Introduction to Unix command-line tools

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Open your terminal

First steps

```
pwd # where am I?

whoami # who am I?

id <your_username> # what can I do?

date # what time/day is it?
```

man - command manual

```
man <command>
```

```
man cat
```

```
man echo
```

```
man awk
```

Tips: Arrows move up or down line by line. Use **space** to move a page down (you can also use **U** or **D** to move a page up or down). Press **Q** to quit.

which - which command is being called

```
which <command>


which cat
which echo
which awk
```

Arguments

Come after the name of the program

Example:

```
ls -l        (program + 1 argument)
ls -l *.pdf  (program + 2 arguments)
```

program   arguments

The number of spaces between arguments doesn't matter

```
ls      -l      *.pdf
```

some tips (i)

Use <Tab> to auto-complete your commands or file/directory names

To search old commands, you can use ↑ and ↓ arrows in your keyboard

some tips (ii)

The command `history` will return a list of your last commands

Use ! to run the last command starting with…

Example:

`!which`

This will run the last command starting with "which"

Special characters (i)

* : any character (with 0 or more occurrences)

: starts comments

"   " : defines strings

'   ' : defines strings

– : starts a parameter

| : "pipe" commands (gets output – sends to input)

Special characters (ii)

~ : home directory

/ : separate internal directories

**** : escape character

 \n : new line (Linux and Mac)

 \r : new line (old versions of Mac)

 \t : tab

Special characters (iii)

` `   : defines commands

;   : separates commands

^   : beginning of line

$: end of line or beginning of variable name

?   : any character (with one occurrence)

[ ]   : define sets of characters

cd - change working directory

```
cd Desktop
cd ..  # goes to directory above
cd ~   # goes to home directory
cd -   # goes to previous directory

cd     # goes to home directory too
```

ls - list files in directories (i)

`ls` : list files of current directory

`ls workshop` : list files in directory workshop

`ls -l` : in long format

`ls -t` : list files sorted by time modified

`ls -1` : force output to be one entry per line

`ls -S` : list files sorted by time modified

ls - list files in directories (ii)

`ls -r` : reverse the sorting

`ls -a` : list hidden files (which begin with a dot)

`ls -h` : show file size human-readable

`ls -G` : colors output

We can combine options:

`ls -lhrt`

find - finds files and directories

```
# finds all pdf files in the current
folder ( . )
find . -name *.pdf


# finds all xlsx files in the
Downloads folder
find ~/Downloads -name *.xlsx
```

mkdir - make directory

```
mkdir bioinfo_files
mkdir workshop123
mkdir workshop_text_files
mkdir -p 2019/May/07
# Suggestion:
# Create names that make sense
```

rmdir - removes empty directories

```
rmdir workshop123
rmdir 2018 # it will return an error
```

echo - write to the standard output

```
echo Hello, friends. # Try it
```
echo -e : prints escape characters
```
echo -e "A\tB\tC" # Try it
```
```
echo -e "A\nB\nC" # Try it
```
echo -n : prints and doesn't go to a new line
```
echo -n "ABC"; echo "123" # Try it
```
```
echo "ABC"; echo "123"     # Try it
```

cat - concatenate and print text files

```
cat file1.txt file2.txt > output.txt
cat *.bed > all.bed
```

cat -n : shows line numbers

cat -e : shows non-printing characters

Redirect output or errors (i)

```
echo "aeiou" > vowels.txt
echo "bcdfgh" > consonants.txt
cat vowels.txt consonants.txt > letters.txt
echo "jlmnpq" >> consonants.txt  # appends
echo "rstvxz" > consonants2.txt
cat consonants2.txt >> letters.txt
cat letters.txt
```

Redirect output or errors (ii)

```
cat -n letters.txt
cat yyy.txt >> letters.txt 2> error.txt
cat error.txt
cat zzz.txt >> letters.txt 2>> error.txt
cat error.txt
```

mv - move files and directories

```
mv letters.txt alphabet.txt
mv letters.txt workshop_text_files
mv workshop_text_files workshop_files
```

rm - remove files and directories

```
rm old_file.txt error_copy.txt

# Use -r (recursive) to remove
# directories and its contents
rm -r bioinfo_files/workshop_files/
rm -r 2018
```

cp - copy files and directories

```
cp pier.jpg workshop_files
cp error.txt error_copy.txt

# To copy directories with its contents,
# use -r (recursive)
cp -r workshop_files bioinfo_files/
# Now, try...
cp -r workshop_files/ bioinfo_files/
```

wget - network downloader

```
curl -O finkbeiner-biowww.gladstone.org/XHMM_results.tar.bz2
```

wget -c : continue (for incomplete downloads)

```
wget finkbeiner-biowww.gladstone.org/chr10.fa
# after 10%, press Ctrl+C
wget -c finkbeiner-biowww.gladstone.org/chr10.fa
```

Let's play with some data

```
cd # Going to the home directory


mkdir unix_workshop # Creating a new directory


cd unix_workshop # Changing the working directory


# Downloading a file

wget https://www.dropbox.com/s/y57blcsk54nrisp/data.tar.gz


# Decompressing the tar.gz file

tar -xvzf data.tar.gz
cd data
```

gzip - zip files

```
ls -lh ATXN2.txt
gzip ATXN2.txt
ls -lh ATXN2.txt.gz
# to unzip, run "gunzip ATXN2.txt.gz"
```

gzcat - cat for zipped files

`gzcat ATXN2.txt.gz`

less - file visualization

`less VCP.txt`

- Use arrows (←↑→↓) to navigate the file
- Type **/** to search

`less -S VCP.txt`

File - determine file type

```
file vowels.txt


file hometown.jpg


# Tip: command "open"

open hometown.jpg
```

alias - "shortcut" for commands

`alias <alias>` : see what is a specific alias

`alias ll` `# ll is not a real command. =)`

`alias fbio='ssh leandrolima@fb-bio-compute01.gladstone.internal'`

`fbio`

alias – other examples (for Mac)

```
alias cleanDesk='defaults write
com.apple.finder CreateDesktop false;
killall Finder'


alias showDesk='defaults write
com.apple.finder CreateDesktop true;
killall Finder'
```

df - report file system disk space usage

`df -h` : human-readable

du - estimate file space usage

`du -h` : human-readable

Survey

https://bioinformatics-course-feedback.questionpro.com/

End