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A lot of my work at the Pai Lab involves cleaning queried data, making/running Pharmacokinetic Models using modeling software, and presenting the results. However, I also get to do a lot of miscellaneous software projects as well, such as these education apps. Using the R package Shiny, I created two desktop/mobile apps based on a published paper by the group (here) on Vancomycin dosing. The apps allow the user to calculate the prescribed dosing regimen for patients based on the patient’s morphomics data, and have a wide variety of toggles to see how changes in dosing, volume of distribution, and other factors can affect the patients Vancomycin concentration curve, and lead to changes/optimization in the prescribed dosing regimen.

Prior to these apps I had never used R at all, most of the data manipulation I did was in Python using the Pandas package. These projects immersed me in the R language, and gave me a strong appreciation for its data presentation abilities. While Python is still my go to language, I have been using R more and more and have grown to appreciate it as a useful tool to have.

Pharm Website

Another opportunity I have at Pai lab is to perform maintenance and updates to the Pharmacy Website. This normally takes the form of updating staff/publication information, but I was also able to build new features, such overhauling the staff directory, installing widgets like twitter feeds, and updating figures for the PK core website.

This experience has made me familiar with the Drupal framework, and while I remain not entirely a fan, I believe it does serve its purpose. In addition, I got to learn/use Tinkercad 3D modeling software to make updated icons for the PK Core site. While I am aware this is a much lighter version of AutoCAD and other more advanced programs, it was enjoyable to get learn 3D modeling.

UMich Math Exercises

A project I am currently undertaking is making online math exercises for the University of Michigan Math department. The problem sets are designed to help students learn the basic concepts of sets and proof logic. This will be done visually through truth tables, Venn Diagrams, etc. With online learning becoming more and more prominent I hope these exercises will be useful for that medium of education. These exercises will be available to the public when they are completed, and links will be provided. For now, there is just a basic demo.

This project brought me back to HTML/CSS/JavaScript work, and provided me the opportunity gain more experience in this field.

Neaton Mathematics

Neaton Mathematics is an education startup that aims to make online math educational content for use by individuals ranging from elementary school to college. For my part I designed the levels/user interface using in CSS/HTML/JavaScript. I also helped construct the SQL databases that kept track of students’ progress, and connected them to the user interface using PHP, so that student data such as level progress, quiz scores, and other data can be shown to the students and the teachers, to monitor the students’ progress. All of the animations were gotten from public pens on Codepen.io and are MIT licensed.

Making the various levels and lessons really helped me to understand how to code in HTML/CSS/JavaScript and how they work together. It also helped me to understand how to use PHP and the general setup for creating dynamic websites. The link above shows a demo level that I made when I first started.