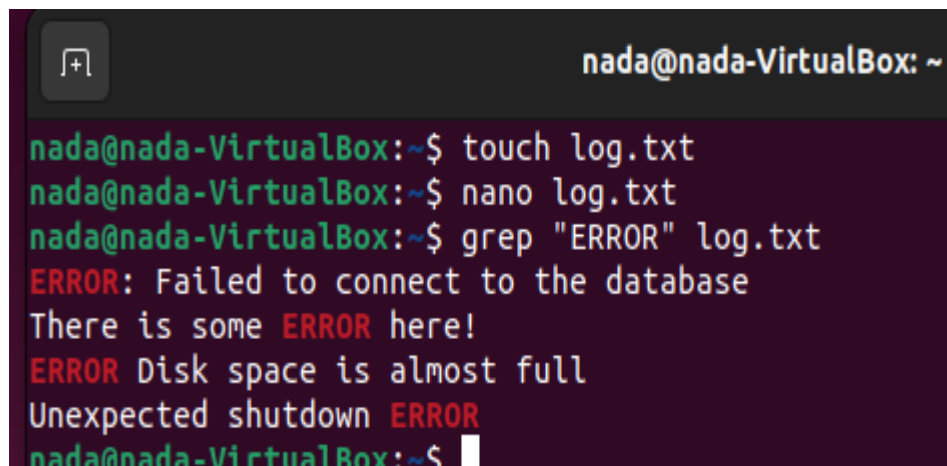
```
nada@nada-VirtualBox:~$ touch data.csv
nada@nada-VirtualBox:~$ nano data.csv
nada@nada-VirtualBox:~$
nada@nada-VirtualBox:~$ cut -d',' -f2 data.csv
Age
27
25
28
nada@nada-VirtualBox:~$
```



```
nada@nada-VirtualBox: ~
GNU nano 6.2 data.csv
Name, Age, City
Ali, 27, Cairo
Bassma, 25, Giza
Dina, 28, Alexandria
```

**12. Search for all lines in a file called log.txt that contain the word "ERROR" using grep.**

- Create the file
- Get into it using `nano`
- Fill it with some content
- Search for the word using `grep` command



```
nada@nada-VirtualBox: ~
nada@nada-VirtualBox:~$ touch log.txt
nada@nada-VirtualBox:~$ nano log.txt
nada@nada-VirtualBox:~$ grep "ERROR" log.txt
ERROR: Failed to connect to the database
There is some ERROR here!
ERROR Disk space is almost full
Unexpected shutdown ERROR
nada@nada-VirtualBox:~$
```

```
GNU nano 6.2                                log.txt
INFO System initialized
ERROR: Failed to connect to the database
DEBUG Connection retrying
There is some ERROR here!
INFO: User logged in
ERROR Disk space is almost full
DEBUG: Memory usage normal
Unexpected shutdown ERROR
INFO: User logged out
```

13. Create a shell variable called `current_user` to store the output of the `whoami` command.

(There should NOT be spaces around the = sign)

```
nada@nada-VirtualBox:~$ current_user=$(whoami)
nada@nada-VirtualBox:~$ echo $current_user
nada
nada@nada-VirtualBox:~$
```

14. Use `tr` to convert a string of lowercase letters to uppercase.

```
nada@nada-VirtualBox:~$ echo "hello ubuntu" | tr '[:lower:]' '[:upper:]'
HELLO UBUNTU
nada@nada-VirtualBox:~$ echo "hello ubuntu" | tr '[a-z]' '[A-Z]'
HELLO UBUNTU
nada@nada-VirtualBox:~$
```

15. Use a pipe to send the output of `ps` to `grep` to search for a specific process name.

```
nada@nada-VirtualBox:~$ ps
  PID TTY          TIME CMD
 95166 pts/0        00:00:00 bash
 95656 pts/0        00:00:00 ps
nada@nada-VirtualBox:~$ ps | grep "bash"
 95166 pts/0        00:00:00 bash
nada@nada-VirtualBox:~$
```

**16. Create a Bash alias named ls for the command ls -l.**

(Unalias is to delete the alias.)

```
nada@nada-VirtualBox:~$ alias ls="ls -l"
nada@nada-VirtualBox:~$ alias ls
alias ls='ls -l'
nada@nada-VirtualBox:~$ unalias ls
nada@nada-VirtualBox:~$ alias ls
bash: alias: ls: not found
nada@nada-VirtualBox:~$
```

