

## List of Files Being Reviewed:

### Structure diagrams:

Class_structure_diagram_integreation.png	- Iman Hamzat, complete (March 14, 11:02pm)
Seng300_class_diagrams_gui.png	- Iman Hamzat, complete (March 14, 11:12pm)
class_diagram_Authentication.png	- Iman Hamzat, complete (March 14, 11:21pm)
Leaderboard_and_matchmaking_class_diagram.png	- Iman Hamzat, complete (March 14, 11:35pm)
Class_diagram_networking.png	- Iman Hamzat, complete (March 14, 11:43pm)
Class_structure_diagram_chess.png	- Brad Cronin, complete (2025-03-15 2:06 pm)
Class_structure_diagram_tictactoe.png	- Iman Hamzat, complete (2025-03-15 9:58 pm)
Class_structure_diagram_connect4.png	- Iman Hamzat, complete (2025-03-19, 10:16am)

### Use Case diagrams

use_case_diagram_Matchmaking.png	- Iman Hamzat, complete (2025-03-19, 10:37am)
use_case_diagram_UserData.png	- Iman Hamzat, complete (2025-03-19, 12:01pm)
use_case_diagram_Synchronization.png	- Brad Cronin, complete (2025-03-19, 9:45 pm)
use_case_diagram_ConnectServer.png	- Brad Cronin, complete (2025-03-19, 10:08 pm)
use_case_diagram_Go.png	- Brad Cronin, complete (2025-03-19, 10:38 pm)
use_case_diagram_Chat.png	- Scott Brown, complete (2025-03-21, 9:23 am)
use_case_diagram_Query.png	- Scott Brown, in progress
use_case_diagram_chess.png	
GUI_use_case_diagram.png	
use_case_diagram_connect4.png	

### Use Case Descriptions:

Use Case: Start Session	- Scott Brown, complete (2025-03-19, 11:23 pm)
Use Case: Matching Players Together	- Scott Brown, complete (2025-03-19, 11:35 pm)
Use Case: Game/Server Selection	- Scott Brown, complete (2025-03-19, 11:59 pm)
Use Case: Registering Gameplay	- Scott Brown, complete (2025-04-20, 12:12 am)
Use Case: Updating Profile	- Scott Brown, complete (2025-04-20, 12:23 am)
Use Case: Updating Leaderboard	- Scott Brown, complete (2025-04-20, 12:45 am)
Use Case: End Session	- Scott Brown, complete (2025-04-20, 1:28 am)
Registering/Creating New Account	- Scott Brown, complete (2025-04-20, 1:49 am)
User Login	- Brad Cronin, complete (2025-03-20, 12:36 pm)
User Logout	- Brad Cronin, complete (2025-03-20, 12:45 pm)
Edit Profile	- Iman Hamzat, complete (2025-03-20, 12:27 pm)
Multifactor Authentication (MFA)	- Iman Hamzat, complete (2025-03-20, 12:35 pm)
Viewing Match History	- Iman Hamzat, complete (2025-03-20, 12:48 pm)
Failed Login Attempt	- Brad Cronin, complete (2025-03-20, 12:58 pm)
Password Reset	- Iman Hamzat, complete (2025-03-20, 1:03 pm)
Delete Account	- Brad Cronin, complete (2025-03-20, 1:12 pm)
View Player Profile	- Iman Hamzat, complete (2025-03-20, 1:11 pm)
View Other Players Profile/Statistics	- Brad Cronin, complete (2025-03-20, 1:31)
Use Case: Challenge Player from Friends List	- Iman Hamzat, complete (2025-03-20, 5:41 pm)
Use Case: Find Matchmade Opponent	- Iman Hamzat, complete (2025-03-20, 5:46 pm)
Use case: Player can view Game Leaderboard	- Iman Hamzat, complete (2025-03-20, 5:51 pm)
Use case: Player viewing their own statistics	- Iman Hamzat, complete (2025-03-20, 5:59 pm)
Use case: Rematch Request	- Brad Cronin, complete (2025-03-20, 6:17 pm)

CONNECT WITH PLAYERS IN MATCHMAKING	- Iman Hamzat, complete(2025-03-20,6:06pm)
DATA RETRIEVAL OF USER FROM SERVER	- Iman Hamzat, complete (2025-03-20, 6:10 pm)
REAL-TIME GAME SYNCHRONIZATION	- Iman Hamzat, complete (2025-03-20, 6:12 pm)
CHAT	- Iman Hamzat, complete (2025-03-20, 6:15 pm)
REDIRECT CLIENT QUERIES	- Iman Hamzat, complete (2025-03-20, 6:17 pm)
CONNECT TO SERVER	- Brad Cronin, complete (2025-03-20, 6:40 pm)
SESSION RECONNECTION	- Brad Cronin, complete (2025-03-20, 6:50 pm)
LATENCY COMPENSATION & NETWORK STABILITY	- Brad Cronin, complete (2025-03-20)
Use case: Click Square	- Brad Cronin, complete, (2025-03-20, 8:04 pm)
Use case: Process Click	- Iman Hamzat, complete (2025-03-20, 8:56 pm)
Use case: Select Square	- Iman Hamzat, complete (2025-03-20, 9:07 pm)
Use case: Deselect Previously Selected Square	- Iman Hamzat, complete(2025-03-20, 9:13 pm)
Use case: Make Move	- Iman Hamzat, complete (2025-03-20, 9:15 pm)
Use case: Update Active Player's Screen	- Iman Hamzat, complete (2025-03-20, 9:17 pm)
Use case: Update Both Player Screens	- Iman Hamzat, complete (2025-03-20, 9:22 pm)
Use case: Switch Active Player	- Iman Hamzat, complete (2025-03-20, 9:20 pm)
Use Case: Playing Multiplayer Tic Tac Toe	- Iman Hamzat, complete (2025-03-20, 9:34 pm)
1. Start New Game	- Scott Brown, complete (2025-03-20, 9:35 pm)
2. Making a Move	- Iman Hamzat, complete (2025-03-29, 9:42 pm)
3. Checking for Win/Draw	- Scott Brown, complete (2025-03-20, 9:42 pm)
4. Handling Invalid Moves	- Scott Brown, complete (2025-03-20, 9:49 pm)
5. Ending the Game	- Iman Hamzat, complete (2025-03-20, 9:47 pm)
6. Writing Chat Message	- Iman Hamzat, complete (2025-03-20, 9:54 pm)
Launch and Play a Game of Go	- Scott Brown, complete (2025-03-20, 10:01 pm)
Use Case 1: Challenge Players	- Iman Hamzat, complete (2025-03-20, 10:24 pm)
Use Case 2: Look up game	- Iman Hamzat, complete (2025-03-20, 10:48 pm)
Use Case 3: Look up Players	- Iman Hamzat, complete (2025-03-20, 11:08 pm)
Use Case 4: Join a game from the library	- Iman Hamzat, complete (2025-03-21, 12:33 am)
Use case 5: In-Game Chatting	- Iman Hamzat, complete (2025-03-21, 12:41 am)

**UI Mockups completed 2/15**

### Notes for the overall design critique paragraph

Formatting consistency, they need better communication between subteams to fix this

The lack of communication is further evidenced by the inclusion of features considered by some teams, but not by others. For example, a guest user login option.

Many duplicated use cases

No consideration or prevention of cheating

There doesn't seem to be any inclusivity features. For example, for people with visual or auditory impairments, different languages.

Grammatical and spelling mistakes make the project seem rushed

Some use case descriptions don't give details on how to handle exceptions. This is like acknowledging issues and then not planning to do anything about them. This is not good design

Syntax issues hinder clarity

Use cases related to the games should be made clearer. They were confusing to understand at first and the titles should be more descriptive.

There needs to be more organization and integration of all the files and use cases. They should not have been separated as much to begin with. The project lacks cohesion

For instance some use cases suggest this will be a web app while others are not clear  
Also see previous points

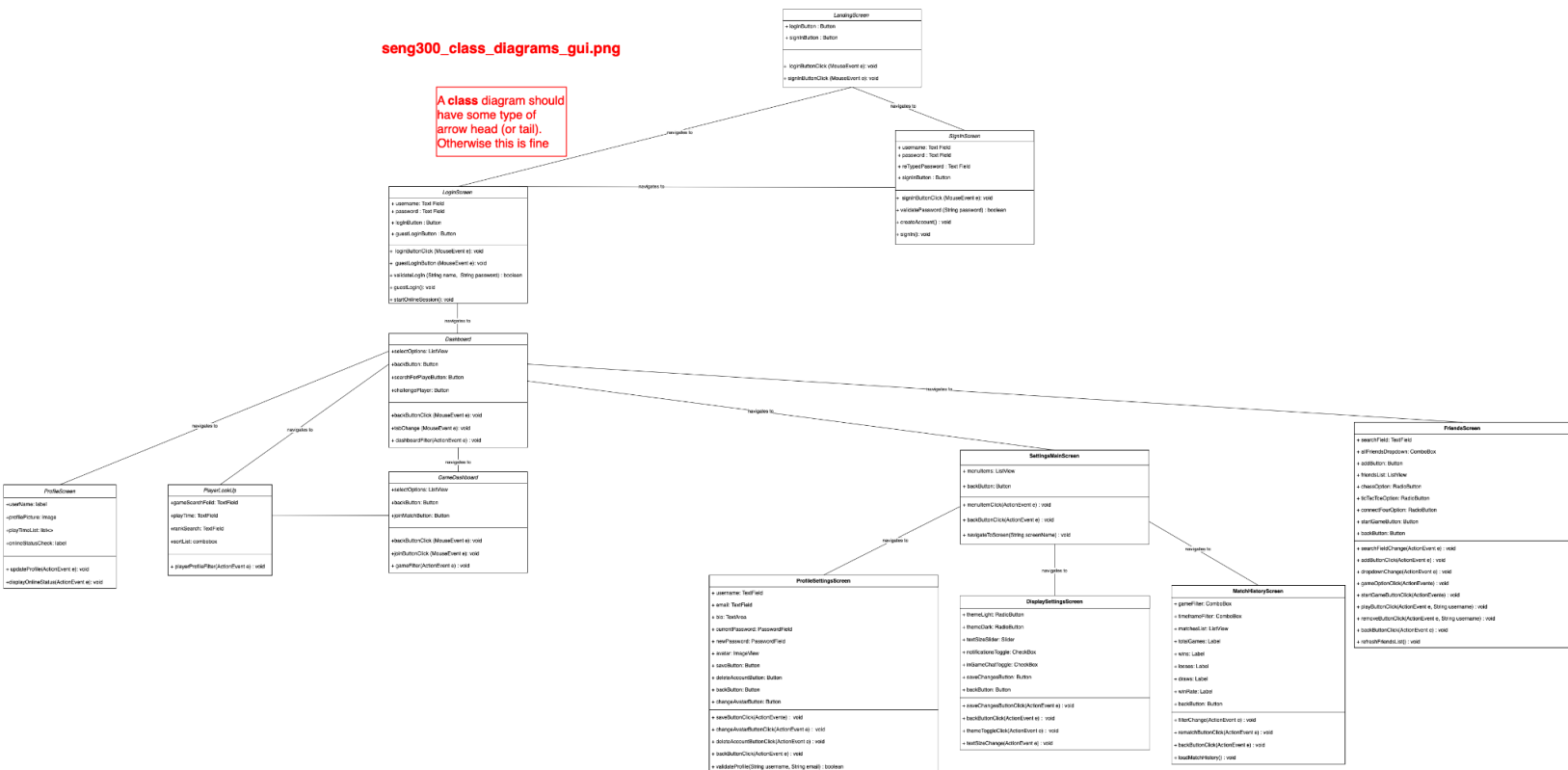
There is an attempt to add a chat feature which is nice (and it includes player safety features too which is great) but it's hard to understand because of the lack of integration of the use cases and system plan

