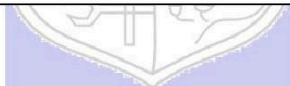




Experiment No. 4

Title: Pipes and filters in Linux



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Aim: To implement pipes and filters in Linux.

Resources needed: Any open source OS/CoCalc online editor

Theory:**Pre lab/Prior concepts:****I/O Redirection**

In this experiment, we will explore a powerful feature used by many command line programs called input/output redirection. As we have seen, many commands such as `ls` print their output on the display. This does not have to be the case, however. By using some special notation we can redirect the output of many commands to files, devices, and even to the input of other commands.

Standard Output

Most command line programs that display their results do so by sending their results to a facility called standard output. By default, standard output directs its contents to the display. To redirect standard output to a file, the `>` character is used like this: `[me@linuxbox me]$ ls > file_list.txt`. In this example, the `ls` command is executed and the results are written in a file named `file_list.txt`. Since the output of `ls` was redirected to the file, no results appear on the display. Each time the command above is repeated, `file_list.txt` is overwritten (from the beginning) with the output of the command `ls`. If you want the new results to be appended to the file instead, use `>>` like this:

```
[me@linuxbox me]$ ls >> file_list.txt
```

When the results are appended, the new results are added to the end of the file, thus making the file longer each time the command is repeated. If the file does not exist when you attempt to append the redirected output, the file will be created.

Standard Input

Many commands can accept input from a facility called standard input. By default, standard input gets its contents from the keyboard, but like standard output, it can be redirected. To redirect standard input from a file instead of the keyboard, the `<` character is used like this:

```
[me@linuxbox me]$ sort < file_list.txt
```

In the above example we used the `sort` command to process the contents of `file_list.txt`. The results are output on the display since the standard output is not redirected in this example. We could redirect standard output to another file like this:

```
[me@linuxbox me]$ sort < file_list.txt > sorted_file_list.txt
```

As you can see, a command can have both its input and output redirected. Be aware that the order of the redirection does not matter. The only requirement is that the redirection operators (the "<" and ">") must appear after the other options and arguments in the command.

Pipe

A pipe is a way to connect the output of one program to the input of another program without any temporary file.

Pipe Defined as:

"A pipe is nothing but a temporary storage place where the output of one command is stored and then passed as the input for the second command. Pipes are used to run more than two commands (Multiple Commands) from the same command line.

Syntax:

command1 | command2

example :

me@linuxbox me]\$ ls -l | less

In this example, the output of the ls command is fed into less. By using this "| less" trick, you can make any command have scrolling output. I use this technique all the time. By connecting commands together, you can accomplish amazing feats. Here are some examples you'll want to try:

Command

ls -lt | head

du | sort -nr

find . -type f -print | wc -l

What it does

Displays the 10 newest files in the current directory.

Displays a list of directories and how much space they consume, sorted from the largest to the smallest.

Displays the total number of files in the current working directory and all of its subdirectories.

Filters

One class of programs you can use with pipes is called filters. Filters take standard input and perform an operation upon it and send the results to standard output. In this way, they can be used to process information in powerful ways. Here are some of the common programs that can act as filters:

Command

sort

uniq

grep

fmt

pr

What it does

Sorts standard input then outputs the sorted result on standard output.

Given a sorted stream of data from standard input, it removes duplicate lines of data (i.e., it makes sure that every line is unique).

Examines each line of data it receives from standard input and outputs every line that contains a specified pattern of characters.

Reads text from standard input, then outputs formatted text on standard output.

Takes text input from standard input and splits the data into pages with page breaks, headers and footers in preparation for printing.

head	Outputs the first few lines of its input. Useful for getting the header of a file.
tail	Outputs the last few lines of its input. Useful for things like getting the most recent entries from a log file.
tr	Translates characters. Can be used to perform tasks such as upper/lowercase conversions or changing line termination characters from one type to another (for example, converting DOS text files into Unix style text files).
sed	Stream editor. Can perform more sophisticated text translations than tr.
awk	An entire programming language designed for constructing filters. Extremely powerful.
cut	Cuts specific characters or fields from a file with options
paste	Creates either rows or columns of data that are combined from two separate files.

