Ryan Mahtab
15-112 Term Project
TP1

Project Proposal

Project Description

My term project is the "NHL Playoff Predictor." The main feature of the project is to predict the outcome of an NHL playoff bracket given 16 teams selected by the user. The actual prediction model will be constructed behind the scenes in the code using data from hockey-reference.com and the nhlscrapi package. The user will also be able to click on a team and the bracket will highlight its path to the trophy and display percentages on how likely the team is to make it past each round. Another potential feature is a page that predicts the outcome of a single head-to-head matchup between two teams unrelated to the bracket page.

Competitive Analysis

A similar project was done in Spring 2018 by Dillan Gajarawala called the "Interactive NHL Experience." This project was mainly for displaying and updating team/player stats and scraping recent NHL headlines from the NHL website. While there was also a page for predicting head-to-head matchups, there was no playoff bracket predictor.

The playoff bracket predictor portion of my project is most similar to the NCAA March madness bracket predictor on fivethirtyeight.com. Their bracket also highlights each teams path to the trophy with a round by round probability displayed at each step. However, I don't believe anything like this exists for the NHL playoffs, which is my main motivation for doing this project.

Structural Plan

I plan to structure the main functions of my project into two main files: one for the animations and one for the predictive analytics. In the animation file, I will use object-oriented programming to define a "PlayoffTeam" class and use the Tkinter module to draw the actual bracket animation. Meanwhile, the analytics file will contain all the necessary functions that I can call on each team or pair of teams to predict who would win/probability of advancing.

Algorithmic Plan

The hardest part of the animation portion of my project is actually drawing the bracket and then highlighting the winning path for a team. I plan to accomplish this by defining a function in the PlayoffTeam class called drawWinningPath() which at first draws the teams path in black based on its seed. Then there will be another function called highlightWinningPath() that will call

drawWinningPath() but in a different color. The tricky part will be to determine how long the path should be highlighted and how to return it back to normal.

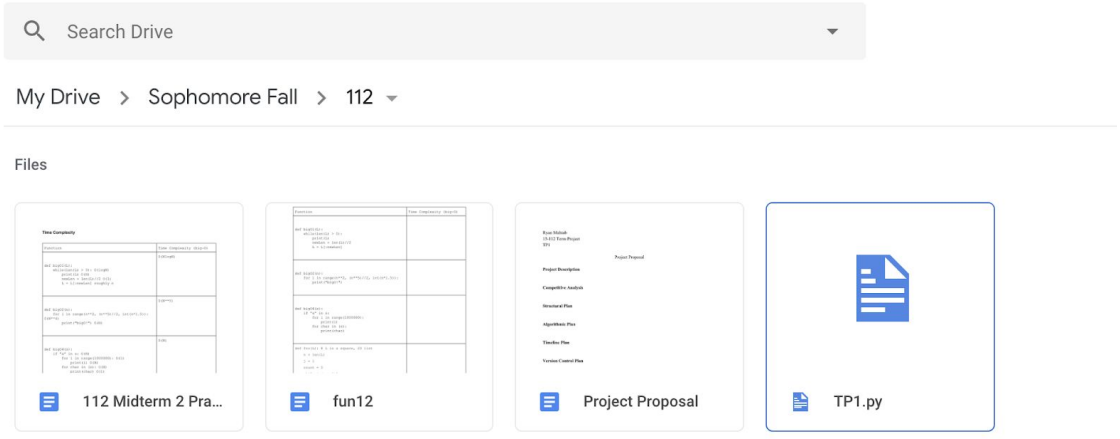
As for the prediction portion, for TP1 I will base the head-to-head winner prediction based off a single statistic called PDO, which is a team's overall shooting percentage + its overall save percentage. The final prediction algorithm will be more complex utilizing stats such as Corsi percentage, Fenwick percentage, goals for and goals against. These stats will also be used in the bracket predictor.

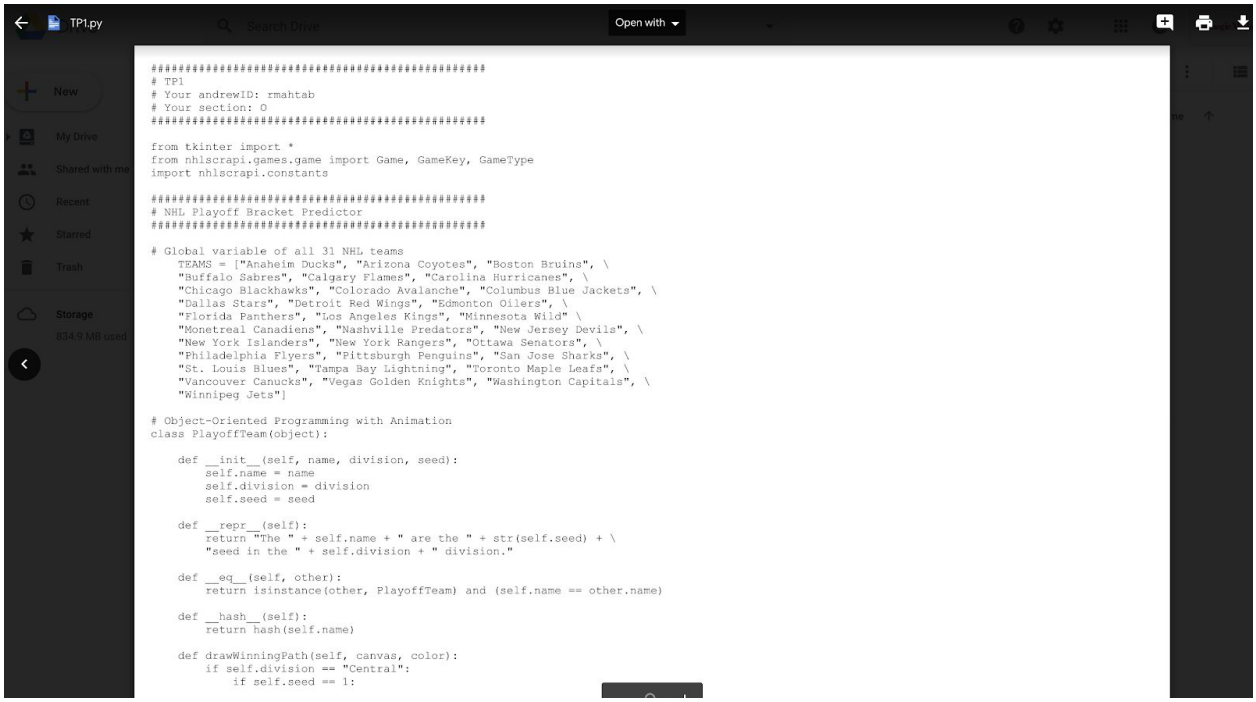
Timeline Plan

By TP1 I aim to have the basic graphics/animation done for the playoff bracket feature. This includes highlighting a team's path to the trophy when clicked and displaying percentages along the path. At this time I will just randomly populate the bracket with 16 teams, but by TP2 I plan to have the user enter teams manually. I also want a simple prediction algorithm for TP1 just to get the basic functionality going, but by TP2 I will have a more sophisticated prediction model. Finally, after creating the user interface for the bracket and refining the prediction model by TP2, my main goal for TP3 is to develop the head-to-head matchup page, and to address any other features/bugs that come up along the way.

Version Control Plan

I will be using Google Drive to backup my code from Pyzo.





Module List

Tkinter, nhlscrapi