

## Final Project – Report (NHL Cumulative Game by Game Visualization)

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### 1 Motivation & Audience for Visualization

I created an application that visualizes various NHL teams' cumulative game by game results during a given season through either the bar and/or line graphs. Users will have the choice of selecting a NHL team, a corresponding season, and the type of plot they want to see their data visualized against. The system also allows for users to view multiple plots at any given time for the point of comparing other teams.

I decided to create this system since I believe it is interesting to view various NHL teams' seasons in comparison to one another. I chose to offer two types of graphs – the bar and the line graph – because both have good uses towards visualizing that type of data set. The bar graph will help emphasize the winning and losing streaks better, whereas the line graph will allow users to view the various trends a team took throughout the season. In the end, this data is targeted at any sports enthusiast that is interested in analyzing various NHL teams against one another.

### 2 Visualization Design Evolution

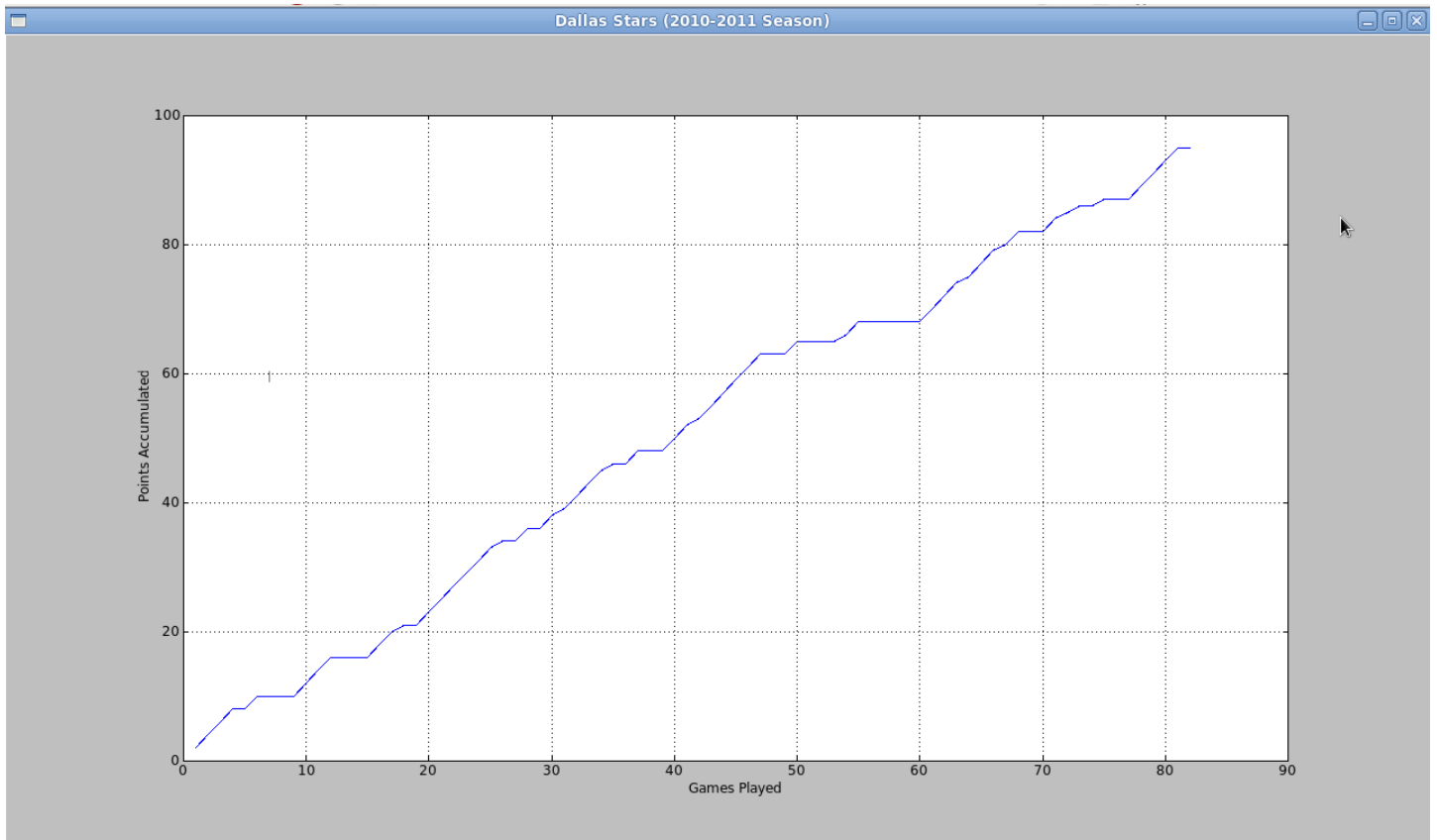
The initial design was to create a bar and line graph illustrating the Dallas Stars 2010-11 season. However, as the semester wore on, I decided to add more functionality to the graphs. This included: adding specific information related to each game; dabbing around with various colors; and adding more NHL teams and seasons for visualizing. Picture illustrations of the various iterations are shown below.