Performing tasks with pipes

Printing from the command line. Linux provides a program called lpr that accepts standard input and sends it to the printer. It is often used with pipes and filters. Here are a couple of examples:

```
cat poorly_formatted_report.txt | fmt | pr | lpr
cat unsorted_list_with_dupes.txt | sort | uniq | pr | lpr
```

In the first example, we use cat to read the file and output it to standard output, which is piped into the standard input of fmt. fmt formats the text into neat paragraphs and outputs it to standard output, which is piped into the standard input of pr. pr splits the text neatly into pages and outputs it to standard output, which is piped into the standard input of lpr. lpr takes its standard input and sends it to the printer.

The second example starts with an unsorted list of data with duplicate entries. First, **cat sends the list into sort which sorts it and feeds it into uniq which removes any duplicates**. Next pr and lpr are used to paginate and print the list.

Viewing the contents of tar files Often you will see software distributed as a gzipped tar file. This is a traditional Unix style tape archive file (created with tar) that has been compressed with gzip. You can recognize these files by their traditional file extensions, ".tar.gz" or ".tgz". You can use the following command to view the directory of such a file on a Linux system:

```
tar tzvf name_of_file.tar.gz | less
```

Activities:

Write command which produces a list of all the files on the system, such that:

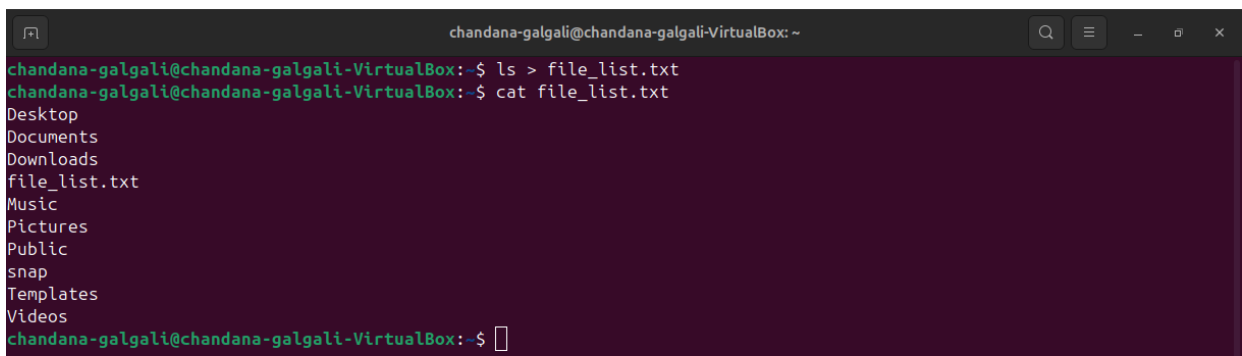
- Their full pathname does not contain the word data.
- Their filename does not contain the letter x.
- The script is Y2K compliant, so all `y's have been replaced by `k's. At the end, print out the number of files that were found.

Write commands that will list the size of each directory given on the command line, sorted by size. The size includes disk space used by the directory and all the files and subdirectories inside it. The script should take options to sort with smallest first, and with largest first.

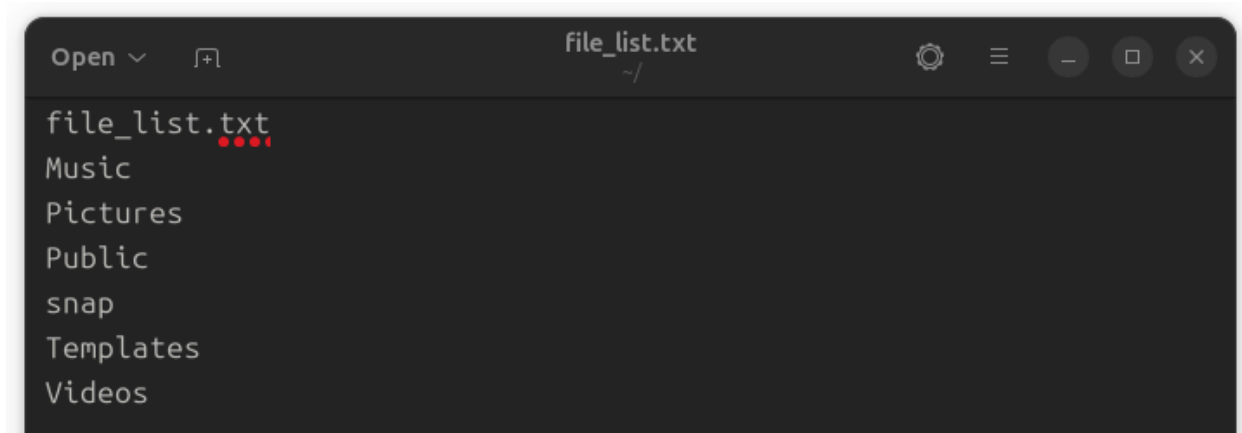
Write a command to count the total number of the files in the present working directory.