There should probably be a friend request feature and use case, based on everything else here

**Double check to make sure all files are present and critiqued**

Incomplete

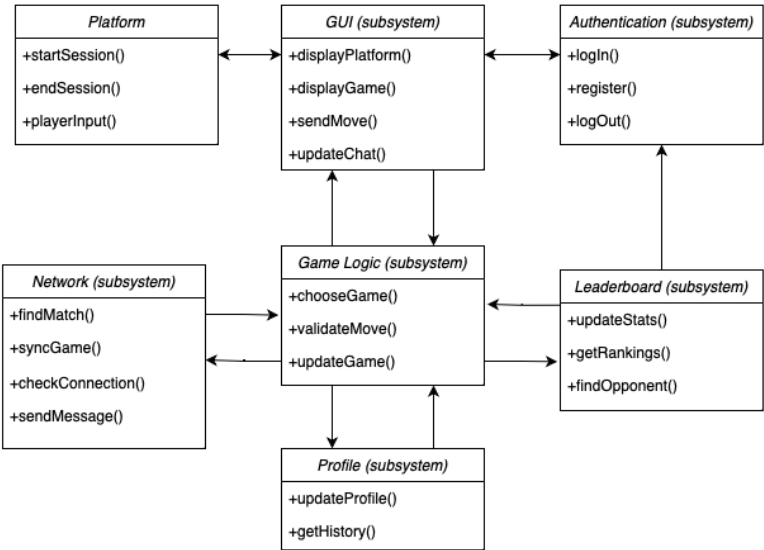
# Structure Diagrams



class\_diagram\_integration.png

This diagram seems to show how different components are connected. The plan looks good. The main issues are with the syntax of a UML class diagram

Each class appears to be incomplete (or simply lacks fields) but this is fine for planning purposes



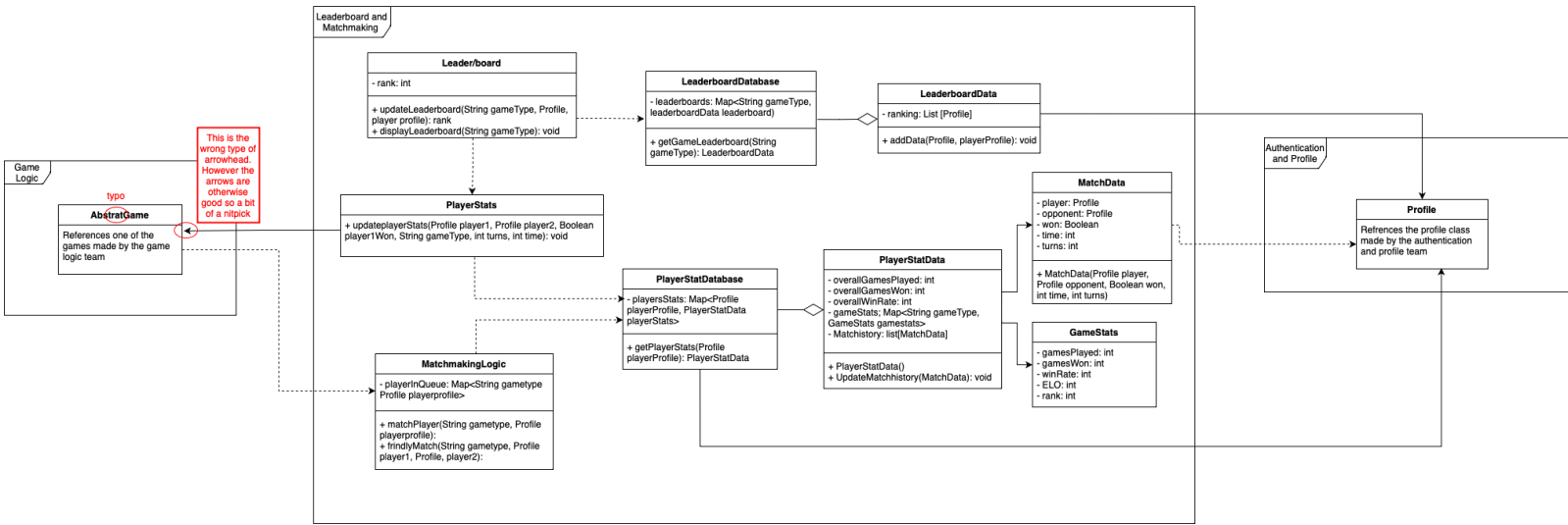
This is the wrong type of arrow for a UML class diagram. Depending on what the diagram wants to communicate however, it may be acceptable

Platform	Authentication
<b>Methods:</b> startSession(): void Initializes the platform and all subsystems.  endSession(): void Closes the session and shuts down subsystems.  playerInput(input: string): void Routes player actions to the appropriate subsystem.	<b>Methods:</b> login(username: string, password: string): boolean Authenticates the player.  register(username: string, password: string): boolean Registers a new player.  logout(): void Ends the player's session.
GUI	Networking
<b>Methods:</b> displayGame(gameState: GameState): void Renders the game board and interface.  updateChat(message: string): void Displays chat messages from the opponent.  sendMove(move: string): void Sends the player's move to the GameLogicManager.	<b>Methods:</b> findMatch(playerID: string): string Searches for an opponent using the LeaderboardManager.  sendMessage(message: string): void Sends chat messages to the opponent.  syncGame(gameState: GameState): void Synchronizes the game state between players.  checkConnection(): boolean Verifies the player's internet connection.
Game Logic	Leaderboard and Matchmaking
<b>Methods:</b> validateMove(move: string): boolean Ensures the player's move is valid.  updateGame(move: string): GameState Updates the game state after a move.  endGame(): Result Determines the winner and sends results to LeaderboardManager.	<b>Methods:</b> updateStats(playerID: string, result: Result): void Updates player stats after a game.  getRankings(): Ranking[] Retrieves the current leaderboard rankings.  findOpponent(playerID: string): string Finds a suitable opponent based on skill level.
Profile	
<b>Methods:</b> updateProfile(playerID: string, stats: Stats): void Updates the player's profile with new stats and game history.  getHistory(playerID: string): GameHistory[] Retrieves the player's game history.	

Not sure what the purpose of having this present in the diagram is. It repeats the same information above but with more detail. This is not necessary and could have been part of the diagram. However if it's for readability and planning purposes then it's fine

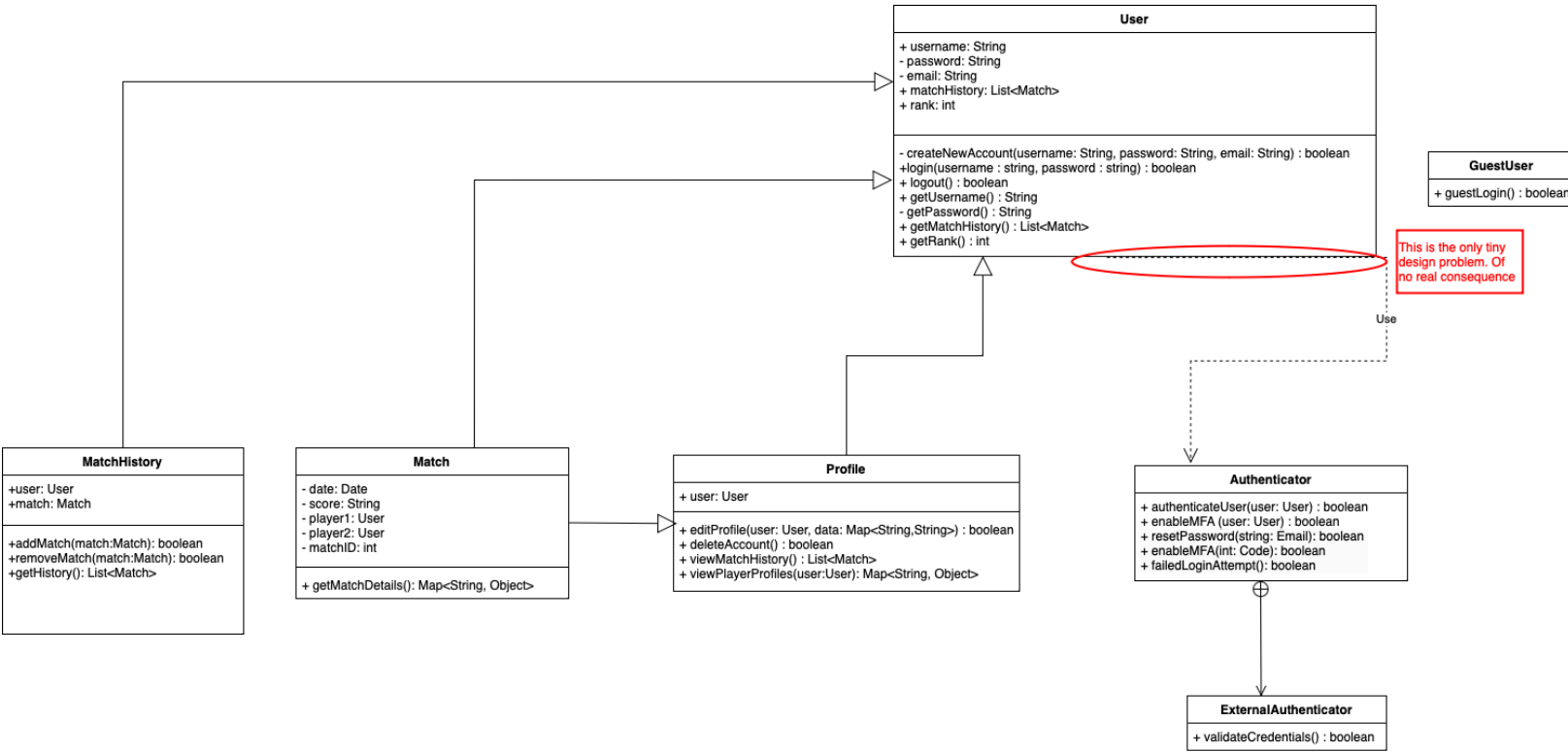
leaderboard\_and\_matchmaking\_class\_diagram.png