In the first iteration, I made a simple line and bar graph plotting the Dallas Stars 2010-11 season. These graphs were used to introduce myself to the matplotlib library.

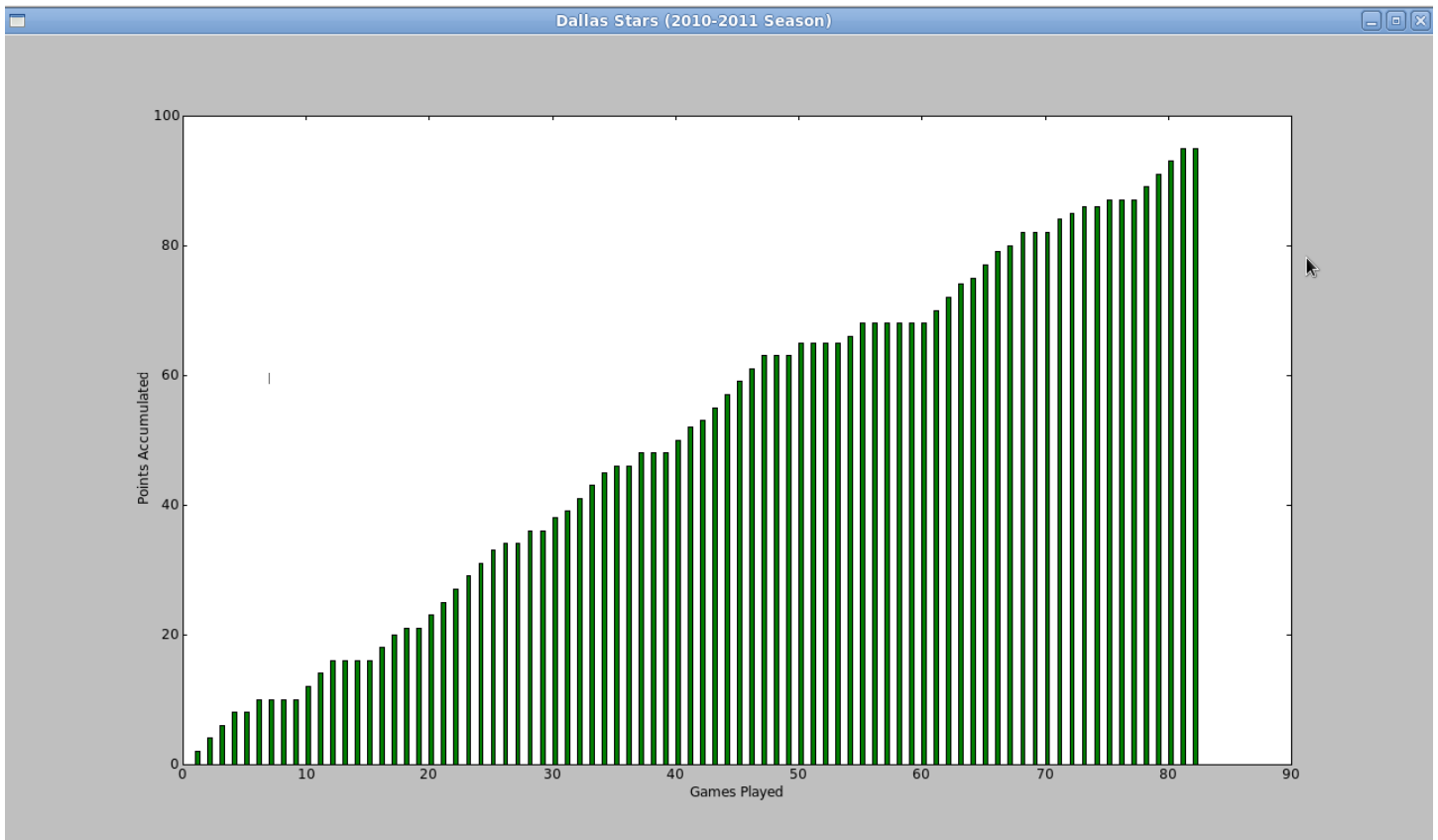
In the second iteration, I made the system more interactive by allowing users to click on a bar in a bar graph to view information regarding that particular game.

