

## Tentative Plan for Bioinformatics Lessons

- Will change depending on how fast we get through stuff
- Also depends on how many of you are gone at a time in November

Date	Subject
10-22	<b>Terminus</b>
10-29	Server Basics
11-5	Server Basics, continued
11-12	How to run software on the server
11-19	Basic Git
11-26	No lesson, week of Thanksgiving
12-03	Start running through RRBS (or RNA-seq)

# How to Use the Server

# Learn by Playing

## Terminus

<https://web.mit.edu/mprat/Public/web/Terminus/Web/main.html>

What's the  
password to get  
into paradise?

Documentation

# Download a markdown editor

## Mac

Download and install MacDown  
from

<https://macdown.uranusjr.com/>

## Windows

Download and install Joplin

<https://joplinapp.org/>

Feel free to use whatever markdown editor you want, but you need one!

# Why do I need a markdown editor? Why do I need to document my work in markdown?

- What is markdown?
  - Text document
  - Allows you to add in a few symbols that make the document look prettier and more organized when viewed with some sort of markdown interpreter
  - However, it's big benefit is that it is still human readable without an interpreter AND it's machine readable
- Why use markdown instead of, say, Microsoft Word or Google Docs?  
**Because more complicated text editing programs do not play well with Linux and especially the command-line**

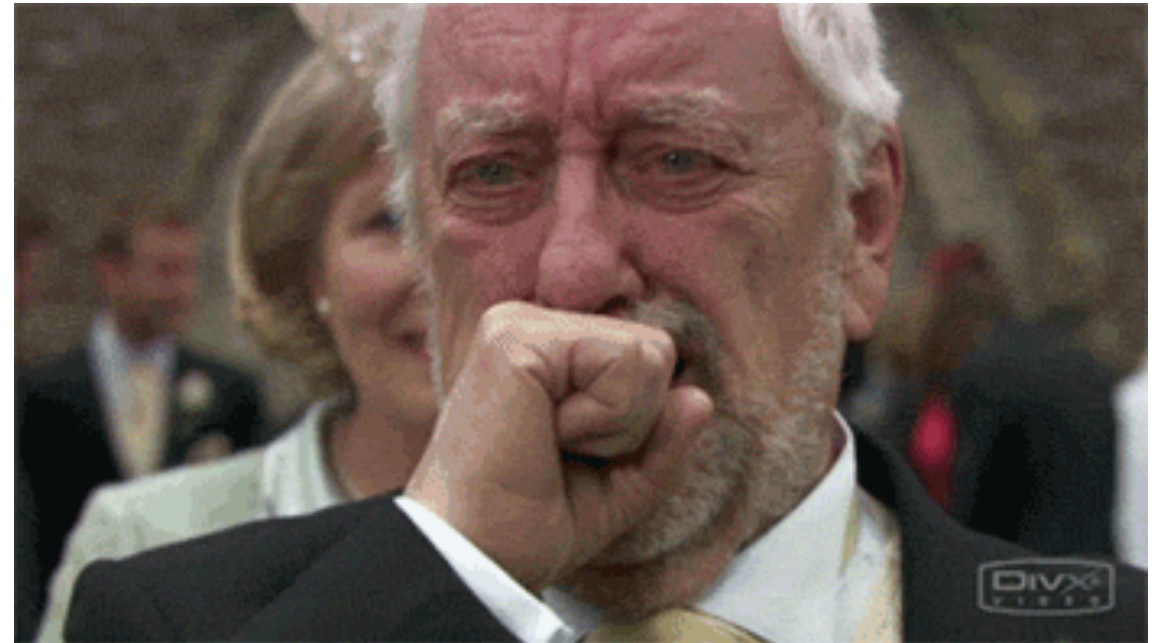
Why do I need to document my work?

1. For your future  
self



# Why do I need to document my work?

## 1. For your future self



# Why do I need to document my work?

## 1. For your future self



# Why do I need to document my work?

1. For your future self

2. For everybody else in the lab



# Why do I need to document my work?

1. For your future self

2. For everybody else in the lab

3. For publication



# Why do I need to document my work?

1. For your future self
2. For everybody else in the lab
3. For publication
4. For your next step in your career



Get Connected to the Server

# Download Software for Accessing the Server

## Mac

Should have installed:

- XQuartz  
<https://www.xquartz.org/>
- MacFusion
  - FUSE for macOS  
<https://osxfuse.github.io/>
  - Homebrew <https://brew.sh/>
- Cisco AnyConnect VPN

## Windows

Should have installed:

- PuTTY  
<https://www.chiark.greenend.org.uk/~sgtatham/putty/>
- Xming  
<https://sourceforge.net/projects/xming/>
- WinSCP  
<https://winscp.net/eng/index.php>
- Cisco AnyConnect VPN