Write a command to extract 4 lines starting from line number 5 to line number 8 from a file which contains 10 lines in it.

Create a file containing rollno, name and marks of 3 students and another file containing branch and address of same 3 students. Use space as delimiter in both files. Write commands to cut rollno and name files first file and address field from second file and paste result in new file and display it.

Results:

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ ls > file_list.txt  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat file_list.txt  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos  
chandana-galgali@chandana-galgali-VirtualBox:~$
```



```
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ ls >> file_list.txt  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat file_list.txt  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
Open ▾ file_list.txt  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ sort < file_list.txt  
Desktop  
Desktop  
Documents  
Documents  
Downloads  
Downloads  
file_list.txt  
file_list.txt  
Music  
Music  
Pictures  
Pictures  
Public  
Public  
snap  
snap  
Templates  
Templates  
Videos  
Videos  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ sort < file_list.txt > sorted_file_list.txt
chandana-galgali@chandana-galgali-VirtualBox:~$ cat sorted_file_list.txt
Desktop
Desktop
Documents
Documents
Downloads
Downloads
file_list.txt
file_list.txt
Music
Music
Pictures
Pictures
Public
Public
snap
snap
Templates
Templates
Videos
Videos
chandana-galgali@chandana-galgali-VirtualBox:~$

```

```

Open ▾ sorted_file_list.txt
~/
Desktop
Desktop
Documents
Documents
Downloads
Downloads
file_list.txt
file_list.txt
Music
Music
Pictures
Pictures
Public
Public
snap
snap
Templates
Templates
Videos
Videos

```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ ls -l | less

```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
total 44
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug  2 21:55 Desktop
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug  2 21:55 Documents
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug  2 21:55 Downloads
-rw-rw-r-- 1 chandana-galgali chandana-galgali 172 Aug 14 21:53 file_list.txt
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug  2 21:55 Music
drwxr-xr-x 3 chandana-galgali chandana-galgali 4096 Aug  2 22:19 Pictures
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug  2 21:55 Public
drwx----- 5 chandana-galgali chandana-galgali 4096 Aug  3 00:00 snap
-rw-rw-r-- 1 chandana-galgali chandana-galgali 172 Aug 14 21:56 sorted_file_list.txt
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug  2 21:55 Templates
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug  2 21:55 Videos
(END)

```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ ls -lt | head
total 44
-rw-rw-r-- 1 chandana-galgali chandana-galgali 172 Aug 14 21:56 sorted_file_list.txt
-rw-rw-r-- 1 chandana-galgali chandana-galgali 172 Aug 14 21:53 file_list.txt
drwx----- 5 chandana-galgali chandana-galgali 4096 Aug 3 00:00 snap
drwxr-xr-x 3 chandana-galgali chandana-galgali 4096 Aug 2 22:19 Pictures
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug 2 21:55 Documents
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug 2 21:55 Downloads
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug 2 21:55 Music
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug 2 21:55 Public
drwxr-xr-x 2 chandana-galgali chandana-galgali 4096 Aug 2 21:55 Templates
chandana-galgali@chandana-galgali-VirtualBox:~$

