

**Student: Alberto Luna**

---

**Semester: Spring 24**

---

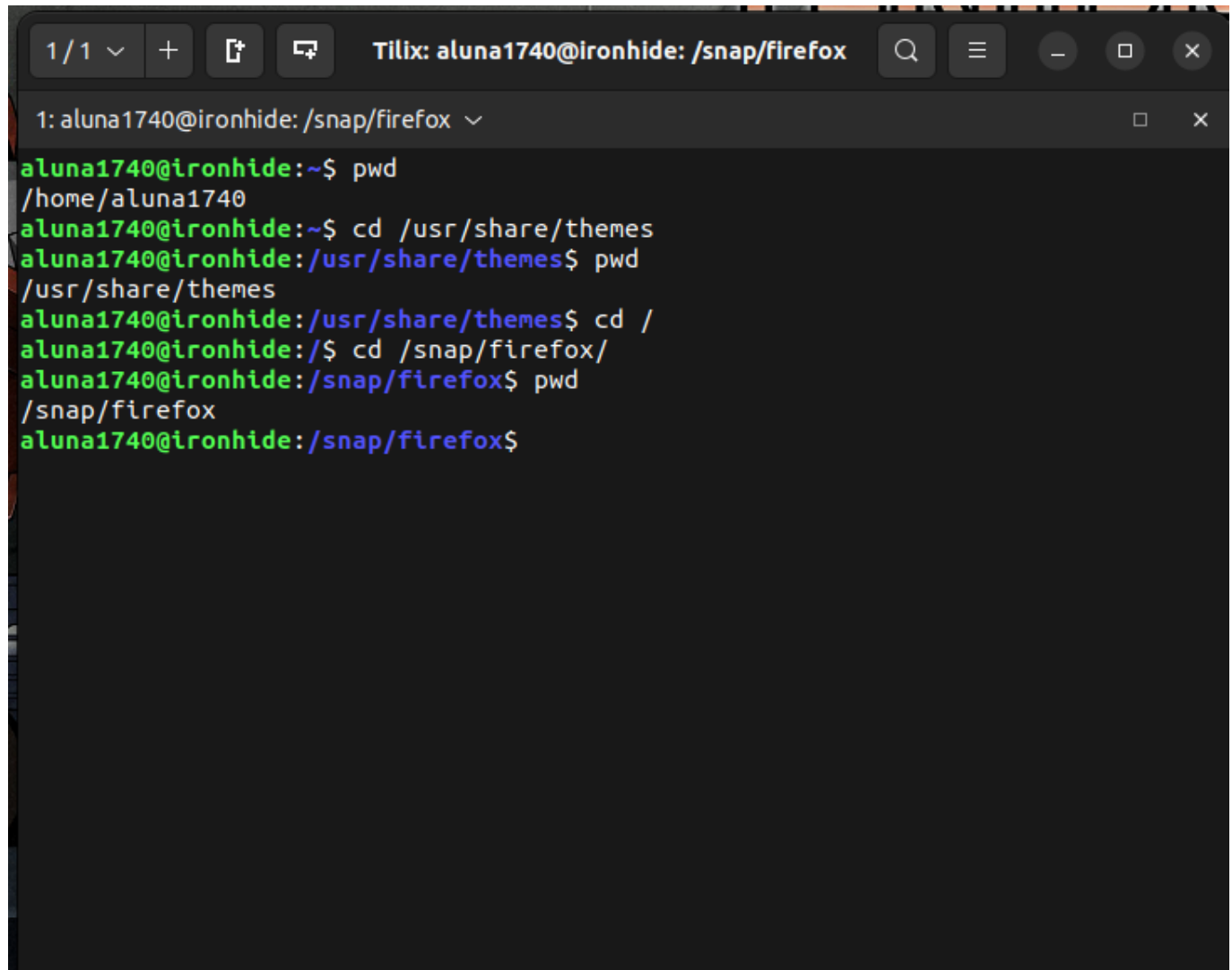
**Assignment: Lab 4**

---

## Lab 4 Submission

---

### Question 1



```
Tilix: aluna1740@ironhide: /snap/firefox
1: aluna1740@ironhide: /snap/firefox
aluna1740@ironhide:~$ pwd
/home/aluna1740
aluna1740@ironhide:~$ cd /usr/share/themes
aluna1740@ironhide:/usr/share/themes$ pwd
/usr/share/themes
aluna1740@ironhide:/usr/share/themes$ cd /
aluna1740@ironhide:/$ cd /snap/firefox/
aluna1740@ironhide:/snap/firefox$ pwd
/snap/firefox
aluna1740@ironhide:/snap/firefox$
```