# Connecting to the Server

## Mac

1. Open terminal
2. Type `ssh -Y  
yourusername@cbix`
3. Enter your password when prompted

## Windows

1. Open PuTTY
2. In the main screen under **HostName** type `cbix`
3. Still on the main screen make sure the connection type is SSH
4. On the left side panel expand the “**SSH**” section then click on **X11**. Make sure the box saying **Enable X11 forwarding** is checked.
5. On the left side panel, click **Session** to go back to the main screen. Under **Saved Sessions**, type a name you want to save the settings under, then press **Save**.
6. Click **Open**.
7. Enter your username and password when prompted.



# Transferring Files To and From the Server

## Mac

### Set up Macfusion

1. Create a folder on your laptop for the server to mount to, ex:  
``mkdir /Users/kelsey/Volumes``
2. Open macfusion.
3. Start the engine
4. Click on the plus sign in the lower left-hand corner and select SSHFS.
5. Fill in your information
  - Under the SSH tab, add the host: 10.1.105.11, your user name, your password, and the path to your home directory /home/username
  - Don't change anything under the SSH Advanced Tab
  - Under the Macfusion tab, in the Mount Point box, add the absolute path to the folder you created in step 1, plus a unique name for the server, ex: /Users/kelsey/Volumes/coriell\_kkeith. In the Volume Name box, put the same name as the name of the folder. I also suggest making sure the "Ignore Apple Double File" and the "Show in Finder Sidebar" boxes are checked.
  - Click ok
6. Click the Mount button and you should be connected to the server.

## Windows

1. Launch **WinSCP**
2. On the **Login** screen that pops up when you launch it enter:
  - Under **HostName** put `cbix`
  - Under **User name:** put your username for the server
  - Under **Password:** put your password for the server
3. Click **Login**

# Command-Line Basic Navigation

# Viewing Stuff on the Command Line

- Ls
  - -l or ll
  - -a
  - -h
- Can  
combine  
options
- --help for  
all options

# Viewing Stuff on the Command Line

```
$ ls
```

```
file1.txt file2.txt
```

- Ls
  - -l or ll
  - -a
  - -h
- Can combine options
- --help for all options


# Viewing Stuff on the Command Line

- `Ls`
    - `-l` or `ll`
      - `-a`
      - `-h`
  - Can combine options
  - `--help` for all options
- ```
$ ls
file1.txt file2.txt

$ ls -l
-rwxr--r--. 1 kkeith research 44    Jul 9 14:45 file1.txt.gz
-rwxr--r--. 1 kkeith research 2048  Jul 9 14:45 file2.txt
```

# Viewing Stuff on the Command Line

- `Ls`
    - `-l` or `ll`
      - `-a`
      - `-h`
  - Can combine options
  - `--help` for all options
- ```
$ ls
file1.txt file2.txt

$ ls -l
-rwxr--r--. 1 kkeith research 44    Jul 9 14:45 file1.txt.gz
-rwxr--r--. 1 kkeith research 2048  Jul 9 14:45 file2.txt
```
- 
- The diagram shows a red bracket under the permissions `-rwxr--r--` of the first line in the `ls -l` output, with a red box below it containing the text "file permissions".

# Viewing Stuff on the Command Line

- Ls

- -l or ll

- -a

- -h

- Can combine options
- --help for all options

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$ ls
```

```
file1.txt file2.txt
```

```
$ ls -l
```

```
-rwxr--r--. 1 kkeith research 44 Jul 9 14:45 file1.txt.gz
```

```
-rwxr--r--. 1 kkeith research 2048 Jul 9 14:45 file2.txt
```

file permissions

number of links

# Viewing Stuff on the Command Line

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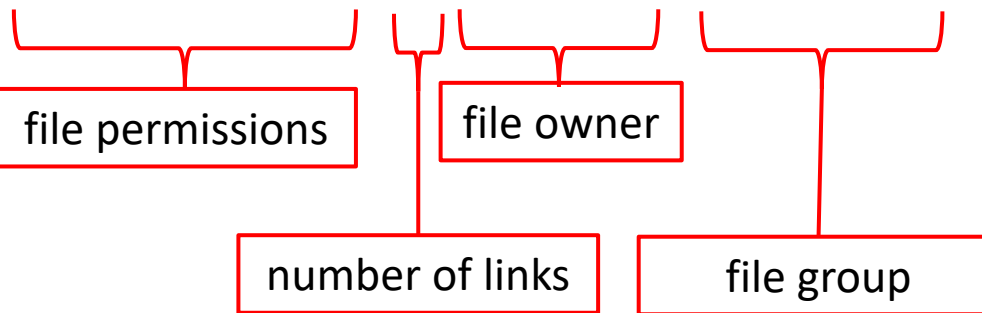
```
$ ls
```

