



IUS
INSTITUT
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DES SCIENCES

**FACULTÉ DES SCIENCES ET DES TECHNOLOGIES
(FST)**

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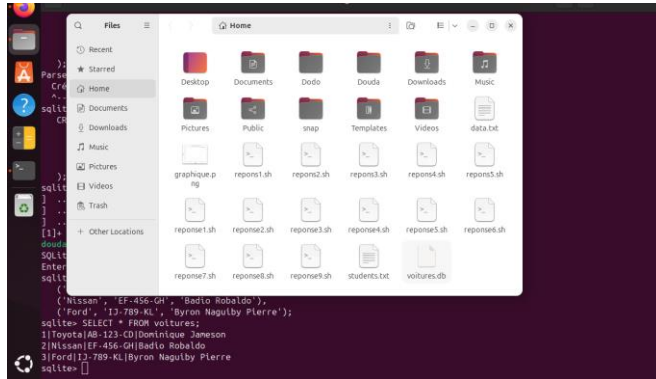
3^{ième} année

Année :

2024-2025

Le 06/03/2025

Exécution du TD



```
douda@douda:~$ sudo apt update
Warning: The unit file, source configuration file or drop-ins of apt-news.service changed on disk. Run 'systemctl daemon
-reload' to reload units.
Warning: The unit file, source configuration file or drop-ins of esm-cache.service changed on disk. Run 'systemctl daemo
n-reload' to reload units.
Get:1 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Hit:2 http://ht.archive.ubuntu.com/ubuntu noble InRelease
Get:3 http://ht.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://ht.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [616 kB]
Get:6 http://ht.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [853 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [8,988 B]
Get:8 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:9 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [803 kB]
Get:10 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.0 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:12 http://ht.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [193 kB]
```

```
douda@douda:~$ sudo apt install gnuplot
[sudo] password for douda:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  aglfn gnuplot-data gnuplot-qt libdouble-conversion3 libmd4c0 libpcre2-16-0 libpcre2-32-0 libpcre2-8-0 libqt5core5t64
  libqt5dbus5t64 libqt5gui5t64 libqt5network5t64 libqt5printsupport5t64 libqt5qml5 libqt5qmlmodels5 libqt5quick5
  libqt5svg5 libqt5waylandclient5 libqt5waylandcompositor5 libqt5widgets5t64 libxbase3.2-1t64 libxkbcommon0 libxkb-xinput0
  qt5-gtk-platformtheme qttranslations5-l10n qwtwayland5
Suggested packages:
  gnuplot-doc qgnomeplatform-qt5 qt5-l10n-tools qt5-gui-tools qt5-qmltooling-plugins
The following NEW packages will be installed:
  aglfn gnuplot gnuplot-data gnuplot-qt libdouble-conversion3 libmd4c0 libpcre2-16-0 libqt5core5t64 libqt5dbus5t64
  libqt5gui5t64 libqt5network5t64 libqt5printsupport5t64 libqt5qml5 libqt5qmlmodels5 libqt5quick5 libqt5svg5
  libqt5waylandclient5 libqt5waylandcompositor5 libqt5widgets5t64 libxbase3.2-1t64 libxkbcommon0 libxkb-xinput0
  qt5-gtk-platformtheme qttranslations5-l10n qwtwayland5
The following packages will be upgraded:
  libpcre2-32-0 libpcre2-8-0
2 upgraded, 26 newly installed, 0 to remove and 288 not upgraded.
Need to get 23.7 MB of archives.
