

# UNIX primer

Some tips and tricks on the **Command Line**

Jakub Vlček & Daniela Souza-Costa  
Angélica Cuevas & Angela P. Fuentes-Pardo

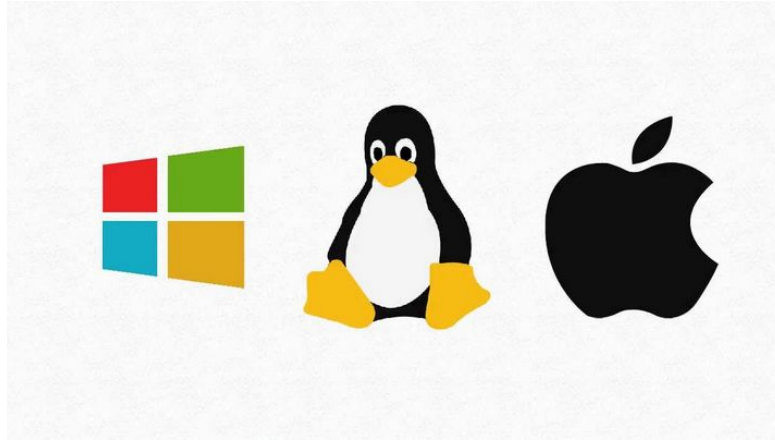
January 19, 2025



Population and Speciation Genomics Workshop - Cesky Krumlov 2025

# What is UNIX?

- Operating system



# Why UNIX?

- Scripting
- Powerful tools
- Easy remote access
- A GUI (Graphical User Interface) is not available for many programs
- Compatibility



# Learning goals

- Navigate in the UNIX environment
- Create, move and delete directories
- Create, move, delete and edit files
- Use basic UNIX commands
- Know where to find help



# The Terminal

```
vikofly@vikofly-ThinkPad-X13-Gen-1: -
vikofly@vikofly-ThinkPad-X13-Gen-1: ~
vikofly@vikofly-ThinkPad-X13-Gen-1: ~
ll_gala.vcf.gz.tbi
novar.o1775083
nel_Chr10a11_gala.vcf.gz
nel_Chr10a11_gala.vcf.gz.log
nel_Chr10a11_gala.vcf.gz.novarfilt.o1783078
nel_Chr10a11_gala.vcf.gz.tbi
nel_Chr11a11_gala.vcf.gz
nel_Chr11a11_gala.vcf.gz.log
nel_Chr12a11_gala.vcf.gz.novarfilt.o1783079
nel_Chr13a11_gala.vcf.gz.tbi
nel_Chr12a11_gala.vcf.gz
nel_Chr12a11_gala.vcf.gz.log
nel_Chr12a11_gala.vcf.gz.novarfilt.o1783081
nel_Chr12a11_gala.vcf.gz.tbi
nel_Chr13a11_gala.vcf.gz
nel_Chr13a11_gala.vcf.gz.log
nel_Chr13a11_gala.vcf.gz.novarfilt.o1783082
nel_Chr13a11_gala.vcf.gz.tbi
nel_Chr14a11_gala.vcf.gz
nel_Chr14a11_gala.vcf.gz.log
nel_Chr14a11_gala.vcf.gz.novarfilt.o1783083
nel_Chr14a11_gala.vcf.gz.tbi
nel_Chr15a11_gala.vcf.gz
nel_Chr15a11_gala.vcf.gz.log
nel_Chr15a11_gala.vcf.gz.novarfilt.o1783084
nel_Chr16a11_gala.vcf.gz.tbi
nel_Chr17a11_gala.vcf.gz
nel_Chr17a11_gala.vcf.gz.log
nel_Chr17a11_gala.vcf.gz.novarfilt.o1783085
nel_Chr17a11_gala.vcf.gz.tbi
nel_Chr18a11_gala.vcf.gz
nel_Chr18a11_gala.vcf.gz.log
nel_Chr18a11_gala.vcf.gz.novarfilt.o1783086
nel_Chr19a11_gala.vcf.gz
nel_Chr19a11_gala.vcf.gz.log
nel_Chr19a11_gala.vcf.gz.novarfilt.o1783087
nel_Chr19a11_gala.vcf.gz.tbi
nel_Chr19a11_gala.vcf.gz
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 zcat all_gala.vcf.gz | grep CHROM > header.txt
:
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 cat header.txt
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 cat header.txt
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 zgrep CHROM all_gala.vcf.gz
CHROM POS ID REF ALT QUAL FILTER INFO FORMAT 1-013 1-MocP01 10-143380 10-272 11-143370 11-276 12-143192 12-280 2-MocP17 2-M25 3-M6
1 4-140 4-MocD02 5-364 5-MocW01 6-288 6-MocW09 7-270 7-MocX01 8-256 8-MocX05 9-143182 9-254
:
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 zgrep CHROM all_gala.vcf.gz > header.txt
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 cat header.txt
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 ^C
300KGWHR/vikoflybskrtt:/storage/brno12-cert/home/vikofly/mockingbird_genomics/napped_to_melanotis/vcf_melanotis/all_gala5 client_loop: send disconnect: Broken pipe
vikofly@vikofly-ThinkPad-X13-Gen-1: ~
```

(the Command Line, Shell, Prompt)



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[illegible]

```

1 // C program to demonstrate array access
2 #include <stdio.h>
3
4 int main()
5 {
6     int a[16];
7     for (int i = 0; i < 16; i++)
8         a[i] = i;
9
10    for (int i = 0; i < 16; i++)
11        printf("i = %d, a[i] = %d\n", i, a[i]);
12
13    return 0;
14 }

```

Output:

```

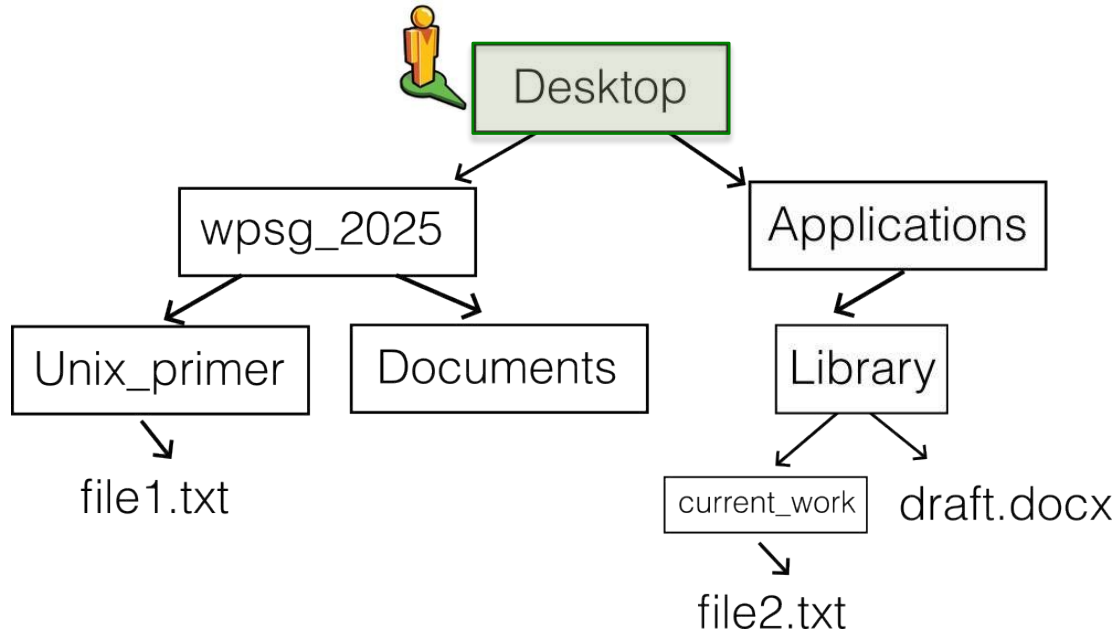
i = 0, a[i] = 0
i = 1, a[i] = 1
i = 2, a[i] = 2
i = 3, a[i] = 3
i = 4, a[i] = 4
i = 5, a[i] = 5
i = 6, a[i] = 6
i = 7, a[i] = 7
i = 8, a[i] = 8
i = 9, a[i] = 9
i = 10, a[i] = 10
i = 11, a[i] = 11
i = 12, a[i] = 12
i = 13, a[i] = 13
i = 14, a[i] = 14
i = 15, a[i] = 15

