

Very well detailed design and schedule

Tandon School of Engineering
New York University

Subject: Introduction to Java
(CS9053)

Project Proposal: Settlers of Catan(Board Game)



Background

Settlers of Catan, designed by Klaus Teuber, has emerged as one of the most iconic and beloved board games worldwide since its release in 1995. Renowned for its blend of strategy, resource management, and negotiation, Settlers of Catan has captivated millions of players of all ages. The game's premise revolves around players colonizing the fictional island of Catan by strategically building settlements, roads, and cities while trading resources with one another. The success of Settlers of Catan has led to numerous expansions, spin-offs, and even digital adaptations, cementing its status as a timeless classic in the realm of tabletop gaming.

As technology continues to evolve, the popularity of digital board games has surged, providing players with convenient and accessible ways to enjoy their favorite games online. However, while digital adaptations of Settlers of Catan exist, many lack the depth and intricacy of the physical board game experience. Therefore, the development of a digital version of Settlers of Catan in Java presents an exciting opportunity to recreate the immersive gameplay and strategic depth of the original game in a digital format. By leveraging Java's versatility and robustness, this project aims to deliver a faithful adaptation of Settlers of Catan that captures the essence of the board game while introducing new features and enhancements tailored to the digital medium.

Furthermore, the creation of a digital Settlers of Catan game in Java serves as an educational endeavor, providing aspiring developers with a hands-on learning experience in software development, game design, and object-oriented programming. Through the implementation of core game mechanics, such as resource generation, player interactions, and turn-based gameplay, participants will gain valuable insights into algorithm design, data structures, and software architecture. Additionally, the project offers an opportunity to explore graphical user interface (GUI) development using Java's Swing or JavaFX libraries, enabling participants to enhance their skills in user experience (UX) design and front-end development. Ultimately, the digital adaptation of Settlers of Catan in Java not only celebrates the enduring legacy of the board game but also fosters creativity, collaboration, and innovation within the programming community.

Objectives

- **Implement Core Game Mechanics:** Develop the basic functionalities of the game, including resource generation, building structures, player turns, and victory conditions.
- **Demonstrate Object-Oriented Design Principles:** Utilize object-oriented programming concepts to design and implement modular, reusable, and maintainable code.
- **Provide a User-Friendly Interface:** Create a graphical user interface (GUI) that allows players to interact with the game board, manage resources, and make strategic decisions. Interfaces to represent game entities (e.g., board, tiles, players) and their interactions. Utilize object-oriented design principles to encapsulate data and behavior, promote code reusability, and facilitate future enhancements.

Approach

- **Implement Core Game Logic:** Develop algorithms for resource generation, player actions, turn-based mechanics, and victory conditions. Utilize data structures such as maps, lists, and arrays to manage game state efficiently.
- **Design Game Architecture:** Develop algorithms for resource generation, player actions, turn-based mechanics, and victory conditions. Utilize data structures such as maps, lists, and arrays to manage game state efficiently.
- **Create Graphical User Interface:** Design and implement a user-friendly GUI using Java's Swing or JavaFX libraries. Provide intuitive controls for players to perform actions, view game status, and navigate the game board.
- **Testing and Debugging:** Conduct thorough testing to identify and rectify any bugs or issues in the

implementation. Perform unit testing, integration testing, and user acceptance testing to ensure the correctness and robustness of the game.

Tentative Milestones with Timeframes

Sr No	Phase	Task	Date
1	Project Initiation	Research and familiarize with the rules and mechanics of Settlers of Catan	04-01-2024
		Define overall architecture of the game, defining classes, interface and their relationships	04-01-2024
		Set up development environment	04-01-2024
2	Initial Methodology Implementation and Evaluation	Implement the game board representation	04-08-2024
		Develop algorithms for resource generation based on dice rolls and adjacent tiles	04-15-2024
		Handle resource trading between players and with a bank, including validation and negotiation	04-22-2024
4	Final GUI Implementation and Evaluation	Design the layout and visual elements including game board, player interface and user interaction.	04-27-2024
		Integrate GUI elements with underlying game logic allowing players to interact with the game board.	04-29-2024
		Conduct user acceptance testing and address bugs, issues or any concerns	05-03-2024
5	Project Finalization	Project Report Writing	05-05-2024
		Project Presentation	05-10-2024

Evaluation:

- **Functionality Testing:** Evaluate the game's functionality by verifying that core mechanics, such as resource generation, player actions, and victory conditions, operate as intended.
- **User Experience Evaluation:** Solicit feedback from users to assess the usability, intuitiveness, and overall experience of the graphical user interface. Incorporate user feedback to improve the interface design and enhance player engagement.
- **Code Review and Refactoring:** Conduct a code review to assess the quality, readability, and maintainability of the codebase. Identify areas for improvement and perform refactoring as necessary to enhance code clarity and efficiency.