After this operation, 89.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ht.archive.ubuntu.com/ubuntu noble-updates/main amd64 libpcre2-8-0 amd64 10.42-4ubuntu2.1 [227 kB]
Get:2 http://ht.archive.ubuntu.com/ubuntu noble/universe amd64 aglfn all 1.7-g1t20191031.4036a9c-2 [30.6 kB]
Get:3 http://ht.archive.ubuntu.com/ubuntu noble/universe amd64 gnuplot-data all 6.0.0+dfsg1-1ubuntu3 [75.3 kB]
Get:4 http://ht.archive.ubuntu.com/ubuntu noble/universe amd64 libdouble-conversion3 amd64 3.3.0-1build1 [40.3 kB]
Get:5 http://ht.archive.ubuntu.com/ubuntu noble-updates/main amd64 libpcre2-16-0 amd64 10.42-4ubuntu2.1 [210 kB]
Get:6 http://ht.archive.ubuntu.com/ubuntu noble/universe amd64 libqt5core5t64 amd64 5.15.13+dfsg-1ubuntu1 [2,011 kB]
```

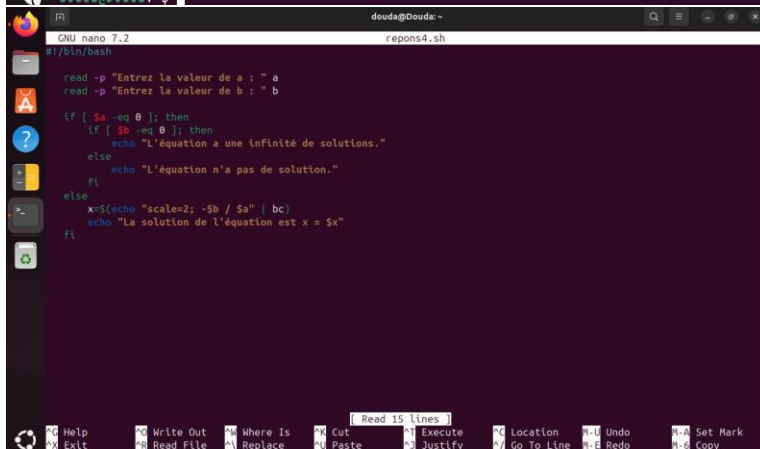
```
douda@douda:~$ sqlite3 --version
3.45.1 2024-01-30 16:01:20 e876e51a0ed5c5b3126f52e532044363a014bc594cfef87ff5b82257cca1t1 (64-bit)
```

```
douda@douda:~$ sudo apt install sqlite3
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libsqlite3-0
Suggested packages:
  sqlite3-doc
The following NEW packages will be installed:
  sqlite3
The following packages will be upgraded:
  libsqlite3-0
1 upgraded, 1 newly installed, 0 to remove and 218 not upgraded.
Need to get 845 kB of archives.
After this operation, 583 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ht.archive.ubuntu.com/ubuntu noble-updates/main amd64 libsqlite3-0 amd64 3.45.1-1ubuntu2.1 [701 kB]
Get:2 http://ht.archive.ubuntu.com/ubuntu noble-updates/main amd64 sqlite3 amd64 3.45.1-1ubuntu2.1 [144 kB]
Fetched 845 kB in 3s (247 kB/s)
(Reading database ... 149065 files and directories currently installed.)
Preparing to unpack .../libsqlite3-0_3.45.1-1ubuntu2.1_amd64.deb ...
Unpacking libsqlite3-0:amd64 (3.45.1-1ubuntu2.1) over (3.45.1-1ubuntu2) ...
Selecting previously unselected package sqlite3.
Preparing to unpack .../sqlite3_3.45.1-1ubuntu2.1_amd64.deb ...
Unpacking sqlite3 (3.45.1-1ubuntu2.1) ...