```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ du | sort -nr
298428 .
270620 ./snap
270164 ./snap/firefox
270080 ./snap/firefox/common
207628 ./snap/firefox/common/.cache
206188 ./snap/firefox/common/.cache/mozilla
206184 ./snap/firefox/common/.cache/mozilla/firefox
206180 ./snap/firefox/common/.cache/mozilla/firefox/eaau7kpk.default
168220 ./snap/firefox/common/.cache/mozilla/firefox/eaau7kpk.default/cache2
167744 ./snap/firefox/common/.cache/mozilla/firefox/eaau7kpk.default/cache2/entries
62448 ./snap/firefox/common/.mozilla
62440 ./snap/firefox/common/.mozilla/firefox
62416 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default
44300 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage
40976 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default
23244 ./snap/firefox/common/.cache/mozilla/firefox/eaau7kpk.default/startupCache
20196 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++mail.google.com
20112 ./cache
20060 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++mail.google.com/cache
17492 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++mail.google.com/cache/morgue
16104 ./cache/tracker3
16100 ./cache/tracker3/files
15568 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++drive.google.com
15544 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++drive.google.com/idb
14640 ./snap/firefox/common/.cache/mozilla/firefox/eaau7kpk.default/safebrowsing
14304 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++drive.google.com/idb/4041069256G
soDoegvlierD.files
12592 ./snap/firefox/common/.cache/mozilla/firefox/eaau7kpk.default/safebrowsing/google4
6680 ./Pictures
6676 ./Pictures/Screenshots
4268 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++meet.google.com
4156 ./snap/firefox/common/.mozilla/firefox/eaau7kpk.default/storage/default/https+++meet.google.com/cache

```



```

chandana-galgali@chandana-galgali-VirtualBox: ~
4  ./local/share/nano
4  ./local/share/icc
4  ./local/share/ibus-table
4  ./local/share/gnome-settings-daemon
4  ./local/share/flatpak/db
4  ./local/share/evolution/tasks/trash
4  ./local/share/evolution/memos/trash
4  ./local/share/evolution/mail/trash
4  ./local/share/evolution/calendar/trash
4  ./local/share/evolution/addressbook/trash
4  ./local/share/evolution/addressbook/system/photos
4  ./local/share/applications
4  ./Downloads
4  ./Documents
4  ./Desktop
4  ./config/update-notifier
4  ./config/nautilus
4  ./config/gtk-4.0
4  ./config/goa-1.0
4  ./config/gnome-session/saved-session
4  ./config/eog
4  ./config/enchant
4  ./cache/tracker3/files/errors
4  ./cache/ibus-table
4  ./cache/gnome-desktop-thumbnailer/gstreamer-1.0
4  ./cache/evolution/tasks/trash
4  ./cache/evolution/sources/trash
4  ./cache/evolution/memos/trash
4  ./cache/evolution/mail/trash
4  ./cache/evolution/calendar/trash
4  ./cache/evolution/addressbook/trash
chandana-galgali@chandana-galgali-VirtualBox:~$

```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ find . -type f -print | wc -l
5729
chandana-galgali@chandana-galgali-VirtualBox:~$

```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ sort
1
6
0
4
2
3
0
1
2
3
4
6
chandana-galgali@chandana-galgali-VirtualBox:~$

```