```

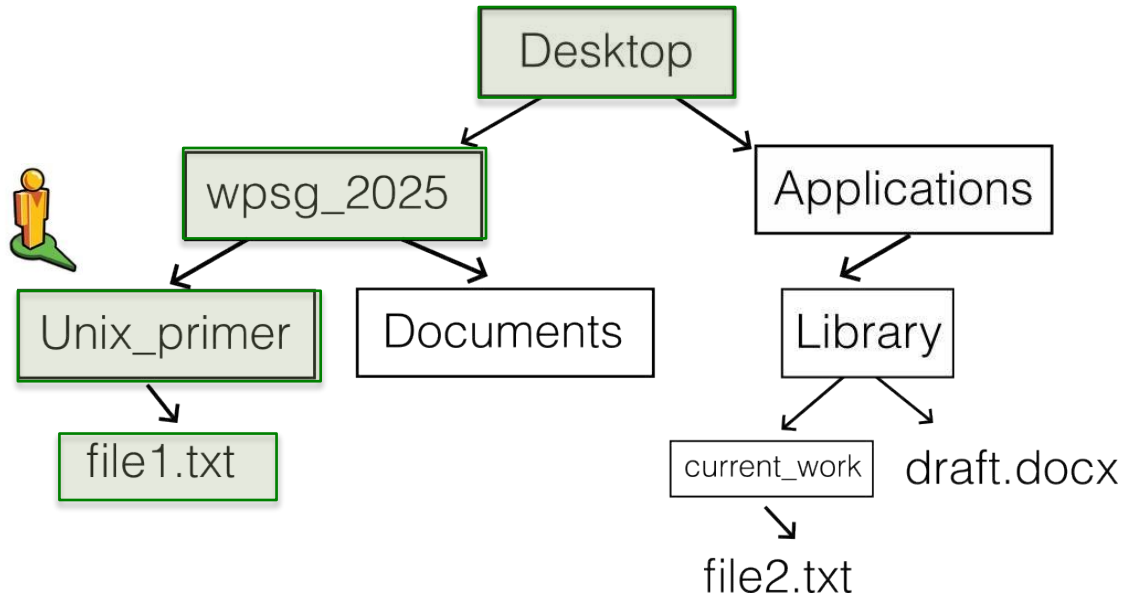
## Modify the look

[illegible]

# PATHS: Absolute vs. Relative



# PATHS: Absolute vs. Relative

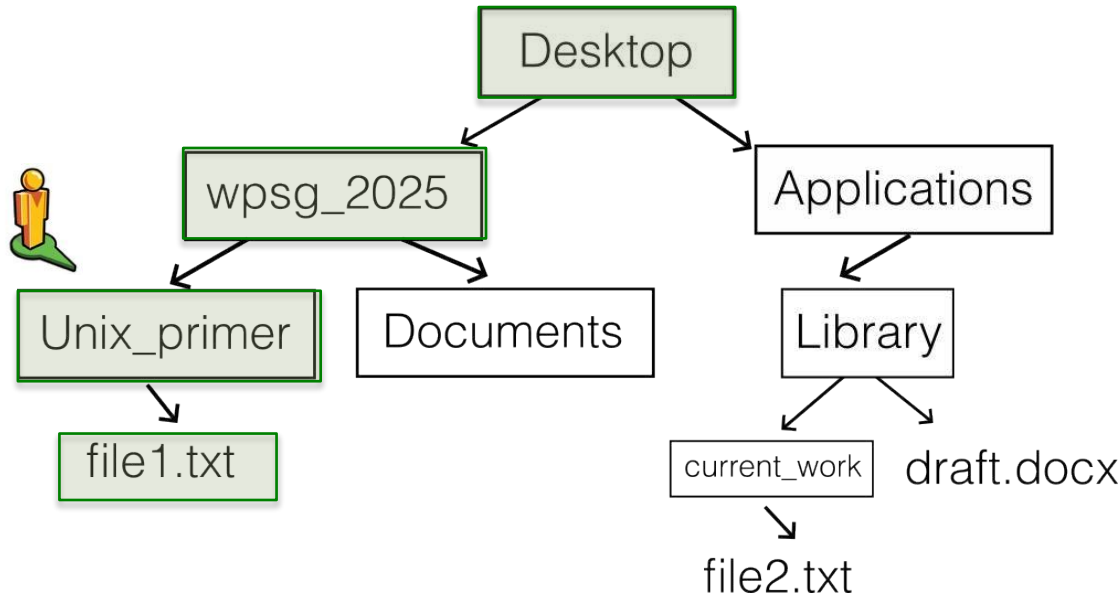


# PATHS: Absolute vs. Relative

In the **Command Line**

ls = list

cd = change directory

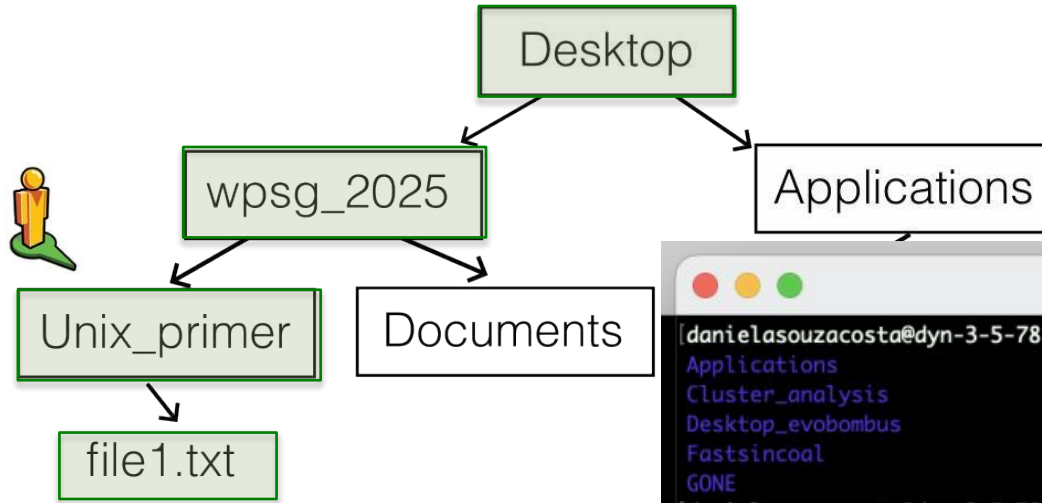


# PATHS: Absolute vs. Relative

In the **Command Line**

ls = list

cd = change directory



```
Unix_primer — -zsh — 114x24
[danielasouzacosta@dyn-3-5-78 Desktop % ls
Applications          PCA_2024              currentNe
Cluster_analysis      Relate_All_samples    wpsg_2025
Desktop_evobombus
Fastsincoal
GONE
[danielasouzacosta@dyn-3-5-78 Desktop % cd wpsg_2025/Unix_primer
[danielasouzacosta@dyn-3-5-78 Unix_primer % ls
file1.txt
[danielasouzacosta@dyn-3-5-78 Unix_primer %
```

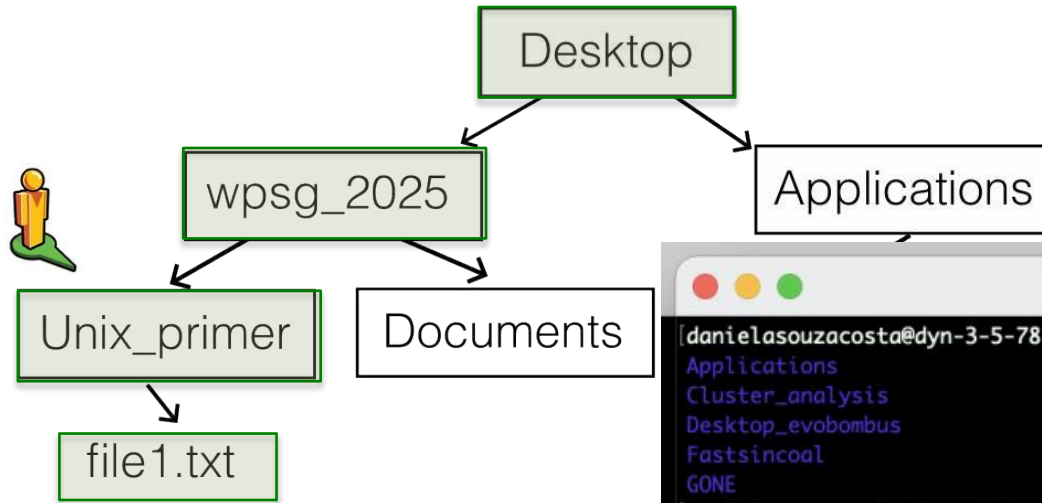


# PATHS: Absolute vs. Relative

In the **Command Line**

ls = list

cd = change directory



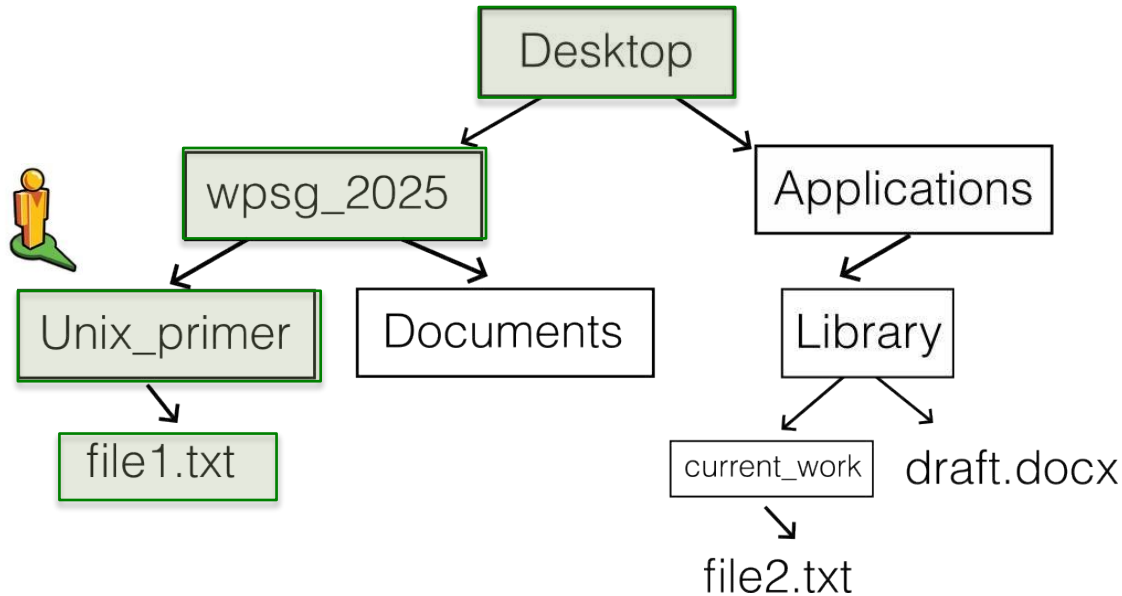
```
Unix_primer — -zsh — 114x24
[danielasouzacosta@dyn-3-5-78 Desktop % ls
Applications          PCA_2024              currentNe
Cluster_analysis      Relate_All_samples    wpsg_2025
Desktop_evobombus
Fastsincoal
GONE
[danielasouzacosta@dyn-3-5-78 Desktop % cd wpsg_2025/Unix_primer
[danielasouzacosta@dyn-3-5-78 Unix_primer % ls
file1.txt
[danielasouzacosta@dyn-3-5-78 Unix_primer %
```