```

```
sqlite>
CREATE TABLE voitures (
  id INTEGER PRIMARY KEY AUTOINCREMENT,
  marque TEXT NOT NULL,
  plaque_immatriculation TEXT NOT NULL,
  proprietaire TEXT NOT NULL
);
```

```
sqlite> INSERT INTO voitures (marque, plaque_immatriculation, proprietaire) VALUES
('Toyota', 'AB-123-CD', 'Dominique Jameson'),
('Nissan', 'EF-456-GH', 'Badio Robaldo'),
('Ford', 'IJ-789-KL', 'Byron Naguiby Pierre');
sqlite> SELECT * FROM voitures;
1|Toyota|AB-123-CD|Dominique Jameson
2|Nissan|EF-456-GH|Badio Robaldo
3|Ford|IJ-789-KL|Byron Naguiby Pierre
sqlite>
```

```
douda@douda:~$ nano repons4.sh
douda@douda:~$ chmod +x repons4.sh
douda@douda:~$ ./repons4.sh
Entrez la valeur de a : 4
Entrez la valeur de b : 5
La solution de l'équation est x = -1.25
douda@douda:~$
```

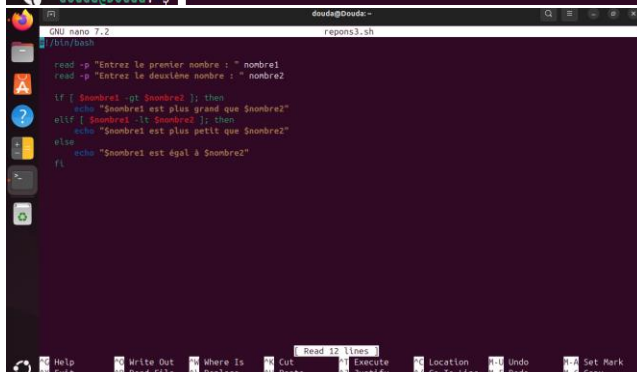


```
GNU nano 7.2 repons4.sh
#!/bin/bash

read -p "Entrez la valeur de a : " a
read -p "Entrez la valeur de b : " b

if [ $a -eq 0 ]; then
  if [ $b -eq 0 ]; then
    echo "L'équation a une infinité de solutions."
  else
    echo "L'équation n'a pas de solution."
  fi
else
  x=$((echo "scale=2; - $b / $a" | bc))
  echo "La solution de l'équation est x = $x"
fi
```

```
douda@douda:~$ nano repons3.sh
douda@douda:~$ chmod +x repons3.sh
douda@douda:~$ ./repons3.sh
Entrez le premier nombre : 12
Entrez le deuxième nombre : 43
12 est plus petit que 43
douda@douda:~$
```



```
GNU nano 7.2 repons3.sh
#!/bin/bash

read -p "Entrez le premier nombre : " nombre1
read -p "Entrez le deuxième nombre : " nombre2

if [ $nombre1 -gt $nombre2 ]; then
  echo "$nombre1 est plus grand que $nombre2"
elif [ $nombre1 -lt $nombre2 ]; then
  echo "$nombre1 est plus petit que $nombre2"
else
  echo "$nombre1 est égal à $nombre2"
fi
```

```
douda@douda:~$ ./repons2.sh
Entrez la longueur du côté du carré :
4
Surface du carré : 16
Entrez la longueur de la base 1 du trapèze :
3
Entrez la longueur de la base 2 du trapèze :
4
Entrez la hauteur du trapèze :
2
Surface du trapèze : 7
Entrez la base du parallélogramme :
5
Entrez la hauteur du parallélogramme :
4
Surface du parallélogramme : 20
Graphique généré dans 'graphique.png'
```

```
GNU nano 7.2 repons2.sh
# Calcul des surfaces
surface_carre() {
    echo "Entrez la longueur du côté du carré : "
    read cote
    surface=$((cote * cote)) | bc
    echo "Surface du carré : $surface"
    echo "1 $surface" >> data.txt
}

surface_trapeze() {
    echo "Entrez la longueur de la base 1 du trapèze : "
    read base1
    echo "Entrez la longueur de la base 2 du trapèze : "
    read base2
    echo "Entrez la hauteur du trapèze : "
    read hauteur
    surface=$((base1 + base2) * hauteur / 2) | bc
    echo "Surface du trapèze : $surface"
    echo "2 $surface" >> data.txt
}

surface_parallelogramme() {
    echo "Entrez la base du parallélogramme : "
    read base