### Question 2

```
1/1  +  [ ] [ ] Tilix: aluna1740@ironhide: ~/Documents  [ ] [ ] [ ] [ ] [ ]
1: aluna1740@ironhide: ~/Documents  [ ] [ ]
aluna1740@ironhide:~/snap/firefox$ cd
aluna1740@ironhide:~$ cd Downloads/
aluna1740@ironhide:~/Downloads$ cd ../../
aluna1740@ironhide:/home$ pwd
/home
aluna1740@ironhide:/home$ cd aluna1740/Documents/
aluna1740@ironhide:~/Documents$
```

```
1/1  +  [ ] [ ] Tilix: aluna1740@ironhide: ~/lab4files  [ ] [ ] [ ] [ ] [ ]
1: aluna1740@ironhide: ~/lab4files  [ ] [ ] AI [ ] [ ]
aluna1740@ironhide:/usr/share$ ls -al /home/aluna1740/lab4files/
total 6588
drwxrwxr-x  2 aluna1740 aluna1740   4096 Mar  9 15:06 .
drwxr-x--- 26 aluna1740 aluna1740   4096 Mar  9 15:06 ..
-rw-rw-r--  1 aluna1740 aluna1740  20471 Feb 22 2022 countries.json
-rw-rw-r--  1 aluna1740 aluna1740 284042 Feb 22 2022 csvfile.csv
-rw-rw-r--  1 aluna1740 aluna1740 764176 Feb 22 2022 document.docx
-rw-rw-r--  1 aluna1740 aluna1740 742478 Feb 22 2022 globe.avi
-rw-rw-r--  1 aluna1740 aluna1740    76 Feb 22 2022 helloWorld.c
-rw-rw-r--  1 aluna1740 aluna1740 2600138 Feb 22 2022 Linux.pdf
-rw-rw-r--  1 aluna1740 aluna1740   8704 Feb 22 2022 sample.xls
-rw-rw-r--  1 aluna1740 aluna1740  42777 Feb 22 2022 Tux.png
-rw-rw-r--  1 aluna1740 aluna1740 2114053 Feb 22 2022 Ubuntu.pdf
-rw-rw-r--  1 aluna1740 aluna1740  137453 Feb 22 2022 website.html
aluna1740@ironhide:/usr/share$ cd ~/lab4files/
aluna1740@ironhide:~/lab4files$ ls -alh
total 6.5M
drwxrwxr-x  2 aluna1740 aluna1740 4.0K Mar  9 15:06 .
drwxr-x--- 26 aluna1740 aluna1740 4.0K Mar  9 15:06 ..
-rw-rw-r--  1 aluna1740 aluna1740  20K Feb 22 2022 countries.json
-rw-rw-r--  1 aluna1740 aluna1740 278K Feb 22 2022 csvfile.csv
-rw-rw-r--  1 aluna1740 aluna1740 747K Feb 22 2022 document.docx
-rw-rw-r--  1 aluna1740 aluna1740 726K Feb 22 2022 globe.avi
-rw-rw-r--  1 aluna1740 aluna1740   76 Feb 22 2022 helloWorld.c
-rw-rw-r--  1 aluna1740 aluna1740 2.5M Feb 22 2022 Linux.pdf
-rw-rw-r--  1 aluna1740 aluna1740 8.5K Feb 22 2022 sample.xls
-rw-rw-r--  1 aluna1740 aluna1740  42K Feb 22 2022 Tux.png
-rw-rw-r--  1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
-rw-rw-r--  1 aluna1740 aluna1740 135K Feb 22 2022 website.html
aluna1740@ironhide:~/lab4files$ ls -alhs
total 6.5M
```

```
total 6.5M
-rw-rw-r-- 1 aluna1740 aluna1740 2.5M Feb 22 2022 Linux.pdf
-rw-rw-r-- 1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
-rw-rw-r-- 1 aluna1740 aluna1740 747K Feb 22 2022 document.docx

1/1 + [ ] Tilix: aluna1740@ironhide: ~/lab4files

1: aluna1740@ironhide: ~/lab4files AI [ ] x
-rw-rw-r-- 1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
