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## Capstone Proposal Report

In this report I will be talking about is Student Objectives, Problem Specification, Solution design List of tools, Time schedule, Grading Scheme, and Deliverables. For my students objectives I am going to understand the Elo algorithm better, gather data from all the NFL teams, enhance my skills in Java, JavaScript, HTML, CSS and php MyAdmin. By creating this program, it will give the user an idea of where their favorite team would be in the standings. In the problem specification the NFL Power Ratings is going to calculate the two team's strength in playing. The home or away team wining makes the ratings update. The way this is going to work is by getting the overall ratings from FiveThirtyEight. The Elo ratings are going to be based on the 2020-2021 season. Two teams will play, and we already have the rating for the team from FiveThirtyEight and we plug those Elo ratings into the equation, and it will give the rating for each team for that matchup. Going back onto the 2020-2021 season we can see the final score and then update the rating for each team. As whatever team wins the game then K comes into play, K is an update factor for the ratings after the week. I will set the maximum number of points to 15, this is what the team gains after winning the game. For the equation there is two values which are R1 is the new home team rating for the equation and R2 is the new away team equation. For the equation there are 4 steps those 4 steps are, Step 1 The new rating for the home team,  $R(\text{Home}) = 10^{R1/400}$  and the new rating for the away team,  $R(\text{Away}) = 10^{R2/400}$ , Step 2 is  $E(\text{Home}) = R1 / (R1 + R2)$  = probability of winning of home team  $E(\text{Away}) = R2 / (R2 + R1)$  = probability of winning of away team, Step 3 is the equation if the home team wins is  $r1 = r1 + K * (S1 - E1)$  and the equation if the home team wins is  $r2 = r2 + K * (S2 - E2)$  and Step 4 is putting everything together and it is Ravens Elo rating= 1200, Cardinals Elo

rating= 1000,  $R1 = \text{Ravens} = 10^{1200/400} = 1000$ ,  $R2 = \text{Cardinals} = 10^{1000/400} = 316.2$ , probability of winning,  $E(\text{Ravens}) = 1000/(1000+316.2) = .76$ , probability of winning,  $E(\text{Cardinals}) = 316.2/(316.2+1000) = .24$ ,  $r1 = R1 + K*(S1 - E1)$ ,  $r2 = R2 + K*(S2 - E2)$ ,  $\text{Ravens} = 1200 + 15*(1 - .76) = 1203.6$  (Updated ratings if ravens win),  $\text{Cardinals} = 1000 + 15*(0 - .24) = 996.4$  (Updated ratings if ravens win),  $\text{Ravens} = 1200 + 15*(0 - .76) = 1188.6$  (Updated ratings if cardinals win), and  $\text{Cardinals} = 1000 + 15*(1 - .24) = 1011.4$  (Updated ratings if cardinals win). In the solution design There will be 32 NFL teams. By picking two teams to play that are playing week one and having the scores, we can see what their ratings will be for week 2. If the team wins their Elo rating increases and move up in the standings and if the team loses their Elo rating decreases and move down in the standings. For the tools I am going to use are Java, HTML, CSS, JavaScript, Php MyAdmin, WinSCP, Github, and the FiveThirtyEight website. For the time schedule I will be starting at Weeks 1: Collect data from NFL season of 2020-2021, Weeks 2-5: Program the algorithm with Data from previous weeks, Weeks 6-11: Make website for the algorithm to see the power ratings, Weeks 11-13: Test website to make sure everything works and fix bugs if needed, and Week 14: Prepare presentation and report. My grading consists of the power rating algorithm and programming at 40%, the user interface at 30%, report 10%, presentation at 10%, and the Elo/NFL data collection at 10%. My deliverables for the project are the proposal, source code for the algorithm, source code for the website, all data collection, project journal, project report, and the final presentation.