/Desktop/wpsg\_2025/Unix\_primer



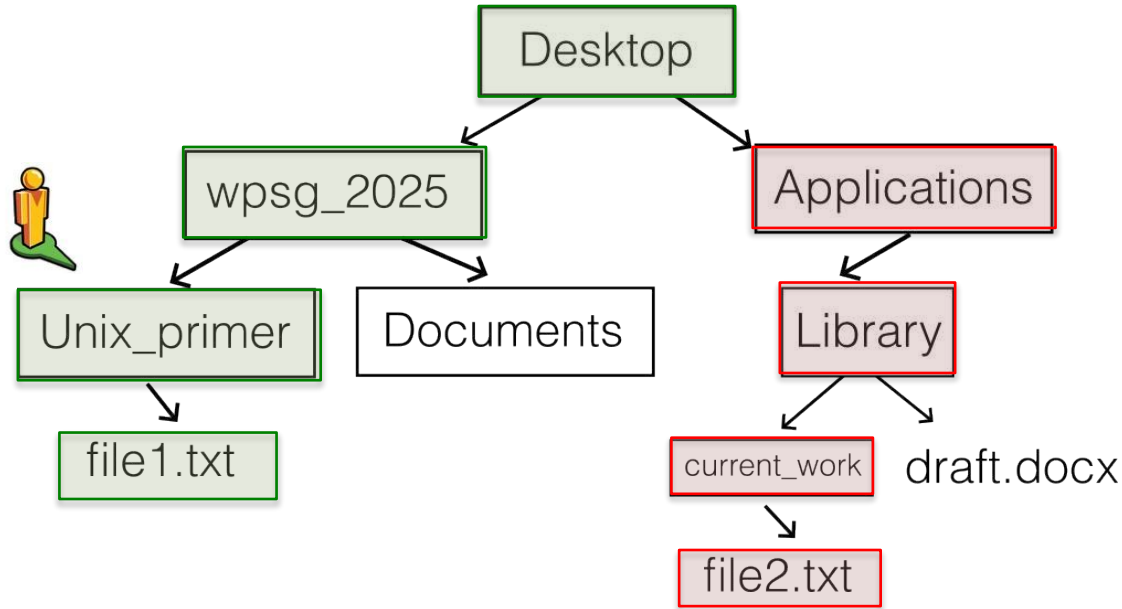
# PATHS: Absolute vs. Relative

In the **Command Line**



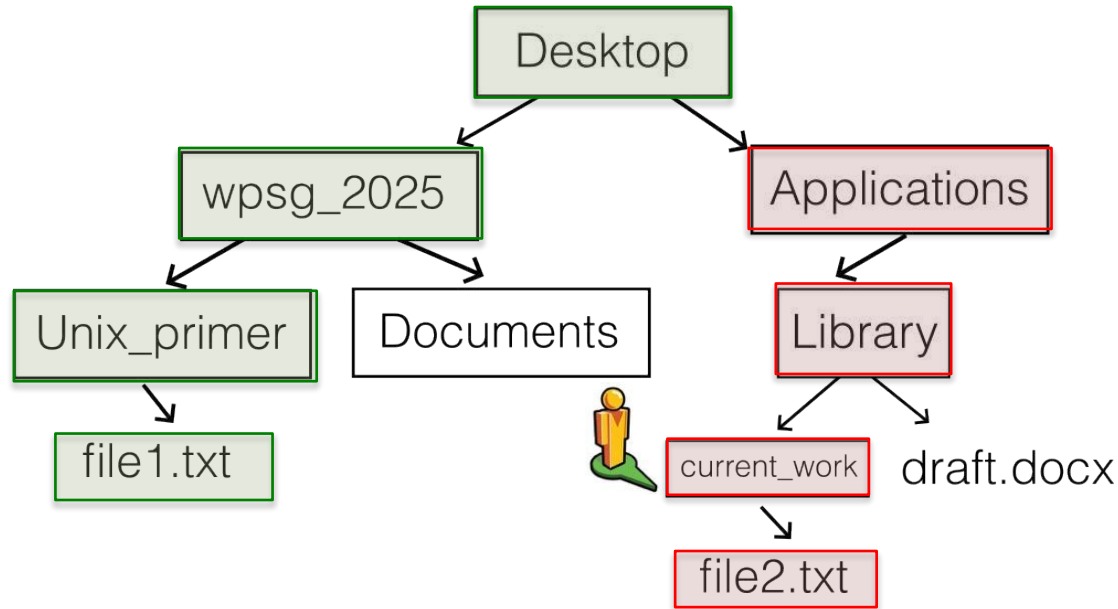
# PATHS: Absolute vs. Relative

In the **Command Line**



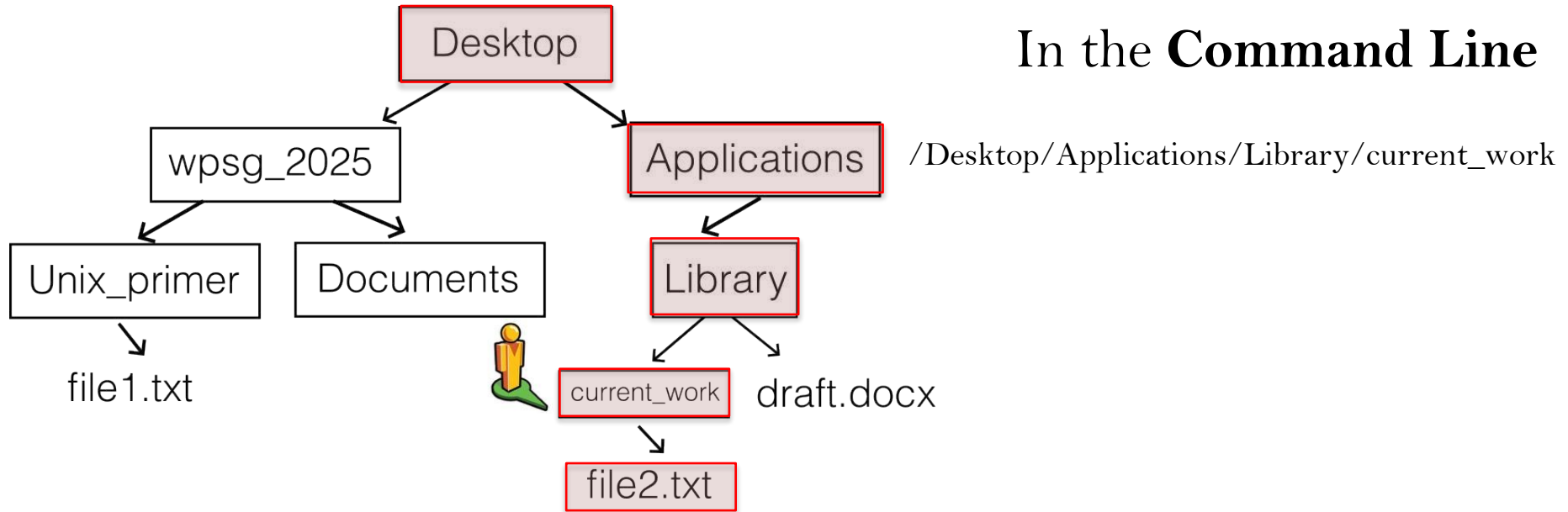
# PATHS: Absolute vs. Relative

In the **Command Line**



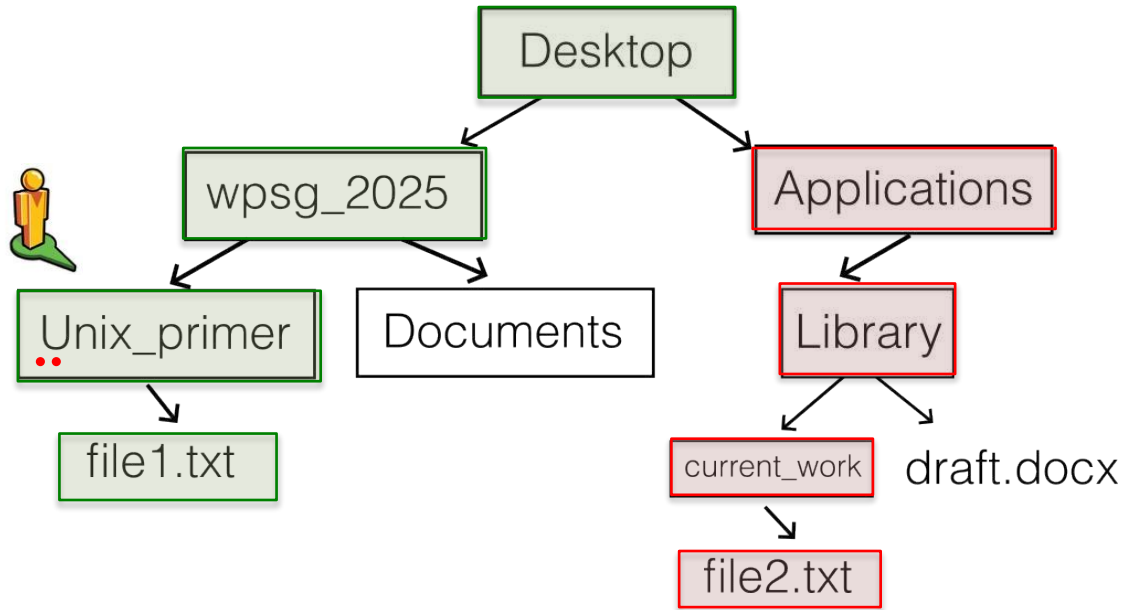
# PATHS: Absolute vs. Relative

In the **Command Line**



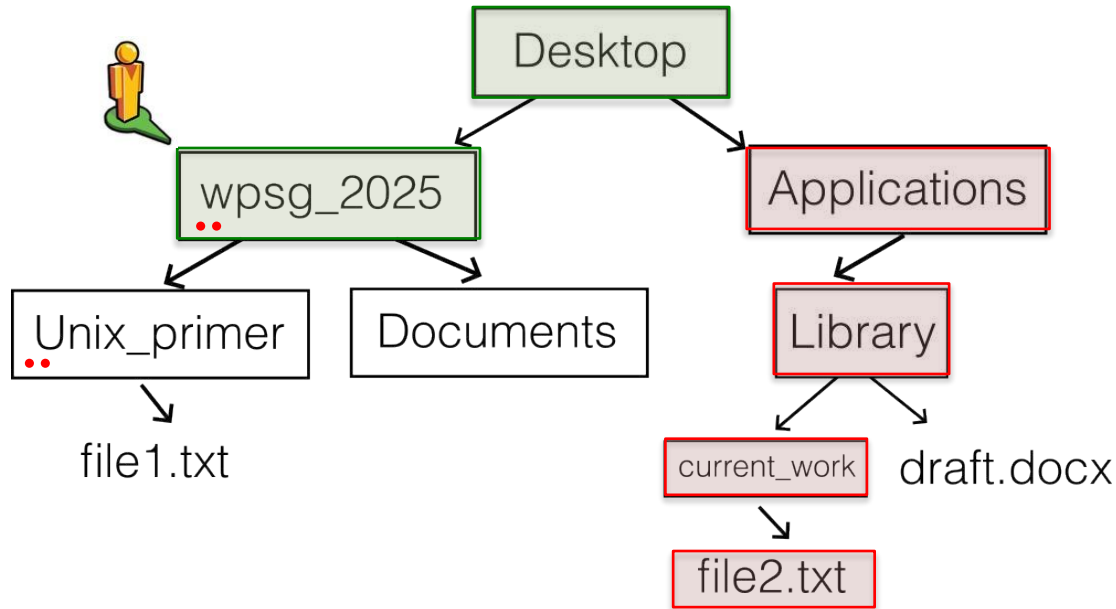
# PATHS: Absolute vs. Relative

In the **Command Line**



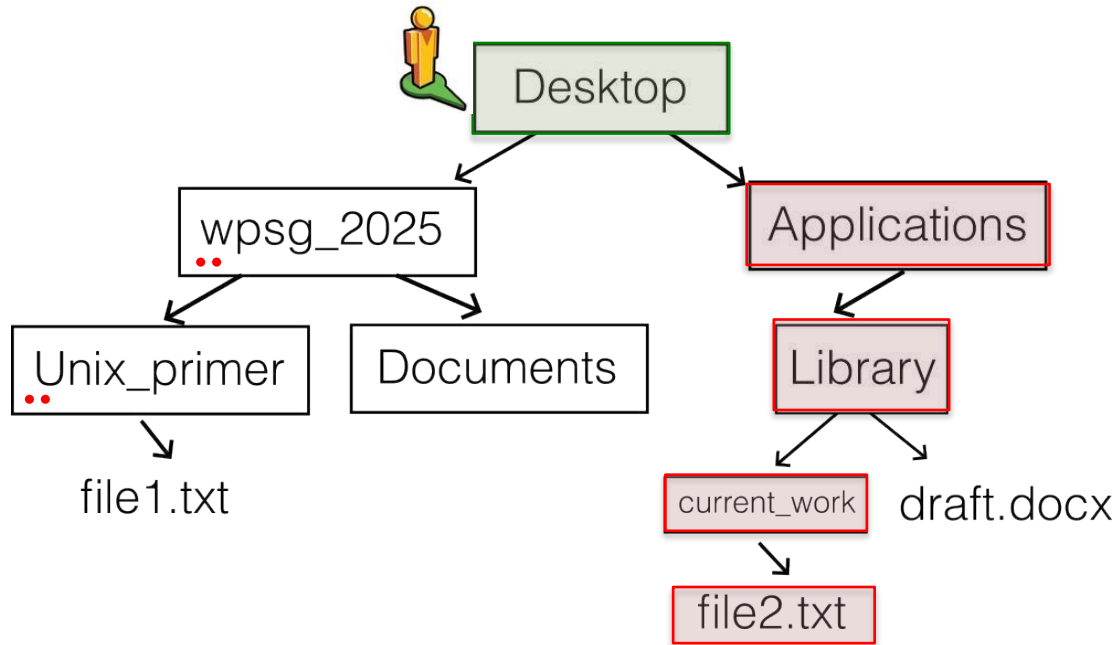