-rw-rw-r-- 1 aluna1740 aluna1740 135K Feb 22 2022 website.html
aluna1740@ironhide:~/lab4files$ ls -alhS
total 6.5M
-rw-rw-r-- 1 aluna1740 aluna1740 2.5M Feb 22 2022 Linux.pdf
-rw-rw-r-- 1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
-rw-rw-r-- 1 aluna1740 aluna1740 747K Feb 22 2022 document.docx
-rw-rw-r-- 1 aluna1740 aluna1740 726K Feb 22 2022 globe.avi
-rw-rw-r-- 1 aluna1740 aluna1740 278K Feb 22 2022 csvfile.csv
-rw-rw-r-- 1 aluna1740 aluna1740 135K Feb 22 2022 website.html
-rw-rw-r-- 1 aluna1740 aluna1740 42K Feb 22 2022 Tux.png
-rw-rw-r-- 1 aluna1740 aluna1740 20K Feb 22 2022 countries.json
-rw-rw-r-- 1 aluna1740 aluna1740 8.5K Feb 22 2022 sample.xls
drwxrwxr-x 2 aluna1740 aluna1740 4.0K Mar 9 15:06 .
drwxr-x--- 26 aluna1740 aluna1740 4.0K Mar 9 15:06 ..
-rw-rw-r-- 1 aluna1740 aluna1740 76 Feb 22 2022 helloWorld.c
aluna1740@ironhide:~/lab4files$ ls -lhSi
total 6.5M
655440 -rw-rw-r-- 1 aluna1740 aluna1740 2.5M Feb 22 2022 Linux.pdf
655442 -rw-rw-r-- 1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
655445 -rw-rw-r-- 1 aluna1740 aluna1740 747K Feb 22 2022 document.docx
655446 -rw-rw-r-- 1 aluna1740 aluna1740 726K Feb 22 2022 globe.avi
655444 -rw-rw-r-- 1 aluna1740 aluna1740 278K Feb 22 2022 csvfile.csv
655449 -rw-rw-r-- 1 aluna1740 aluna1740 135K Feb 22 2022 website.html
655441 -rw-rw-r-- 1 aluna1740 aluna1740 42K Feb 22 2022 Tux.png
655443 -rw-rw-r-- 1 aluna1740 aluna1740 20K Feb 22 2022 countries.json
655448 -rw-rw-r-- 1 aluna1740 aluna1740 8.5K Feb 22 2022 sample.xls
655447 -rw-rw-r-- 1 aluna1740 aluna1740 76 Feb 22 2022 helloWorld.c
aluna1740@ironhide:~/lab4files$ ls -hSi
655440 Linux.pdf      655444 csvfile.csv      655448 sample.xls
655442 Ubuntu.pdf     655449 website.html    655447 helloWorld.c
655445 document.docx  655441 Tux.png
655446 globe.avi      655443 countries.json
```

```
1/1 + [L] Tilix: aluna1740@ironhide: ~/lab4files
1: aluna1740@ironhide: ~/lab4files
655446 globe.avi 655443 countries.json
aluna1740@ironhide:~/lab4files$ ls -lsi
total 6580
655440 -rw-rw-r-- 1 aluna1740 aluna1740 2600138 Feb 22 2022 Linux.pdf
655442 -rw-rw-r-- 1 aluna1740 aluna1740 2114053 Feb 22 2022 Ubuntu.pdf
655445 -rw-rw-r-- 1 aluna1740 aluna1740 764176 Feb 22 2022 document.docx
655446 -rw-rw-r-- 1 aluna1740 aluna1740 742478 Feb 22 2022 globe.avi
655444 -rw-rw-r-- 1 aluna1740 aluna1740 284042 Feb 22 2022 csvfile.csv
655449 -rw-rw-r-- 1 aluna1740 aluna1740 137453 Feb 22 2022 website.html
655441 -rw-rw-r-- 1 aluna1740 aluna1740 42777 Feb 22 2022 Tux.png
655443 -rw-rw-r-- 1 aluna1740 aluna1740 20471 Feb 22 2022 countries.json
655448 -rw-rw-r-- 1 aluna1740 aluna1740 8704 Feb 22 2022 sample.xls
