G) Redirection and piping.

Run command ls -l /etc > myfiles.txt. What happens here? Why don't you see any output?

Command list out content of etc folder in long format, then sends output data to myfiles.txt. That file will be created in current folder. If file already exists, it's earlier content will be deleted firstly.

Run also command ls -l | more. Now you can see output data, but it comes in one page at once (press space for next page). Why?

ls -l command list out content of current folder and prints out all files and folders together. Command more loads whole content firstly, then shows it on one by one page.

Try this: ls -l /etc | wc -l
What happens here? Use man and find out what wc does.

Command wc stands for word count, option -l stands for line, or line count together.
ls -l /etc - sends content of etc folder in lines to standard output, then we use piping and line count command. Output is qty of files and folders in etc folder. I got 220 on my PC.

Try now to redirect output to another terminal, using command ls -l > /dev/pts/2, where 2 is a number of your terminal. Use tty command to find out number of current terminal window.

:/$ tty
/dev/pts/0 - terminal nr. 0 is in use now
:/$ ls -l > /dev/pts/0 – it works well, get output in same terminal.

Ctrl+alt+t - starting a new terminal

:/$ ls -l > /dev/pts/1 - from terminal nr. 0

It works fine, output goes to terminal nr. 1.

Try to list out all files from root folder recursively. Command results in many lines with text (your can cancel it with Ctrl+c). Run command again and redirect outdata to file ls-outdata.txt. Did you get error messages? Send them to file ls-error.txt.

:/$ ls -R
(It takes time, interrupting with Ctrl+c)

:/$ ls -R > ~/Desktop/ls-outdata.txt
Output data went to a file ls-utdata.txt, got multiple errors: "Permission denied"
:/$ ls -R > ~/Desktop/ls-outdata.txt 2> ~/Desktop/ls-error.txt
Now error messages went to a file ls-error.txt

Run same command again, with long format and redirection to a file. Check appr. how long much time did it take. Try now same command without -l option. Check time now as well. Did you see a noticeable difference?

:/$ ls -R > ~/Desktop/ls-outdata.txt 2>~/Desktop/ls-error.txt - ca. 2 sek.
:/$ ls -l -R > ~/Desktop/ls-outdata.txt 2>~/Desktop/ls-error.txt - ca. 6 sek.

Difference was about 4 seconds, or thrice more time went to same command with -l option.
I would say it is quite a difference in a computer world.

:/$ ls -l -R | wc -l 368210 - files and folders totally on my PC.

H) Finding files

Try this at a first: find out how many files are on your system. Hint: use ls with -R option.

:/$ ls -lR | grep -v ^[d,l] | wc -l 298816 - files totally on my PC

-R option gives recursive count, extra piping with | grep -v ^d ^[d,l] | returns just lines with files, skipping folders and links.

Try then commands whereis and which. Use a command name as argument, for instance cat or ls. Check man for whereis and which and find out what does these commands do.

which … command shows path to current actual (executable) program (instead of ...).

whereis … command show a path both to executable program, source version (human-readable), and manual for that command.

Try also command locate with any filename as argument. Try your home directory name.

Prøv også kommandoen locate med et hvilket som helst filnavn som argument. Prøv gjerne et filnavnene på hjemmemappa di. Prøv også et filnavn som er en kommando, f.eks cal.

:~$ sudo apt-get install locate - locate command shall be installed before use
:~$ sudo updated - database shall be updated before use

:~$ locate txt
:~$ locate todat.txt
:~$ locate cal

Create a new file in your home directory and check whether locate finds it. Check manual of locate command to find out how it works. What can you do for locate command to find newly created files?

Locate command uses database where all files and folders are stored. In order to have new files in this database, we need to run updatedb command before using locate command. Therefore we can be sure that dababase contains all files and folders.

I) Finding files with find command.

Find all files ending with "txt" in your home directory. Try then same command again and save result to a file. Find all pdf files on your PC, starting from root directory. Redirect output to a file. Did you get some messages on screen? Those are error messages. How can you avoid them?

:~$ find -type f -name "*.txt"

:~$ find -type f -name "*.txt" > textfiles.txt

:/$ find -type f -name "*.pdf"

:/$ find -type f -name "*.txt" > ~/my_pdf.txt

:/$ find -type f -name "*.txt" > ~/my_pdf.txt 2> ~/pdf_err.txt

J) Manipulating found files with other commands.

You can operate on files you have found with -exec option. Find all text files in your home folder.

:~$ find -type f -name "*.txt"

Can you also show content on these files?

:~$ find -type f -name "*.txt" -exec more {} \;
Ctrl+c

Find also all pdf files and open them at same time?

:~$ find -type f -name "*.pdf" -exec firefox {} \;

Try to find all files bigger than 100 Mbyte, files saved during last hour, files saved during last week, files saved at certain date. (Hint: use option -type together with timing option). Check man for -type

:/$ find -type f -size +100M
:~$ find -type f -mmin -60
:~$ find -type f -mtime -7
:~$ find -type f -ls | grep "Oct 22"

Find all pdf files once again and copy them to /tmp folder.
(NB! Don't run this command with sudo.)

:~$ find -type f -name "*.pdf" -exec cp {} /tmp/ \;

K) Finding content in files with grep command.

Go to one of subfolders and create a text file with some content. Check this file with less command. Use then grep command to search for some definite word in file. Try to find line number where this word was found.

*Had file words.txt with random words on Desktop before.

:~$ grep “program” Desktop/words.txt
:~$ grep -n “program” Desktop/words.txt

Go then to /etc folder. Look at file services content, choose a word, for example protocol. Check if you can find this word with grep command. Use an option to show the line this word was found on. Check if there are other files in /etc folder containing word protocol. Is it possible to search recursively?

:/etc$ grep -n protocol services
:/etc$ grep protocol * 2> /dev/null - (getting result without error messages)

There were to files containing word ‘protocol’ – 1) services 2) protocols

:/etc$ grep -r protocol * 2> /dev/null - recursive search

Try to search another word. Command grep can also be used on output of other commands, for example ls. Find files created on certain date in your home directory by using ls and grep.

:~$ find -type f -ls | grep “Oct 22”

:~$ ls -lR | grep -v ^[d,l] | “Oct 22”