

INTRODUCTION TO UNIX

ONE OPERATING SYSTEM TO RULE THEM ALL

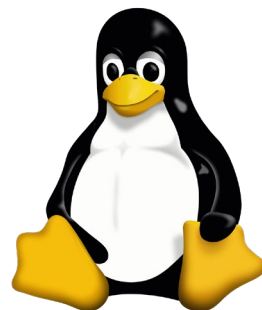
Windows + DOS



Unix Based



OS X



Linux Distributions





BUT WHY...?

- Lots of good information
- Unix is easy and flexible to write in – so people write a lot of tools for it.
- Unix is good for high performance computing
- Stable – rarely crash.
- Reproducible
- Automation



GETTING HELP

- Slack channel #tutorial-discussion
- Your work Slack channel #technical-questions

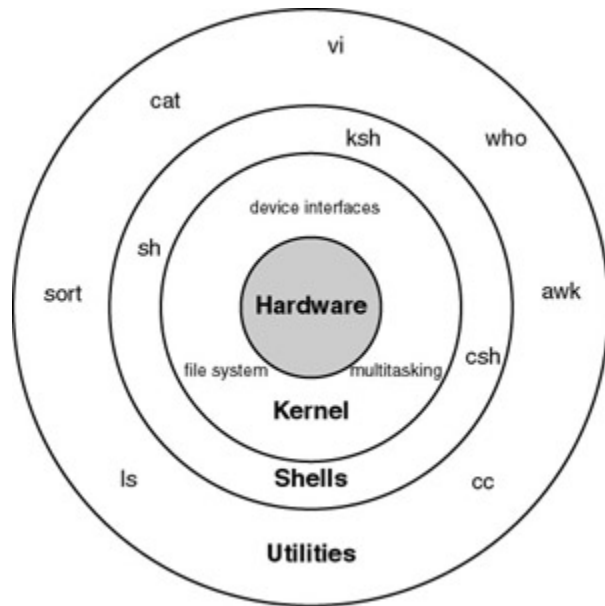


TUTORIAL

- Go through exercises in 1.1 together
- Remainder on GitHub
- Sign on to the ECU VPN
- Write down the answers to the tutorial questions – we will discuss them in the review tomorrow... Be prepared to share your answers.