For the third iteration, I incorporated color into the visualization. The various colors will help to indicate the result of each game that a particular team has played.

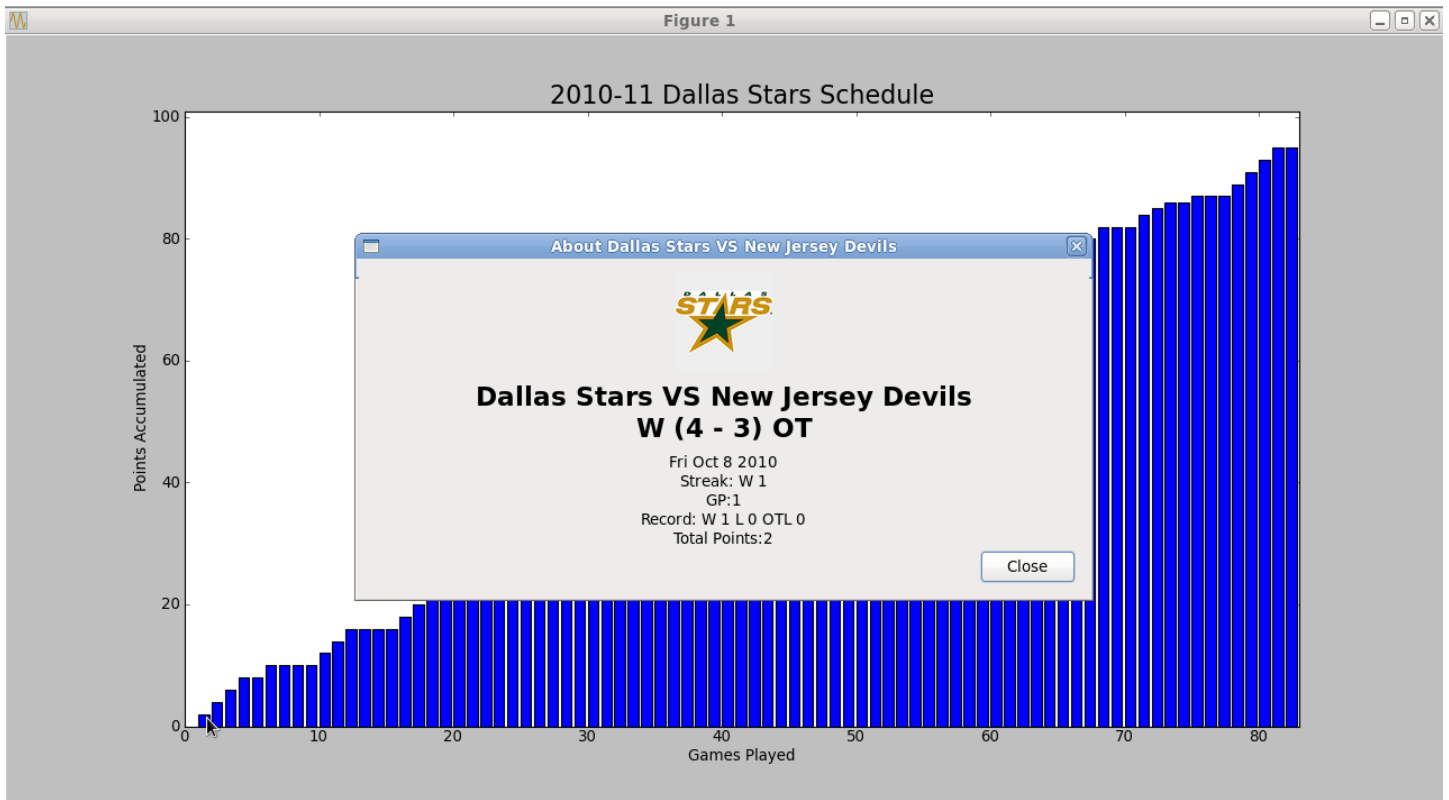
For the fourth and final iteration, I incorporated a GUI platform that allows users to view multiple bar graphs of NHL teams at any given time. The GUI interface also allows users to visualize different NHL teams under various seasons.