    echo "Entrez la hauteur du parallélogramme : "
    read hauteur
    surface=$((base * hauteur)) | bc
    echo "Surface du parallélogramme : $surface"
    echo "3 $surface" >> data.txt
}

# Génération du graphique avec gnuplot
echo "set terminal png"
echo "set output 'graphique.png'"
echo "set title 'Surface des Figures géométriques'"
echo "set xlabel 'Figure'"
echo "set ylabel 'Surface'"
echo "plot 'data.txt' with linespoints" | gnuplot
echo "Graphique généré dans 'graphique.png'"
```

```
GNU nano 7.2 repons2.sh
# Calcul des surfaces
surface_carre() {
    echo "Entrez la longueur du côté du carré : "
    read cote
    surface=$((cote * cote)) | bc
    echo "Surface du carré : $surface"
    echo "1 $surface" >> data.txt
}

surface_trapeze() {
    echo "Entrez la longueur de la base 1 du trapèze : "
    read base1
    echo "Entrez la longueur de la base 2 du trapèze : "
    read base2
    echo "Entrez la hauteur du trapèze : "
    read hauteur
    surface=$((base1 + base2) * hauteur / 2) | bc
    echo "Surface du trapèze : $surface"
    echo "2 $surface" >> data.txt
}

surface_parallelogramme() {
    echo "Entrez la base du parallélogramme : "
    read base
    echo "Entrez la hauteur du parallélogramme : "
    read hauteur
    surface=$((base * hauteur)) | bc
    echo "Surface du parallélogramme : $surface"
    echo "3 $surface" >> data.txt
}
```

```
douda@douda:~$ nano repons1.sh
douda@douda:~$ chmod +x repons1.sh
douda@douda:~$ ./repons1.sh
Choisissez une opération :
1. Racine carrée
2. Puissance
3. Quitter
Entrez votre choix (1-3) : 1
Entrez un nombre : 4
Racine carrée de 4 est 2.000000000000000000000000
douda@douda:~$ ./repons1.sh
Choisissez une opération :
1. Racine carrée
2. Puissance
3. Quitter
Entrez votre choix (1-3) : 2
Entrez la base : 5
Entrez l'exposant : 2
5 à la puissance 2 est 25
```

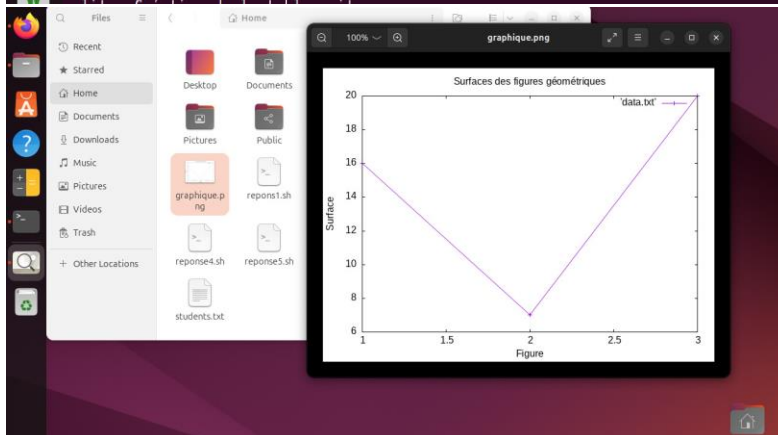
```
douda@douda:~$ nano repons1.sh
#!/bin/bash

echo "Choisissez une opération !"
echo "1. Racine carrée"
echo "2. Puissance"
echo "3. Quitter"

read -p "Entrez votre choix (1-3) : " choix

case $choix in
    1)
        read -p "Entrez un nombre : " nombre
        resultat=$(echo "sqrt($nombre)" | bc -l)
        echo "Racine carrée de $nombre est $resultat"
        ;;
    2)
        read -p "Entrez la base : " base
        read -p "Entrez l'exposant : " exposant
        resultat=$(echo "$base$exposant" | bc -l)
        echo "$base à la puissance $exposant est $resultat"
        ;;
    3)
        echo "Au revoir !"
        exit 0
        ;;
    *)
        echo "Choix invalide"
        ;;
esac
```

```
douda@douda:~$ sqlite3 --version
3.45.1 2024-01-30 16:01:20 e876e51a0ed5c5b3126f52e532044363a014bc594cfefa87ffb5b82257ccalt1 (64-bit)
douda@douda:~$ sqlite3 voitures.db
SQLite version 3.45.1 2024-01-30 16:01:20
Enter ".help" for usage hints.