In general, excellent job! It's also organized and well made



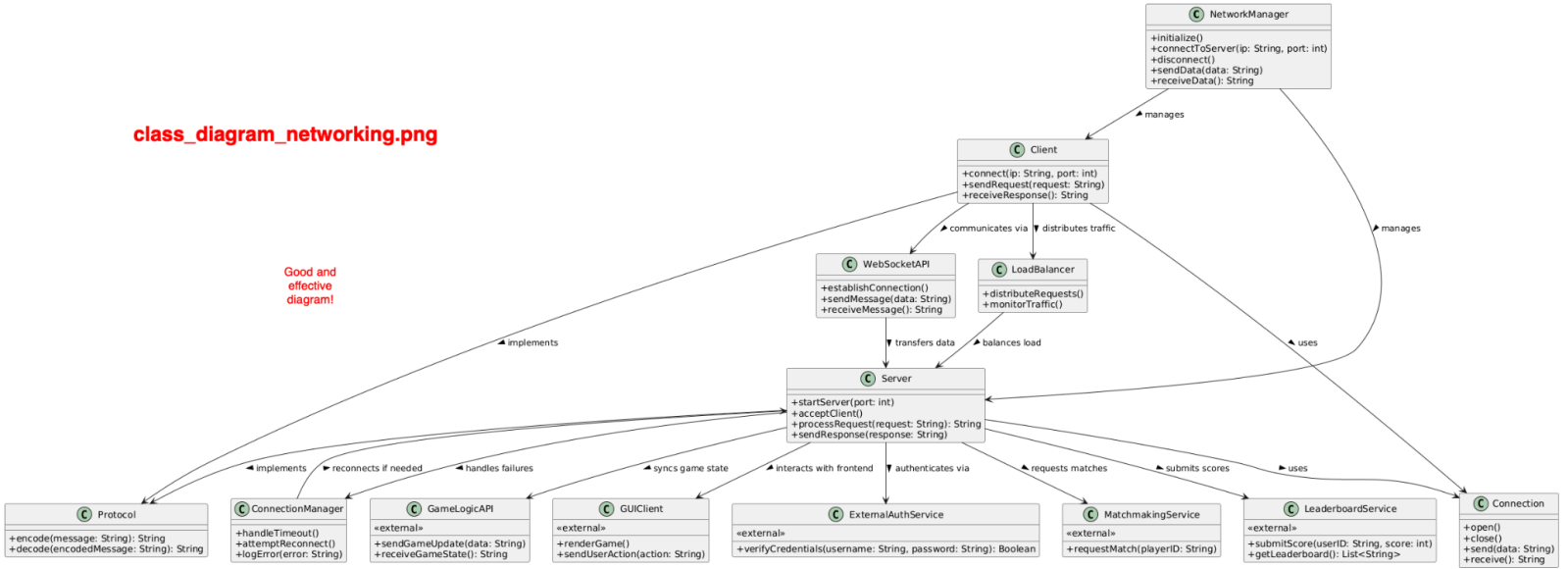
class\_diagram\_Authentication.png

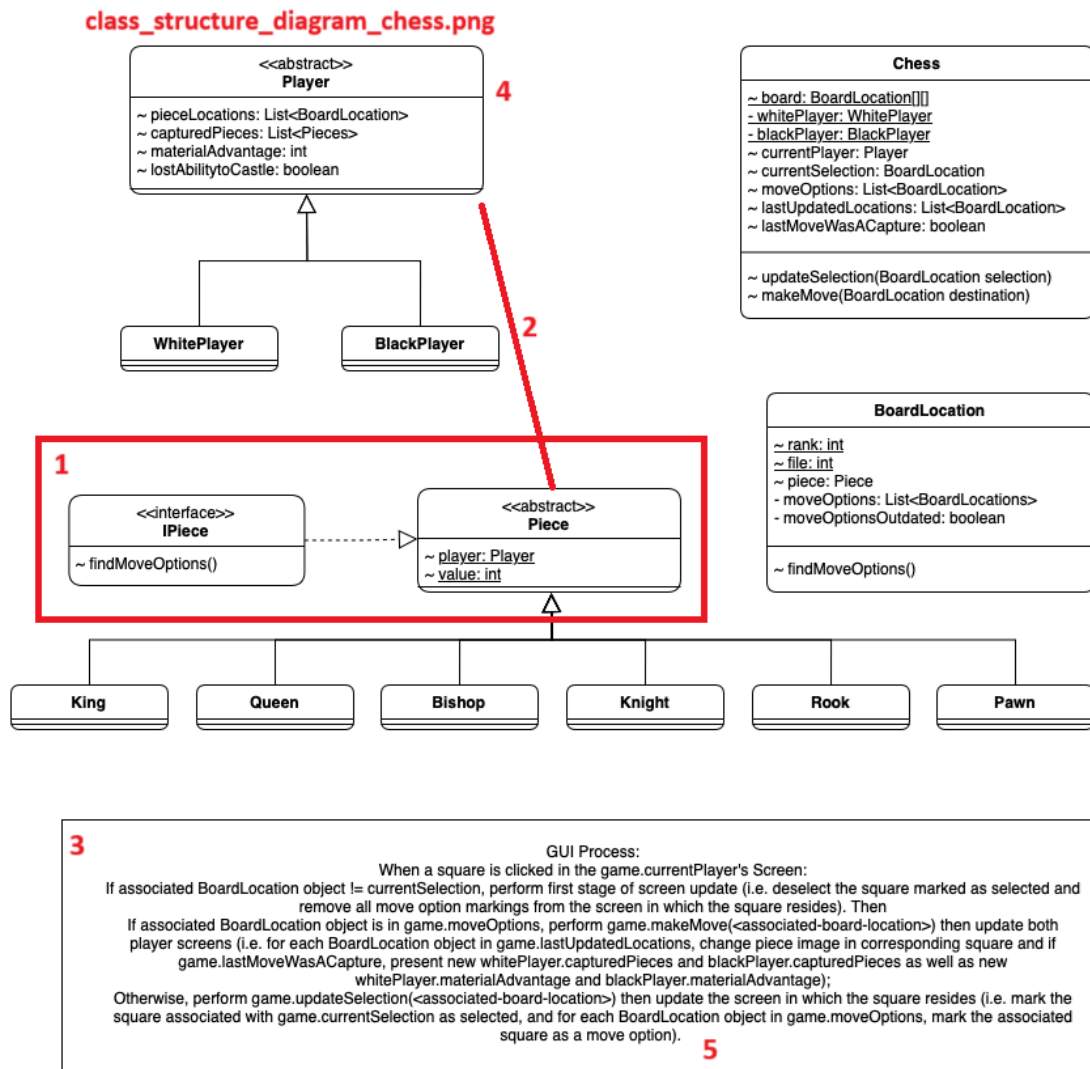
Great job!



class\_diagram\_networking.png

Good and effective diagram!

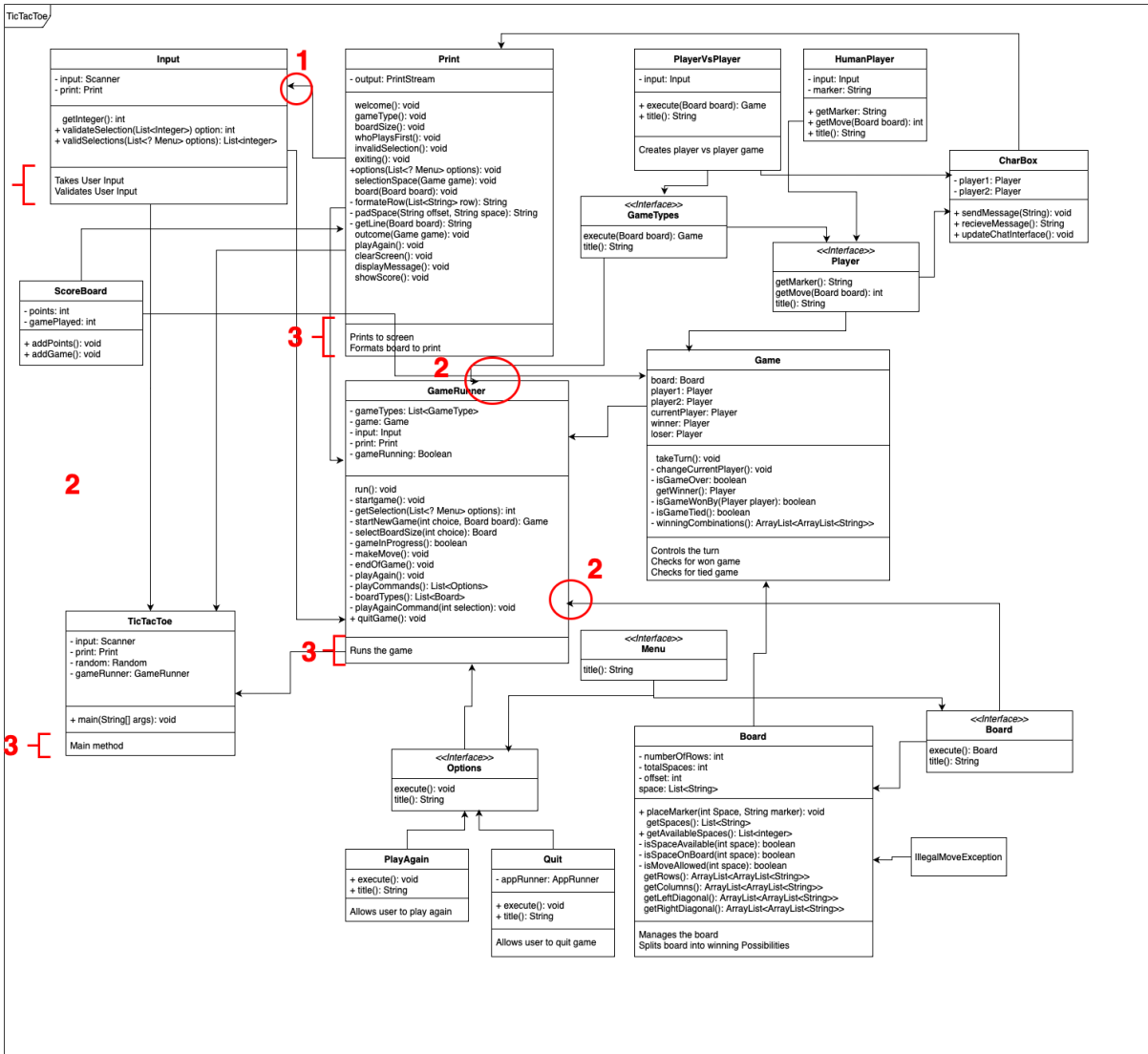




1. Does this need to be a separate interface if there is only one inheritor?
2. Piece requires Player (should show connection)
3. Please left-justify (difficult to follow when centred). Also consider bullet points or a list
4. How do players (white/black) link to a user's account?
5. Would recommend GUI is only updated once for the non-active player's turn (at the end of opponent's turn)