655447 -rw-rw-r-- 1 aluna1740 aluna1740 76 Feb 22 2022 helloWorld.c
aluna1740@ironhide:~/lab4files$ ls -lahSi
total 6.5M
655440 -rw-rw-r-- 1 aluna1740 aluna1740 2.5M Feb 22 2022 Linux.pdf
655442 -rw-rw-r-- 1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
655445 -rw-rw-r-- 1 aluna1740 aluna1740 747K Feb 22 2022 document.docx
655446 -rw-rw-r-- 1 aluna1740 aluna1740 726K Feb 22 2022 globe.avi
655444 -rw-rw-r-- 1 aluna1740 aluna1740 278K Feb 22 2022 csvfile.csv
655449 -rw-rw-r-- 1 aluna1740 aluna1740 135K Feb 22 2022 website.html
655441 -rw-rw-r-- 1 aluna1740 aluna1740 42K Feb 22 2022 Tux.png
655443 -rw-rw-r-- 1 aluna1740 aluna1740 20K Feb 22 2022 countries.json
655448 -rw-rw-r-- 1 aluna1740 aluna1740 8.5K Feb 22 2022 sample.xls
655418 drwxrwxr-x 2 aluna1740 aluna1740 4.0K Mar 9 15:06 .
655400 drwxr-x-- 26 aluna1740 aluna1740 4.0K Mar 9 15:06 ..
655447 -rw-rw-r-- 1 aluna1740 aluna1740 76 Feb 22 2022 helloWorld.c
```

```
1 / 1  +  [icon] [icon]  Tilix: aluna1740@ironhide: ~/lab4files  [search] [menu] [minus] [maximize] [close]

1: aluna1740@ironhide: ~/lab4files  AI [icon] [close]

655418 drwxrwxr-x  2 aluna1740 aluna1740 4.0K Mar  9 15:06 .
655400 drwxr-x--- 26 aluna1740 aluna1740 4.0K Mar  9 15:06 ..
655447 -rw-rw-r--  1 aluna1740 aluna1740  76 Feb 22  2022 helloWorld.c
aluna1740@ironhide:~/lab4files$ ls -lHSi
total 6.5M
655440 -rw-rw-r--  1 aluna1740 aluna1740 2.5M Feb 22  2022 Linux.pdf
655442 -rw-rw-r--  1 aluna1740 aluna1740 2.1M Feb 22  2022 Ubuntu.pdf
655445 -rw-rw-r--  1 aluna1740 aluna1740 747K Feb 22  2022 document.docx
655446 -rw-rw-r--  1 aluna1740 aluna1740 726K Feb 22  2022 globe.avi
655444 -rw-rw-r--  1 aluna1740 aluna1740 278K Feb 22  2022 csvfile.csv
655449 -rw-rw-r--  1 aluna1740 aluna1740 135K Feb 22  2022 website.html
655441 -rw-rw-r--  1 aluna1740 aluna1740  42K Feb 22  2022 Tux.png
655443 -rw-rw-r--  1 aluna1740 aluna1740  20K Feb 22  2022 countries.json
655448 -rw-rw-r--  1 aluna1740 aluna1740 8.5K Feb 22  2022 sample.xls
655447 -rw-rw-r--  1 aluna1740 aluna1740  76 Feb 22  2022 helloWorld.c
aluna1740@ironhide:~/lab4files$ ls -lHS --inode
total 6.5M
655440 -rw-rw-r--  1 aluna1740 aluna1740 2.5M Feb 22  2022 Linux.pdf
655442 -rw-rw-r--  1 aluna1740 aluna1740 2.1M Feb 22  2022 Ubuntu.pdf
655445 -rw-rw-r--  1 aluna1740 aluna1740 747K Feb 22  2022 document.docx
655446 -rw-rw-r--  1 aluna1740 aluna1740 726K Feb 22  2022 globe.avi
655444 -rw-rw-r--  1 aluna1740 aluna1740 278K Feb 22  2022 csvfile.csv
655449 -rw-rw-r--  1 aluna1740 aluna1740 135K Feb 22  2022 website.html
655441 -rw-rw-r--  1 aluna1740 aluna1740  42K Feb 22  2022 Tux.png
