

# Computational Labs

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ISU GEN 462

AUGUST 27, 2019

# TA: Jessica Judson

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- From Fort Worth, TX
- Master's Degree: Mississippi State University
  - Population genetics of the Lesser Antillean Iguana
- PhD Candidate
  - Dr. Fredric Janzen
  - Population genomics, local adaptation, mating strategies of the painted turtle and the western terrestrial garter snake
- I will be available by appointment or via Slack direct message
  - Send me an email: [jjudson@iastate.edu](mailto:jjudson@iastate.edu)
  - 353C Bessey Hall



# Tools for the Course

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1. Laptop (Your own or a provided laptop)
2. Communication: Slack (questions and announcements about the labs); Canvas (all grades, lecture material posted on Canvas)
3. File Sharing for Computational Exercises: GitHub
4. Programming Language: R and R Studio
5. Other misc. programs for special topics (TBA)



<https://2019isugen462.slack.com/>

Messaging, chat, and file sharing device

- Can set up notifications to your desktop
- Where you will turn in your assignments
- Can ask questions about homework, ect.

Create your account with your ISU email; use this link to access the Slack page:

- [https://join.slack.com/t/2019isugen462/shared\\_invite/enQtNzMyMzQ2MzE2MTk3LTNmNmZkZTA3Y2E2Nzg1ZmVjMWU2ZDI0YjFhMTRmYjA2MWJiINTQ2NzI5YTM0MGMwMWJkMzc0ZmNkYWMxN2FkZGI](https://join.slack.com/t/2019isugen462/shared_invite/enQtNzMyMzQ2MzE2MTk3LTNmNmZkZTA3Y2E2Nzg1ZmVjMWU2ZDI0YjFhMTRmYjA2MWJiINTQ2NzI5YTM0MGMwMWJkMzc0ZmNkYWMxN2FkZGI)

GEN 462 2019 ▾



● jjudson

Jump to...

Channels



# announcements

# general\_homework\_tips

# random

Direct Messages



♥ Slackbot

● jjudson (you)

Apps



+ Add apps

# Slack Guides

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1. [Getting Started with Slack](#)
2. [Slack How-To Video](#)

General comments:

- **#announcements** is for me to communicate with everyone about issues I have found with code, general reminders, and for you to ask general troubleshooting questions
- **#general\_homework\_tips** is for me to share tips on how to complete assignments, or point out common errors in code
- **#random** can be for whatever you would like! If you come across some cool way of analyzing genetic and genomic data you want to share, this is the place!
- **Direct messaging** is for submitting your homework assignments to me, and for other questions you want to ask me directly (setting up meetings, help, discussing grades, ect.)
- There is an app for iPhone and Android, and the messaging functions much like texting



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Great tool for sharing files

Has neat features for collaborative work

- Avoids merge conflicts
- Split up large projects

While GitHub has a GUI (graphical user interface), we will not be using it. Instead, you will learn to use the text-based interface.

- Must learn some coding!

# GitHub Resources

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We will be doing the preparation of GitHub on your computer in two parts:

1. Installing Git on your computer
2. Cloning a GitHub repository

Here are some resources to help you with GitHub:

[GitHub Guides](#)

[Terminal-based GitHub How-To](#)

# Step #1: Installing Git on your computer

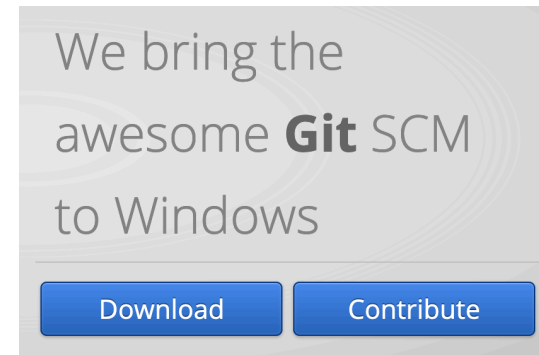
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GitHub: You can make an account if you'd like [here](#); you don't have to if you just want to clone a repository

[Mac Git Download](#)

[Windows Git Download](#)

