Tic Tac Toe Game Design and Usage Document

Overview

This program is a console-based Tic Tac Toe game where a human player competes against an AI opponent. The game offers three levels of difficulty: easy, medium, and hard, each corresponding to a different board size (5x5, 4x4, and 3x3, respectively). The game is implemented in Java and uses object-oriented programming principles.

Design

The game is divided into several classes:

Main: This class is the entry point of the game. It handles the game setup, including welcoming the player, asking for the difficulty level, and initiating the game based on the player's choice.

Player: This class represents a player in the game. It defines constants for the human player symbol ('X'), the AI player symbol ('O'), and an empty space on the game board.

TicTacToe3X3: This class represents the hard mode of the game, which uses a 3x3 game board. It includes methods for starting the game, initializing and printing the game board, checking for a win or a full board, and implementing the AI's strategy using the minimax algorithm.

TicTacToeCustom: This class represents the easy and medium modes of the game, which use a 5x5 and 4x4 game board, respectively. It includes methods for initializing and printing the game board, checking for a win or a full board, validating a move, making a move, and running the game loop.

Usage

To play the game, run the Main class. The game will print a welcome message and ask you to choose a difficulty level. Enter 1 for easy, 2 for medium, or 3 for hard. The game will then print the initial game board and prompt you to make your move.

To make a move, enter the row and column numbers of the cell where you want to place your mark. The numbers should be separated by a space and should correspond to a valid, empty cell on the game board. For example, to place your mark in the top-left cell of the board, enter “**1 1**”.

After you make your move, the game will print the updated game board and the AI will make its move. The game continues in this way until either a player wins or the game board is full.

If you win, the game will print a congratulatory message. If the AI wins, the game will print a message indicating that you lost. If the game board is full and there is no winner, the game will print a message indicating a draw.

After the game ends, you can start a new game by running the Main class again.