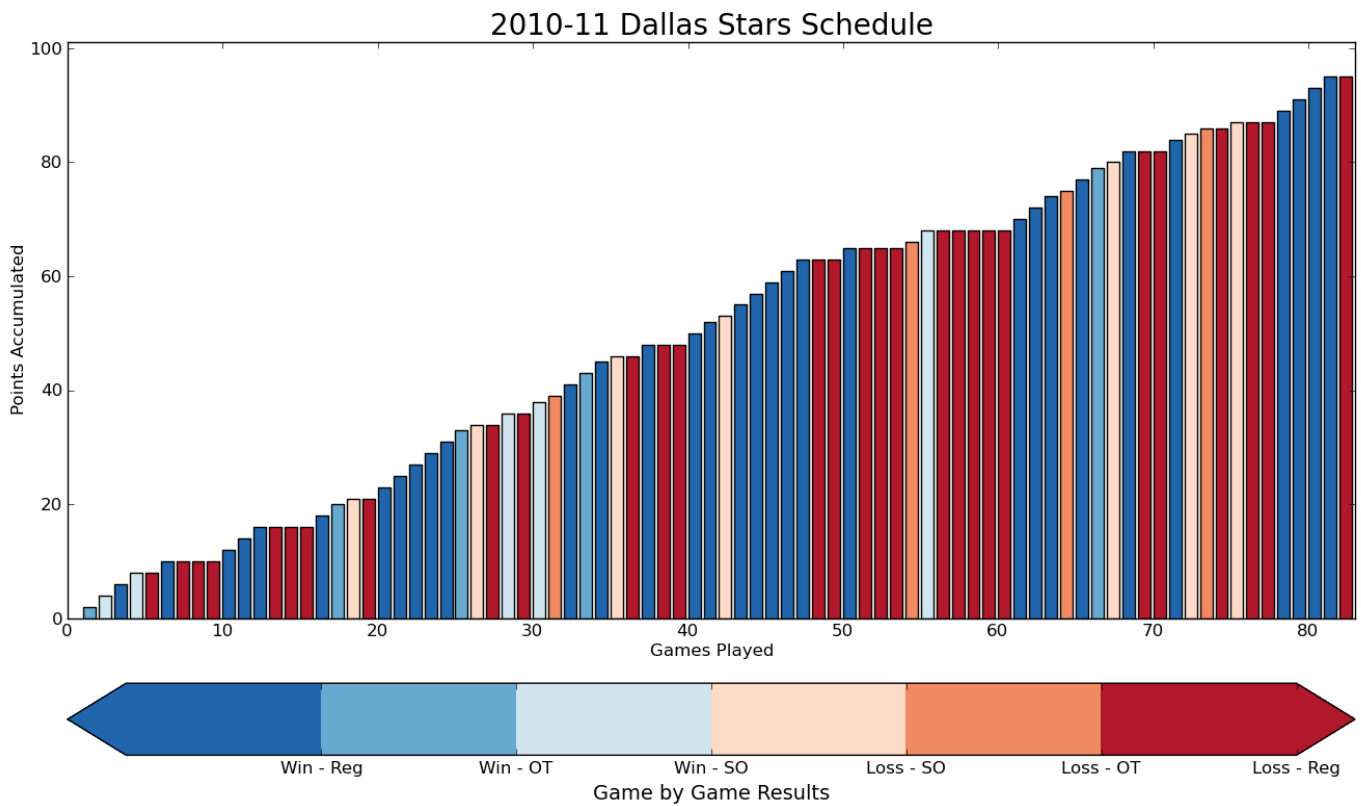
Iteration 1 – Line graph detailing the Dallas Stars 2010-11 season