655443 -rw-rw-r--  1 aluna1740 aluna1740  20K Feb 22  2022 countries.json
655448 -rw-rw-r--  1 aluna1740 aluna1740 8.5K Feb 22  2022 sample.xls
655447 -rw-rw-r--  1 aluna1740 aluna1740  76 Feb 22  2022 helloWorld.c
```



```

1 / 1  +  [ ]  [ ]  Tilix: aluna1740@ironhide: ~/lab4files  Q  [ ]  [ ]  [ ]  [ ]
1: aluna1740@ironhide: ~/lab4files  AI  [ ]  [ ]  [ ]
655443 -rw-rw-r-- 1 aluna1740 aluna1740 20K Feb 22 2022 countries.json
655448 -rw-rw-r-- 1 aluna1740 aluna1740 8.5K Feb 22 2022 sample.xls
655447 -rw-rw-r-- 1 aluna1740 aluna1740 76 Feb 22 2022 helloWorld.c
aluna1740@ironhide:~/lab4files$ ls -lHS --inode | awk '{print $1, $2, $6, $7, $8
}'
total 6.5M
655440 -rw-rw-r-- 2.5M Feb 22
655442 -rw-rw-r-- 2.1M Feb 22
655445 -rw-rw-r-- 747K Feb 22
655446 -rw-rw-r-- 726K Feb 22
655444 -rw-rw-r-- 278K Feb 22
655449 -rw-rw-r-- 135K Feb 22
655441 -rw-rw-r-- 42K Feb 22
655443 -rw-rw-r-- 20K Feb 22
655448 -rw-rw-r-- 8.5K Feb 22
655447 -rw-rw-r-- 76 Feb 22
aluna1740@ironhide:~/lab4files$ ls -lHS --inode
total 6.5M
655440 -rw-rw-r-- 1 aluna1740 aluna1740 2.5M Feb 22 2022 Linux.pdf
655442 -rw-rw-r-- 1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
655445 -rw-rw-r-- 1 aluna1740 aluna1740 747K Feb 22 2022 document.docx
655446 -rw-rw-r-- 1 aluna1740 aluna1740 726K Feb 22 2022 globe.avi
655444 -rw-rw-r-- 1 aluna1740 aluna1740 278K Feb 22 2022 csvfile.csv
655449 -rw-rw-r-- 1 aluna1740 aluna1740 135K Feb 22 2022 website.html
655441 -rw-rw-r-- 1 aluna1740 aluna1740 42K Feb 22 2022 Tux.png
655443 -rw-rw-r-- 1 aluna1740 aluna1740 20K Feb 22 2022 countries.json
655448 -rw-rw-r-- 1 aluna1740 aluna1740 8.5K Feb 22 2022 sample.xls
655447 -rw-rw-r-- 1 aluna1740 aluna1740 76 Feb 22 2022 helloWorld.c
aluna1740@ironhide:~/lab4files$ ls -lHS --inode | awk '{print $1, $2, $6, $7, $8
,$9}'
total 6.5M
655440 -rw-rw-r-- 2.5M Feb 22 2022
655442 -rw-rw-r-- 2.1M Feb 22 2022
655445 -rw-rw-r-- 747K Feb 22 2022
655446 -rw-rw-r-- 726K Feb 22 2022
655444 -rw-rw-r-- 278K Feb 22 2022
655449 -rw-rw-r-- 135K Feb 22 2022
655441 -rw-rw-r-- 42K Feb 22 2022
655443 -rw-rw-r-- 20K Feb 22 2022
655448 -rw-rw-r-- 8.5K Feb 22 2022
655447 -rw-rw-r-- 76 Feb 22 2022
aluna1740@ironhide:~/lab4files$ ls -lHS --inode | awk '{print $1, $2, $6, $7, $8
,$10}'
total 6.5M
655440 -rw-rw-r-- 2.5M Feb 22 Linux.pdf
655442 -rw-rw-r-- 2.1M Feb 22 Ubuntu.pdf
655445 -rw-rw-r-- 747K Feb 22 document.docx
655446 -rw-rw-r-- 726K Feb 22 globe.avi
655444 -rw-rw-r-- 278K Feb 22 csvfile.csv
655449 -rw-rw-r-- 135K Feb 22 website.html
655441 -rw-rw-r-- 42K Feb 22 Tux.png
655443 -rw-rw-r-- 20K Feb 22 countries.json
655448 -rw-rw-r-- 8.5K Feb 22 sample.xls
655447 -rw-rw-r-- 76 Feb 22 helloWorld.c

