Fantasy league legend

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# Abstract

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# 1 introduction

As more and more sports move towards professionalism, sports analytics is gaining more and more attention, especially after the great success of baseball and basketball, and now terms such as "magic ball theory" and "penalty kicks" have gained considerable fame in both fan and AI circles. At the same time, "fantasy leagues" have become very common. A fantasy league tournament is a model in which players create their own teams as professional basketball managers.

The goal of this report is to create a card game based on the fantasy league model. Two players will choose their respective players as professional basketball managers and the system will score the players individually and by the bonds between them, with the team with the highest score winning. Another objective is to clarify the difference between the scoring system and other scoring systems. The main difference is that the scoring system takes into account the overall relationship between the players and the impact of the level of understanding on the overall team score. This will be achieved through memization. This report will demonstrate in more detail the program requirements, practices, implementation and evaluation of this project.

Team chemistry in NBA

Most teams have great surface strengths, but when they don't produce results, the team says 'wait, give me time, all we're missing is chemistry. It could be conclude as two main part:

A sense of community - when every player on the team finds their place, plays to their strengths and is willing to contribute to their teammates.

The level of understanding - players understand each other's strengths and weaknesses and are able to work well together e.g. when one player could free to shot, his teammate pass the ball to him in time.

In this project, the team chemistry will be considered as an index，and the team rating system will calculate the actual value of this index. Also the value will be taken into account in the final team score.

This article will show the process of making the game in 8 steps and the key points：

Part 2details the preliminary research carried out before starting to design the solution. This includes an outline for some of the scoring systems already in place.

Part 3 deals with professional considerations, including how the project will take into account the public interest, professional competence and integrity, and accountability to relevant authorities.

Part 4 outlines the requirements of the project to determine the size and focus of the anticipated final project. This includes the functional and non-functional requirements of the final system.

Part 5 describes the overall game and the design process for the rating system. The learning objectives of the project are discussed, as well as the functionality that the rating system will have. Furthermore, the selection and comparison of models for player data structures will also be discussed in this section. Finally, the creation of the user interface and the explanation of the rules of the game are explained in detail.

Part 6 describes all the problems encountered during the implementation of the project. It outlines the general order in which the problems occurred and how they were dealt with.

part7 describes the evaluation and testing of the system. It includes a comparison of this scoring system with other scoring systems and an assessment of the accuracy of the project using R-values. It also includes a self-reflection on the overall results of the project and highlights any other outstanding issues with the system.

Part8 is the conclusion, which summarises all the elements covered in this report.And discusses further work that could be done on this project in the future, reflecting on the outstanding requirements and explaining how they could be implemented.

# 2.background research

# 3.professional considerations

# 4.requirement analysis

The main use of the scoring system is to allow users to choose as well as match their 'fantasy league' and get feedback. This part will consider an rational rating system, which the functional requirement and non-functional requirement will be outline.

Functional requirements

Here are the List for Functional requirements:

* The project shall be playable by two player on one computer
* The user will be able to input their team name
* The system should provide the user the order of pick
* Users will be able to choose the player from the random set
* Users will be able to see the information and image of the player
* The system should rate the team fairly

Non-functional requirements

Here are the List of Non-Functional Requirements

* The project will be developed using Python and Python Graphical User Interface
* The User could go through the user interface easily
* The project will compatible on desktop device

# 5.system design

## 5.1 learning objectives

* Explore and figure out the most suitable model for players data structure
* Strength python knowledge
* Learn to build the User Interface by Python Tkinter library
* Explore the how to calculate the value of relationship and how the player relation will impact on the final rating
* Come up with a reasonable function to rate the player group

The main learning objectives of this project were to learn and find the most suitable model for the player data structure and to build a team scoring system by finding the core of the relational ability values between players. As the final form of the project will be a game, it was necessary to find a suitable framework library. The last and most important part of the project is to find a suitable scoring method for the players. By comparing Fibonacci and memoization, it was found that memoization is the easiest and most efficient way to calculate the final team score, so understanding how to use memoization became another learning objective. The last learning objective was to learn more about the use of the python library and to increase proficiency in python. The choice of programming language for this project was simple as python is simple and easy to understand with many libraries for data analysis and statistics.

#### Explore the suitable model for data structure

For the basic setting of the database, the main objective of this project was to explore and calculate the tacit values of the relationships between players (team chemistry). Based on the background research, I selected 14 famous combinations and compiled their team and teammate data as database for this project.

The initial stage of the model is based on the graph by adjacency list, in other words, each player has a certain relationship with each other.



-The adjacency list model

This image shows how the relationships between players can be represented by the adjacency list.

the adjacency list is a chain structure of the graph it will have the vector, states, and a line connect the state. In this diagram, Player A connect to Player B, that means Player A have a relationship with Player B. And the result for adjacency list is easy to represent Here are the graph to show the relation result:



However there are another way to represent the result of Adjacency list.

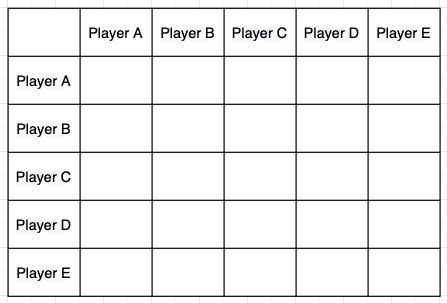
Adjacency list can also be represented as arrays:



-The Adjacency list result

In this table the horizontal rows represent the number of connections of that point and the vertical columns represent each unit, with column 0 indicating how many connections there are.

The second stage is to use the Graph represent by adjacency matrix as a basis to upgrade the relationships from the previous stage and to find the relationships between individual players and different sets. As the initial data structure model, Although the Adjacency List gives a clear represent of the relationship between players, this project takes into account the relationship between players as a value. Therefore, in the second stage I chose to use the adjacency matrix to express the relationships between players. The graph is used to be design as the model to show the relationship combine between each player. A Graph is a non-linear data structure consisting of nodes and edges. The nodes are sometimes also referred to as vertices and the edges are lines or arcs that connect any two nodes in the graph. And it is consists of a finite set of vertices(or nodes) and set of Edges which connect a pair of nodes .The Adjacency Matrix is the main factor which give us a way to represent our player relation graph in an efficient and structured procedure. It is easy to represent nodes and edges by creating a matrix table as the graph show below:



-empty graph represent by adjacency matrix

In this project, both of the horizontal and vertical node will be the power set, which is the power set of combine of players , stand for the function could be shown as P(p) \* P(p) = Graph. And for the edge in this project is used to show the relation between each power set if there are no relation between the group the edge will be input null, otherwise will be input 1 to show there do exist the relation between the chosen power sets.

Finally, the power set model is set up, which not only identifies relationships between individuals and groups, but also between groups and groups

# 6.implementation

# 7.evaluation

# 8.conclusion

# 9.appendix