# PATHS: Absolute vs. Relative

In the **Command Line**



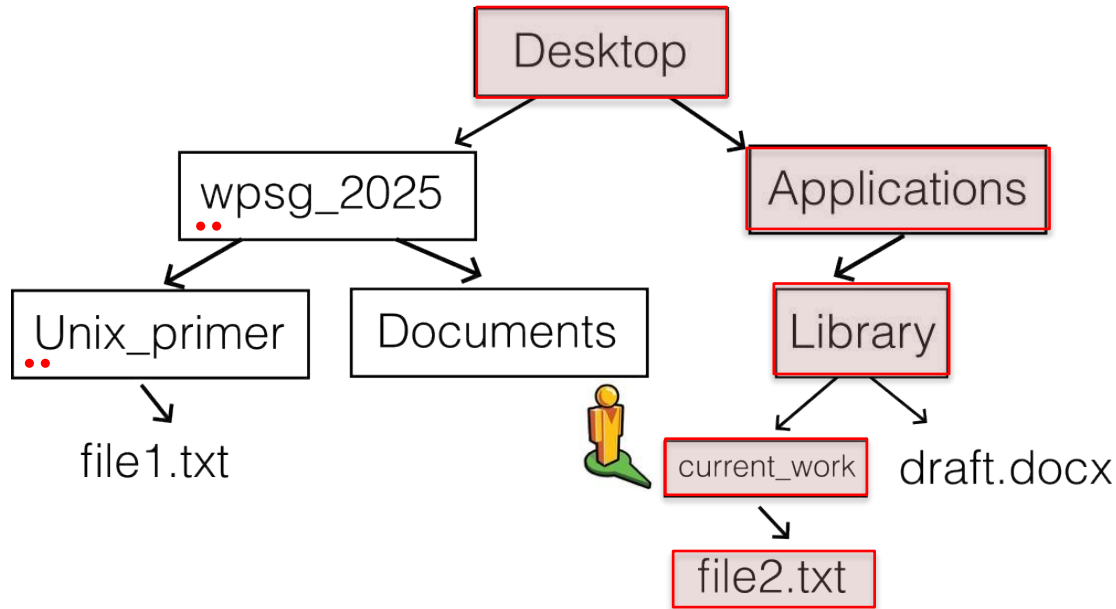
# PATHS: Absolute vs. Relative

In the **Command Line**



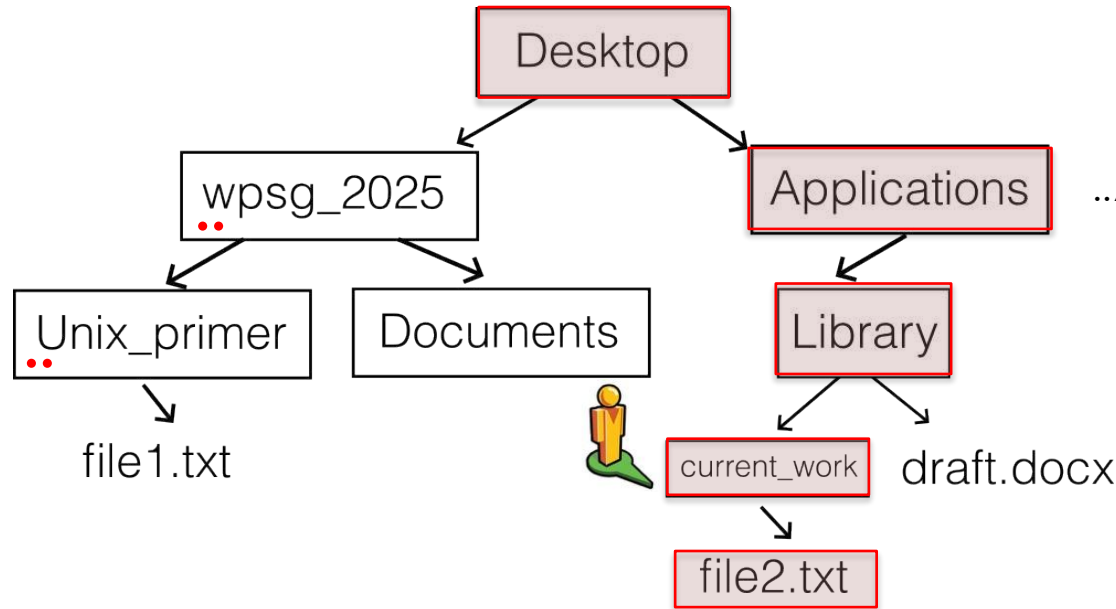
# PATHS: Absolute vs. Relative

In the **Command Line**



# PATHS: Absolute vs. Relative

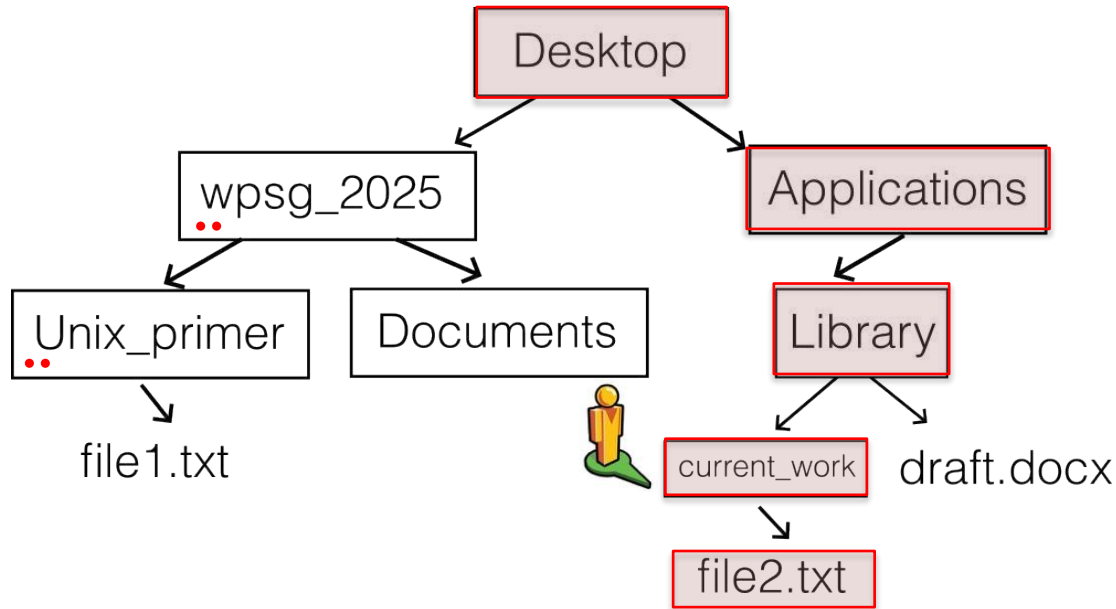
In the **Command Line**



`../../Applications/Library/current_work`



# PATHS: Absolute vs. Relative



## In the **Command Line**

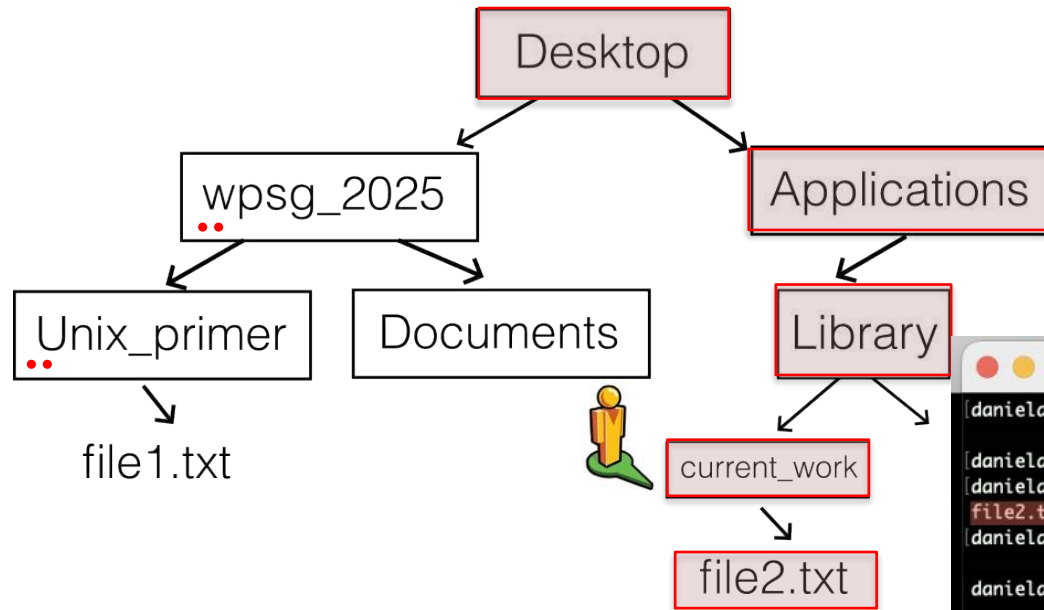
ls = list

cd = change directory

pwd = print working directory



# PATHS: Absolute vs. Relative



## In the **Command Line**

ls = list

cd = change directory

pwd = print working directory

```
current_work — -zsh — 114x24
[danielasouzacosta@dyn-3-5-78 Unix_primer % pwd
/Desktop/wpsg_2025/Unix_primer
[danielasouzacosta@dyn-3-5-78 Unix_primer % cd ../../Applications/Library/current_work
[danielasouzacosta@dyn-3-5-78 current_work % ls
file2.txt
[danielasouzacosta@dyn-3-5-78 current_work % pwd
/Desktop/Applications/Library/current_work
[danielasouzacosta@dyn-3-5-78 current_work %
```