```

chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ uniq < sorted_file_list.txt
Desktop
Documents
Downloads
file_list.txt
Music
Pictures
Public
snap
Templates
Videos
chandana-galgali@chandana-galgali-VirtualBox:~$

```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ grep "Chandana"  
My name is Chandana.  
My name is Chandana.  
I don't think chandana would work!  
That's what I thought.  
"Chandana"wouldworkeveninacontinuousstring,itshould!  
"Chandana"wouldworkeveninacontinuousstring,itshould!  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox:~$ fmt  
The quick brown fox jumps over the lazy dog. This sentence contains every letter of the English alphabet at least once.  
It is often used in typing practice and as a sample text for testing fonts and other typesetting tools. The quick brown  
fox is known for its agility and speed, while the lazy dog prefers a more relaxed lifestyle.  
  
The quick brown fox jumps over the lazy dog. This sentence contains every  
letter of the English alphabet at least once. It is often used in typing  
practice and as a sample text for testing fonts and other typesetting  
tools. The quick brown fox is known for its agility and speed, while  
the lazy dog prefers a more relaxed lifestyle.  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox:~$ pr  
The quick brown fox jumps over the lazy dog. This sentence contains every letter of the English alphabet at least once.  
It is often used in typing practice and as a sample text for testing fonts and other typesetting tools. The quick brown  
fox is known for its agility and speed, while the lazy dog prefers a more relaxed lifestyle.  
  
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The quick brown fox jumps over the lazy dog. This sentence contains every letter of the English alphabet at least once.  
It is often used in typing practice and as a sample text for testing fonts and other typesetting tools. The quick brown  
fox is known for its agility and speed, while the lazy dog prefers a more relaxed lifestyle.
```

```
chandana-galgali@chandana-galgali-VirtualBox:~$ head  
The quick brown fox jumps over the lazy dog. This sentence contains every letter of the English alphabet at least once.  
It is often used in typing practice and as a sample text for testing fonts and other typesetting tools. The quick brown  
fox is known for its agility and speed, while the lazy dog prefers a more relaxed lifestyle.  
The quick brown fox jumps over the lazy dog. This sentence contains every letter of the English alphabet at least once.  
It is often used in typing practice and as a sample text for testing fonts and other typesetting tools. The quick brown  
fox is known for its agility and speed, while the lazy dog prefers a more relaxed lifestyle.  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox:~$ tail  
The quick brown fox jumps over the lazy dog. This sentence contains every letter of the English alphabet at least once.  
It is often used in typing practice and as a sample text for testing fonts and other typesetting tools. The quick brown  
fox is known for its agility and speed, while the lazy dog prefers a more relaxed lifestyle.  
  
The quick brown fox jumps over the lazy dog. This sentence contains every letter of the English alphabet at least once.  
It is often used in typing practice and as a sample text for testing fonts and other typesetting tools. The quick brown  
fox is known for its agility and speed, while the lazy dog prefers a more relaxed lifestyle.  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox:~$ tr "u" "e"  
Hullo!  
Hello!  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ sed 's/u/e/g'  
Hullo!  
Hullo!  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ awk '{print $1}'  
Hello!  
Hello!  
Bye  
Bye  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ cut -d' ' -f1,2 file_list.txt  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ paste file_list.txt sorted_file_list.txt > combined.txt  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat combined.txt  
Desktop Desktop  
Documents Desktop  
Downloads Documents  
file_list.txt Documents  
Music Downloads  
Pictures Downloads  
Public file_list.txt  
snap file_list.txt  
Templates Music  
Videos Music  
Desktop Pictures  
Documents Pictures  
Downloads Public  
file_list.txt Public  
Music snap  
Pictures snap  
Public Templates  
snap Templates  
Templates Videos  
Videos Videos  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat file_list.txt | fmt | pr  
  
2024-08-14 22:59 Page 1  
  
Desktop Documents Downloads file_list.txt Music Pictures Public snap  
