Use Case Descriptions: Connect Four

Use Case: <u>Load Game</u>
Iteration: First
Primary Actor: Player, Player_2
Goal in Context: To load the connect four game so that a player can play the game.
Preconditions:
- The player must already be on the Online Multiplayer Board Game Platform
- The player must have enough RAM to run the game

Trigger: The player chooses to play connect four on the platform
Scenario:
1. The player clicks the option to play connect four on the online platform
2. The player is notified to choose their opponent for the match
3. The connect four game loads and begins

Postconditions:
- The game starts for the player who selected it
- The condition of the game (whether or not someone has won) is constantly checked

Exceptions:
- The server for connect four players is full

Priority: High. The Connect Four game is one of the initial games for the Online Multiplayer Board Game Platform, and must be up and running for the initial release.
When Available: April 11, 2025.
Frequency of Use: Dependent on the number of system users, but expected to be high based on being one of few initial games
Channel to Actor: Player interaction through the mouse and keyboard to select the option.
Secondary Actors: None.
Channel to Secondary Actors: N/A.
Open Issues:
- How should the system allow multiple Connect Four games to be run simultaneously?
- How should the game handle the scenario of a player abandoning the game partway through? Should their place be taken over by AI? Should the game end immediately?

Use Case: <u>Choose Opponent</u>
Iteration: First
Primary Actor: Player, Player_2
Goal in Context: To allow the player to select their opponent for the game
Preconditions:
- The player must already be on the Online Multiplayer Board Game Platform
- The player must have chosen to load connect four

Trigger: The player chooses to select their opponent for connect four
Scenario:
1. The player selects the option to choose their opponent in connect four

2. The player selects a player they would like to play against from a list of currently online players, chooses one of their friends on the database to request to play with, chooses to play with a random player, or chooses to play in single-player against an AI-bot
3. The player's opponent accepts, and the game begins

Postconditions:
- The player gains an opponent for the game
- The game can complete loading

Exceptions:
- There are no available players online to play connect four
- The players opponent leaves while the match is loading

When Available: April 11, 2025.
Frequency of Use: As often as the connect four game is expected to be used, which is expected to be high.
Channel to Actor: Player uses their mouse and keyboard to select the option to choose their opponent.
Secondary Actors: None.
Channel to Secondary Actors: N/A
Open Issues:
- The server will need to adapt to an opponent selection system where the player can request multiple opponents, since they may request a friend that is not currently online or a random online opponent that does not want to play with them, and ensure that no player is allowed into a match where they do not have an opponent by accident

Use Case: Restart
Iteration: First
Primary Actor: Player, Player_2
Goal in Context: To allow the player to restart the match they are in at any time.
Preconditions:
- The player must be currently in a connect four match

Trigger: The player selects the restart button during the match.
Scenario:
1. The player selects the option to restart the game during a match
2. The player is asked to confirm this choice and the opposing player is as well, and after doing so the match restarts so that the player is playing against the same opponent as before

Postconditions:
- The game has been reset with the same players involved

Exceptions:
- The opposing player leaves during the reset and as such the same players are not involved in the next match

When Available: April 11, 2025.
Frequency of Use: Minimal, as the matches are intended to last until a player wins however there will be some scenarios where it is logical to restart the match.

Channel to Actor: Player uses their mouse and keyboard to select the restart button
Secondary Actors: None
Channel to Secondary Actors: N/A
Open Issues:
- The ability to restart the match in the middle of the game could make some rounds of connect four unreasonability long, and as such a restart limit may be beneficial