# PATHS: Absolute vs. Relative

## Absolute

`/Desktop/Applications/Library/current_work`

## Relative

`../Applications/Library/current_work`



# A CHEAT SHEET ... and the internet is your best friend!

## Unix/Linux Command Reference

FOSSwire.com

| File Commands                                                                                                                                              | System Info                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <code>ls</code> - directory listing                                                                                                                        | <code>date</code> - show the current date and time                                                                                  |
| <code>ls -al</code> - formatted listing with hidden files                                                                                                  | <code>cal</code> - show this month's calendar                                                                                       |
| <code>cd <i>dir</i></code> - change directory to <i>dir</i>                                                                                                | <code>uptime</code> - show current uptime                                                                                           |
| <code>cd</code> - change to home                                                                                                                           | <code>w</code> - display who is online                                                                                              |
| <code>pwd</code> - show current directory                                                                                                                  | <code>whoami</code> - who you are logged in as                                                                                      |
| <code>mkdir <i>dir</i></code> - create a directory <i>dir</i>                                                                                              | <code>finger <i>user</i></code> - display information about <i>user</i>                                                             |
| <code>rm <i>file</i></code> - delete <i>file</i>                                                                                                           | <code>uname -a</code> - show kernel information                                                                                     |
| <code>rm -r <i>dir</i></code> - delete directory <i>dir</i>                                                                                                | <code>cat /proc/cpuinfo</code> - cpu information                                                                                    |
| <code>rm -f <i>file</i></code> - force remove <i>file</i>                                                                                                  | <code>cat /proc/meminfo</code> - memory information                                                                                 |
| <code>rm -rf <i>dir</i></code> - force remove directory <i>dir</i> *                                                                                       | <code>man <i>command</i></code> - show the manual for <i>command</i>                                                                |
| <code>cp <i>file1 file2</i></code> - copy <i>file1</i> to <i>file2</i>                                                                                     | <code>df</code> - show disk usage                                                                                                   |
| <code>cp -r <i>dir1 dir2</i></code> - copy <i>dir1</i> to <i>dir2</i> ; create <i>dir2</i> if it doesn't exist                                             | <code>du</code> - show directory space usage                                                                                        |
| <code>mv <i>file1 file2</i></code> - rename or move <i>file1</i> to <i>file2</i>                                                                           | <code>free</code> - show memory and swap usage                                                                                      |
| If <i>file2</i> is an existing directory, moves <i>file1</i> into it                                                                                       | <code>whereis <i>app</i></code> - show possible locations of <i>app</i>                                                             |
| <code>ln -s <i>file link</i></code> - create symbolic link <i>link</i> to <i>file</i>                                                                      | <code>which <i>app</i></code> - show which <i>app</i> will be run by default                                                        |
| <code>touch <i>file</i></code> - create or update <i>file</i>                                                                                              | Compression                                                                                                                         |
| <code>cat &gt; <i>file</i></code> - places standard input into <i>file</i>                                                                                 | <code>tar cf <i>file.tar files</i></code> - create a tar named <i>file.tar</i> containing <i>files</i>                              |
| <code>more <i>file</i></code> - output the contents of <i>file</i>                                                                                         | <code>tar xf <i>file.tar</i></code> - extract the files from the tar                                                                |
| <code>head <i>file</i></code> - output the first 10 lines of <i>file</i>                                                                                   | <code>tar czf <i>file.tar.gz files</i></code> - create a tar with Gzip compression                                                  |
| <code>tail <i>file</i></code> - output the last 10 lines of <i>file</i>                                                                                    | <code>tar xzf <i>file.tar.gz</i></code> - extract a tar using Gzip                                                                  |
| <code>tail -f <i>file</i></code> - output the contents of <i>file</i> as it grows, starting with the last 10 lines                                         | <code>tar cJf <i>file.tar.bz2</i></code> - create a tar with Bzip2 compression                                                      |
| <code>tar xJf <i>file.tar.bz2</i></code> - extract a tar using Bzip2                                                                                       | <code>gzip <i>file</i></code> - compresses <i>file</i> and renames it to <i>file.gz</i>                                             |
| Process Management                                                                                                                                         | <code>gunzip <i>file.gz</i></code> - decompresses <i>file.gz</i> back to <i>file</i>                                                |
| <code>ps</code> - display your currently active processes                                                                                                  | Network                                                                                                                             |
| <code>top</code> - display all running processes                                                                                                           | <code>ping <i>host</i></code> - ping <i>host</i> and output results                                                                 |
| <code>kill <i>pid</i></code> - kill process id <i>pid</i>                                                                                                  | <code>whois <i>domain</i></code> - get whois information for <i>domain</i>                                                          |
| <code>killall <i>proc</i></code> - kill all processes named <i>proc</i> *                                                                                  | <code>dig <i>domain</i></code> - get DNS information for <i>domain</i>                                                              |
| <code>bg</code> - job is stopped or background job; resume a stopped job in the background                                                                 | <code>dig -x <i>host</i></code> - reverse lookup <i>host</i>                                                                        |
| <code>fg</code> - brings the most recent job to foreground                                                                                                 | <code>wget <i>file</i></code> - download <i>file</i>                                                                                |
| <code>fg %n</code> - brings job <i>n</i> to the foreground                                                                                                 | <code>wget -c <i>file</i></code> - continue a stopped download                                                                      |
| File Permissions                                                                                                                                           | Installation                                                                                                                        |
| <code>chmod octal <i>file</i></code> - change the permissions of <i>file</i> to octal, which can be found separately for user, group, and world by adding: | install from source                                                                                                                 |
| <u>r</u> - read (r)                                                                                                                                        | <code>/configure</code>                                                                                                             |
| <u>w</u> - write (w)                                                                                                                                       | <code>make</code>                                                                                                                   |
| <u>x</u> - execute (x)                                                                                                                                     | <code>make install</code>                                                                                                           |
| Examples:                                                                                                                                                  | <code>dpkg -i <i>pkg.deb</i></code> - install a package (Debian)                                                                    |
| <code>chmod 777</code> - read, write, execute for all                                                                                                      | <code>rpm -Uvh <i>pkg.rpm</i></code> - install a package (RPM)                                                                      |
| <code>chmod 755</code> - rx for owner, rx for group and world                                                                                              | Shortcuts                                                                                                                           |
| For more options, see <code>man chmod</code>                                                                                                               | <code>Ctrl+C</code> - halts the current command                                                                                     |
| SSH                                                                                                                                                        | <code>Ctrl+Z</code> - stops the current command, resume with <code>fg</code> in the foreground or <code>bg</code> in the background |
| <code>ssh <i>user@host</i></code> - connect to <i>host</i> as <i>user</i>                                                                                  | <code>Ctrl+W</code> - log out of current session, similar to <code>exit</code>                                                      |
| <code>ssh -p <i>port user@host</i></code> - connect to <i>host</i> on <i>port</i> as <i>user</i>                                                           | <code>Ctrl+W</code> - erases one word in the current line                                                                           |
| <code>ssh -C <i>user@host</i></code> - add your key to <i>host</i> for user to enable a keyed or passwordless login                                        | <code>Ctrl+U</code> - erases the whole line                                                                                         |
| Searching                                                                                                                                                  | <code>Ctrl+R</code> - type to bring up a recent command                                                                             |
| <code>grep <i>pattern files</i></code> - search for <i>pattern</i> in <i>files</i>                                                                         | <code>!!</code> - repeats the last command                                                                                          |
| <code>grep -r <i>pattern dir</i></code> - search recursively for <i>pattern</i> in <i>dir</i>                                                              | <code>exit</code> - log out of current session                                                                                      |
| <code>command   grep <i>pattern</i></code> - search for <i>pattern</i> in the output of <i>command</i>                                                     |                                                                                                                                     |
| <code>locate <i>file</i></code> - find all instances of <i>file</i>                                                                                        |                                                                                                                                     |

\* Use with extreme caution.



# Where should you look for help ... your best friends!



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## Extract sample data from VCF files

Asked 10 years, 11 months ago · Modified 4 years, 3 months ago · Viewed 15k times · Part of R Language Collective

14

I have a large Variant Call format (VCF) file (> 4GB) which has data for several samples.

I have browsed Google, Stackoverflow as well as tried the VariantAnnotation package in R to somehow extract data only for a particular sample, but have not found any information on how to do that in R.

Did anybody try anything like that, or maybe knows of another package that would enable this?

`r` `bioinformatics` `vcf-variant-call-format`

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edited Oct 2, 2020 at 14:58  
Timur Shtatland  
12.3k · 2 · 37 · 61

asked Feb 6, 2014 at 9:03  
rokošir  
155 · 1 · 1 · 7

If you use `scan`, you can specify on which line you would like to start reading the file (`skip`) and how many lines to read (`nlines`). I have no experience with VCF files, but this could help you. – Zbynek Feb 6, 2014 at 9:13

The tag `vcf` does not pertain to the `vcf` that you are talking about in the question.. – Ank Feb 13, 2014 at 20:17

1 Have you considered just using the unix utility `cut`? – tommy.carstensen Oct 27, 2014 at 2:50

Use a dedicated tool: `samtools view -h in.bcf out.bcf` `html` – 7xR75d · 1 · 1 · 1

Linked

9 How to read vcf file in R

0 Automated process for formatting in R



# Where should you look for help ... your best friends!



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## VCF record format error when trying to run Beagle 5.4

Hi everyone,

I am trying to run the Beagle 5.4 software where it needs to read a VCF file. The error message I have is:

```
Exception in thread "main" java.lang.IllegalArgumentException:
    at vcf.VcfRecGTParser.ninthTabPos(VcfRecGTParser.java:8
    at vcf.VcfHeader.isDiploid(VcfHeader.java:73)
    at vcf.RefIt.<init>(RefIt.java:130)
    at vcf.RefIt.create(RefIt.java:97)
    at vcf.RefTargSlidingWindow.refIt(RefTargSlidingWindow.
    at vcf.RefTargSlidingWindow.<init>(RefTargSlidingWindow
    at vcf.RefTargSlidingWindow.instance(RefTargSlidingWinc
    at main.Main.slidingWindow(Main.java:129)
    at main.Main.main(Main.java:107)
```

What I get from the message is that the VCF record format in the 9th column (FORMAT) is not what the software expects. The Beagle software manual addresses:

gt=[file] specifies a VCF file containing genotypes for the study samples. Each VCF record must contain a GT (genotype) format field.

Therefore I supposed that I prepared the data correctly, you see the the first two rows of the VCF file:



19 months ago  
r.tor • 50

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[vcf file has an empty sample id •](#)  
updated 4.9 years ago  
by [lakhujanivijay](#) • 5.9k  
• written 4.9 years ago  
by [yh362](#) • 50

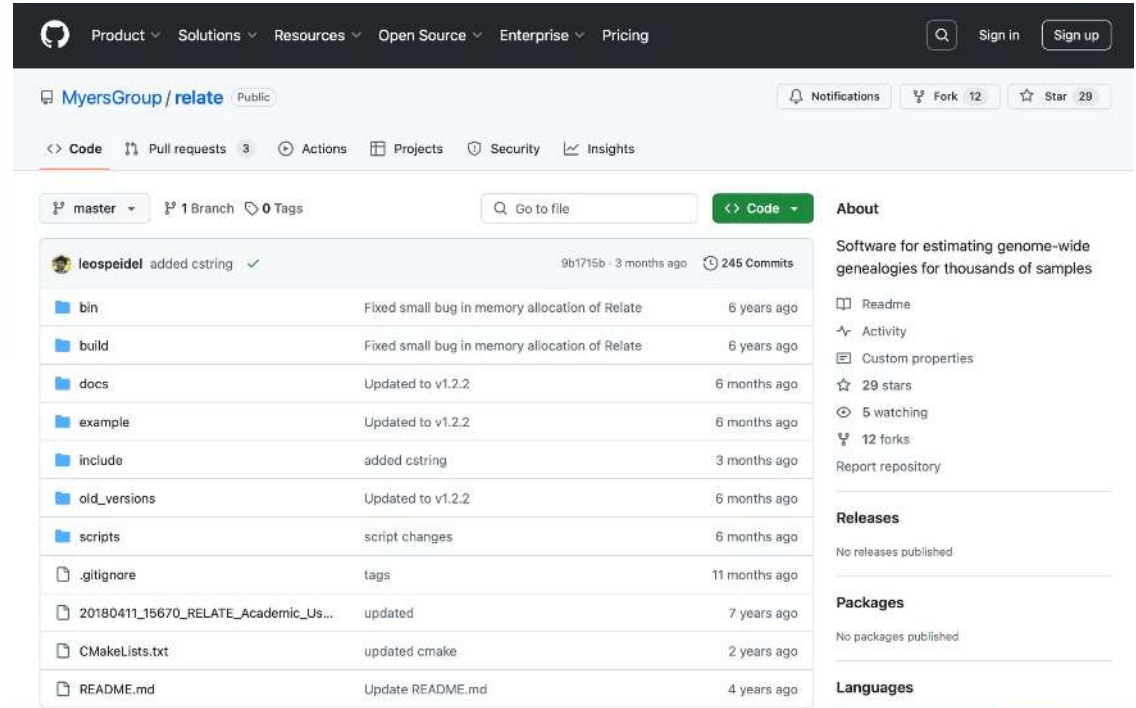
It seems like my VCF's header contains at least an empty sample ID. I am not sure how to figure out where it goes wrong because, if I run a...