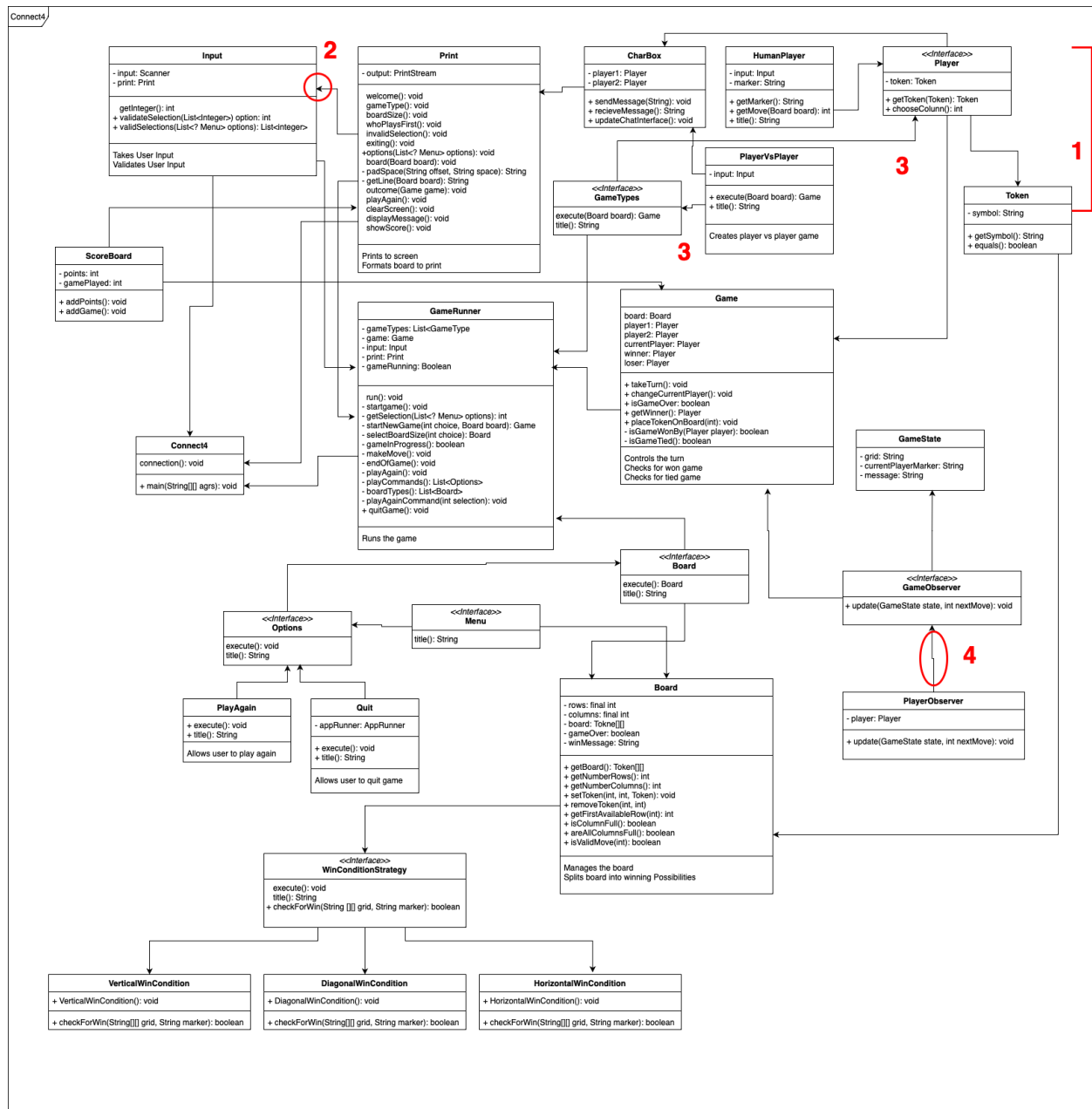
## class\_structure\_diagram\_tictactoe.png



1. This is the wrong type of arrowhead for a UML class diagram. All the arrows are identical which means they can't be distinguished either. It's harder to understand what each connection is communicating
2. The formatting of the arrows makes the diagram hard to read. Some are disorganized, some overlap too much, and there are unnecessary bends.
3. Descriptions like these are not conventionally part of UML class diagrams. It's ok however if it's helpful for planning

In general for this diagram, the design is fine but the syntax is a problem. There are mistakes that make it hard to understand. The style and formatting of the arrows is a major issue.

## class\_structure\_diagram\_connect4.png



1. Due to the incorrect syntax, the relationship can't be determined. It's hard to understand what this part is trying to communicate. Is this dependency, association, composition or aggregation? Is `Token` a field or is there also a part whole relationship? It's not clear
2. Point 1 relates to this point 2 here. This is the wrong type of arrowhead for a UML class diagram. In addition, all the arrows are identical. The relationship between different classes cannot be understood now, nor what the diagram may be

communicating.

3. These parts have the same problem as number 1 and 2

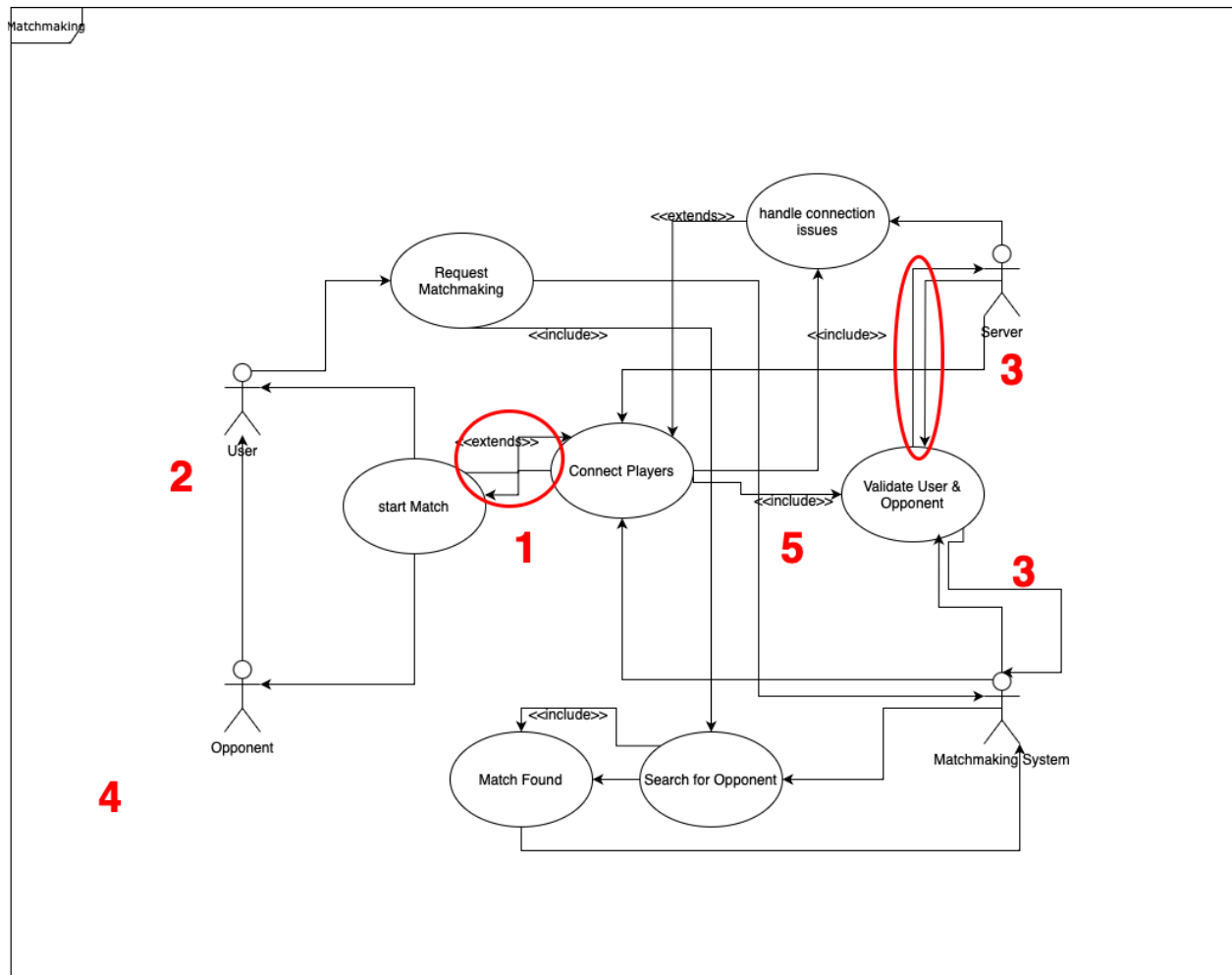
4. This is a small design issue but makes the diagram less organized

If not for the syntax, this would be an excellent diagram. One can still assume what it's communicating because of the clear design and descriptive naming, but assumptions can also be wrong.