Use Case: Exit Game
Iteration: First
Primary Actor: Player, Player_2
Goal in Context: To allow the player to exit the game during the match or when the match is complete.
Preconditions:
- The player must already be on the Online Multiplayer Board Game Platform
- The player must have chosen to load a connect four game and picked an opponent in order to have a match to leave
Trigger: The player selects the exit button during the match.
Scenario:
1. The player decides they want to leave their connect four match, and subsequently exits the game using the exit button
2. The player is removed from the game, but is still in the online multiplayer platform
3. If the game is multiplayer and ongoing, the player who is left in the game is replaced with an AI bot
4. The database of user statistics is updated for both players, with the player who left automatically losing and the player who did not automatically winning
Postconditions:
- The player is no longer in the connect four game they were currently playing in
Exceptions:
- The server is malfunctioning and cannot immediately remove the player
When Available: April 11, 2025.
Frequency of Use: Fairly frequent, as it occurs at least once a match
Channel to Actor: Player uses their mouse and keyboard to select the exit button
Secondary Actors: None
Channel to Secondary Actors: N/A
Open Issues:
- The transition from a human player acting in the game to an AI bot may be difficult

Use Case: Play Chip
Iteration: First
Primary Actor: Player, Player_2
Goal in Context: To allow the player to play a chip (either blue or yellow) during their turn of the connect four game.
Preconditions:
- The player must have chosen to load a connect four game and picked an opponent

- The match must currently be running and it must be the players turn

Trigger: The opposing player plays their turn or the match begins and the player starts the round.

Scenario:
1. The player is informed it is currently their turn, and that they may now play a chip
2. The player selects the column that they would like to play their chip in, and then a chip is added to the lowest possible spot in that column, as though the chip fell until it landed on another
3. The system checks on whether the player has won with this turn, and then switches back to the opponents turn if the game is not won

Postconditions:
- The player has one more chip on the board than they had at the start of their turn
- The players pieces have been checked to ensure that if the player did win on their previous turn, the game has ended

Exceptions:
- The game has ended abruptly so the player will no longer play on their turn

When Available: April 11, 2025.

Frequency of Use: Incredibly often, this case will occur each time a chip is played.

Channel to Actor: Player uses their mouse and keyboard to select the board to play their chip

Secondary Actors: None.

Channel to Secondary Actors: N/A

Open Issues:
- A time limit on how long a turn can take should be considered so that if one of the players is not participating, the game ends and the other player's statistics are not faulted

Use Case: Check Win

Iteration: First

Primary Actor: Player, Player_2

Goal in Context: Checks whether or not the game has been won in the last turn and acts accordingly.

Preconditions:
- A Connect Four game must be currently running
- A player must have just taken their turn

Trigger: A player places their chip, prompting the game to check if they have won

Scenario:
1. A player drops a new chip into the board during their turn
2. The game checks whether the player won the game with that turn
3. If the player won the game, then the player exits the game and the statistics of the database are updated. Otherwise, the game continues running

Postconditions:
- The game has either ended or the opposing player is allow to play their turn

Exceptions:

- The game ended immediately after a player dropped their chip due to players exiting the game so the checking feature never ran

When Available: April 11, 2025.

Frequency of Use: Incredibly often, since it is included in Play Chip which will occur every time a chip is played.

Channel to Actor: The Play Chip use case includes the Check Win use case, which is how it is utilized to check whether a player has won

Secondary Actors: None

Channel to Secondary Actors: N/A

Open Issues:
- How should the checking function for whether a player has won connect to the database to update a player's statistics?

Use Case: <u>Choose Move</u>

Iteration: First

Primary Actor: Player_2 (AI bot)

Goal in Context: To choose a move for the AI bot to play when a user is playing on single-player.

Preconditions:
- Single-player mode is chosen so an individual is playing against a AI bot
- It is the AI bot's turn to play

Trigger: The human player completes their turn and does not win, prompting the AI bot to take it's turn.

Scenario:
1. The AI is prompted to take it's turn and subsequently must pick a row to drop its chip that is not full
2. Once the AI chooses a row, it drops the chip into the row and the game checks whether or not it has won with that move

Postconditions:
- The AI bot has added a chip to the board
- It is the human players turn

Exceptions:
- The game has ended abruptly due to the human player leaving so the bot no longer needs to play

When Available: April 11, 2025.

Frequency of Use: Will be used when single-player mode for the connect four game is implemented.

Channel to Actor: The AI bot communicates directly with the computer

Secondary Actors: None

Channel to Secondary Actors: N/A

Open Issues:
- Should the bot be optimized to choose the best move, or to give the users a better chance of winning should it simply pick a random move?