[How to Convert Fasta format or .aln format to PIR format ?? •](#)  
updated 3.8 years ago  
by [Ram](#) • 44k • written 10.2 years ago  
by [rajkishore.ouatbi](#) • 10

I have fasta format. Can anyone say how to convert the fasta format to pir format. Also, I have clustalw alignment format, then how to con...



# Where should you look for help ... your best friends!

A screenshot of the GitHub web interface for the repository "MyersGroup/relate". The page shows the repository's file structure, commit history, and various statistics. The repository is public and has 12 forks and 29 stars. The commit history shows a recent commit by "leospeidel" adding "cstring" to the "include" directory. The file structure includes folders like "bin", "build", "docs", "example", "include", "old\_versions", "scripts", and files like ".gitignore", "20180411\_15670\_RELATE\_Academic\_Us...", "CMakeLists.txt", and "README.md".

Product Solutions Resources Open Source Enterprise Pricing

MyersGroup / relate Public

Code Pull requests 3 Actions Projects Security Insights

master 1 Branch 0 Tags

leospeidel added cstring ✓ 9b1715b · 3 months ago 245 Commits

|                                      |                                                |               |
|--------------------------------------|------------------------------------------------|---------------|
| bin                                  | Fixed small bug in memory allocation of Relate | 6 years ago   |
| build                                | Fixed small bug in memory allocation of Relate | 6 years ago   |
| docs                                 | Updated to v1.2.2                              | 6 months ago  |
| example                              | Updated to v1.2.2                              | 6 months ago  |
| include                              | added cstring                                  | 3 months ago  |
| old_versions                         | Updated to v1.2.2                              | 6 months ago  |
| scripts                              | script changes                                 | 6 months ago  |
| .gitignore                           | tags                                           | 11 months ago |
| 20180411_15670_RELATE_Academic_Us... | updated                                        | 7 years ago   |
| CMakeLists.txt                       | updated cmake                                  | 2 years ago   |
| README.md                            | Update README.md                               | 4 years ago   |

About

Software for estimating genome-wide genealogies for thousands of samples

Readme Activity Custom properties 29 stars 5 watching 12 forks Report repository

Releases

No releases published

Packages

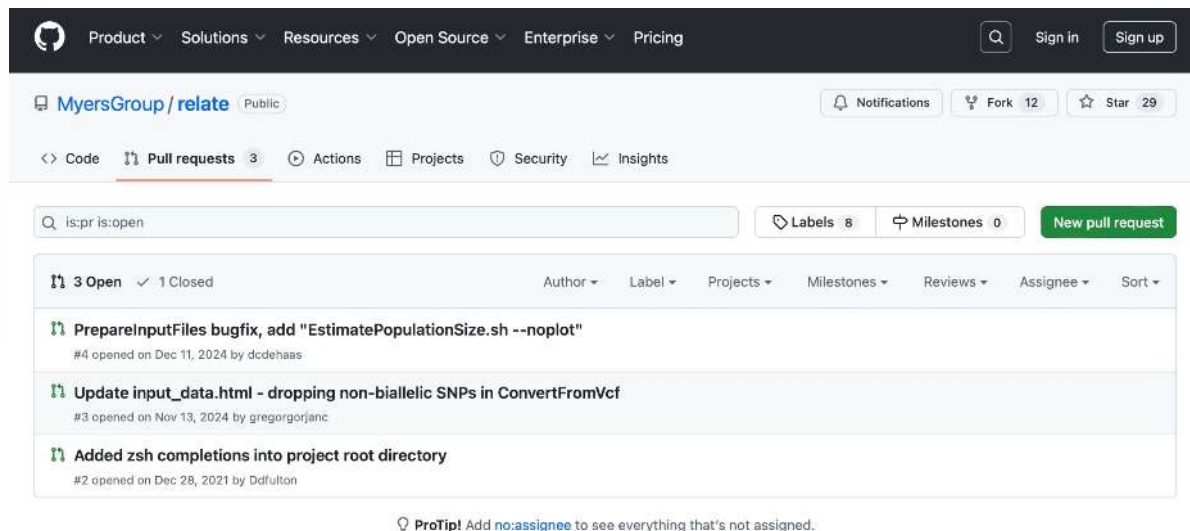
No packages published

Languages



Population and Speciation Genomics Workshop – Cesky Krumlov 2025

# Where should you look for help ... your best friends!

A screenshot of the GitHub web interface for the repository "MyersGroup/relate". The interface is in dark mode. At the top, there's a navigation bar with links for Product, Solutions, Resources, Open Source, Enterprise, and Pricing. Below this, the repository name "MyersGroup/relate" is shown with a "Public" badge. To the right are buttons for Notifications, Fork (12), and Star (29). A secondary navigation bar includes links for Code, Pull requests (3), Actions, Projects, Security, and Insights. Below this is a search bar containing "is:pr is:open". To the right of the search bar are buttons for Labels (8) and Milestones (0), and a green "New pull request" button. The main content area shows a list of pull requests. The first pull request is titled "PrepareInputFiles bugfix, add 'EstimatePopulationSize.sh --noplots'" and is marked as "Open". The second is "Update input\_data.html - dropping non-biallelic SNPs in ConvertFromVcf" and is also "Open". The third is "Added zsh completions into project root directory" and is marked as "Closed". At the bottom, there's a "ProTip!" section suggesting to add "no:assignee" to see everything that's not assigned.

Population and Speciation Genomics Workshop - Cesky Krumlov 2025

# Now it's your turn to dig into UNIX



## Important Information

### PRE-WORKSHOP INFORMATION AND MAP

- [Preparation material: suggested reading and activities to get ready for the 2025 workshop!](#)
- [Map of important locations in Český Krumlov](#)

### COMPUTING

- [AMI IP addresses](#)



## SCHEDULE

Week 1 : 19 – 25 January, 2025

| DATE   | DAY    | TIME         | PRESENTER                          | TOPIC                                  | LOCATION          |
|--------|--------|--------------|------------------------------------|----------------------------------------|-------------------|
| 19 Jan | Sunday | 3p – 6p      | <a href="#">Workshop Team</a>      | <a href="#">UNIX Primer (optional)</a> | Prelate           |
|        |        | 7p – 10p     | Everyone                           | Reception Dinner                       | Hotel Zlatý Anděl |
| 20 Jan | Monday | 9a – 10:30a  | <a href="#">Workshop Team</a>      | Workshop Introduction                  | Town Theater      |
|        |        | 10:30a – 12p | <a href="#">Michael Matschiner</a> | Likelihood and Probability             | Town Theater      |
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|        |        | 3:30p – 5p   | <a href="#">Workshop Team</a>      | Probability Activity                   | Prelate           |
|        |        | 7p – 10p     | Everyone                           | Participant Introduction               | Prelate           |



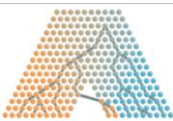
```
ssh wpsg@ec2-XX-XXX-XXX-XXX.compute-1.amazonaws.com
```

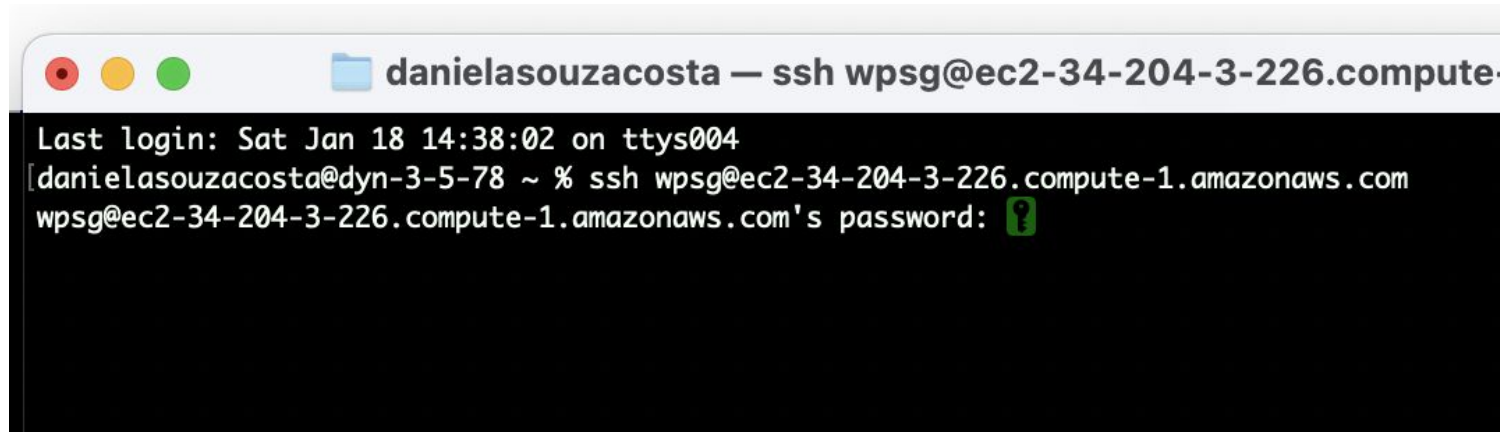
File Edit View Insert Format Data Tools Extensions Help