**17. Use sort to sort the output of ls -l by file size.**

```
nada@nada-VirtualBox: ~
nada@nada-VirtualBox:~$ ls -l --sort=size
total 64
drwxr-xr-x 6 nada nada 4096 2023 25 ملي Desktop
drwxrwxr-x 2 nada nada 4096 02:34 6 ابر docs
drwxr-xr-x 2 nada nada 4096 2023 4 ملي Documents
drwxr-xr-x 3 nada nada 4096 2023 25 ملي Downloads
drwxr-xr-x 2 nada nada 4096 2023 4 ملي Music
drwxr-xr-x 3 nada nada 4096 2023 20 ملي Pictures
drwxr-xr-x 2 nada nada 4096 2023 4 ملي Public
drwx----- 6 nada nada 4096 2023 20 ملي snap
drwxr-xr-x 2 nada nada 4096 2023 4 ملي Templates
drwxr-xr-x 2 nada nada 4096 2023 4 ملي Videos
drwxrwxr-x 3 nada nada 4096 2023 4 ملي x-tools
-rw-r--r-- 1 nada nada 3086 00:21 6 ابر oldpasswd
-rw-rw-r-- 1 nada nada 245 00:32 7 ابر log.txt
-rw-rw-r-- 1 nada nada 138 00:14 7 ابر file_list2.txt
-rw-rw-r-- 1 nada nada 109 00:04 7 ابر file_list.txt
-rw-rw-r-- 1 nada nada 69 00:27 7 ابر data.csv
nada@nada-VirtualBox:~$
```

**18. Use grep to count the number of lines that contain the word "success" in a file.**

- Create the file
- Get into it using nano to fill it with some content
- Count the number of lines containing the word using grep command



```
nada@nada-VirtualBox:~$ touch file_list3.txt
nada@nada-VirtualBox:~$ nano file_list3.txt
nada@nada-VirtualBox:~$ grep -c 'success' file_list3.txt
3
```

```
GNU nano 6.2 file_list3.txt
The operation was a success after many retries.
There were challenges along the way,
but we eventually achieved success.
success comes to those who persevere, and it happened today.
After hours of work, we had a huge progress with the project.
```

19. Redirect the output of the dmesg command to a file and view the first 20 lines using head.

```
nada@nada-VirtualBox: ~
nada@nada-VirtualBox:~$ sudo dmesg > file_list4.txt; head -n 20 file_list4.txt
[sudo] password for nada:
[ 0.000000] Linux version 5.19.0-41-generic (buildd@lcy02-amd64-045) (x86_64-
linux-gnu-gcc (Ubuntu 11.3.0-1ubuntu1~22.04.1) 11.3.0, GNU ld (GNU Binutils for
Ubuntu) 2.38) #42~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Tue Apr 18 17:40:00 UTC 2 (
Ubuntu 5.19.0-41.42~22.04.1-generic 5.19.17)
[ 0.000000] Command line: BOOT_IMAGE=/boot/vmlinuz-5.19.0-41-generic root=UUI
D=6ebe9b28-d401-4ec4-9bb7-b95f145e6e60 ro quiet splash
[ 0.000000] KERNEL supported cpus:
[ 0.000000] Intel GenuineIntel
[ 0.000000] AMD AuthenticAMD
[ 0.000000] Hygon HygonGenuine
[ 0.000000] Centaur CentaurHauls
[ 0.000000] zhaoxin Shanghai
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x001: 'x87 floating point regi
sters'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x002: 'SSE registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x004: 'AVX registers'
[ 0.000000] x86/fpu: xstate_offset[2]: 576, xstate_sizes[2]: 256
[ 0.000000] x86/fpu: Enabled xstate features 0x7, context size is 832 bytes,
using 'standard' format.
[ 0.000000] signal: max sigframe size: 1776
[ 0.000000] BIOS-provided physical RAM map:
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x0000000000009fbff] usable
```



20. Use cut to extract the first field from a CSV file and display it.

```
nada@nada-VirtualBox:~$ touch data2.csv
nada@nada-VirtualBox:~$ nano data2.csv
nada@nada-VirtualBox:~$ cut -d' ' -f1 data2.csv
Name
Ali
Bassma
Dina
nada@nada-VirtualBox:~$ cut -f1 -d' ' data2.csv
Name
Ali
Bassma
Dina
nada@nada-VirtualBox:~$
```

```
GNU nano 6.2 data2.csv
Name Age City
Ali 27 Cairo
Bassma 25 Giza
Dina 28 Alexandria
```

## Content of Files created

<i>data.csv</i>	<i>file_list3.txt</i>
Name, Age, City	The operation was a success after many retries.
Ali, 27, Cairo	There were challenges along the way,
Bassma, 25, Giza	But we eventually achieved success.
Dina, 28, Alexandria	success comes to those who persevere, and it happened today.
	After hours of work, we had a huge progress with the project.
<i>log.txt</i>	<i>data2.csv</i>
INFO System initialized	Name Age City
ERROR: Failed to connect to the database	Ali 27 Cairo
DEBUG Connection retrying	Bassma 25 Giza
There is some ERROR here!	Dina 28 Alexandria
INFO: User logged in	
ERROR Disk space is almost full	
DEBUG: Memory usage normal	
Unexpected shutdown ERROR	
INFO: User logged out	