Templates Videos Desktop Documents Downloads file_list.txt Music Pictures  
Public snap Templates Videos
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat file_list.txt | sort | uniq | pr  
  
2024-08-14 23:00 Page 1  
  
Desktop  
Documents  
Downloads  
file_list.txt  
Music  
Pictures  
Public  
snap  
Templates  
Videos
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ touch chand.tar.gz  
chandana-galgali@chandana-galgali-VirtualBox:~$ tar tzvf chand.tar.gz | less
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
  
gzip: stdin: unexpected end of file  
tar: Child returned status 1  
tar: Error is not recoverable: exiting now  
(END)
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ find / -type f ! -path "*data*" ! -name "*x*" | sed 's/y/k/g' | tee >(wc  
-l)
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
/usr/lib/grub/i386-pc/help.mod  
/usr/lib/grub/i386-pc/legack_password_test.mod  
/usr/lib/grub/grub-sort-version  
/usr/lib/grub/grub-multi-install  
/usr/lib/snapd/snap-failure  
/usr/lib/snapd/skstem-shutdown  
/usr/lib/snapd/snap-preseed  
/usr/lib/snapd/info  
/usr/lib/snapd/snapctl  
/usr/lib/snapd/snap-confine  
/usr/lib/snapd/snap-gdb-shim  
/usr/lib/snapd/snapd.run-from-snap  
/usr/lib/snapd/snap-discard-ns  
/usr/lib/snapd/complete.sh  
/usr/lib/snapd/snap-gdbserver-shim  
/usr/lib/snapd/snap-recoverk-chooser  
/usr/lib/snapd/snap-bootstrap  
/usr/lib/snapd/snap-mgmt  
/usr/lib/snapd/snap-seccomp  
/usr/lib/snapd/snap-update-ns  
/usr/lib/snapd/etelpmoc.sh  
/usr/lib/snapd/snap-repair  
/usr/lib/snapd/snap-device-helper  
/usr/lib/snapd/snap-fde-kekmgr  
/usr/lib/snapd/snap-apparmor  
/usr/lib/snapd/snapd  
/usr/lib/nvidia/alternate-install-available  
/usr/lib/os-release  
/usr/lib/ufw/ufw-init-functions  
/usr/lib/ufw/ufw-init  
347308  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ du -sh "$@" | sort -h  
351M .  
chandana-galgali@chandana-galgali-VirtualBox:~$ du -sh "$@" | sort -rh  
352M .  
chandana-galgali@chandana-galgali-VirtualBox:~$ find . -type f | wc -l  
8346  
chandana-galgali@chandana-galgali-VirtualBox:~$ sed -n '5,8p' file_list.txt  
Music  
Pictures  
Public  
snap  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~  
chandana-galgali@chandana-galgali-VirtualBox:~$ touch file1.txt  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat >> file1.txt  
16010422234 Chandana 97  
16010422234 Mahek 100  
16010422235 Sam 99  
16010422236 Prichi 98  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat file1.txt  
16010422234 Chandana 97  
16010422234 Mahek 100  
16010422235 Sam 99  
16010422236 Prichi 98  
chandana-galgali@chandana-galgali-VirtualBox:~$ touch file2.txt  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat >> file2.txt  
CS Boston  
IT Mumbai  
CS Bangalore  
ECE Mumbai  
chandana-galgali@chandana-galgali-VirtualBox:~$ cat file2.txt  
CS Boston  
IT Mumbai  
CS Bangalore  
ECE Mumbai  
chandana-galgali@chandana-galgali-VirtualBox:~$
```

```
chandana-galgali@chandana-galgali-VirtualBox: ~
chandana-galgali@chandana-galgali-VirtualBox:~$ cut -d' ' -f1,2 file1.txt > temp1.txt
chandana-galgali@chandana-galgali-VirtualBox:~$ cat temp1.txt
16010422234 Chandana
16010422234 Mahek
16010422235 Sam
16010422236 Prichi
chandana-galgali@chandana-galgali-VirtualBox:~$ cut -d' ' -f1,2 file2.txt > temp2.txt
chandana-galgali@chandana-galgali-VirtualBox:~$ cat temp2.txt
CS Boston
IT Mumbai
CS Bangalore
ECE Mumbai
chandana-galgali@chandana-galgali-VirtualBox:~$ paste temp1.txt temp2.txt > result.txt
chandana-galgali@chandana-galgali-VirtualBox:~$ cat result.txt
16010422234 Chandana      CS Boston
16010422234 Mahek        IT Mumbai
16010422235 Sam          CS Bangalore
16010422236 Prichi       ECE Mumbai
chandana-galgali@chandana-galgali-VirtualBox:~$
```

Outcomes: CO4 - Demonstrate open source standards usage

Conclusion:

In this experiment, we successfully implemented various commands using pipes and filters in Linux, demonstrating the ability to redirect input and output, manipulate text, and manage files and directories efficiently. The usage of these commands showcases the powerful functionality provided by the Linux command line to perform complex tasks with simple, yet effective commands. This exercise highlights the importance of understanding and utilizing pipes and filters to streamline processes, automate tasks, and enhance productivity in a Unix-like environment.

Grade: AA/AB/BB/BC/CC/CD/DD

Signature of faculty in-charge with date

References:

Books/ Journals/ Websites:

1. Richard Blum and Christine Bresnahan, “Linux Command Line & Shell Scripting”, II Edition, Wiley, 2012.
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