## Use case diagrams

## use\_case\_diagram\_Matchmaking.png

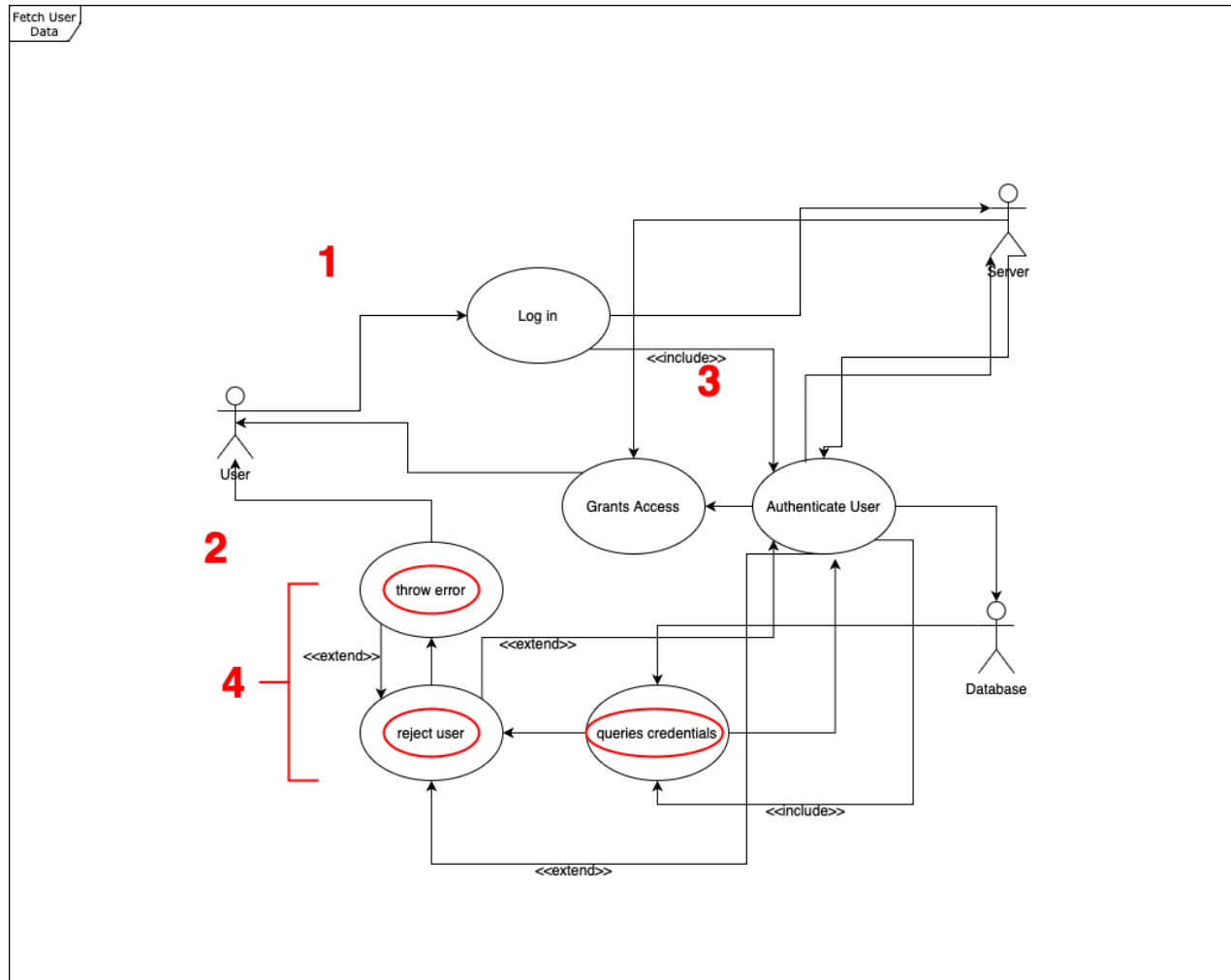
1. This is unorganized and it's unclear which is pointing to which
2. Arrows should point away from the actors. This also makes the diagram difficult to follow
3. Here double headed arrows would be better as they are clearer
4. A major problem: The arrow style is not good for reading the diagram. Curved and diagonal arrows would be better
5. Arrows that use <<includes>> or <<extends>> should be dashed



The diagram has significant issues with the syntax. They are consequential enough to affect understanding.

## use\_case\_diagram\_UserData.png

1. A major problem: The arrow style is not good for reading the diagram. Curved and diagonal arrows would be better
2. Arrows should point away from the actors. This also makes the diagram difficult

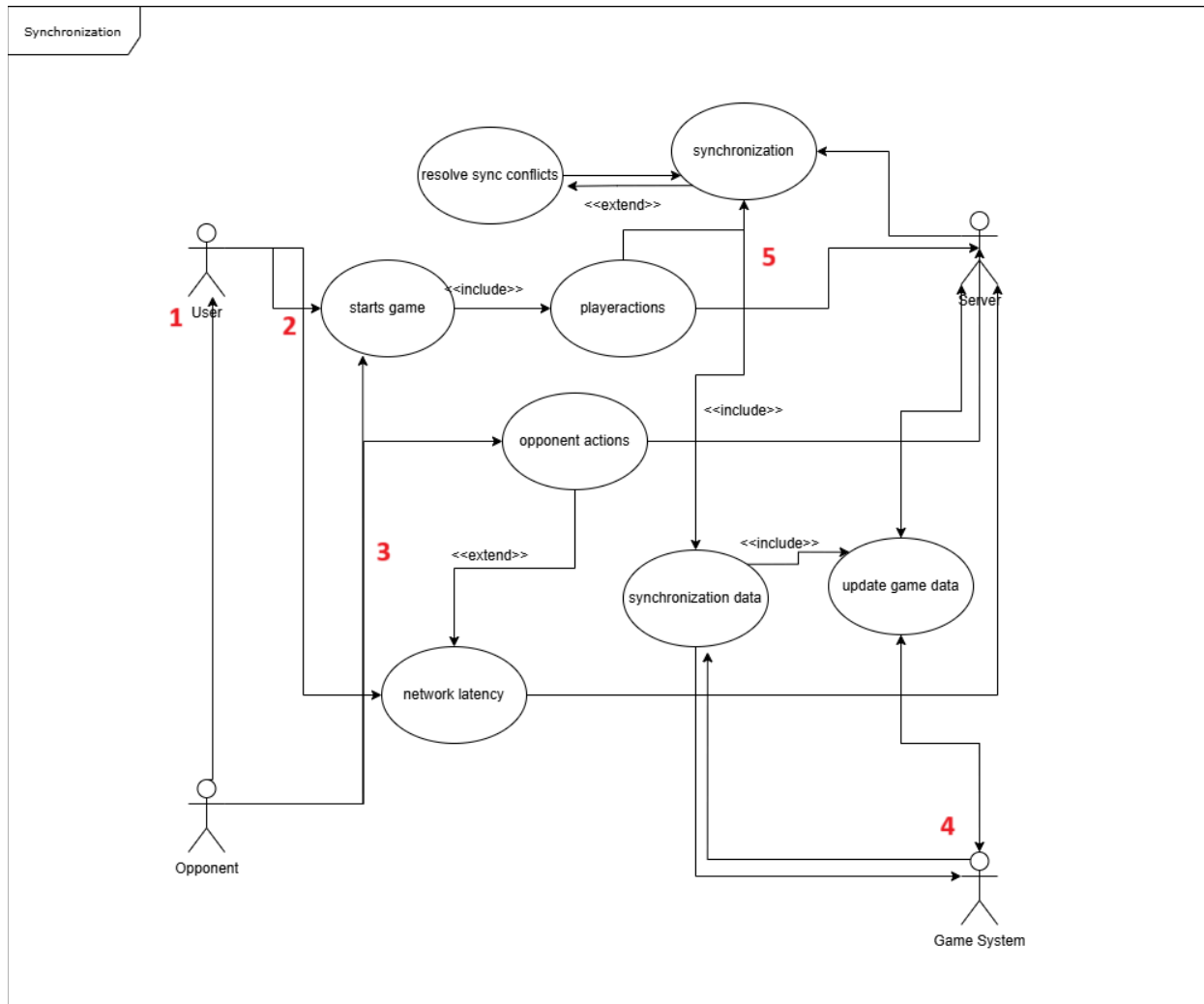


to follow

3. Arrows that use <<includes>> or <<extends>> should be dashed
4. The names of these use cases should have some capitalization as they are proper nouns

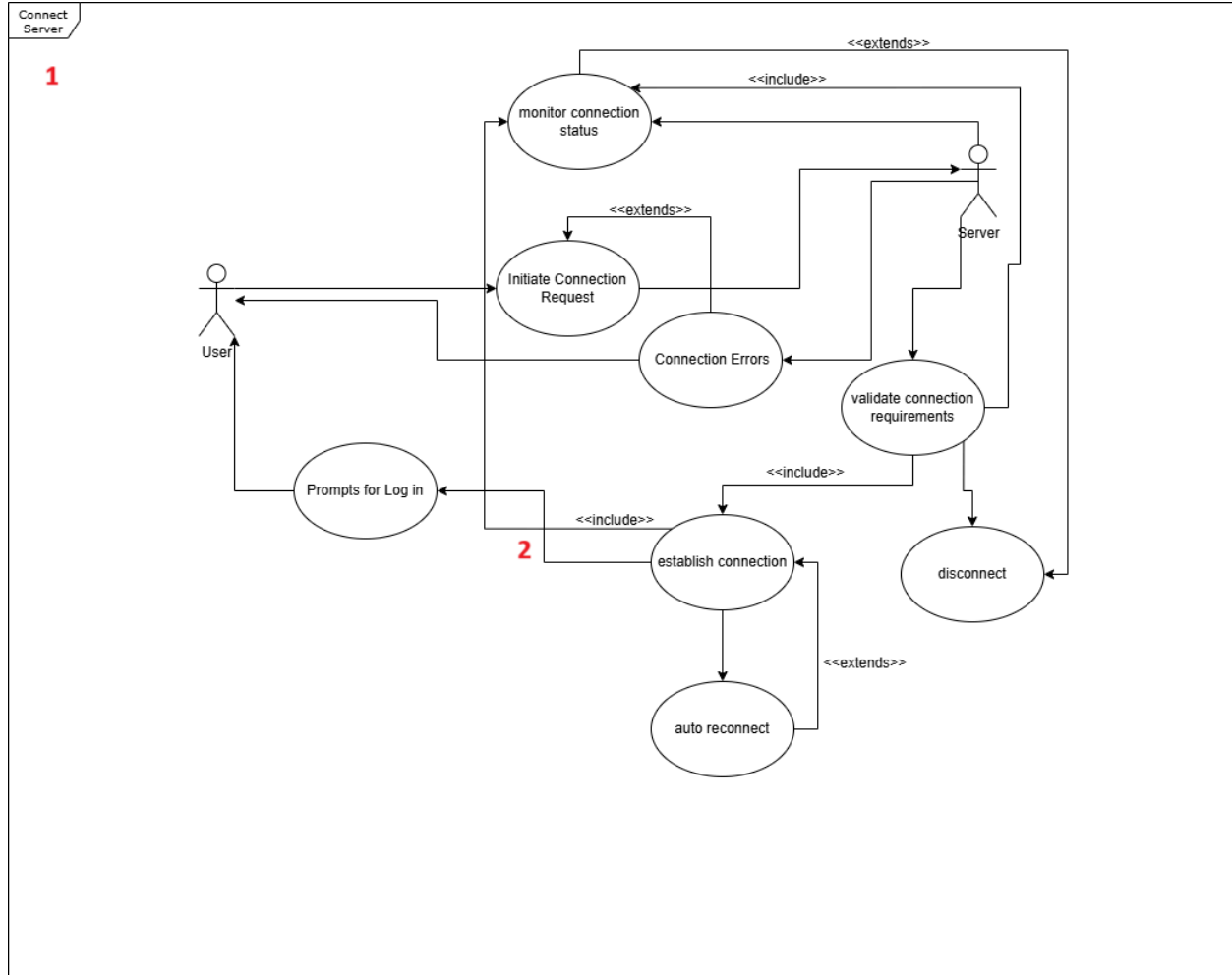
The syntax and organization of this diagram should be improved upon

