Collaborators: none
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Project Writeup

<p align="center">Degrees of Freedom of NBA Players</p>

Description of Data Set

  For this project, I chose a dataset from Kaggle titled "NBA player data by game from 1949 to 2019," which can be found in the README.md or at the bottom of this proposal. This dataset contains information not only about players, teams, and games, but as well as other metrics. However, for this project, the only relevant CSV files are the players, teams, and game CSV files.

Algorithm

  Through this project, I wanted to focus on finding a path that connects a Player A to Player C, and for that reason, I thought of using the idea of Six Degrees of Freedom into play. The vertices would be the players, and each edge would have to be the fact that Player A and Player B have been teammates on the same team in the same year. The algorithm I used for this project is Breadth-First Search (BFS) for traversing graph data structures because of its advantage to find me the shortest distance between players, which is what I want.

Interesting Observations

- The data only contains players from 1949-2019.
- There may not be a connection between two players in the datasets.
    - I would imagine this is because the data is lackluster and doesn't have all the necessary information for me to properly find the path between two players.
    - Either that, or there actually isn't any connection between two players.
- cargo run –release is 8x faster than cargo run.
    - cargo run –release takes about 1.5 seconds to run while cargo run takes 13 seconds.
- Players with long careers tend to have shorter degrees of separation on average than players with shorter careers.

How to Run It

The following instructions assume that you have Rust already installed.

1. Clone this repository.
    a. git clone https://github.com/jwu04/Rust-NBA-Project.git
2. cd Rust-NBA-Project/
3. cd src/
4. cargo run –release
5. Input text according to the prompt!

6. Enjoy!

Output

Assuming no input:

```
level@Astronic MINGW64 ~/Rust-NBA-Project/project (main)
$ cargo run --release
    Finished release [optimized] target(s) in 0.02s
     Running `target\release\rust_nba_project.exe`
====== Do you want to input two basketball players? (y/n):
n
----------------------------------
====== NBA 6 Degrees of Separation Between:
====== [Brandan Wright] and [Sam Jones]
----------------------------------
====== Brandan Wright -- [Golden State Warriors, 2007-08 Season] -- Baron Davis
====== Baron Davis -- [Charlotte Hornets, 2000-01 Season] -- Otis Thorpe
====== Otis Thorpe -- [Sacramento Kings, 1984-85 Season] -- Billy Knight
====== Billy Knight -- [Boston Celtics, 1978-79 Season] -- Don Chaney
====== Don Chaney -- [Boston Celtics, 1968-69 Season] -- Sam Jones
----------------------------------
====== Found 5 degree(s) of separation between [Don Chaney] and [Sam Jones]!
====== Brandan Wright has an average degrees of separation of 2.725783!
----------------------------------
====== Search completed in: 1.528134s
```

Assuming input:

```
level@Astronic MINGW64 ~/Rust-NBA-Project/project (main)
$ cargo run --release
    Finished release [optimized] target(s) in 0.03s
     Running `target\release\rust_nba_project.exe`
====== Do you want to input two basketball players? (y/n):
y
====== Input the first basketball player (from 1949-2019):
lebron james
====== Input the second basketball player (from 1949-2019):
wilt chamberlain
----------------------------------
====== NBA 6 Degrees of Separation Between:
====== [LeBron James] and [Wilt Chamberlain]
----------------------------------
====== LeBron James -- [Cleveland Cavaliers, 2004-05 Season] -- Scott Williams
====== Scott Williams -- [Chicago Bulls, 1990-91 Season] -- Bill Cartwright
====== Bill Cartwright -- [New York Knicks, 1979-80 Season] -- Jim Cleamons
====== Jim Cleamons -- [Los Angeles Lakers, 1971-72 Season] -- Wilt Chamberlain
----------------------------------
====== Found 4 degree(s) of separation between [Jim Cleamons] and [Wilt Chamberlain]!
====== LeBron James has an average degrees of separation of 2.6204107!
----------------------------------
====== Search completed in: 13.5168005s
```

Instance of no connection:

```
level@Astronic MINGW64 ~/Rust-NBA-Project/project (main)
$ cargo run --release
    Finished release [optimized] target(s) in 0.03s
     Running `target\release\rust_nba_project.exe`
====== Do you want to input two basketball players? (y/n):
n
----------------------------------
====== NBA 6 Degrees of Separation Between:
====== [Kevin Hervey] and [Allan Ray]
----------------------------------
====== Due to insufficient data, it could not establish a connection between Kevin Hervey and Allan Ray.
====== Try again!
----------------------------------
====== Search completed in: 1.4800397s
```

Kaggle Dataset:

https://www.kaggle.com/datasets/harisbeslic/nba-player-data-by-game-from-1949-to-2019?select=all_game_scores.csv