[How to Install Git: Guide](#)



 [Contribute on GitHub](#) [Report an Issue](#) | [View File](#) | [Edit File](#)

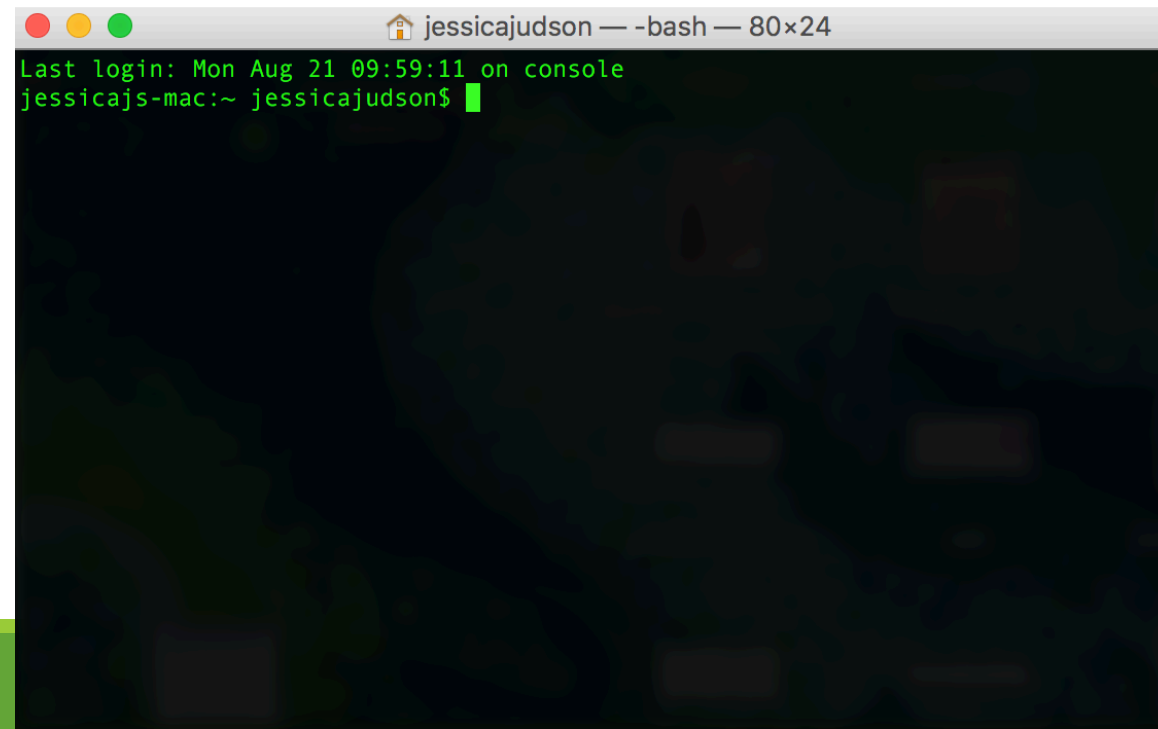




# Terminal

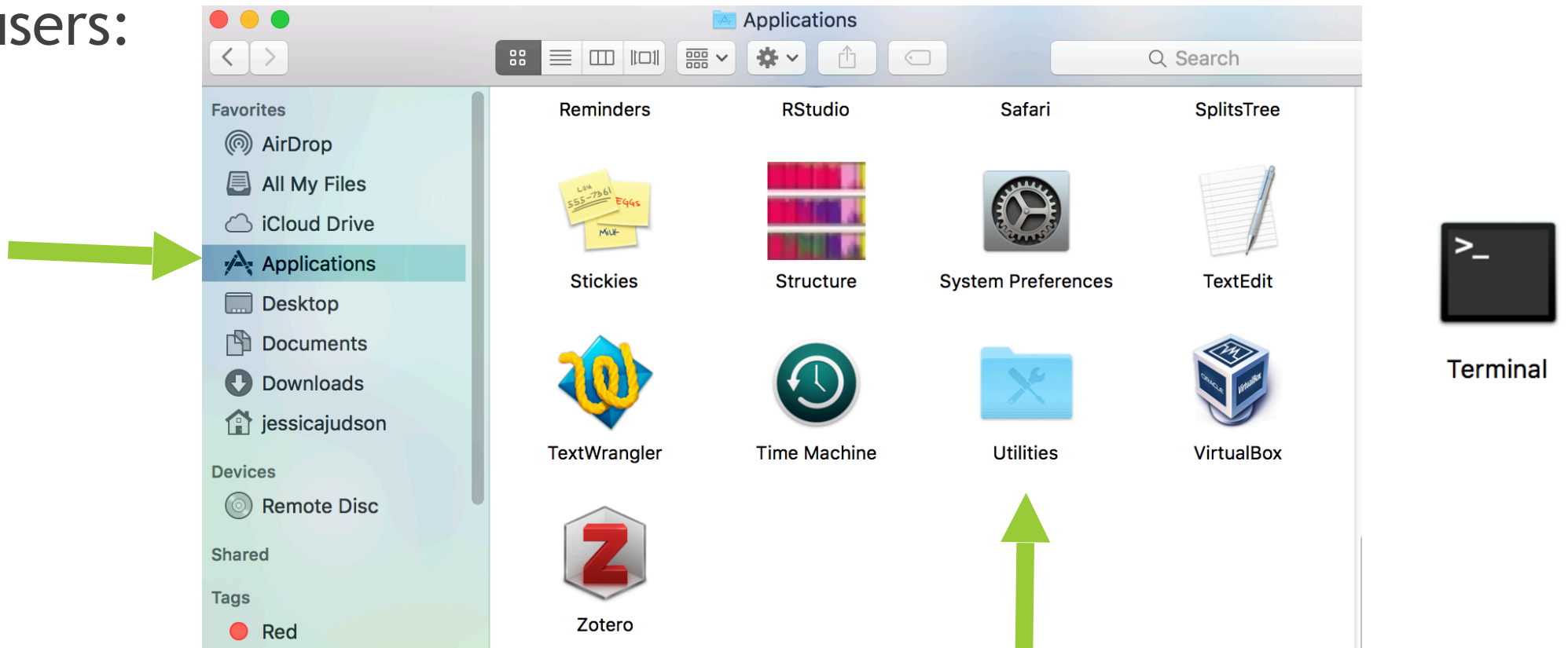
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- An interface in which you can type and execute text based commands
- Offers flexibility, streamlines repetitive tasks and file sorting, and is repeatable for other researchers



# Navigating the Terminal

Mac users:

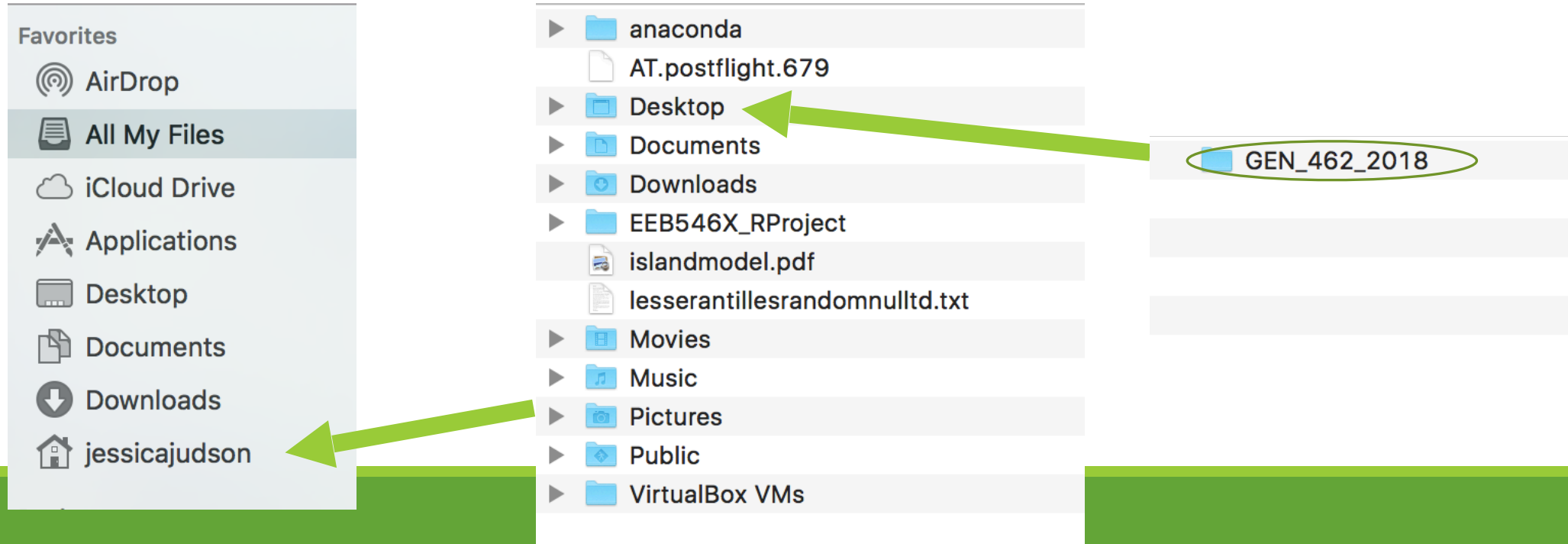


# Navigating the Terminal

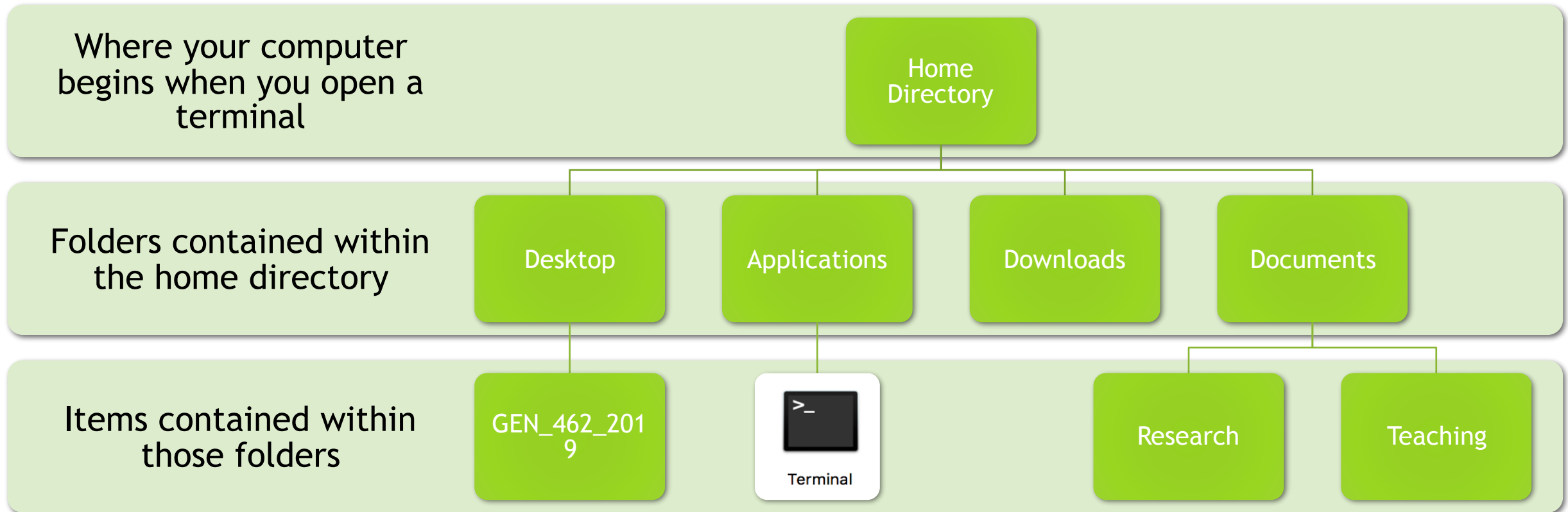


## Windows Users:

- Open the terminal in Git Bash (if you checked the box for desktop icon during set-up, should show up on your desktop)