UNIX SHELL

- Most common shell type is bash

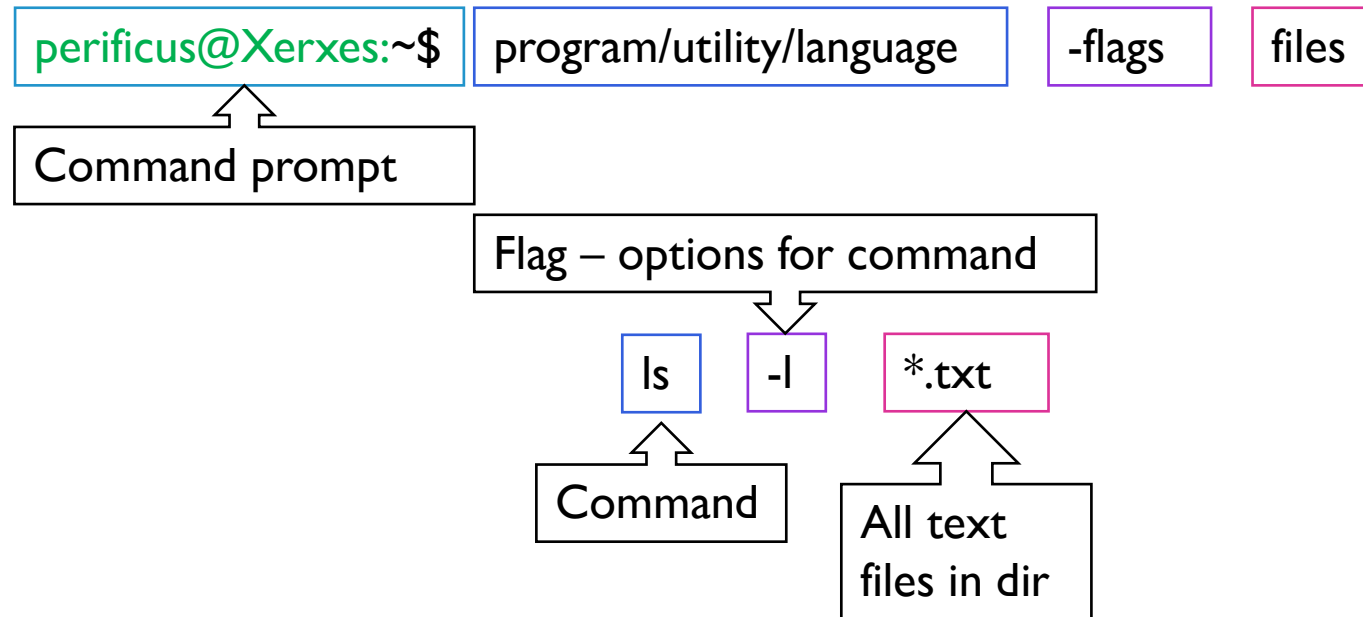


```
ngsclass@ecubio-PowerEdge-R910: ~  
(base) perificus@Xerxes:~$  
(base) perificus@Xerxes:~$ ssh ngsclass@150.216.55.139 -p 1200  
ngsclass@150.216.55.139's password:  
  
Permission denied, please try again.  
ngsclass@150.216.55.139's password:  
Welcome to Bio-Linux on ecubio-PowerEdge-R910 (based on Ubuntu 18.04.5 LTS)  
  
* More info at: http://nebc.nerc.ac.uk/tools/bio-linux  
  
New release '20.04.2 LTS' available.  
Run 'do-release-upgrade' to upgrade to it.  
  
*** System restart required ***  
Last login: Thu May  6 13:28:24 2021 from 172.23.138.85  
  
conda: command not found  
  
(base) ngsclass@ecubio-PowerEdge-R910:~$  
(base) ngsclass@ecubio-PowerEdge-R910:~$  
(base) ngsclass@ecubio-PowerEdge-R910:~$  
(base) ngsclass@ecubio-PowerEdge-R910:~$ ls  
0598_S1_L001_R1_001_fastqc.html  Finger                                R  
612.counts                      HailongY                           RHale  
612.counts_FriMar08_15_29_36.png kallisto_results                   SampleStudent  
7_MAV_SH                        L_cortes                          seq_databases
```

ANATOMY OF A SHELL

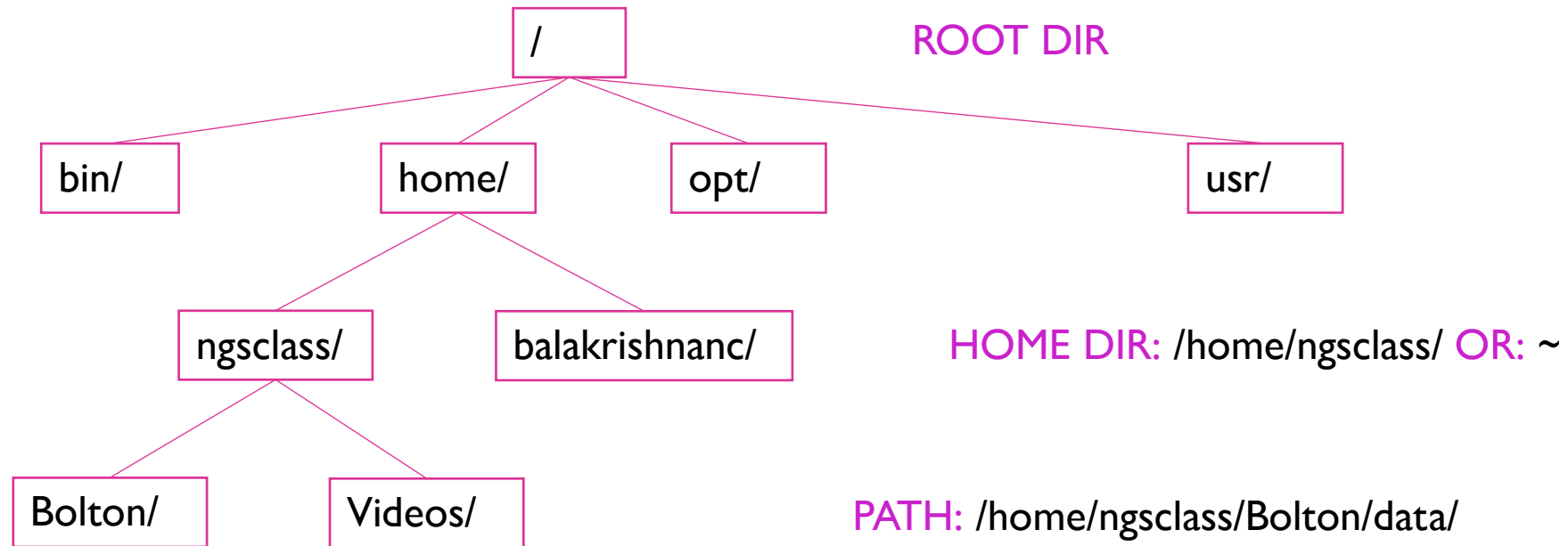
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612.counts                      HailongY       RHale  
612.counts_FriMar08_15_29_36.png kallisto_results SampleStudent  
7_MAV_SH                        L_cortes       seq_databases
```


ANATOMY OF A SHELL COMMAND