```

```
aluna1740@ironhide:~/lab4files$ ls -lahrX
total 6.5M
-rw-rw-r-- 1 aluna1740 aluna1740 8.5K Feb 22 2022 sample.xls
-rw-rw-r-- 1 aluna1740 aluna1740 42K Feb 22 2022 Tux.png
-rw-rw-r-- 1 aluna1740 aluna1740 2.1M Feb 22 2022 Ubuntu.pdf
-rw-rw-r-- 1 aluna1740 aluna1740 2.5M Feb 22 2022 Linux.pdf
-rw-rw-r-- 1 aluna1740 aluna1740 20K Feb 22 2022 countries.json
-rw-rw-r-- 1 aluna1740 aluna1740 135K Feb 22 2022 website.html
-rw-rw-r-- 1 aluna1740 aluna1740 747K Feb 22 2022 document.docx
-rw-rw-r-- 1 aluna1740 aluna1740 278K Feb 22 2022 csvfile.csv
-rw-rw-r-- 1 aluna1740 aluna1740 76 Feb 22 2022 helloWorld.c
-rw-rw-r-- 1 aluna1740 aluna1740 726K Feb 22 2022 globe.avi
drwxr-x--- 26 aluna1740 aluna1740 4.0K Mar 9 15:06 ..
drwxrwxr-x 2 aluna1740 aluna1740 4.0K Mar 9 15:06 .
```