```
file1.txt file2.txt
```

```
$ ls -l
```

```
-rwxr--r--. 1 kkeith research 44 Jul 9 14:45 file1.txt.gz
```

```
-rwxr--r--. 1 kkeith research 2048 Jul 9 14:45 file2.txt
```





# Viewing Stuff on the Command Line

- Ls

- -l or ll

- -a

- -h

- Can combine options
- --help for all options

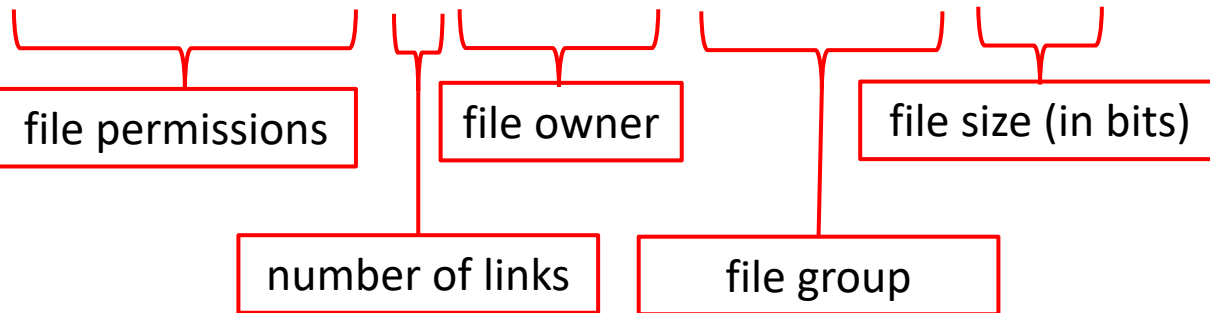
```
$ ls
```

```
file1.txt file2.txt
```

```
$ ls -l
```

```
-rwxr--r--. 1 kkeith research 44 Jul 9 14:45 file1.txt.gz
```

```
-rwxr--r--. 1 kkeith research 2048 Jul 9 14:45 file2.txt
```



# Viewing Stuff on the Command Line

- Ls

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$ ls
```

```
file1.txt file2.txt
```

```
$ ls -l
```

```
-rwxr--r--. 1 kkeith research 44 Jul 9 14:45 file1.txt.gz
```

```
-rwxr--r--. 1 kkeith research 2048 Jul 9 14:45 file2.txt
```

file permissions

file owner

file size (in bits)

number of links

file group

time file last modified

# Viewing Stuff on the Command Line

- Ls

- -l or ll

- -a

- -h

- Can combine options
- --help for all options

```
$ ls
```

```
file1.txt file2.txt
```

```
$ ls -l
```

```
-rwxr--r--. 1 kkeith research 44 Jul 9 14:45 file1.txt.gz
```

```
-rwxr--r--. 1 kkeith research 2048 Jul 9 14:45 file2.txt
```

file permissions

file owner

file size (in bits)

file/directory name

number of links

file group

time file last modified

# Viewing Stuff on the Command Line

- `Ls`
  - `-l` or `ll`

```
$ ls
file1.txt file2.txt
```
  - `-a`

```
$ ls -l
-rwxr--r--. 1 kkeith research 44    Jul  9 14:45 file1.txt.gz
-rwxr--r--. 1 kkeith research 2048  Jul  9 14:45 file2.txt
```
  - `-h`

```
$ ls -a
.  .. .secret file1.txt file2.txt
```
- Can combine options
- `--help` for all options

# Viewing Stuff on the Command Line

- **Ls**
    - `-l` or `ll`
    - `-a`
    - `-h`
  - **Can combine options**
  - **--help for all options**
- ```
$ ls
file1.txt file2.txt

$ ls -l
drwxr--r--. 1 kkeith research 44    Jul  9 14:45 file1.txt.gz
drwxr--r--. 1 kkeith research 2048  Jul  9 14:45 file2.txt

$ ls -a
.  .. .secret file1.txt file2.txt

$ ls -alh
drwxr-xr-x. 2 kkeith research 4.0K Jul  9 14:45 .
drwxr-xr-x. 5 kkeith research 4.0K Jul  9 14:45 ..
-rwx-----. 2 root      root      1.0K Jul  9 14:45 .secret
-rwxr--r--. 2 kkeith  research   44   Jul  9 14:45 file1.txt.gz
-rwxr--r--. 2 kkeith  research  2.0K Jul  9 14:45 file2.txt
```

PRACTICE

BREAK