University Name: Technical University of Košice
Faculty: FEI (Faculty of Electrical Engineering and Informatics)
Assignment Title: Minesweeper Game Implementation
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Abstract:

This documentation outlines the design and implementation details of a Minesweeper game developed in C using the ncurses library. The game features mine placement, cell revealing, flag toggling, and a console-based user interface.

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1. Introduction:

The Minesweeper game is a classic single-player puzzle game that challenges players to uncover cells on a grid while avoiding hidden mines. This implementation utilizes C and the ncurses library to create a console-based Minesweeper game.

2. Implementation Details:

The game is implemented using a 2D array representing the game board, where each cell is an object with properties indicating if it's a mine, if it's revealed, if it's flagged, and the number of neighboring mines. Mines are randomly placed on the board, and the number of neighboring mines for each cell is calculated during initialization.

User input is captured using the ncurses library, allowing arrow key movements for cursor navigation, spacebar for revealing cells, and 'h' key for toggling flags. The game state is continuously updated based on user input, and the board is redrawn to reflect changes.

3. User Interaction:

- **Arrow Keys:** Navigate the cursor to the desired cell.
- **Spacebar:** Reveal a cell.
- **'h' Key:** Toggle a flag on a cell.

4. Example Usage:

1. Navigate the cursor using arrow keys.
2. Press the spacebar to reveal a cell.
3. Press 'h' to toggle a flag on a cell.
4. Continue revealing cells and toggling flags until all non-mine cells are revealed or a mine is triggered.
5. Winning Condition: Reveal all non-mine cells without triggering a mine.

5. Conclusion:

The implemented Minesweeper game provides a basic yet functional console-based gaming experience. Future enhancements may include implementing a timer, improving the user interface, and incorporating error handling for invalid input. These improvements would contribute to a more engaging and user-friendly game.

This documentation serves as a comprehensive overview of the Minesweeper game implementation, covering its design, features, and user interaction. The provided example usage guide assists users in understanding the game mechanics. Further enhancements could be explored to elevate the user experience.