## use\_case\_diagram\_Synchronization.png



1. Lines obscure labels in several areas
2. Try to minimize line crossings, for clarity. This crossing at the label '2', for example, is unnecessary. Actors and use cases may need to be reorganized on the diagram
3. Associations should be between a single actor and single use case, without branching
4. Inconsistencies between double-headed arrow, and two single-headed arrows
5. Branching lines with arrows create confusion about what the intended design is

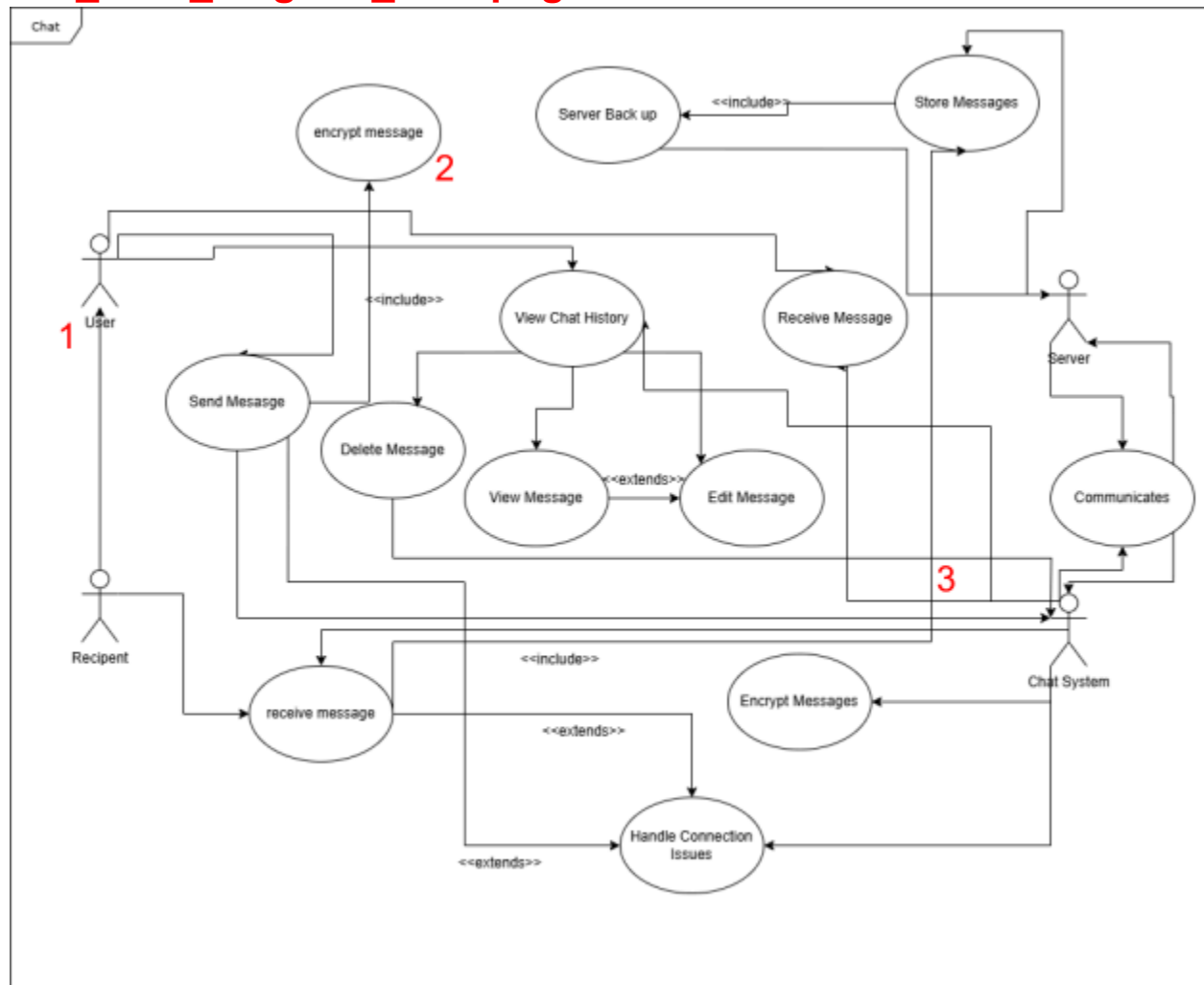
## use\_case\_diagram\_ConnectServer.png



1. Please see other generic comments related to use case diagram styling, including arrow types, line types, line crossings, and use case layouts
2. Select areas seem intentionally confusing



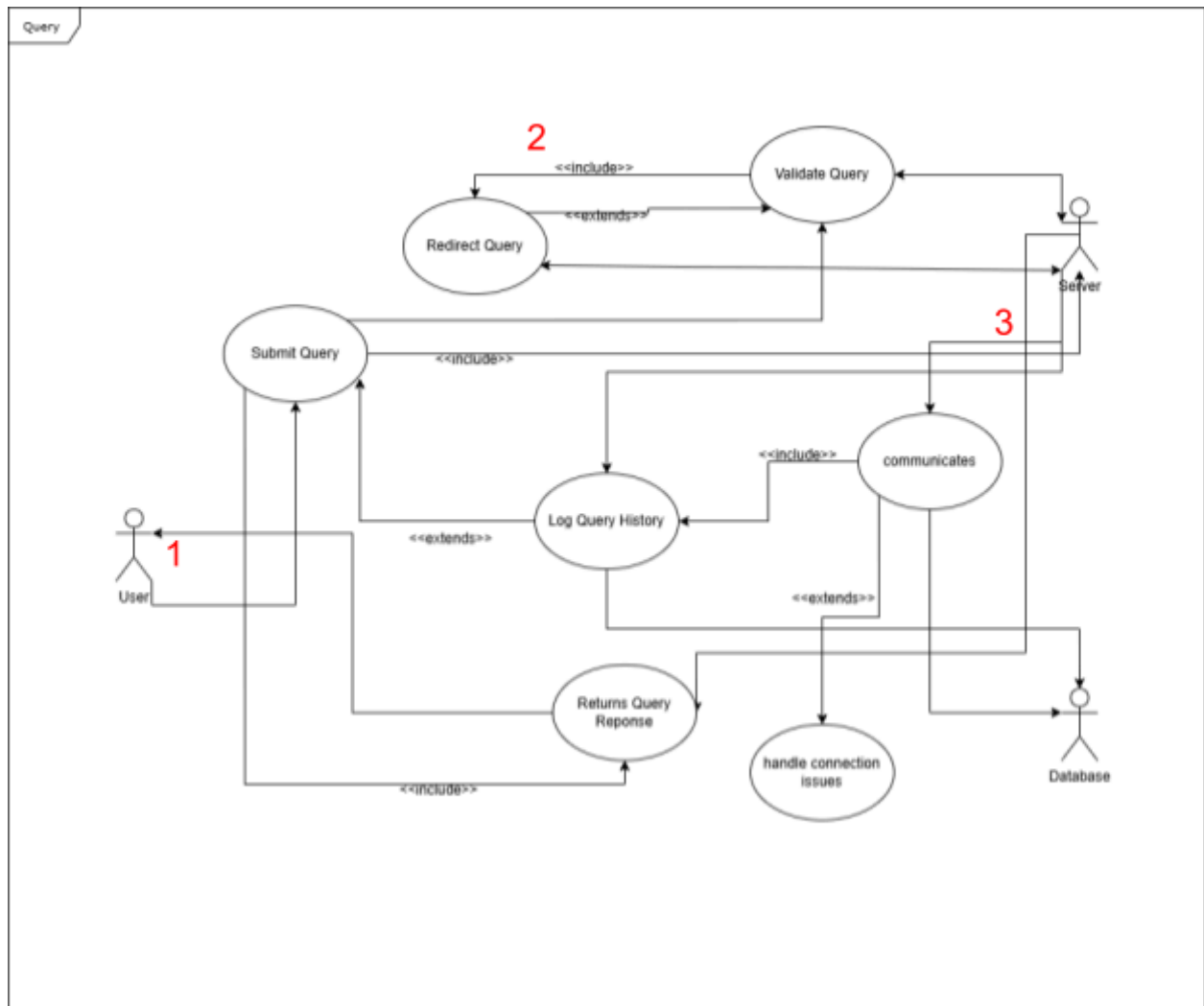
## use\_case\_diagram\_chat.png

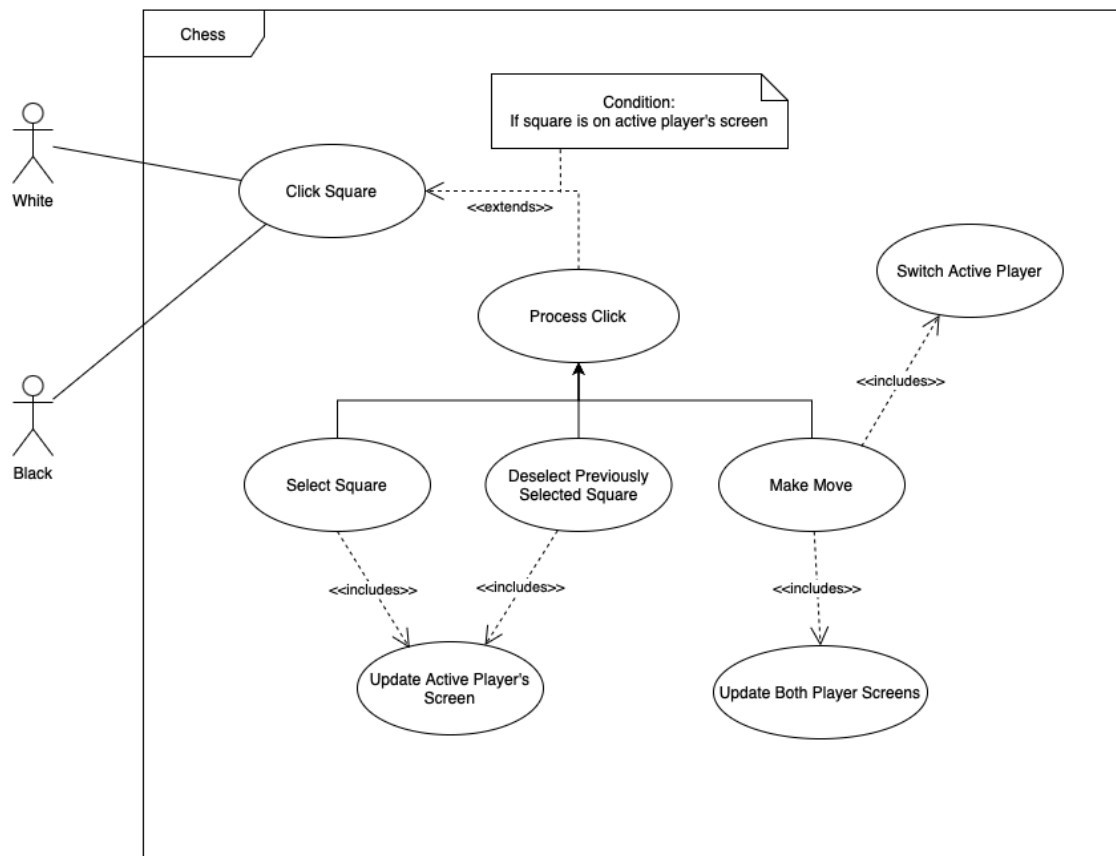


1. The arrows should be pointing away from the actors
2. 'Encrypt Messages' and 'Encrypt Message' seems redundant
3. The diagram is generally complicated and hard to follow, it could be simplified

