

The Unix Shell

What is Unix?

- Family of operating systems (just like Windows)
- Many different "flavors"
 - MacOSX (and iOS)
 - Linux
 - Ubuntu, Debian, RedHat, SElinux, etc...
 - Android
- Nearly every high-performance compute cluster
 - local (RIS compute, others)
 - cloud
 - All of the top 500 "supercomputers" run Linux

Unix philosophy


- **Modular design**
- Small programs that do one thing well
- Write them to work together
- Handle text streams as the universal interface



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Getting started

- `ls` - list contents of a directory
- `echo` - print text string
- `head/tail` – print the first or last lines of a file
- `grep` – search within a file

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The Basics

Navigate the terminal

The terminal is a text-based interface that interprets commands and outputs the result to your screen.

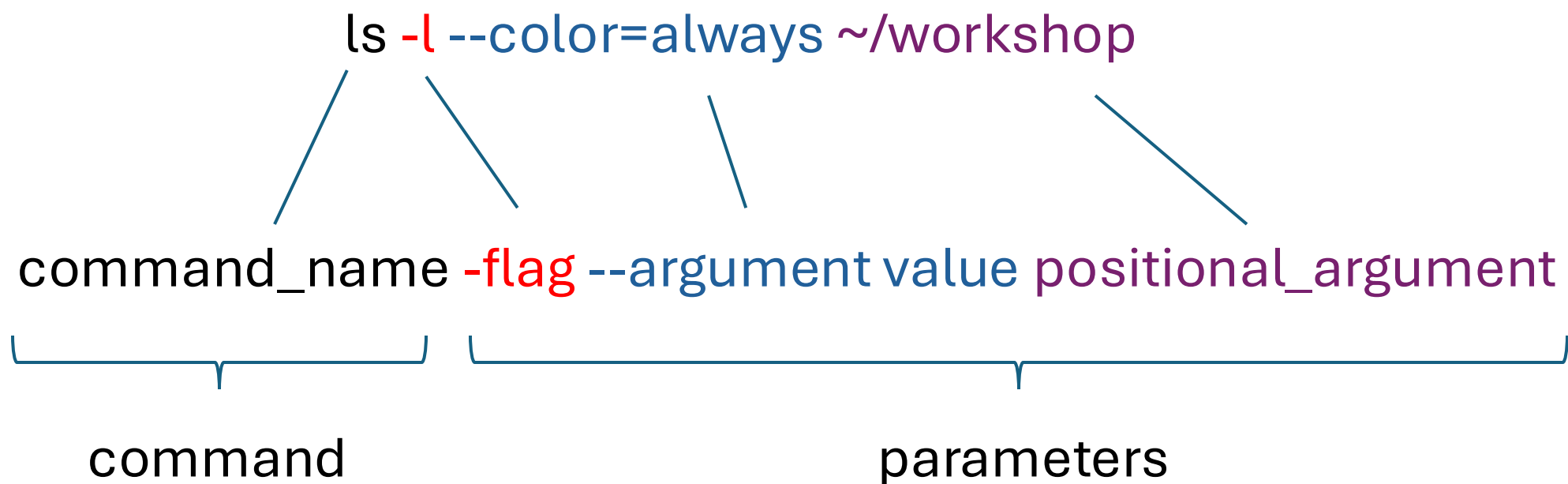
The first command we'll try is `echo`, which simply returns the string you provide it.

Click the box below to execute the command

```
root@localhost:~/tutorial# ls
orders.tsv  ref.fa  ref.fa.bak
root@localhost:~/tutorial# cd ../
root@localhost:~# ls
tutorial
root@localhost:~# echo "Hello world"
Hello world
root@localhost:~#
```

<https://sandbox.bio/tutorials/terminal-basics/>

Anatomy of a command



What options are available?

Generally:

command --help
command -h = short help

man command = manual/more detailed help

Practice

- <https://github.com/genome/bfx-workshop>
- Go to lectures/week02/

Good naming for files and directories

- DO use combinations of
 - Alphabetic letters (a-z, A-Z)
 - Numbers (0-9)
 - period (.) underscore (_) and hyphen (-)
- DO be concise, but informative
- DON'T start a filename with a hyphen
 - those are used for parameters
- DON'T use spaces in file names
- DON'T use other special characters

File naming

sample637-bob_mice_w_addback_of_gene_construct_134_plus_gfp_age_3_months.txt

File naming

sample637-bob_mice_w_addback_of_gene_construct_134_plus_gfp_age_3_months.txt

Too long!

Easy to get confused, hard to keep organized

File naming

Mouse Sample A.txt

File naming

Mouse Sample A.txt

Spaces!

```
$ sort Mouse Sample A.txt  
sort: No such file or directory
```

looking for files "Mouse" "Sample" and "A.txt"

```
sort "Mouse Sample A.txt"
```

would work, but is a pain

File naming

-sample123_Tp53+/-_het&Dox*_a.txt

File naming

sample123_Tp53+/-_het&Dox*_a.txt

Special characters!

Unix dirs:

/home/cmler/workshop/sample123_Tp53+/-_het&Dox*_a.txt

Stick with dashes (-) and underscores(_)
use "plus" or "with" instead of "+"

File naming

-sample123.txt

Starts with hyphen!

```
sort -t -sample123_Tp53+/-_het&Dox*_a.txt
```

```
sort: invalid option - sample123_ Tp53+/-_het&Dox*_a.txt
```

File naming

-sample123.txt

Starts with hyphen!

```
sort -sample123.txt
```

```
sort: invalid option - sample123.txt
```


Sample naming

sample637.tsv

647sample2.tsv

sample983_batch3.tsv

Sample naming

sample637.tsv
647sample2.tsv
sample983_batch3.tsv

sample_637_batch1.tsv
sample_647_batch2.tsv
sample_983_batch3.tsv

Inconsistent!

Sample naming

sample1.tsv
sample2.txt
sample3.tsv
sample10.tsv
sample11.tsv

Sample naming

sample1.tsv
sample2.txt
sample3.tsv
sample10.tsv
sample11.tsv

```
$ ls  
sample1.tsv  
sample10.tsv  
sample11.tsv  
sample2.txt  
sample3.tsv
```

Sample naming

sample1.tsv
sample2.txt
sample3.tsv
sample10.tsv
sample11.tsv

```
$ ls  
sample1.tsv  
sample10.tsv  
sample11.tsv  
sample2.txt  
sample3.tsv
```

```
$ ls  
sample01.tsv  
sample02.txt  
sample03.tsv  
sample10.tsv  
sample11.tsv
```

Sample naming

sample637

sample647

sample983

Sample naming

sample637

sample647

sample983

Mouse_637_TP53_KO_WGBS

Mouse_647_TP53_WT_WGBS

Mouse_983_TP53_KO_WGBS

Not very informative!

Sample naming

Some good recent examples:

M_RD_57404-CBFB-VavCre_h3k4mono_ChIP

M_RD_57404-CBFB-VavCre_h3k27ac_ChIP

M_YL_NPM9-3A-day1_BM_WGBS

M_YL_NPM9-3L-day1_BM_WGBS

I'm stuck!

- **Ctrl-C** to interrupt/kill a running process
- **q** quits some interactive commands (e.g. less)
- editing a file with vim?
 - press **Escape**
 - type **:q!**
 - press **Return**