```



```
douda@douda:~$ journalctl -n 10
Feb 06 12:29:11 Douda pkexec[26128]: pam_unix(polkit-1:session): session opened for user root(uid=0) by douda(uid=1000)
Feb 06 12:29:11 Douda pkexec[26128]: douda: Executing command [USER=root] [TTY=unknown] [CMD=/home/douda] [COMMAND=/usr>
Feb 06 12:30:01 Douda CRON[26176]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Feb 06 12:30:01 Douda CRON[26177]: (root) CMD ([ -x /etc/init.d/anacron ] && if [ ! -d /run/systemd/system ]; then /usr>
Feb 06 12:30:01 Douda systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
Feb 06 12:30:01 Douda CRON[26176]: pam_unix(cron:session): session closed for user root
Feb 06 12:30:01 Douda systemd[1]: sysstat-collect.service: Deactivated successfully.
Feb 06 12:30:01 Douda systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
Feb 06 12:37:28 Douda systemd-resolved[369]: Clock change detected. Flushing caches.
Feb 06 12:37:28 Douda systemd[1]: anacron.service - Run anacron jobs was skipped because of an unmet condition check (C>
```



```
douda@douda:~$ journalctl -b
Feb 05 21:24:11 Douda kernel: Linux version 6.8.0-52-generic (buildd@lcy02-and64-046) (x86_64-linux-gnu-gcc-13 (Ubuntu
Feb 05 21:24:11 Douda kernel: Command line: BOOT_IMAGE=/boot/vmlinuz-6.8.0-52-generic root=UUID=ddafe2cc-b834-4265-8742
Feb 05 21:24:11 Douda kernel: KERNEL supported cpus:
Feb 05 21:24:11 Douda kernel: Intel GenuineIntel
Feb 05 21:24:11 Douda kernel: AMD AuthenticAMD
Feb 05 21:24:11 Douda kernel: Hygon HygonGenuine
Feb 05 21:24:11 Douda kernel: Centaur CentaurHauls
Feb 05 21:24:11 Douda kernel: zhaoxin Shanghai
Feb 05 21:24:11 Douda kernel: BIOS-provided physical RAM map:
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000009fbff] usable
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x000000000009fc00-0x000000000009ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x000000000009f000-0x000000000009ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] usable
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] ACPI data
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: NX (Execute Disable) protection: active
Feb 05 21:24:11 Douda kernel: APIC: Static calls initialized
Feb 05 21:24:11 Douda kernel: SMBIOS 2.5 present.
Feb 05 21:24:11 Douda kernel: DMI: Innatek GmbH VirtualBox/VirtualBox, BIOS VirtualBox 12/01/2006
Feb 05 21:24:11 Douda kernel: Hypervisor detected: KVM
```

```
douda@douda:~$ journalctl -f
Feb 06 12:26:58 Douda systemd[1]: Started packagekit.service - PackageKit Daemon.
Feb 06 12:27:07 Douda sudo[25874]: pam_unix(sudo:session): session closed for user root
Feb 06 12:29:11 Douda pkexec[26128]: pam_unix(polkit-1:session): session opened for user root(uid=0) by douda(uid=1000)
Feb 06 12:29:11 Douda pkexec[26128]: douda: Executing command [USER=root] [TTY=unknown] [CWD=/home/douda] [COMMAND=/usr/
lib/update-notifier/package-system-locked]
Feb 06 12:30:01 Douda CRON[26176]: pam_unix(cron:session): session opened for user root(uid=0) by root(uid=0)
Feb 06 12:30:01 Douda CRON[26177]: (root) CMD ([ -x /etc/init.d/anacron ] && if [ ! -d /run/systemd/system ]; then /usr/
sbin/invoke-rc.d anacron start >/dev/null; fi)
Feb 06 12:30:01 Douda systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
Feb 06 12:30:01 Douda CRON[26176]: pam_unix(cron:session): session closed for user root
Feb 06 12:30:01 Douda systemd[1]: sysstat-collect.service: Deactivated successfully.