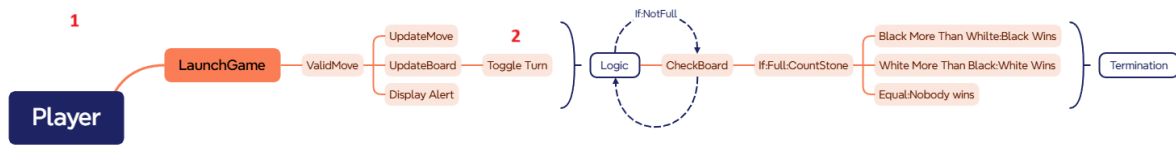
Please see other generic comments related to use case diagram styling, including arrow types, line types, line crossings, and use case layouts

use\_case\_diagram\_Query.png



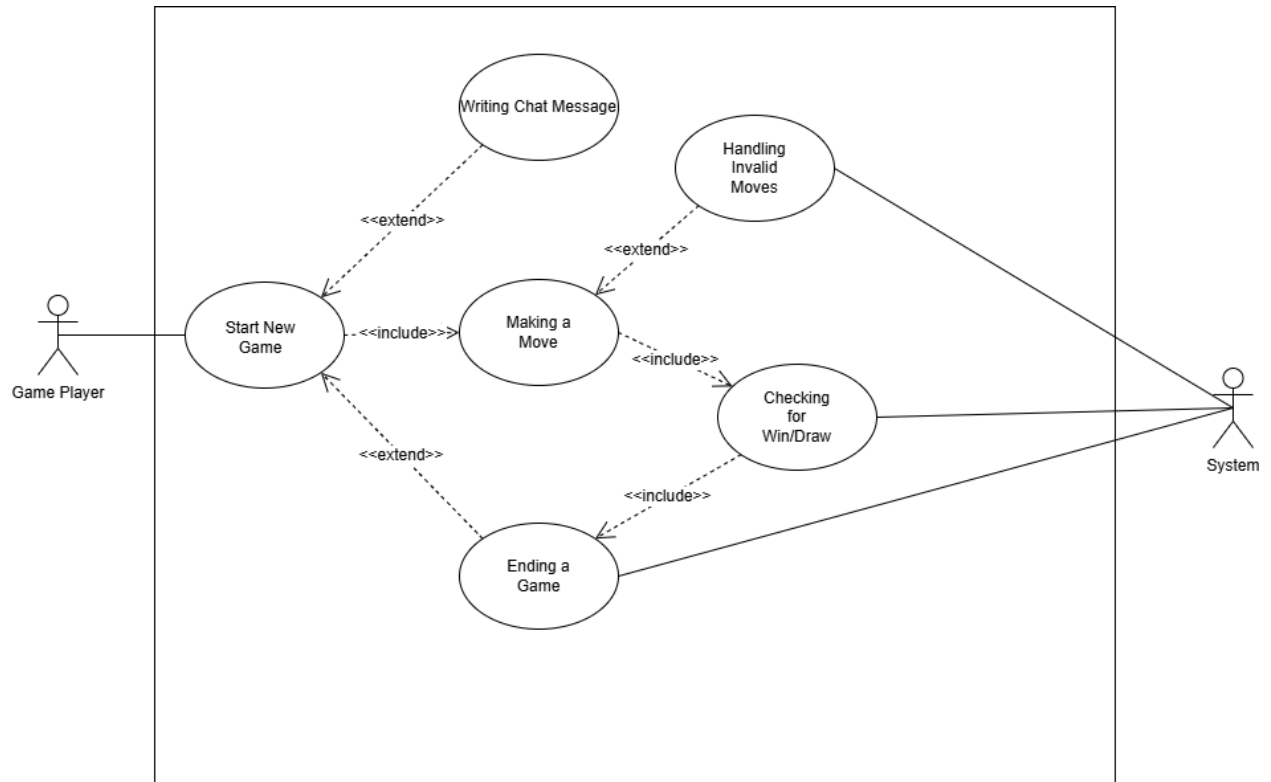


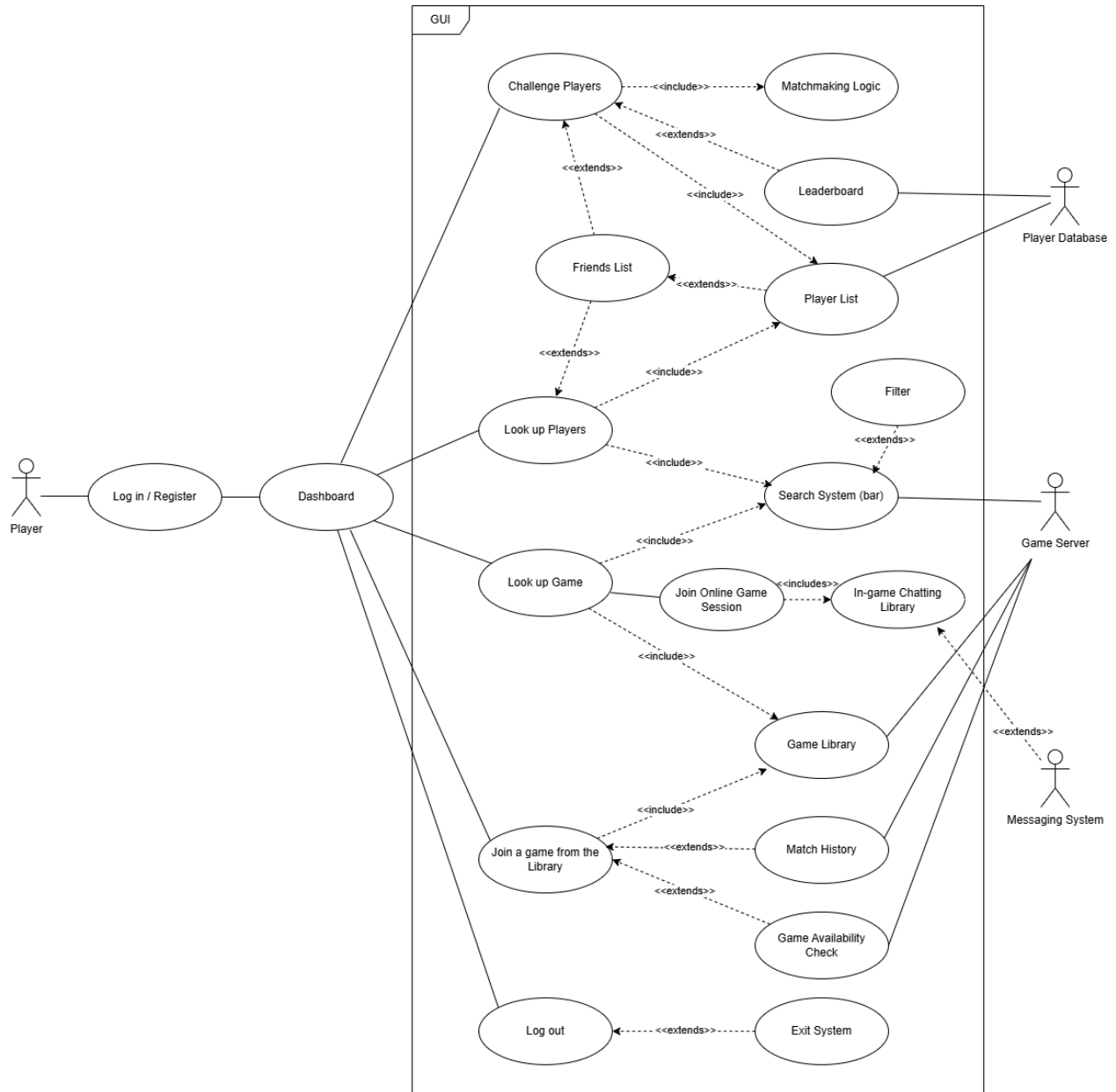
## use\_case\_diagram\_Go.png



Presented with xmind AI 3

1. Diagram style inconsistent with other use case diagrams, and does not align with UML standards
2. How does Toggle Turn connect to player accounts? Where is the server actor?
3. AI watermark visible





## Use case Descriptions

# Use Case: Start Session

Primary Actor: Player

Goal in Context: The player begins a session to play a game.

## Preconditions:

1. The player is connected to the internet.
2. The player has the platform installed (if necessary)

## Trigger:

The player starts the game platform.

## Scenario:

1. The player opens the platform.
2. Platform GUI starts.
3. The player logs into their account (authentication, profile, GUI, and network).  
Or a guest account

## Postconditions:

1. The player can check stats, view the leaderboard, or start a game.

## Exceptions:

1. The player does not have the platform installed (if necessary).
2. The player is not connected to the internet.  
The GUI must still start if the player is not connected to the internet to inform them of this

## Priority: Essential

When Available: Once the platform is installed.

Which release will this feature be available

Frequency of Use: Whenever the platform is opened.

Channel to Actor: Platform, electronic device (computer, laptop, etc.).

## Secondary Actors:

- GUI
- Authentication and Profile
- Network

Channels to Secondary Actors: Platform Be more specific

## Open Issues:

1. Does the platform require installation, or is it available on a web browser?
2. What to do in the event of update releases, (allow use on outdated versions?)



There is a similar use case so this may be redundant

## Use Case: Matching Players Together

Primary Actor: Player

Goal in Context: Connect the player to a suitable opponent.

### Preconditions:

1. The player is connected to the internet.
2. The player is logged into their account. Or a guest account.

### Trigger:

The player selects which game they want to play.

### Scenario:

1. The system finds all other players looking for a match (network).
2. The system selects an opponent with the closest skill rating (leaderboard and matchmaking).
3. The game begins (GUI and game logic).

### Postconditions:

1. The player may now begin the game.

### Exceptions:

1. The player is offline.  
The player must be online for the preconditions to be met
2. There are no available opponents to match up with.

### Priority: Essential

When Available: Once the game is selected.

