Title of the Project

Development of a Cross-Platform Application Based on the Board Game "Bang!" for Mobile and Web Platforms with Multiplayer Support

Relevance of the Topic

In recent years, the digitization of board games has become a significant trend, enabling unique gameplay experiences in a digital environment and making them accessible to a broader audience. Adapting the board game *Bang!* into a cross-platform application (mobile and web versions) allows players to interact in real-time, regardless of the platform. This approach offers convenience, a choice of devices, and enhances social interaction among players. The project is relevant due to the growing demand for cross-platform solutions that provide flexibility and freedom of device choice for players.

Objective of the Project

The objective of this project is to develop a cross-platform application that accurately adapts the rules and mechanics of the *Bang!* board game for mobile devices and web platforms, with multiplayer support and an intuitive interface.

Tasks

To achieve the project's objective, the following tasks need to be completed:

1. Study and analyze the rules and game mechanics of the *Bang!* board game for precise adaptation into a digital format.
2. Determine a suitable technology stack for implementing a cross-platform application that supports both mobile devices and web platforms.
3. Design the application architecture, considering the features of both the mobile and web versions, to ensure stable interaction between them.
4. Develop an interface that adapts to various screen resolutions and platforms, allowing players to interact with the game process effortlessly.
5. Implement a multiplayer mode with real-time data synchronization among players.
6. Conduct testing of the application to identify and fix errors, as well as to optimize performance.
7. Launch the application and collect feedback for further improvement and expansion of functionality.

Research Methods

The following methods will be used in the course of this work:

1. **Document and literature analysis**: studying the *Bang!* game rules and existing digital adaptations of board games.

2. **Interface and architecture design**: developing an adaptive interface for mobile and web platforms, as well as creating a client-server architecture with multiplayer support.
3. **Programming and cross-platform integration**:
   - **Unity with WebGL** for cross-platform support.
   - **React** for developing the web interface that will interact with the server and support cross-platform compatibility.
4. **Cross-platform compatibility testing**: verifying the game's functionality on different devices (mobile and desktop) and browsers to ensure a stable and convenient gameplay experience.
5. **User testing methods**: gathering feedback and suggestions from users to identify and resolve issues, as well as to improve the game's interface and functionality.

Structure of the Project

1. **Introduction**

   - Justification of the relevance of the chosen topic.
   - Definition of the research objective and tasks.
   - Brief description of the thesis structure.

2. **Theoretical Background**

   - History and rules of the *Bang!* board game.
   - Analysis of existing digital adaptations of board games and justification for the selected technology stack.
   - Choice of architectural solutions to ensure cross-platform accessibility.

3. **Design**

   - Application architecture design, considering multiplayer interaction and cross-platform compatibility.
   - Creation of an adaptive interface optimized for both mobile devices and desktop screens.

4. **Development and Implementation**

   - Implementation of core game mechanics, including role distribution, card drawing, and distance-based interactions.
   - Integration of multiplayer mode using server-side technologies for real-time data synchronization.
   - Development of the web version using React and integration with Unity WebGL.

5. **Testing and Debugging**

   - Functional and performance testing of the game on mobile and web platforms.
   - Analysis of user feedback, identifying and fixing issues to improve the user experience.

6. **Conclusion**

   - Findings and results of the work.
   - Prospects for further development, including potential updates and feature expansion.

7. **References**

- Sources and materials used during the development and writing of the thesis.

Expected Results

The expected outcome of the project is the creation of a cross-platform application that will:

- Accurately convey the game mechanics and atmosphere of the *Bang!* board game for mobile devices and web browsers.
- Provide players with access to the game regardless of the device used, enabling real-time interaction.
- Support an intuitive and user-friendly interface that adapts to different screen resolutions.
- Receive positive feedback from users and offer opportunities for further updates and expansions based on collected data.

References

1. Official rules of the *Bang!* board game.
2. Literature on mobile and web application development using Unity and WebGL.
3. Recommendations and guidelines on UX/UI for cross-platform applications.
4. Articles and books on implementing multiplayer applications using Node.js and WebSocket.
5. Research and analysis of trends in digital adaptations of board games.