Feb 06 12:30:01 Douda systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
Feb 06 12:37:28 Douda systemd-resolved[369]: Clock change detected. Flushing caches.
```

```
douda@douda:~$ journalctl
Feb 05 21:24:11 Douda kernel: Linux version 6.8.0-52-generic (buildd@lcy02-and64-046) (x86_64-linux-gnu-gcc-13 (Ubuntu
Feb 05 21:24:11 Douda kernel: Command line: BOOT_IMAGE=/boot/vmlinuz-6.8.0-52-generic root=UUID=ddafe2cc-b834-4265-8742
Feb 05 21:24:11 Douda kernel: KERNEL supported cpus:
Feb 05 21:24:11 Douda kernel: Intel GenuineIntel
Feb 05 21:24:11 Douda kernel: AMD AuthenticAMD
Feb 05 21:24:11 Douda kernel: Hygon HygonGenuine
Feb 05 21:24:11 Douda kernel: Centaur CentaurHauls
Feb 05 21:24:11 Douda kernel: zhaoxin Shanghai
Feb 05 21:24:11 Douda kernel: BIOS-provided physical RAM map:
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000009fbff] usable
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x000000000009fc00-0x000000000009ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x000000000009f000-0x000000000009ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] usable
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] ACPI data
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
Feb 05 21:24:11 Douda kernel: BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] usable
Feb 05 21:24:11 Douda kernel: NX (Execute Disable) protection: active
Feb 05 21:24:11 Douda kernel: APIC: Static calls initialized
```

```
douda@douda:~$ ss -tln
Netid State Recv-Q Send-Q Local Address:Port Peer Address:Port Process
udp UNCONN 0 0 0.0.0.0:37946 0.0.0.0:*
udp UNCONN 0 0 0.0.0.0:5353 0.0.0.0:*
udp UNCONN 0 0 127.0.0.54:53 0.0.0.0:*
udp UNCONN 0 0 127.0.0.53%lo:53 0.0.0.0:*
udp UNCONN 0 0 :::5353 :::*
udp UNCONN 0 0 :::34734 :::*
tcp LISTEN 0 4096 127.0.0.53%lo:53 0.0.0.0:*
tcp LISTEN 0 4096 127.0.0.1:631 0.0.0.0:*
tcp LISTEN 0 4096 127.0.0.54:53 0.0.0.0:*
tcp LISTEN 0 4096 :::631 :::*
```

You can paste the image from the clipboard.

```
douda@douda:~$ netstat -tln
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address Foreign Address State
tcp 0 0 0.0.0.0:53:53 0.0.0.0:* LISTEN
tcp 0 0 127.0.0.1:631 0.0.0.0:* LISTEN
tcp 0 0 127.0.0.54:53 0.0.0.0:* LISTEN
tcp6 0 0 :::631 :::* LISTEN
udp 0 0 0.0.0.0:37946 0.0.0.0:*
udp 0 0 0.0.0.0:53:53 0.0.0.0:*
udp 0 0 127.0.0.54:53 0.0.0.0:*
udp 0 0 127.0.0.53:53 0.0.0.0:*
udp6 0 0 :::5353 :::*
udp6 0 0 :::34734 :::*
```

```
douda@douda:~$ traceroute google.com
traceroute to google.com (142.250.217.238), 30 hops max, 60 byte packets
 1 10.0.2.2 (10.0.2.2) 15.391 ms 14.007 ms 2.510 ms
 2 * * *
 3 * * *
 4 * * *
 5 * * *
 6 * * *
 7 * * *
 8 * * *
 9 * * *
10 * * *
11 * * *
12 * * *
13 * * *
14 * * *
15 * * *
16 * * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
```

```
douda@douda:~$ sudo apt install traceroute
[sudo] password for douda:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  traceroute
0 upgraded, 1 newly installed, 0 to remove and 218 not upgraded.
Need to get 60.5 kB of archives.
After this operation, 162 kB of additional disk space will be used.
Get:1 http://ht.archive.ubuntu.com/ubuntu noble/universe amd64 traceroute amd64 1:2.1.5-1 [60.5 kB]
Fetched 60.5 kB in 1s (188 kB/s)
Selecting previously unselected package traceroute.