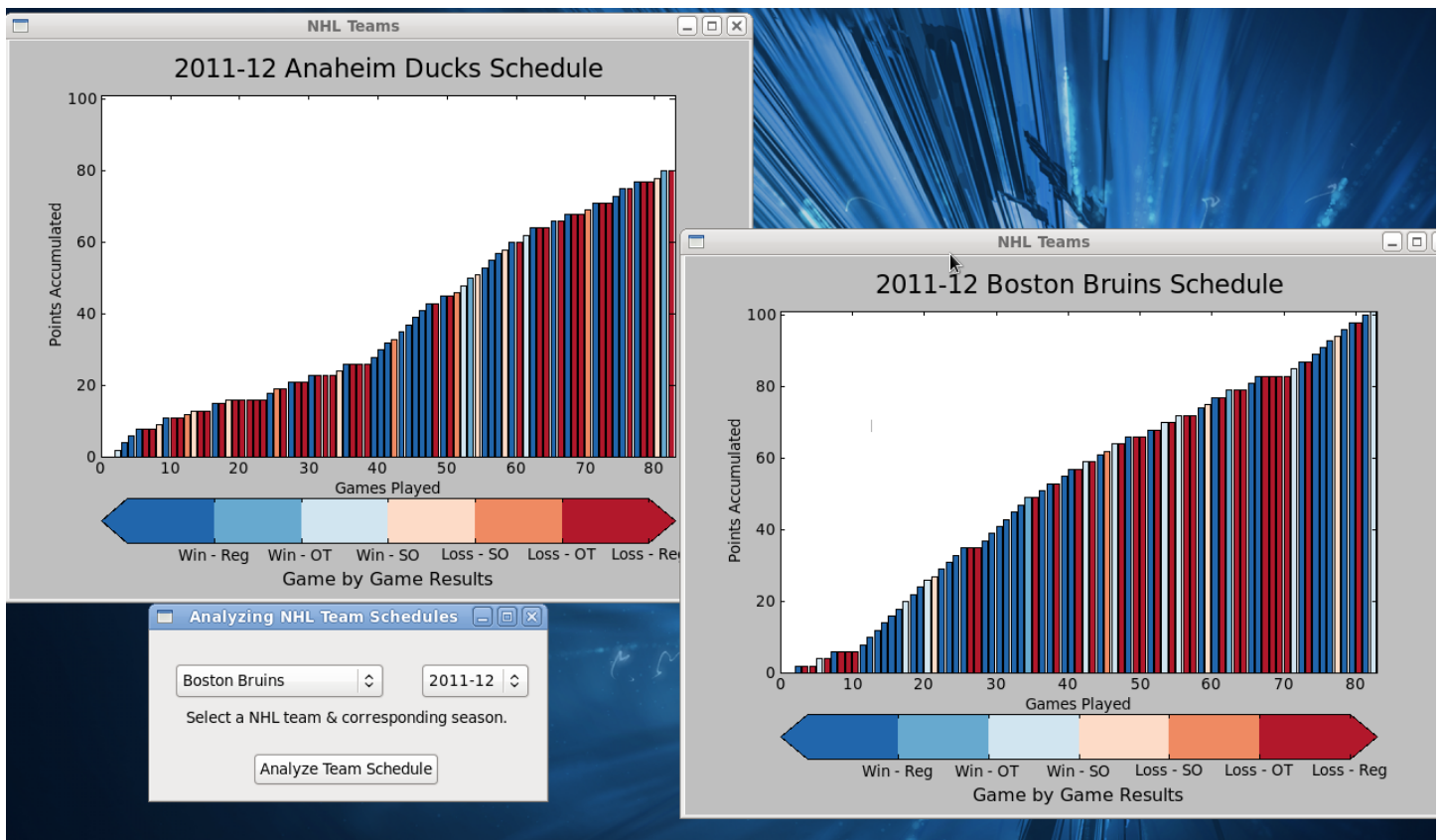
Iteration 1 – Bar graph detailing the Dallas Stars 2010-11 season



