Project Title:

Graph Analysis of Upcoming Video Game Releases by Platform

Objective:

To explore the relationships and patterns among video game releases from 2022 to 2024, focusing on connectivity and influence among gaming platforms.

Data Set Description:

The dataset contains information about the number of major video games scheduled for release between 2022 and 2024, categorized by platform. This dataset is interesting as it provides insights into the gaming industry's trends, the popularity of platforms, and the potential saturation of the market.

Proposed Analyses:

Graph Construction:

Nodes: Each node represents a video game platform (e.g., PC, Xbox, PlayStation).

Edges: Connect platforms if games are released on multiple platforms within the same timeframe.

Six Degrees of Separation:

Goal: Determine the average path length between any two platforms, exploring the 'six degrees of separation' concept in the context of video game platform connectivity.

Method: Use Breadth-First Search (BFS) and Shortest Paths algorithms to calculate distances.

Degree Distributions:

Goal: Analyze the degree distribution of the graph to understand how connected each platform is in terms of shared game releases.

Method: Calculate the degree of each vertex (platform) and examine the distribution, comparing it to theoretical distributions like power-law.

Centrality Measures:

Goal: Identify the most influential gaming platforms based on various centrality measures.

Method: Compute centrality metrics such as closeness and betweenness to determine the influence of each platform.

Densest Subgraph:

Goal: Identify periods when the gaming market is most competitive across platforms.

Method: Implement the 2-approximation algorithm for finding a dense subgraph to discover times with the highest game release density.

Implementation Steps:

Data Preparation: Convert the Excel data into a suitable format for graph analysis, mapping game releases to platforms and times.

Graph Construction: Develop the graph structure in Rust, ensuring all nodes and edges are correctly represented.

Algorithm Implementation: Code the BFS, Shortest Paths, and centrality measure algorithms in Rust.

Analysis Execution: Run all analyses on the constructed graph, collecting and interpreting results.

Documentation and Final Submission: Compile the findings into a comprehensive report, detailing methodologies, results, and insights.

#Not confirm the time setting, might plan differently.

Testing Strategy:

Unit Testing: Implement unit tests for each graph algorithm to ensure correctness.

Integration Testing: Test the integration of data import, graph construction, and analysis modules.

Validation: Compare the graph's degree distribution and centrality results with expected theoretical outcomes.

Conclusion:

This project will provide valuable insights into the interconnectivity of video game platforms and market trends. By applying graph theory, we can uncover underlying patterns and influences in the video game industry, offering a unique perspective on its competitive landscape.

Dataset Link:

<https://www.statista.com/statistics/1391589/major-upcoming-video-games-by-platform/>