(Reading database ... 149071 files and directories currently installed.)
Preparing to unpack .../traceroute_1K3a2.1.5-1_amd64.deb ...
Unpacking traceroute (1:2.1.5-1) ...
Setting up traceroute (1:2.1.5-1) ...
update-alternatives: using /usr/bin/traceroute.db to provide /usr/bin/traceroute (traceroute) in auto mode
update-alternatives: using /usr/bin/traceroute6.db to provide /usr/bin/traceroute6 (traceroute6) in auto mode
update-alternatives: using /usr/bin/lft.db to provide /usr/bin/lft (lft) in auto mode
update-alternatives: using /usr/bin/traceproto.db to provide /usr/bin/traceproto (traceproto) in auto mode
update-alternatives: using /usr/sbin/tcptraceroute.db to provide /usr/sbin/tcptraceroute (tcptraceroute) in auto mode
Processing triggers for man-db (2.12.0-4build2) ...
```

```
douda@douda:~$ 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: Innatek 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 00)
00:08.0 USB controller: Intel Corporation 82801FB/FM/FW/FW (ICH6 Family) USB2 EHCI Controller
00:08.0 SATA controller: Intel Corporation 82801HM/HM (ICH8M/ICH8M-E) SATA Controller [AHCI mode] (rev 02)
```

```
douda@douda:~$ ps aux
USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.1  0.1 23248 14284 ?        Ss   06:44   0:20 /sbin/init splash
root           2  0.0  0.0      0     0 ?        S    06:44   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        S    06:44   0:00 [pool_workqueue_release]
root           4  0.0  0.0      0     0 ?        I<   06:44   0:00 [kworker/R-rcu_g]
root           5  0.0  0.0      0     0 ?        I<   06:44   0:00 [kworker/R-rcu_p]
root           6  0.0  0.0      0     0 ?        I<   06:44   0:00 [kworker/R-slub_]
root           7  0.0  0.0      0     0 ?        I<   06:44   0:00 [kworker/R-netns]
root          12  0.0  0.0      0     0 ?        I<   06:44   0:00 [kworker/R-mm_pg]
root          13  0.0  0.0      0     0 ?        I    06:44   0:00 [rcu_tasks_kthread]
root          14  0.0  0.0      0     0 ?        I    06:44   0:00 [rcu_tasks_rude_kthread]
root          15  0.0  0.0      0     0 ?        I    06:44   0:00 [rcu_tasks_trace_kthread]
root          16  0.0  0.0      0     0 ?        S    06:44   0:14 [ksoftirqd/0]
root          17  0.1  0.0      0     0 ?        I    06:44   0:31 [rcu_preempt]
root          18  0.0  0.0      0     0 ?        S    06:44   0:01 [migration/0]
root          19  0.0  0.0      0     0 ?        S    06:44   0:00 [idle_inject/0]
root          20  0.0  0.0      0     0 ?        S    06:44   0:00 [cpuhp/0]
root          21  0.0  0.0      0     0 ?        S    06:44   0:00 [cpuhp/1]
root          22  0.0  0.0      0     0 ?        S    06:44   0:00 [idle_inject/1]
root          23  0.0  0.0      0     0 ?        S    06:44   0:02 [migration/1]
```

```
douda@douda:~$ free -h
               total        used        free      shared  buff/cache   available
Mem:            10Gi        2.4Gi        6.4Gi        62Mi        2.4Gi        8.5Gi
Swap:            0B           0B           0B
```

```
douda@douda:~$ du -sh
151M .

douda@douda:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
tmpfs            1.1G  1.7M   1.1G   1% /run
/dev/sda2        49G   5.5G   41G  12% /
tmpfs            5.5G   0    5.5G   0% /dev/shm
tmpfs            5.0M  8.0K   5.0M   1% /run/lock
tmpfs            1.1G 184K   1.1G   1% /run/user/1000
```

En conclusion, ce TD me permet d'apprendre et de comprendre les concepts avancés de programmation en bash, tels que les fonctions, les opérations logiques, les graphes et les bases de données.