### Question 3

```

1 #!/bin/bash
2 # A script to practice:
3 # 1. Environment variables
4 # 2. User defined variables
5 # 3. ls, pwd, and cd
6
7 # Creating some variables
8 cis="$HOME/cis106"
9 downloads="$HOME/Downloads"
10 msg1="The current directory is: \t"
11 msg2="\nAll files (including hidden files ) in"
12
13 # Using cd in a script
14 echo "The current user is $USER. It's 'home directory is $HOME"
15 echo ""
16 cd $downloads
17 echo -e $msg1 |
18 pwd
19 echo ""
20 cd $cis
21 echo -e $msg1
22 pwd
23 echo ""
24
25 #Using ls in a script
26 echo -e "$msg2 /"
27 ls -mA --color=auto /
28
29 echo -e "$msg2 $HOME"
30 ls -mA --color=auto $HOME
31
32 echo -e "$msg2 $downloads"
33 ls -mA --color=auto $downloads
34
35 echo -e "$msg2 $cis"
36 ls -mA --color=auto $cis
37

```

```

aluna1740@ironhide:~/Documents$ bash lab4_script.sh
The current user is aluna1740. It's 'home directory is /home/aluna1740

The current directory is:
/home/aluna1740/Downloads

The current directory is:
/home/aluna1740/cis106

All files (including hidden files ) in /
., bin, boot, cdrom, dev, etc, home, lib, lib32, lib64, libx32, lost+found, media, mnt, opt, proc, root, run,/sbin, snap, srv, swapfile, sys,
tmp, usr, var

All files (including hidden files ) in /home/aluna1740
Applications, .bash_history, .bash_logout, .bashrc, .cache, .cargo, cis106, .config, Desktop, .dmrc, Documents, .dotnet, Downloads,
.gitconfig, .gnupg, lab4files, .lessshst, .local, Music, Pictures, .pki, practicels, practicels.tar.xz, .profile, Public, .rustup, snap, .ssh,
.sudo_as_admin_successful, Templates, .var, .vboxclient-clipboard-tty2-control.pid, .vboxclient-clipboard-tty7-control.pid,
.vboxclient-clipboard-tty7-service.pid, .vboxclient-draganddrop-tty2-control.pid, .vboxclient-draganddrop-tty7-control.pid,
