Game Development Techniques Applied to a Competitive Chess Game

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***Abstract*—This thesis explores the development techniques for games, focusing on chess game development using C#. It covers game classification, artificial intelligence, search techniques, and the implementation of a chess game with local and networked multiplayer functionalities. The author discusses the advantages and limitations of the developed program, and outlines future development plans. The work details the classification of games, including symmetric and asymmetric games, zero-sum and non-zero-sum games, simultaneous and sequential games, perfect and imperfect information games, and infinite games. It also covers artificial intelligence techniques, search algorithms, and the implementation of a chess game with local and networked multiplayer functionalities. The developed program includes features such as local and networked multiplayer modes, chat functionality, and basic move handling. The author acknowledges that the program is not fully optimized and has some unresolved issues, and outlines future development plans, such as improving the user interface, enhancing AI, and adding additional features.**

***Index Terms*—game development, chess, C#, artificial intelligence, search algorithms, multiplayer**

I. Introduction

The thesis begins by discussing the increasing demand for entertainment through computer games, with a particular focus on chess as a popular intellectual game. It outlines the development of a chess game using C#, covering game rules, strategies, and the implementation of various game modes. The author explores the classification of games, including symmetric and asymmetric games, zero-sum and non-zero-sum games, simultaneous and sequential games, perfect and imperfect information games, and infinite games. This classification helps in understanding the nature and complexity of the game. The author also delves into the implementation of artificial intelligence techniques, search algorithms, and the development of a chess game with local and networked multiplayer functionalities. The work highlights the importance of C# in game development, emphasizing its versatility and ease of use [1]. Related earlier ICTU undergraduate theses provide context for this English summary [9], [10], [11].

II. Methods

The methods section details the classification of games, including symmetric and asymmetric games, zero-sum and non-zero-sum games, simultaneous and sequential games, perfect and imperfect information games, and infinite games. It also covers artificial intelligence techniques, search algorithms, and the implementation of a chess game with local and networked multiplayer functionalities. The author uses C# as the programming language for the implementation, leveraging its features to create a robust and efficient game. The implementation includes the development of a chess board, piece movement, and the integration of AI for the computer player. The author also implements chat functionality and basic move handling to enhance the user experience. The limitations of the current implementation include the need for further optimization and the addition of more advanced features [1].

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III. Results

The results include the development of a chess game with features such as local and networked multiplayer modes, chat functionality, and basic move handling. The author acknowledges that the program is not fully optimized and has some unresolved issues. The chess game was implemented using C#, and the author successfully integrated various functionalities, including piece movement, AI for the computer player, and chat functionality. The program allows for local and networked multiplayer modes, enabling players to compete against each other either on the same machine or over a local area network. The basic move handling functionality ensures that the game follows the rules of chess, providing a solid foundation for further development. However, the author notes that the program is not yet fully optimized and requires further refinement [1].

IV. Discussion

The discussion highlights the advantages of the developed program, including the implementation of AI, local and networked multiplayer functionalities, and basic move handling. The author also outlines future development plans, such as improving the user interface, enhancing AI, and adding additional features. The implementation of AI using search algorithms and the minimax strategy provides a challenging opponent for the players. The local and networked multiplayer modes offer a versatile gaming experience, allowing players to compete against each other in a variety of settings. The basic move handling functionality ensures that the game follows the rules of chess, providing a solid foundation for further development. The author acknowledges that the current implementation has

limitations, such as the need for further optimization and the addition of more advanced features. Future work will focus on refining the user interface, enhancing the AI, and adding new functionalities to improve the overall gaming experience [1].

V. Conclusion

The conclusion summarizes the limitations of the current program and the author's plans for future improvements, including refining the user interface, enhancing AI, and adding new functionalities. The author acknowledges that the program is not fully optimized and has some unresolved issues. The chess game was successfully implemented using C#, and the author successfully integrated various functionalities, including piece movement, AI for the computer player, and chat functionality. The program allows for local and networked multiplayer modes, enabling players to compete against each other in a variety of settings. The basic move handling functionality ensures that the game follows the rules of chess, providing a solid foundation for further development. The author outlines future development plans, such as improving the user interface, enhancing AI, and adding additional features to improve the overall gaming experience [1].

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