

Computer Systems and -architecture

Introduction to UNIX

1 Ba INF 2018-2019

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Time Schedule

Exercises are made individually. Put all your files in a tgz archive, as explained on the course's website, and submit your solution to the exercises on Blackboard.

- Deadline: **October 4, 23u55**

Exercises

Use as few commands as possible. Nearly all exercises can be solved with only 1 command. Fill in all commands you used to solve the exercises in the file `oefeningen.html`.

1. Files and Browsing

- Navigate to the root of the file system using the absolute path.
Solution: **ls /**
- List all files and directories in the current directory.
Solution: **ls**
- Descend into the directory `usr`. Print the current directory.
Solution: **cd usr**
Solution: **pwd**
- Descend into the directory `bin`. List the file type for all files that start with an `f` in this directory.
Solution: **cd bin**
Solution: **file f***
- Navigate up to the root directory using a relative path.
Solution: **cd ../../**
- Navigate to your home directory.
Solution: **cd ~**
- List all files including hidden files.
Solution: **ls -la**
- Create in your home directory two new subdirectories named `color` and `shape`.
Solution: **mkdir color shape**
- Navigate to the `color` directory, and create the files `red`, `green`, `blue`, `apple` and `square`. (*hint: use `touch` to create new files*)
Solution: **cd color**
Solution: **touch red green blue apple square**

- (j) List all files in the directory.
Solution: **ls**
- (k) Remove `apple`, as it is not really a color.
Solution: **rm apple**
- (l) Hide `square` by prepending a dot.
Solution: **mv square .square**
- (m) Edit the remaining files so that they contain their hexadecimal color codes (FF0000 for red, 00FF00 for green, 0000FF for blue).
Solution: **echo "FF0000" > red**
Solution: **echo "00FF00" > green**
Solution: **echo "0000FF" > blue**
- (n) Copy `blue` to a new file `purple`, and change the contents of the new file to 800080.
Solution: **cp blue purple**
Solution: **echo "800080" > purple**
- (o) Rename `red` to `yellow`, and change the contents of the file to FFFF00.
Solution: **mv red yellow**
Solution: **echo "FFFF00" > yellow**
- (p) Create a soft link named `darkblue` to `blue`.
Solution: **ln -s blue darkblue**
- (q) List all files in the directory.
Solution: **ls -a**
- (r) Edit `darkblue` to 0000A0.
Solution: **echo "0000A0" > darkblue**
- (s) Print the contents of `blue`.
Solution: **cat blue**
- (t) Print the disk size of every file in this directory (*hint: use the wildcard **).
Solution: **du ***
- (u) Move `.square` to the `shape` directory using the relative path and make it visible again.
Solution: **mv .square ../shape/square**
- (v) List the contents of the `shape` directory without navigating there.
Solution: **ls ../shape**
- (w) Go to the parent directory and remove the `shape` directory.
Solution: **cd ..**
Solution: **rmdir shape**

2. Archiving

- (a) Create an archive `color.tgz` containing all files in the `color` directory (not the `color` directory itself!).
Solution: **tar -cvfz color.tgz color/***
- (b) Create a new file `orange` with contents FFA500.
Solution: **echo FFA500 > orange**
- (c) Change the file `purple` to FF0080, which is a lighter variant of the color.
Solution: **echo FF0080 > purple**
- (d) Remove the compression of the archive `color.tgz` by unzipping it.
You have to unzip the archive because updating a compressed archive is not possible.
Solution: **gunzip color.tgz**

- (e) Update the archive `color.tar` to include the new and changed files.
Solution: **tar -uf color.tar orange purple**
- (f) Gzip the archive `color.tar` again, and make sure the file has a `.tgz` extension.
Solution: **gzip color.tar**
Solution: **mv color.tar.gz color.tgz**
- (g) Remove the `color` directory, but keep the archive.
Solution: **rmdir color**
- (h) Create a new directory `color2` in your home directory, and unzip the archive into that directory. What happened to the soft link?
Solution: **mkdir color2**
Solution: **tar -xvf color.tgz**

3. Processes

- (a) Navigate to the directory `/usr/games`.
Solution: **cd /usr/games**
- (b) Run one of the games in the foreground. Kill the program using the keyboard shortcut.
Solution: **sol**
Solution: **Ctrl+C**
- (c) Run another game in the background. Display the process info and note the process ID.
Solution: **gnome-mines & — 3012**
- (d) Kill the process using the process ID.
Solution: **kill -9 3012**
- (e) Startup a number of `sleep 60` processes in the background, and terminate them all at the same time using the `pkill` command.
Solution: **sleep 100 &**
Solution: **pkill sleep**

4. Streams

- (a) Download the file `http://msdl.cs.mcgill.ca/people/hv/teaching/ComputerSystemsArchitecture/materials/Names.tgz`.
Solution: **wget http://msdl.cs.mcgill.ca/people/hv/teaching/ComputerSystemsArchitecture/materials/Names.tgz**
- (b) Unzip the downloaded archive.
Solution: **tar -xvf Names.tgz**
- (c) Display the last 25 male names.
Solution: **tail -n 25 male-names**
- (d) Display the first 30 female names.
Solution: **head -n 30 femaile-names**
- (e) Count the number of lines in both files. Are there more male or female names?
Solution: **wc -l male-names — 3906**
Solution: **wc -l female-names — 4955**
Solution: **more female names**
- (f) Search the list for your own name.
(Hint: use `grep`)
Solution: **cat male-names — grep 'quinten'**

- (g) Print all names that contain the letter `q`.
Solution: `cat male-names | grep '.*q.*'`
- (h) The name `raf` is not in the list. Append the name using the stream operator `>>`.
Solution: `echo 'raf' |&& male-names`
- (i) Sort the male names again and write the result to `male-names-sorted`.
Solution: `sort male-names |> male-names-sorted`
- (j) Merge the male and female names into the file `all-names`. Make sure the names are sorted.
Solution: `cat male-names |> tmp`
Solution: `cat female-names |&& tmp`
Solution: `sort tmp |> all-names`
- (k) Print the number of names that appear more than once in `all-names`, and are thus suitable for both boys and girls.
(Hint: use `uniq`)
Solution: `uniq -d all-names | wc -l`
- (l) Store all names that are both male and female names in `unisex-names`.
Solution: `uniq -d all-names |> unisex-names`
- (m) Remove duplicate names from `all-names`.
Solution: `uniq -u all-names |> tmp`
Solution: `mv tmp all-names`
- (n) Update the archive `Names.tgz` so that it contains the updated version of `male-names` and the new files `all-names` and `unisex-names`.
Solution: `unzip Names.tgz`
Solution: `tar -uf Names.tar male-names all-names unisex-names`
Solution: `gzip Names.tar`
- (o) Use `find` to compile a list of all directories in `/proc`, redirecting the output so that the list of directories ends up in a file called `directories.txt` and the list of error messages ends up in a file called `errors.txt`.
Solution: