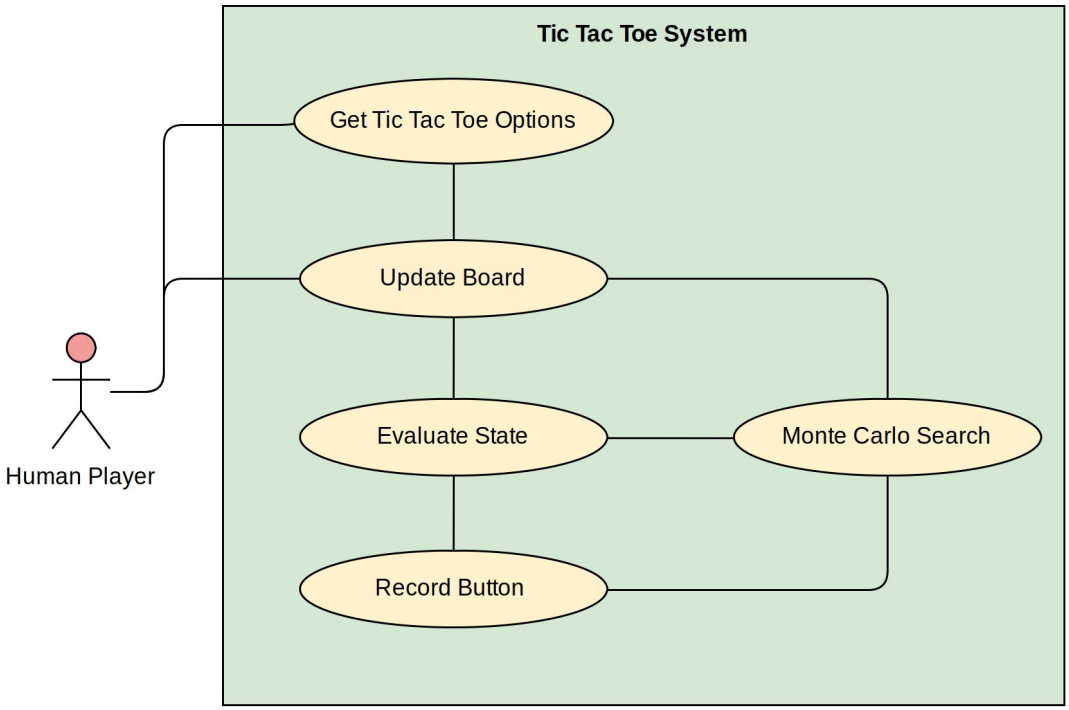
Use Case Diagram



Use Case Name	Get Tic Tac Toe Options
Participating actors	Initiated by Human Player
Flow of events	1. The Get Tic Tac Toe Options is activated by the Human Player when the player's choices are entered. 2. The Human Player's choices are passed on to Update Board, which uses this information to find the next move. 3. Update Board gives information to Get Tic Tac Toe Options on whether the game has ended.
Entry condition	• The Human Player selects an option presented by Get Tic Tac Toe Options.
Exit Condition	• Human Player is informed if the game ended in a win, a loss or a draw.
Quality Requirements	• The move is instantaneously recorded and applied • The game ending status is immediately applied when available, otherwise board information is updated after 1500 simulations.

Use Case Name	Update Board
Participating actors	Human Player makes moves on the board.
Flow of events	1. Update Board is activated when it is provided with information by Get Tic Tac Toe Options on the Human Player's choices. 2. Update Board gets a Human Player move, and checks with Evaluate State if the move is terminal. 3. If the move is not terminal, Monte Carlo Search is called. 4. Monte Carlo Search informs Update Board on computer's next move. 5. The computer's move is applied on the board by Update Board. 6. Otherwise, Evaluate State informs Update Board that the game has ended. 7. Get Tic Tac Toe Options is informed that the game has ended.
Entry condition	• The Human Player has already activated Get Tic Tac Toe Options.
Exit Condition	• The Human Player is presented with a new move on the board, Or • The Human Player is informed that the game has ended.
Quality Requirements	• The move is instantaneously recorded and applied • The game ending status is immediately applied when available, otherwise board information is updated after 1500 simulations.

Use Case Name	Monte Carlo Search
Participating actors	
Flow of events	1. Evaluate State calls Monte Carlo Search to evaluate the next move. 2. Monte Carlo Search calls Record Button to determine the available squares on the board. 3. 1500 simulations are performed on the available squares. 4. During the simulation Record Button is called and UCT values of the squares are updated. 5. Monte Carlo Search determines the square with the highest UCT value. 6. Monte Carlo Search tells Update Board to select the square with the highest UCT value, and provides the square identity to Update Board.
Entry condition	• Evaluate State cannot find an immediate terminal move.
Exit Condition	• Update Board gets the location of the next move.
Quality Requirements	• The move is instantaneously recorded and applied • The game ending status is immediately applied when available, otherwise board information is updated after 1500 simulations.

Use Case Name	Record Button
Participating actors	
Flow of events	1. Evaluate State informs Record Button on the button which the user clicked, and its mark. 2. Record Button stores this information and makes it available to Monte Carlo Search. 3. Monte Carlo Search calls Record Button to determine the number of available squares. 4. Monte Carlo Search calls Record Button to update its UCT scores. 5. Monte Carlo Search calls Record Button to obtain the identity of the square with the highest UCT score.
Entry condition	• Evaluate State calls Record Button to store information on a square.
Exit Condition	• Monte Carlo Search has a list of squares which are still available.
Quality Requirements	• The move is instantaneously recorded and applied • The game ending status is immediately applied when available, otherwise board information is updated after 1500 simulations.

Use Case Name	Evaluate State
Participating actors	
Flow of events	1. Record Button passes a list of available unclicked buttons to Evaluate State. 2. Evaluate State checks if immediate terminal moves exist. 3. If terminal game ending moves exist, Evaluate State passes this information to Update Board. 4. If no terminal moves exist, Evaluate State calls Monte Carlo Search to determine the next move.
Entry condition	• Record Button has a list of clicked, and unclicked buttons.
Exit Condition	• Either Update Board selects a terminal square to end the game, Or • Monte Carlo Search starts performing 1500 simulations to determine the next move.
Quality Requirements	• The move is instantaneously recorded and applied • The game ending status is immediately applied when available, otherwise board information is updated after 1500 simulations.