Multiplayer Bomberman Game

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1 Introduction

Welcome to the Multiplayer Bomberman game, a competitive and strategic game developed as part of the Software Technology Course at the ELTE Faculty of Informatics. In this game, players control Bomberman characters, placing bombs to destroy obstacles and defeat opponents. This project was created by Abdullah Canberk Arkose, Alidin Abylkasym Uulu, Murad Huseynov, and Ren Koike .

2 Getting Started

Upon launching the game, players can choose from the following options:

- **Start**: Begin a new game session.
- **Instructions**: Review the game mechanics and controls.

3 User Interface

The game interface is designed for ease of use, with all essential tools and elements prominently displayed for quick access.

3.1 Main Screen

The main screen features a scrollable map where the game takes place. Players can explore and interact with the game field, which consists of tiles, walls, boxes, and monsters.

At the top left of the screen, you'll find game options:

- **Quit**: Exit the current game and go back to the opening page.
- **Restart**: Reset and restart the game from the beginning.
- **Modify Controls**: Modify the controls that were set before starting the game, in the configuration panel.

On the sides of the game map, you'll see:

- **Player Stats**: A comprehensive panel for each player that shows the ID of the player, number of bombs, obstacles, and obtained power-ups.

4 Configuration Panel

The configuration panel allows users to choose from three different maps. Additionally, users can select the number of players (either 2 or 3), the number of rounds needed to win the overall game, and customize their keyboard controls before starting the game.

5 Game Mechanics

5.1 Movement and Bomb Placement

Players can move their Bomberman characters in four directions: left, right, up, and down. Bombs can be placed on the tile where the player is standing, and they will explode after a short time, affecting adjacent tiles.

5.2 Walls and Boxes

Walls are indestructible barriers, while boxes can be destroyed by bombs. Destroying boxes may reveal power-ups that players can collect.

5.3 Monsters

Monsters roam the game field and can defeat players by stepping on the same tile. Different types of monsters have unique behaviors and movement patterns.

6 Advanced Features

In addition to the base game mechanics, we have implemented several advanced features:

6.1 Advanced Power-ups

We have included additional power-ups such as:

- **Detonator**: Allows manual detonation of bombs.
- **Roller Skate**: Increases player speed.
- **Invincibility**: Grants temporary invincibility.
- **Ghost**: Allows passing through walls, boxes, and bombs temporarily.
- **Obstacle**: Enables players to place indestructible obstacles.

6.2 Three Players

The game supports up to three players, adding a new level of complexity and strategy to the gameplay.

6.3 Customizable Controls

Players can customize their control key bindings and save these settings for future sessions.

6.4 Intelligent Monsters

We implemented four types of intelligent monsters:

- **Basic Monster**: Moves randomly.
- **Wall-Passing Monster**: Passes through walls and boxes, moves slower.
- **Chasing Monster**: Targets the nearest player using the shortest path, moves faster.
- **Fork-Choosing Monster**: Makes decisions at forks, sometimes incorrectly, moves at normal speed.

7 Gameplay Tips

- **Strategic Bomb Placement**: Place bombs strategically to trap opponents and destroy obstacles.
- **Collect Power-ups**: Power-ups can give you a significant advantage. Prioritize collecting them.
- **Avoid Monsters**: Keep an eye on monster movements and avoid their paths.
- **Customize Controls**: Adjust the controls to your preference for a better gameplay experience.

8 Technical Details

The Multiplayer Bomberman game is developed using React and TypeScript. Below are the key technical aspects of the project:

8.1 Dependencies

The project uses several dependencies to enhance functionality and ensure smooth performance:

- **@emotion/react** and **@emotion/styled**: For styling components.
- **@mui/icons-material** and **@mui/material**: For Material-UI components and icons.
- **@testing-library/jest-dom**, **@testing-library/react**, and **@testing-library/user-event**: For testing the application.
- **@types/jest**, **@types/node**, **@types/react**, and **@types/react-dom**: TypeScript type definitions.
- **react** and **react-dom**: Core React libraries.
- **react-router-dom**: For routing.
- **react-scripts**: For running and building the React application.
- **typescript**: For TypeScript support.
- **web-vitals**: For measuring performance metrics.

8.2 Scripts

The following scripts are available to manage the project:

- **start**: Runs the application in development mode.
- **build**: Builds the application for production.
- **lint**: Lints the TypeScript codebase.
- **test**: Runs the test suite with coverage.
- **eject**: Ejects the app configuration and dependencies.

8.3 Development Tools

The project uses several development tools to maintain code quality:

- **eslint**: For identifying and fixing problems in the code.
- **@typescript-eslint/eslint-plugin** and **@typescript-eslint/parser**: For linting TypeScript code.
- **eslint-config-airbnb**: Airbnb's ESLint configuration.
- **eslint-plugin-import**, **eslint-plugin-jsx-a11y**, **eslint-plugin-react**, and **eslint-plugin-react-hooks**: Additional ESLint plugins for React and accessibility.

8.4 Browserslist

The application supports the following browser environments:

- **Production**: Browsers with more than 0.2% market share, not dead, not Opera Mini.
- **Development**: The latest version of Chrome, Firefox, and Safari.

9 Conclusion

The Multiplayer Bomberman game project showcases our ability to design and implement a complex, engaging game with advanced features. We hope you enjoy playing the game and find it both challenging and entertaining.