**Computational Biology**

01/17/2017

Introduction

Goals:

1. Think on paper
2. Computational tools
3. Core programming methods
4. Speaking skills

Philosophy: go ahead, try things out, and see if they work!

Develop a portfolio with all of your ongoing work

Two major presentations:

1. Research presentation: apply tools to your own research
2. R presentation: teach the class some coding

Lab: 1-3:30pm in the same room

GitHub Vocabulary

* Version control
  + Software we’re using for version control: git
    - Purpose of git: track files on a local computer
* GitHub: a public repository for git files (website)
  + Anyone can access what’s on GitHub, but they can’t change it (you’re the only one who can change it)
  + There is an option to make a repository private, if you pay a little bit
* Repository: set of files + git control files
  + The set of files that you’re working on (“repo”)
* Clone: copy the repository from GitHub to a local computer (where you’ll be doing your work)
  + “Clone a repository”
* Commit: a snapshot of your work (snapshot of the version(s) that you have at a given point in time); also a verb
  + Description that goes along with each commit
  + Commit isn’t saving the actual files; instead it’s saving the individual lines in each file that have changed, and it can then reconstruct what you had in the past
  + This process usually takes place on your local computer
* Push: takes place after you make a commit; pushes your commits up to GitHub
  + Make changes locally and then post them to the website
  + Becomes important if multiple people are working on project
* Pull: “GitHub, give me the most current version of what’s on the repository, and bring it to my local file.”
* Synchronize: combines push and pull
  + Most of GitHub activity will be commit + synchronize

Lab this week

* Build a repository
* Erase it and start over
* Get used to the setup and workflow (making changes and see them come through) processes
* Email Nick when you’re done, with:
  + GitHub webpage that you will have created by the end of lab (initial portal; your actual website)
  + GitHub repository (presence on the GitHub website itself; where all of your repositories are stored)
  + Fun fact: one sentence statement about you that is memorable

Lab

01/18/2017

Class website (where homework solutions will be posted): lvash.github.io/Bio381

Due to [ngotelli@uvm.edu](mailto:ngotelli@uvm.edu) at the end of today:

1) Fun fact

2) username.github.io/Bio381

3) github.com/username

Computational Biology Homework Assignment

Hi Nick,

Below is my Computational Biology homework assignment from today.

Many thanks,

Melanie

1) https://github.com/mkazenel

2) <https://mkazenel.github.io/Bio381/>

3) Fun fact: After completing my undergraduate degree, I worked for two years as an immigration law paralegal.

01/19/2017

library(prettydoc)

Control + shift + k 🡪 to knit in R

01/24/2017

Kinds of files we’ll create and work with

* Plain text files
  + Have only simple characters that can be read directly by a human from a screen
  + Can be opened on any computer in plain text editor
  + Lots of good coding material was developed first for this file type
  + What you see is what you need
    - Allows focus on words
    - In contrast with what you see is what you get (what we’re used to in modern computers, with fonts, etc.)
  + Languages we’ll work on in plain text files
    - LaTex
      * Computer program invented in late 1970s
      * Has thousands of typesetting commands (lots of control!)
    - Markdown
      * A very simple version of LaTex
    - Rmarkdown
      * A version of Markdown
      * Will let us mix in line of R code and get them to run
      * We’ll create a file:
        + Filename.Rmd

A plain text file and also an Rmarkdown file

* + - * + When we’re ready, we’ll knit our Rmarkdown file into one of the following formats:

Filename.html

Filename.pdf (will be rendered as a LaTex file)

Filename.docx (because we do have to talk to the rest of the world sometimes)

* + - Yaml (yet another markdown language)
      * Information at the top of an Rmarkdown file
      * We won’t edit or work with this for the most part (spacing of it is important)

RMarkdown

Knitting a file: Control+shift+k

Help🡪Markdown quick reference

Knitting automatically saves file

Three spaces after line to get a paragraph space

command for chunk: control + option + i

chunk: where we’ll do r coding

Settings 🡪 output options

We’ve bee using two languages in this document: markdown and r code

Can also use LaTex: when we want to build an equation

Command + enter 🡪 close a window

01/26/2017

**Markdown/LaTeX**

\_{} in LaTeX: curly brackets mean “treat everything within it together” (underscore applies to whole thing

alt + command + I = insert chunk

In an r chunk:

echo = FALSE 🡪 shows output but not code

eval = FALSE 🡪 shows code but not output

**In an R script:**

Command + shift + enter 🡪 runs all code

Up and down arrow keys: history of commands you’ve run

Control L 🡪 cleans console