100% View only

| A          | B                    | C             | D                   | E              | F             | G                 | H                                          | I                      |
|------------|----------------------|---------------|---------------------|----------------|---------------|-------------------|--------------------------------------------|------------------------|
| Last Name  | First Name           | Instance name | Instance ID         | Instance state | Instance type | Status check      | Public DNS                                 | Launch time            |
| Abush      | Zinaw                | WPSG 1.0      | i-0b8ebcee4c8afa4bb | Running        | t3.xlarge     | 2/2 checks passed | ec2-44-200-40-67.compute-1.amazonaws.com   | 2022/05/31 14:34 GMT+2 |
| Agnieszka  | Lipinska             | WPSG 1.0      | i-0f508e5ee1c6f5af0 | Running        | t3.large      | 2/2 checks passed | ec2-44-203-148-243.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Albertien  | van Heerden          | WPSG 1.0      | i-0695fab01f918ac7b | Running        | t3.large      | 2/2 checks passed | ec2-54-172-182-168.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Alexander  | Brandt               | WPSG 1.0      | i-0cc305fd706a4438d | Running        | t3.large      | 2/2 checks passed | ec2-44-202-43-70.compute-1.amazonaws.com   | 2022/06/04 17:18 GMT+2 |
| Alistair   | Hudson               | WPSG 1.0      | i-0d17f868f7ab44ed2 | Running        | t3.large      | 2/2 checks passed | ec2-35-172-133-194.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Amanda     | Lazdina              | WPSG 1.0      | i-0bfe0452838268d85 | Running        | t3.large      | 2/2 checks passed | ec2-3-85-56-171.compute-1.amazonaws.com    | 2022/06/04 17:18 GMT+2 |
| Anastasiia | Mykhailenko          | WPSG 1.0      | i-0b8ebcee4c8afa4bb | Running        | t3.xlarge     | 2/2 checks passed | ec2-44-200-40-67.compute-1.amazonaws.com   | 2022/05/31 14:34 GMT+2 |
| Annabelle  | de Vries             | WPSG 1.0      | i-0f508e5ee1c6f5af0 | Running        | t3.large      | 2/2 checks passed | ec2-44-203-148-243.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Bárbara    | Rocha Venancio Meyer | WPSG 1.0      | i-0695fab01f918ac7b | Running        | t3.large      | 2/2 checks passed | ec2-54-172-182-168.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Cecilia    | Padilla Iglesias     | WPSG 1.0      | i-0cc305fd706a4438d | Running        | t3.large      | 2/2 checks passed | ec2-44-202-43-70.compute-1.amazonaws.com   | 2022/06/04 17:18 GMT+2 |
| Charlotte  | Wright               | WPSG 1.0      | i-0d17f868f7ab44ed2 | Running        | t3.large      | 2/2 checks passed | ec2-35-172-133-194.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Colette    | Blyth                | WPSG 1.0      | i-0bfe0452838268d85 | Running        | t3.large      | 2/2 checks passed | ec2-3-85-56-171.compute-1.amazonaws.com    | 2022/06/04 17:18 GMT+2 |
| Conor      | Gilligan             | WPSG 1.0      | i-0b8ebcee4c8afa4bb | Running        | t3.xlarge     | 2/2 checks passed | ec2-44-200-40-67.compute-1.amazonaws.com   | 2022/05/31 14:34 GMT+2 |
| Daniela    | Souza                | WPSG 1.0      | i-0f508e5ee1c6f5af0 | Running        | t3.large      | 2/2 checks passed | ec2-44-203-148-243.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Darren     | O'Connell            | WPSG 1.0      | i-0695fab01f918ac7b | Running        | t3.large      | 2/2 checks passed | ec2-54-172-182-168.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Emile      | Cavalet-Giorsa       | WPSG 1.0      | i-0cc305fd706a4438d | Running        | t3.large      | 2/2 checks passed | ec2-44-202-43-70.compute-1.amazonaws.com   | 2022/06/04 17:18 GMT+2 |
| Emmanuel   | Tergemina            | WPSG 1.0      | i-0d17f868f7ab44ed2 | Running        | t3.large      | 2/2 checks passed | ec2-35-172-133-194.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Eva        | Paulus               | WPSG 1.0      | i-0bfe0452838268d85 | Running        | t3.large      | 2/2 checks passed | ec2-3-85-56-171.compute-1.amazonaws.com    | 2022/06/04 17:18 GMT+2 |
| Francesco  | Giannelli            | WPSG 1.0      | i-0b8ebcee4c8afa4bb | Running        | t3.xlarge     | 2/2 checks passed | ec2-44-200-40-67.compute-1.amazonaws.com   | 2022/05/31 14:34 GMT+2 |
| Grégoire   | Vernaz               | WPSG 1.0      | i-0f508e5ee1c6f5af0 | Running        | t3.large      | 2/2 checks passed | ec2-44-203-148-243.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Hiranya    | Sudasinghe           | WPSG 1.0      | i-0695fab01f918ac7b | Running        | t3.large      | 2/2 checks passed | ec2-54-172-182-168.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
| Isabel     | Blasco-Costa         | WPSG 1.0      | i-0cc305fd706a4438d | Running        | t3.large      | 2/2 checks passed | ec2-44-202-43-70.compute-1.amazonaws.com   | 2022/06/04 17:18 GMT+2 |
| Jack       | Harper               | WPSG 1.0      | i-0d17f868f7ab44ed2 | Running        | t3.large      | 2/2 checks passed | ec2-35-172-133-194.compute-1.amazonaws.com | 2022/06/04 17:18 GMT+2 |
|            |                      |               |                     |                |               |                   |                                            |                        |

Participant instance IPs Organiser instance IPs Hints Explore



A screenshot of a macOS-style terminal window. The title bar at the top shows three colored window control buttons (red, yellow, green) on the left, followed by a blue folder icon and the text "danielasouzacosta — ssh wpsg@ec2-34-204-3-226.compute-1.amazonaws.com". The terminal area has a black background with white text. It displays the message "Last login: Sat Jan 18 14:38:02 on ttys004", followed by a prompt "[danielasouzacosta@dyn-3-5-78 ~ % ssh wpsg@ec2-34-204-3-226.compute-1.amazonaws.com" and then "wpsg@ec2-34-204-3-226.compute-1.amazonaws.com's password:" followed by a green key icon.

```
danielasouzacosta — ssh wpsg@ec2-34-204-3-226.compute-1.amazonaws.com
Last login: Sat Jan 18 14:38:02 on ttys004
[danielasouzacosta@dyn-3-5-78 ~ % ssh wpsg@ec2-34-204-3-226.compute-1.amazonaws.com
wpsg@ec2-34-204-3-226.compute-1.amazonaws.com's password: 
```



```
Last login: Sat Jan 18 14:38:02 on ttys004
[danielasouzacosta@dyn-3-5-78 ~ % ssh wpsg@ec2-34-204-3-226.compute-1.amazonaws.com
[wpsg@ec2-34-204-3-226.compute-1.amazonaws.com's password:
Connection closed by 34.204.3.226 port 22
[danielasouzacosta@dyn-3-5-78 ~ % ssh wpsg@ec2-34-204-3-226.compute-1.amazonaws.com
[wpsg@ec2-34-204-3-226.compute-1.amazonaws.com's password:
```

```
#####
##                WPSG 2025                ##
##                Cesky Krumlov              ##
##                @evomics #evomics2025     ##
#####
```

Welcome to Ubuntu 24.04.1 LTS (6.8.0-1021-aws).

```
* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:        https://ubuntu.com/pro
```

System information as of Sat Jan 18 15:07:11 CET 2025

```
System load:  0.11           Temperature:   -273.1 C
Usage of /:    40.9% of 484.63GB Processes:    183
Memory usage:  17%           Users logged in: 1
Swap usage:    0%            IPv4 address for ens5: 172.31.92.108
```

Last login: Sat Jan 18 14:48:30 2025 from 131.152.231.234

wpsg@krumlov: [~]\$

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|        |        | 7p – 10p     | Everyone                           | Participant introduction               | Prelate           |



## UNIX primer: tips, tricks, and more!

Jakub Vlček, Daniela Souza-Costa, Angelica Cuevas, Angela P. Fuentes-Pardo, Julia M.I. Barth. 19th January 2025

- [UNIX primer slides](#)

### Background and Objectives

Welcome everyone!

We have prepared this UNIX activity to get all of you to the same level, as you will use the Terminal a lot during this workshop. Depending on your level, this activity will take more or less time.

Learning goals:

- Navigate in the UNIX environment
- Create, move and delete directories
- Create, move, delete and edit files
- Use basic UNIX commands and know where to find help

### Why would we use the Terminal / shell in the first place?

*Scripting:* We can write down a sequence of commands to perform particular tasks or analyses; when working with genomic data, a task usually takes minutes, sometimes hours or even days – it's no fun to sit and wait in front of your computer this long just for a mouse-click to initiate the next task.

*Powerful Tools:* In UNIX, powerful tools are available that enable you to work through large amounts of files, data, and tasks quite quickly and in an automated (that is, programmatic) way.

