

Project Description: Object-Oriented Tic Tac Toe Game

Project Overview:

The Tic-Tac-Toe game is a two-player game in which each player takes turns placing their symbol ('X' or 'O') on a 3x3 grid. The objective is to form a winning sequence by aligning three symbols horizontally, vertically, or diagonally. The game ends when a player wins or when the board is completely filled, resulting in a draw.

This project follows the structure of the game into modular classes.

Classes and Their Responsibilities

1. Board (Represents the Tic Tac Toe Grid)

Attributes:

grid (3x3 2D array) - Represents the Tic Tac Toe board.

SIZE (Constant) - The fixed size of the board (3x3).

Behaviors:

initializeBoard() - Sets up an empty board with all positions unoccupied.

printBoard() - Displays the current state of the board.

isValidMove(row, col) - Checks if a move is valid (i.e., within bounds and not occupied).

placeMove(row, col, symbol) - Places a player's symbol on the board.

checkWin(symbol) - Determines if a player has won the game.

isFull() - Checks if the board is full, indicating a draw.

2. Player (Represents a Player in the Game)

Attributes:

name (String) - The player's name.

symbol (Character) - The player's symbol ('X' or 'O').

Behaviors:

getName() - Returns the player's name.

getSymbol() - Returns the player's symbol.

3. Game (Handles Gameplay Logic)

Attributes:

board (Instance of Board) - Represents the Tic Tac Toe board.

player1 (Instance of Player) - Represents the first player.

player2 (Instance of Player) - Represents the second player.

currentPlayer (Instance of Player) - Keeps track of whose turn it is.

scanner (User Input Handler) - Reads user input for player moves.

Behaviors:

play() - Runs the game loop until a player wins or the game is a draw.

switchPlayer() - Alternates turns between the two players.

promptMove() - Asks the current player to enter a row and column for their move.

4. TicTacToe (Main Class to Run the Game)

Attributes:

scanner (User Input Handler) - Reads player names.

Behaviors:

main() - Initializes players and starts the game.

Object Interaction:

1. The main class (TicTacToe) initializes two Player objects.
2. A Game object is created, which initializes a Board and controls game execution.
3. Players take turns making moves, and the board updates accordingly.
4. The Game class checks for a win or draw after each move.
5. If a win condition is met, the game declares a winner; otherwise, it continues until the board is full.