Tic Tac Toe

High Level Concept

The Tic Tac Toe game begins with an empty 3x3 board, where "X" is defaulted to player 1. Players 1 and 2 take turns selecting empty spaces on the board until a winner or draw is determined. A player wins by placing three respective marks in a row, column, or diagonal. If all positions are filled without a winner, the game ends in a draw.

Implementation

Functions Needed

- char displayBoard(char board[3][3]);
  - Purpose: Displays the current state of the board
  - Implementation: Iterates through the 3x3 array and prints the board
- bool markSpot(char board[3][3], int pos, char currentPlayer);
  - Purpose: Marks selected position for the current player if the position is not already taken.
  - Implementation: Converts user input (1-9) to the corresponding row and column. Checks whether or not the position is already taken. If so, return false to the main function and the current player must re-choose another position. Return true if the position was successfully marked.
- bool checkForWinner(char board[3][3]);
  - Purpose: Checks if there are matching marks in a row, column, or diagonal pattern.
  - Implementation: Create a for loop that iterates through an if-statement that examines the rows and columns and checks if there are three matching marks vertically or horizontally. Create another if-statement outside of the for loop to check if there are three matching marks diagonally. Return true if so, otherwise return false.
- bool checkTie(char board[3][3]);
  - Purpose: Checks if all spots on board are filled without a winner, resulting in a tie.
  - Implementation: Create a nested loop that iterates through each position on the board. If a position on the board is found without either an 'X' or 'O', this means that there's still an empty position on the board and it returns false when called from the main function. However, if all spots are occupied by either player, it will return true, meaning a tie has been reached.

Variables Needed

- char player1, player2, currentPlayer: Define variables for the two players and the current player. Assign ‘X’ to player1 and ‘O’ to player2. currentPlayer will alternate between player1 and player2 during the game.
- int pos: indicates position on the board chosen by the current player.
- bool gameOver: indicates status of the game.

Main Function Implementation

- Initialize the variables and assign respective values as needed.
- Create a 2D array for the board and fill it with positions 1-9 type char.
- Display the board and prompt the first player to choose a position.
- Check if the user input is valid, otherwise prompt the player to re-enter a position that is valid.
- Check if a winner or draw is reached.
- Alternate between players.
- When a winner or draw is reached, end the game and set boolean value of gameOver to true. Program exits.