# What Are Directories?



# Navigating the Directories in Terminal

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Moving around your computer in Unix Bash: The Basics

- Change directories: `cd DirectoryName/`

```
jessicajs-mac:~ jessicajudson$ cd Desktop/
```

- Go back a directory: `cd ..`

```
[jessicajs-mac:Teaching jessicajudson$ cd ..  
jessicajs-mac:Documents jessicajudson$ █
```

- Go back to the home directory: `cd`

```
[jessicajs-mac:Evolutionary Genetics jessicajudson$ cd  
jessicajs-mac:~ jessicajudson$
```

**Helpful tip:** when entering directories, can use **tab** to automatically fill in the directory name once you have entered a few letters

# More Terminal Commands

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Up arrow: scrolls through previous commands you have used

pwd: “Print working directory” tells you your location in your computer’s files

```
jessicajs-mac:~ jessicajudson$ pwd  
/Users/jessicajudson
```

ls: See contents of your working (current) directory

```
jessicajs-mac:ISUEvoGen462 jessicajudson$ ls  
README.md      Week_1
```



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[https://github.com/jjudson28/GEN\\_462\\_2019](https://github.com/jjudson28/GEN_462_2019)

Always read the README documents

- Explains what is in each folder, and with programs, tells you how to use the program, ect.

[Guide to Cloning a Repository](#)

# Cloning the GitHub Repository on your Computer

jjudson28 / ISUEvoGen462

Watch

0

Star

0

Fork

0

Code

Issues 0

Pull requests 0

Projects 0

Wiki

Settings

Insights

Repository for bioinformatics in Evolutionary Genetics class

Edit

Add topics

1 commit

1 branch

0 releases

1 contributor

Branch: master

New pull request

Create new file

Upload files

Find file

Clone or download

jjudson28 Initial commit

Latest commit 73fcd63 an hour ago

Create new file

Upload files

Find file

Clone or download

Initial commit

an hour ago

Clone with HTTPS

Use SSH

Use Git or checkout with SVN using the web URL.

https://github.com/judson28/ISUEvoGen462



Open in Desktop

Download ZIP



# Cloning the GitHub Repository on your Computer

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Open either Terminal (Mac) or Git Bash (Windows)

Navigate to where you want to put the folder containing the repository;  
ex:


```
jessicajs-mac:~ jessicajudson$ cd Desktop/
```

Type git clone; ex:

```
jessicajs-mac:Desktop jessicajudson$ git clone
```

Then paste the url you copied earlier and press enter

```
[Jessicas-MacBook-Pro-9:Desktop jessicajudson$ git clone https://github.com/jjudson28/GEN_462_2019.git
Cloning into 'GEN_462_2019'...
remote: Enumerating objects: 6, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 6 (delta 1), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (6/6), done.
Jessicas-MacBook-Pro-9:Desktop jessicajudson$
```



# Possible Error Mac

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Mac error: invalid active developer path

- `xcode-select --install`

# Getting Materials from GitHub

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Move into the GEN\_462\_2019 Folder

- `cd GEN_462_2019/`

Type `ls` to list the folder's contents

To update your repository to be consistent with what is online, type `git pull` and then press enter

```
jessicajs-mac:ISUEvoGen462 jessicajudson$ git pull
Already up-to-date.
```

You must be in your GEN\_462\_2019 folder to update your repository

DO THIS BEFORE EVERY COMPUTATIONAL CLASS

# R and R Studio

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## Download R

- <https://www.r-project.org/>
- CRAN mirror is Iowa State University

## Download R Studio

- <https://www.rstudio.com/products/rstudio/download/#download>

# Possible Error PC: R Studio Download

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If you can download Rstudio, but can't open it:

- 1) Open the Rstudio file in your program files.
- 2) In the Rstudio file, double click INSTALL. It will then prompt you by asking what application you would like to use to open it with.
- 3) Select Rstudio.
- 4) Now that you have Rstudio open, pin it to your taskbar so you don't lose it.