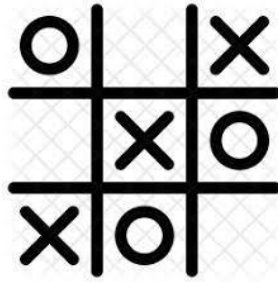


Tic Tac Toe Game:

Tic-tac-toe (also known as **noughts** and **crosses** or Xs and Os) for two players, X and O, who take turns marking the spaces in a 3×3 grid. The player who succeeds in placing three of their marks in a horizontal, vertical, or diagonal row wins the game.

The sample tic tac toe board of order 3 by 3 is shown in the figure below. Suppose player 1 had chosen X and player 2 has chosen O.



Problem Statement

You need to implement **Min-Max Algorithm** to search optimal solution for each player in Tic-Tac-Toe game. (Algorithm is given at the end for your reference)

Rules of Game :

The simple rules to play the game are:

- Two players can play the game. Each player will choose either O or X.
- The winning of a player is dependent on the consecutive Os or Xs (in either row or column or Diagonal).
- Each player will play alternately. There is no biasness towards or against any player.
- The game will stop when either player has won.
- If no player has won and all the board cells are occupied, the game has been drawn.

Code Provided

def initial_state(): Returns starting state of the board.

def player(board): Returns player who has the next turn on a board.

def actions(board): Returns set of all possible actions (i, j) available on the board.

def result(board, action): Returns the board that results from making move (i, j) on the board.

def winner(board): Returns the winner of the game if there is one.

def terminal(board): Returns True if game is over, False otherwise.

def utility(board): Returns 1 if X has won the game, -1 if O has won, 0 otherwise.

Tasks to Perform

def minimax(board): Returns the optimal action for the current player on the board.