.vboxclient-draganddrop-tty7-service.pid, .vboxclient-hostversion-tty2-control.pid, .vboxclient-hostversion-tty7-control.pid,
.vboxclient-seamless-tty2-control.pid, .vboxclient-seamless-tty7-control.pid, .vboxclient-seamless-tty7-service.pid,
.vboxclient-vmsvga-session-tty2-control.pid, .vboxclient-vmsvga-session-tty7-control.pid, .vboxclient-vmsvga-session-tty7-service.pid, Videos,
.vscode, .Xauthority, .xsession-errors, .xsession-errors.old

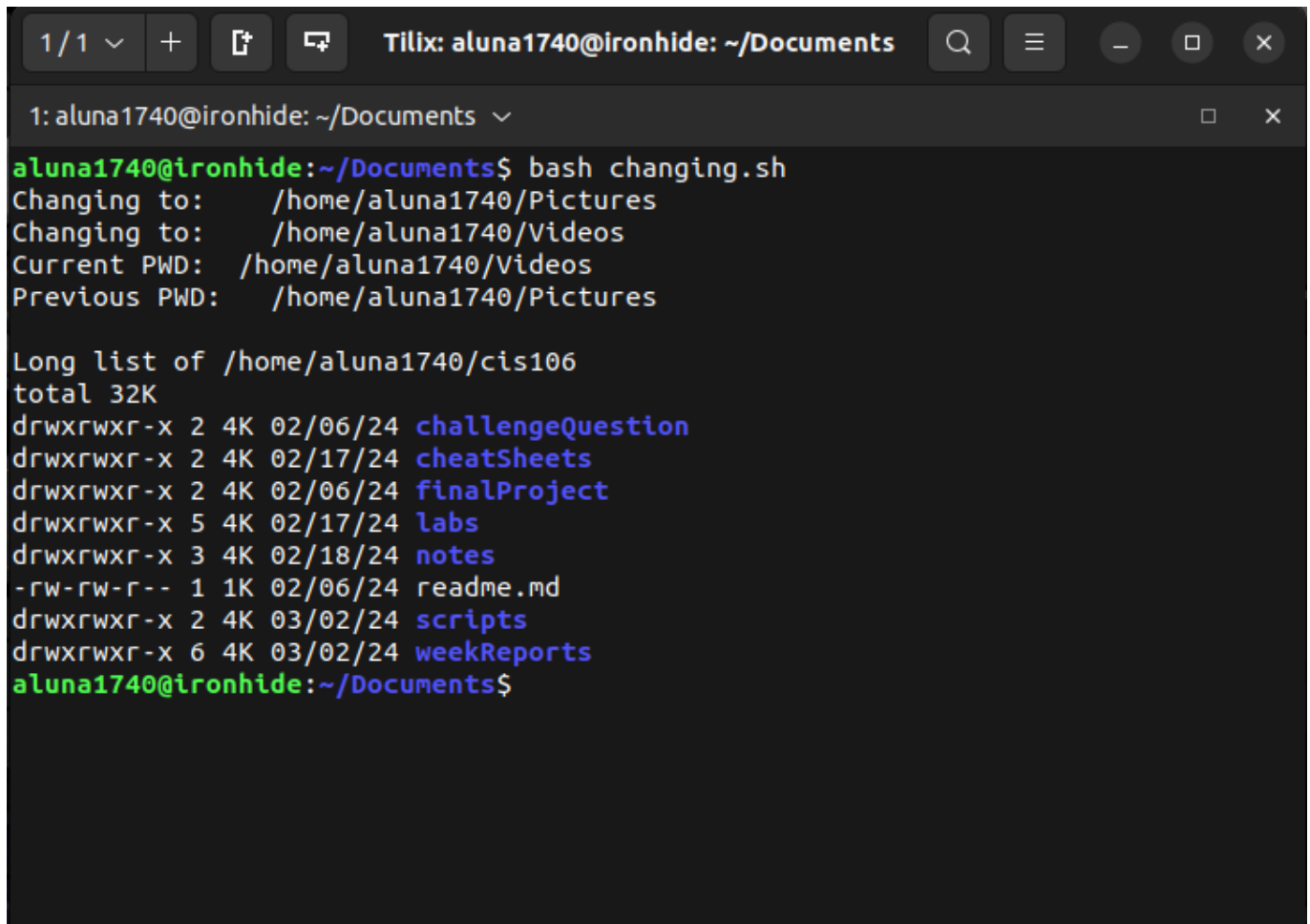
All files (including hidden files ) in /home/aluna1740/Downloads
code_1.86.0-1706698139_amd64, code_1.86.0-1706698139_amd64.deb, code_1.86.2-1707854558_amd64.deb, Food, games,
google-chrome-stable_current_amd64.deb, kcs.sh, Kcs.sh, lab4files.zip, ScreenConnect.ClientSetup.sh, test.txt

All files (including hidden files ) in /home/aluna1740/cis106
challengeQuestion, cheatSheets, finalProject, .git, labs, notes, readme.md, scripts, .vscode, weekReports
aluna1740@ironhide:~/Documents$

```

## Challenge Question



A terminal window titled 'Tilix: aluna1740@ironhide: ~/Documents'. The prompt is '1: aluna1740@ironhide: ~/Documents'. The user runs 'bash changing.sh'. The script outputs: 'Changing to: /home/aluna1740/Pictures', 'Changing to: /home/aluna1740/Videos', 'Current PWD: /home/aluna1740/Videos', and 'Previous PWD: /home/aluna1740/Pictures'. Then it lists files in '/home/aluna1740/cis106' with a total size of 32K. The files listed are: 'challengeQuestion' (2 4K, 02/06/24), 'cheatSheets' (2 4K, 02/17/24), 'finalProject' (2 4K, 02/06/24), 'labs' (5 4K, 02/17/24), 'notes' (3 4K, 02/18/24), 'readme.md' (1 1K, 02/06/24), 'scripts' (2 4K, 03/02/24), and 'weekReports' (6 4K, 03/02/24). The prompt returns to 'aluna1740@ironhide:~/Documents\$'.

### Question 3 Source Code:

[lab4-Question3](#)

### Challenge Question Source code:

[lab4-Question4](#)