Iteration 2 – Bar graph detailing the Dallas Stars 2010-11 season with game by game information



Iteration 3 – Bar graph detailing the Dallas Stars 2010-11 season with game by game information and colors



Iteration 4 – GUI platform that allows users to view multiple bar graphs of NHL teams at one time

### 3 Core Features and Implementation Detail

#### 3.1 Core Features

The system incorporates three main features: flexibility, scalability, and interactivity.

In the case of flexibility, users can choose to plot any NHL teams' cumulative game by game results for a particular season. Users are also given the option of choosing the type of graph that they want that data represented under.

For scalability, the system holds data for all teams during the two seasons of 2010-11 and 2011-12. The system can allow users to view and compare multiple graphs at any given time.

Lastly, our system allows users to interact with the data. Essentially, users can click a single bar in the bar graph or a dot in the line graph to retrieve information about that particular game.

#### 3.2 Libraries Used

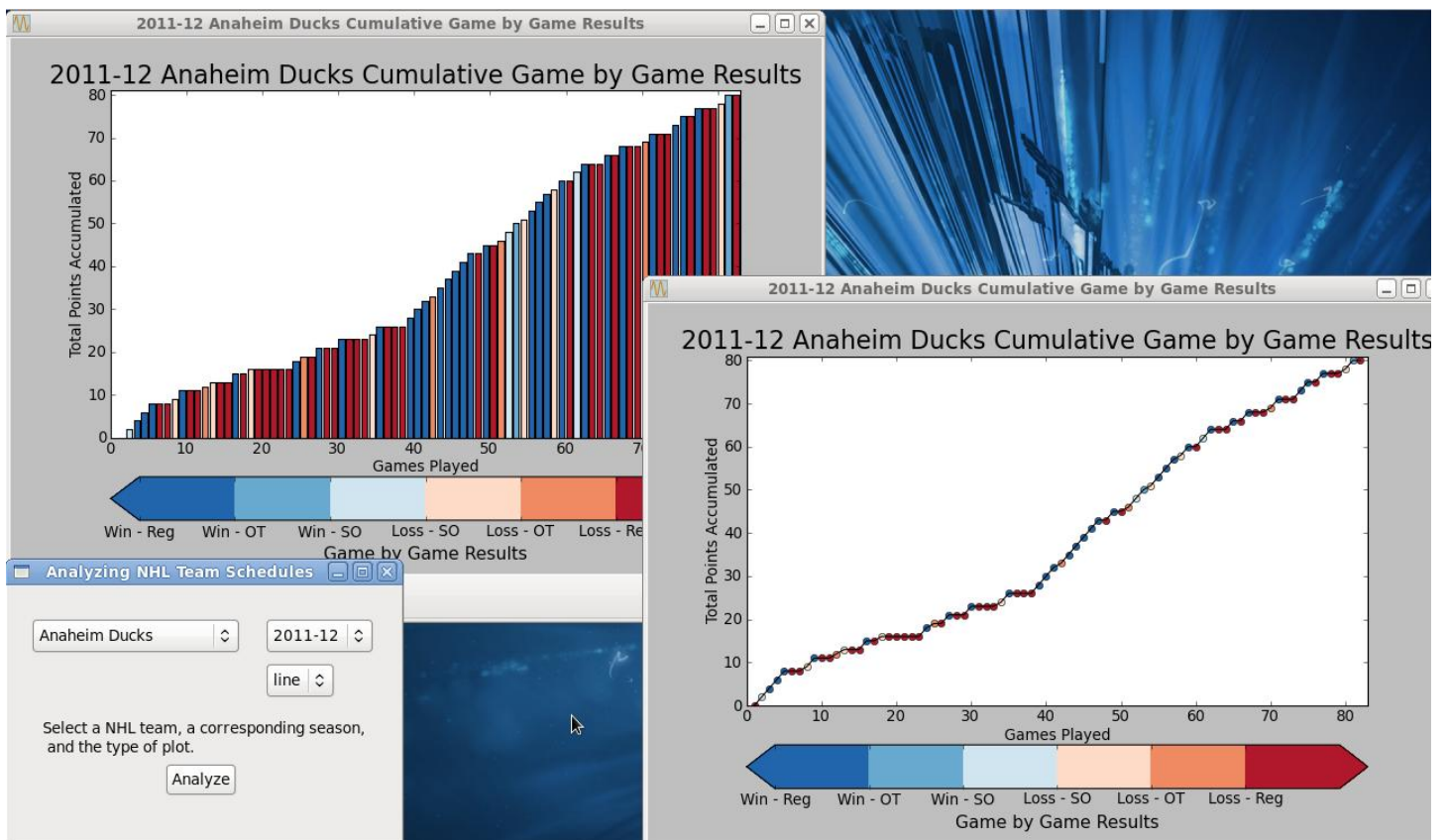
The following libraries used include: matplotlib, GTK, JSON, GDBM, and CSV.

### 3.3 Technical Implementation Detail

I went to the website [hockey-reference.com] and acquired, in CSV format, all NHL teams' schedule and results from the 2010-12 seasons. I then built a Python script that interpreted and extracted each NHL team's schedule and results into JSON format. The program then stored the information in a dbm file, with the key set to the team name and the value set to a list of dictionaries with keys set as the season and the value set to all of the information relevant to that particular season.

I also have a Python script that reads in the dbm file generated from the previous Python script. It then acquires all the data from the dbm file and formats it to satisfy the plots in matplotlib. From that data, it creates a bar graph based off of the given user input.

### 4 Image of Current Iteration of System



GUI platform that allows users to view multiple types of graphs of NHL teams at any given time

### 5 References

- 1) "matplotlib Home Page." *matplotlib*. Sourceforge, n.d. Web. 10 Apr 2012. < <http://matplotlib.sourceforge.net/>>
- 2) "Hockey-Reference.com Home Page." Hockey-Reference.com USA TODAY Sports Media Group, n.d. Web. 10 Apr 2012. < [hockey-reference.com/](http://hockey-reference.com/)>