```
java -Xmx8g -jar snpEff.jar build -gtf22 -v Mv_protein_gtf
```

UNIFIED FILE HIERARCHY



WHERE AM I? PWD

- “pwd” command.
- “Print Working Directory”
- Not password!

WHAT'S HERE? LS

- “ls” command
- list
- ls -l

FILE PERMISSIONS

user other users

```
drwxr-xr-x 58 ngsclass ngsclass 101 May 6 15:26 ./
drwxr-xr-x 37 root root 43 Sep 4 2020 ../
-rw-rw-r-- 1 ngsclass ngsclass 351651 Feb 26 2017 0598_S1_L001_R1_001_fastqc.html
-rw-rw-r-- 1 ngsclass ngsclass 576318 Mar 8 2019 612.counts
-rw-rw-r-- 1 ngsclass ngsclass 189634 Mar 8 2019 612.counts_FriMar08_15_29_36.png
drwxrwxr-x 4 ngsclass ngsclass 4 Mar 7 2019 7_MAV_SH/
drwxrwxr-x 7 ngsclass ngsclass 30 Dec 17 21:46 Akers/
drwx----- 3 ngsclass ngsclass 6 Dec 14 08:34 alignments/
```

group

r is read only

w write permission

x execute (either a program or viewing a dir's contents)

'chmod' command can modify permissions for files you own.

OTHER INFO LS -L

No. files

```
drwxr-xr-x 58 ngsclass ngsclass 101 May  6 15:26 ./
drwxr-xr-x 37 root      root      43 Sep  4 2020 ../
-rw-rw-r-- 1 ngsclass ngsclass 351651 Feb 26 2017 0598_S1_L001_R1_001_fastqc.html
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-rw-rw-r-- 1 ngsclass ngsclass 189634 Mar  8 2019 612.counts_FriMar08_15_29_36.png
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drwx----- 3 ngsclass ngsclass 6 Dec 14 08:34 alignments/
```

User Group

File Size (bytes)

NEW DIR AND NAVIGATION

- 'mkdir' make directory
- 'cd' change directory

HELP!

- 'man' Manual page

Tutorial Question 1: How do you get the file size to display in a more human readable way when using 'ls'?

GO FORTH!

- Remember Unix is CaSE sEnSiTivE
- Google is your friend
- If you name a file the same thing you will overwrite – IT WILL NOT ASK YOU FOR PERMISSION.
- Use keyboard `tab` to autocomplete
- Use up and down arrows to see previous commands
- Keep track of your commands in a programming friendly text editor like TextVrangler, BBEdit (Mac) Notepad++ (Windows)

GO FORTH!

- Continue with exercise next exercise: Jobs
- Answer questions and write down your answers.
- Meet again tomorrow at 4pm EDT

🔗 Table of Contents

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REFERENCES

- <https://qcb.ucla.edu/collaboratory/workshops/w1-intro-to-unix-command-line>
- <http://swcarpentry.github.io/shell-novice/>
- This tutorial is based on one by Dr Nicholas Navin (MD Anderson Cancer Center, University of Texas), and another from Prof. Roger Butlin at University of Sheffield (https://openwetware.org/wiki/Butlin:Unix_for_Bioinformatics_-_basic_tutorial), as well as some additional material added by Dr Peri Bolton and Prof Chris Balakrishnan.