OPERATING SYSTEMS
– Laboratory 2 –

1. STANDARD STREAMS REDIRECTION. CONNECTING COMMANDS WITH PIPES

- the UNIX shells use three standard streams:
  - 0 = standard input (STDIN)
  - 1 = standard output (STDOUT)
  - 2 = standard error (STDERR)
- symbols used to:
  - redirect the standard input: <
  - redirect the standard output/standard error:
    - > (if the file exists, the file content will be overwritten)
    - >> (if the file exists, append the output to the existing file content)
- examples:
  - redirect standard input:

```
cat   sort <users.txt
```

  - redirect standard output to a file:

```
ls -l >list.txt     or   ls -l 1>list.txt
ls -l >>list.txt    or   ls -l 1>>list.txt
```

  - redirect standard error to a file:

```
ls -l /bonus >error.log     or   ls -l /bonus 2>error.log
ls -l /bonus >>error.log    or   ls -l /bonus 2>>error.log
```

  - redirect standard output and standard error to the same file:

```
ls -l /bonus >output.log 1>&2
ls -l /bonus >>output.log 1>>&2
```

- connecting commands with pipes:

```
who | sort
who | wc -l
sort users.txt | head -n 5
sort users.txt | tail -n 5
```

2. EMAIL and users

mail [options] [user ...]

Ex:

```
echo "Salutare!" | mail -s "salut" sanda@scs.ubbcluj.ro
```

To read emails use cmds: mail, mailx, or pine.

3. EDITING FILES

Configure your editor. You can do this for Vi/Vim. Emacs, Nano, Joe and Micro, but the example below is for Vim. IF you want to configure other editors, search their documentation for the config file name and location, and the values you need to write to achieve the same things as below.

a. Create/edit file `~/.vimrc` and write in it the lines below, to enable syntax coloring, tab size of 4 and tab insertion as spaces

```
syntax on
set tabstop=4
set expandtab
```

b. ~ is alias for the home directory, so go there, then run vim .vimrc
c. files having their name starting with . are hidden (ls -a was mentioned above)
d. About vim editor:

- 2 working modes: INSERT i / COMMAND Esc
- shortcuts: x, dd, dw, /, V, y, p
- commands: :w, :q, :x, :q! (:wq to save and exit)

4. PRACTICE

man	mkdir	ps	file	df
ls -l -d -a -p	cd	jobs	ln	du
cat	rm -r -i -f	bg	find	diff
less	rmdir	fg	cp -r -i -f	pwd
more	chmod	kill	mv -i -f	passwd
who	finger	last	pine	mail

1. Connect to linux.scs.ubbcluj.ro using ssh. – see lab 1 or Video
2. Try the commands above
3. Create a small Unix manual with the most important commands and options.
4. Copy this manual on Windows and create a txt or doc or pdf file. Files can be transfered using FTP. You can use Total Commander (Ctrl+N) or WinScp.

REFERENCES:

- Redirecting: `http://www.ee.surrey.ac.uk/Teaching/Unix/unix3.html`
- Permissions: `http://www.ee.surrey.ac.uk/Teaching/Unix/unix5.html`
- Other UNIX commands: `http://www.ee.surrey.ac.uk/Teaching/Unix/unix6.html`
- Learn VIM: `http://www.openvim.com/tutorial.html`
- C programming: `https://www.tutorialspoint.com/cprogramming/index.htm`