Which release will this feature be available

Frequency of Use: Often.

Channel to Actor: Platform, electronic device (computer, laptop, etc.).

### Secondary Actors:

- Opponent
- Network
- Leaderboard and Matchmaking
- GUI
- Game Logic

Channels to Secondary Actors: Platform Be more specific

### Open Issues:

1. What if there are no online opponents within a reasonable skill range of the player?
2. How are guest users matched by skill?

# Use Case: Game/Server Selection

Primary Actor: Player

Goal in Context: Matches the player to online opponents in the desired server and game.

*This doesn't seem to be the goal.*

*Selecting the server and game from which to match players*

Preconditions:

1. The player is connected to the internet.
2. The player is logged into their account. *Or a guest account.*

Trigger:

The player wants to begin a game.

Scenario:

1. The player selects which server they want to play on (network and GUI).
2. The player selects which game they want to play (GUI).

Postconditions:

1. *The* player can now match up with an opponent.

Exceptions:

1. The player is not connected to the internet.  
*The player must be connected to the internet to meet the preconditions*

Priority: Essential

When Available: Whenever the platform is open and a game is not already in play.

*Which release will this feature be available?*

Frequency of Use: Often.

Channel to Actor: Platform, electronic device (computer, laptop, etc.).

Secondary Actors:

- Network
- GUI

Channels to Secondary Actors: Platform

Open Issues:

1. Will different servers be available on launch?
2. *What kinds of servers will be available?*

# Use Case: Registering Gameplay

Primary Actor: Player

Goal in Context: Update gameplay and GUI for both players.

## Preconditions:

1. The game has already begun.
2. The player is connected to the internet
3. The player is logged into their account. Or a guest account

## Trigger:

The player chooses what move they want to make.

## Scenario:

1. The player makes a move (game logic).
2. GUI updates to show the move (GUI).
3. Opponent's GUI updates to show the player's move (network, GUI, game logic).

## Postconditions:

1. The Opponent can now make their move.

## Exceptions:

1. Player does not make a valid move.
2. Player disconnects from the network.
3. Player closes the game/platform.

## Priority: Essential

When Available: Whenever the game is in play.

What release will this feature be available

Frequency of Use: Often.

Channel to Actor: Platform, electronic device (computer, laptop, etc.).

## Secondary Actors:

- Opponent
- Network
- GUI
- Game Logic

Channels to Secondary Actors: Platform Be more specific

## Open Issues:

1. What will happen if either player leaves mid-game?

# Use Case: Updating Profile

Primary Actor: Player

Goal in Context: After the game concludes, both players' profiles are updated to reflect new stats.

## Preconditions:

1. Player is connected to the internet.
2. Player is logged into their account. Or a guest account
3. Player has completed at least one match.

This is the trigger

## Trigger:

Game has been completed.

## Scenario:

1. Win/loss is added to both players' records (leaderboard, matchmaking, and network).
2. Both players' stats are updated according to the game outcome (leaderboard, matchmaking, and network).

## Postconditions:

1. The player can check new stats on their profile.

## Exceptions:

1. Either player leaves before the game is completed.  
The profile must still be updated in this instance

## Priority: High

When Available: Right after the game is completed.

What release will this feature be available

Frequency of Use: Often.

Channel to Actor: Platform, electronic device (computer, laptop, etc.).

## Secondary Actors:

- Opponent
- Network
- Leaderboard and Matchmaking

Channels to Secondary Actors: Platform Be more specific

## Open Issues:

1. How are stats affected if a player leaves mid-game?
2. Can the game end in a draw?

Yes, Go, Tic Tac Toe, Chess, and Connect Four can all end in a draw. This must be supported.

# Use Case: Updating Leaderboard

Primary Actor: Player

Goal in Context: Update the global leaderboard based on the outcome of a match.

## Preconditions:

1. Player is connected to the internet.
2. Player is logged into their account. Or a guest account
3. Player has completed at least one match.  
This is the trigger

## Trigger:

Match has been completed.

## Scenario:

1. Players' individual stats are updated (leaderboard, matchmaking, and network)
2. Players' position on the leaderboard is updated based on new stats (leaderboard, matchmaking, and network).

## Postconditions:

1. The player can check their new position on the leaderboard.

## Exceptions:

1. The game doesn't finish, or the game result is inconclusive.

## Priority: Medium

When Available: After the game is finished.

What release will this feature be available?

Frequency of Use: Often.

Channel to Actor: Platform, electronic device (computer, laptop, etc.).

## Secondary Actors:

- Opponent
- Leaderboard and Matchmaking
- Network

Channels to Secondary Actors: Platform Be more specific

## Open Issues:

1. What statistics are used to determine the leaderboard? (e.g., win rate, number of games won).
2. How are players ranked?
3. Is there more than one leaderboard for different rankings?
4. Are guest accounts ranked temporarily?

# Use Case: End Session

Primary Actor: Player

Goal in Context: Player ends the session.

## Preconditions:

1. A Game is not currently in progress.  
A player is unable to log out mid game?
2. The Player is connected to the internet.
3. The Player is logged into their account. Or a guest account

## Trigger:

Player clicks the log-out button (GUI).

## Scenario:

1. The Player is logged out of their account (authentication, profile, and GUI).
2. The Player closes the platform (GUI).

## Postconditions:

1. The Player is disconnected from the platform.

## Exceptions:

1. The Player is currently playing a game.  
The player is not playing a game if the preconditions are met

## Priority: Essential

When Available: Whenever the game is not in session.

When will this feature be available?

Frequency of Use: Often.

Channel to Actor: Platform, electronic device (computer, laptop, etc.).

## Secondary Actors:

- GUI
- Authentication and Profile
- Network

Channels to Secondary Actors: Platform Be more specific

## Open Issues:

1. Can the session be ended while the game is in progress?
2. Will a "save login info" feature be implemented so the user doesn't have to log out at the end of the session?
3. Will a player be logged out if they disconnect from the internet?
4. Will a player be logged out if they close the platform?
5. Will a guest be notified that their history will be lost?

## Registering/Creating New Account

Primary Actor: Game Player

Goal in Context: Enable any person to create an account.

Pre-Conditions:

- Networking is running as needed.
- It's a human player and not a bot that is trying to overload the server

### Trigger:

- Player clicks the 'create new account' **button** after opening the platform.

### Scenario:

1. Player loads the platform through a web browser.  
**Does this have to be done on a browser? What about a downloaded platform?**
2. Player clicks "Create An Account" after being prompted to login.
3. Player inputs sufficient details for Username, Password, Verify Password & Email.
4. If inputted invalid details where passwords don't match the requirements or if username already exists, it asks the user to perform actions again until valid details are put in.
5. When **the** player's details are valid, it creates **an** account for the player and asks the user to login.

### Post-Conditions:

- The player has created an account with an username and passwords that meet the minimum requirements.
- The account details get added to the authentication database and thus allows the player to save progress in game and have a tracked identity in the platform.

### Exceptions:

- Server malfunction due to overloading

### Priority:

- High – Essential for all parties in the game.

### When Available:

- First increment.

### Frequency of Use:

- Frequent – Couple times every day or couple times every minute depending on the popularity of the platform.

### Channel to Actor:

- Click on **a** button using touchscreen or mouse click.

### Secondary Actors:

- Developers & Testers

### Channels to Secondary Actors:

- Raw Code

### Open Issues:

1. At what point should the server forcibly shut **down** the player (if the user is creating many **accounts** using the same IP)?

# Use Case: User Login

## Primary Actor:

Game Player

## Goal in Context:

Allow a player to login.

## Pre-Conditions:

- The system is accessible and online.
- The player has an already registered account.

## Trigger:

- Player initiates login by clicking the "Login" button
- Player selects "Guest Login" **A guest should not need an account as a precondition**

## Scenario:

### *Login:*

1. Player opens the platform and is prompted to login
2. Player clicks the "login" button.
3. Players enters their username and password.
4. System validates their login credentials.
5. if credentials are valid, the player is granted access. **Recommend items 5 and 6 to be subpoints (eg. (a) and (b) since they're mutually exclusive**
6. If credentials are invalid, an error message is displayed and the player is prompted to try again.
7. The system may temporarily lock the account if the player has multiple failed attempts.
8. If player does not have an account, they click "Create An Account" and are redirected to the creating an account page. **Recommend this is higher (item 2?)**

### *Guest Login:*

1. Player clicks on "Guest Login"



2. System grants limited access, restricting certain features like, saving progress, or accessing leaderboards.

**Post-Conditions:**

- After login, the player has access to their profile, and the game features.
- After guest login, the player has limited access.

**Exceptions:**

- Server downtime.
- Multiple incorrect credentials may result in a temporary lock. **How long is the lock?**

**Priority:**

- High. Essential for security, and also for user access control.

**When Available:**

- First increment.

**Frequency of Use:**

- Frequent. Every time a player accesses the platform. Channel to Actor:
- Web interface via mouse click or touch interaction. Secondary Actors:
- Database

**Channels to Secondary Actors:**

- Code **Secondary actor just the server/database?**

**Open Issues:**

1. A possible "Remember Me" option for easier access.
2. Should multifactor authentication be implemented?
3. What specific limitations should be placed on guest users?
4. **"Forgot Password" option available to users?**

# Use Case: User Logout

## Primary Actor:

Game Player

## Goal in Context:

Allow a player to logout.

## Pre-Conditions:

- The system is accessible and online.
- The player is logged in.

## Trigger:

- Player initiates logout by clicking the "Logout" button. **Do Guest logins have this option?**
- Automatic logout due to inactivity. **How long before auto log-out? Does this apply to Guest logins?**

## Scenario:

1. Player clicks the "logout" button.
2. System ends the session.
3. Player is redirected to the login page.

## Post-Conditions:

- After logout, the session is ended, and the player must login again to access their profile.

## Exceptions:

- Server downtime.
- Server error prevents proper session termination. **What happens after this?**

## Priority:

- High. Essential for security, and also for user access control.

## When Available:

- First increment.

## Frequency of Use:

- Frequent. Everytime a player exits the platform.

**Channel to Actor:**

- Web interface via mouse click or touch interaction. Secondary Actors:
- Database

**Channels to Secondary Actors:**

- Code

**Open Issues:**

1. After how long should the system automatically logout due to inactivity?
2. Should there be a confirmation prompt?
3. How do guest accounts terminate a session?

## **Edit Profile Primary Actor: Game Player**

**Goal in Context:** Allow user to make changes to profile when needed.

### **Pre-Conditions:**

- Networking is running as needed.
- Player has an existing profile and wants to make changes to it.  
*Having an existing profile only counts as a pre condition*
- Player is logged in.

### **Trigger:**

- Player clicks the edit profile button after logging in to existing account.

### **Scenario:**

1. Player loads the platform through a web browser.
2. Player is able to log in to the system.
3. Player clicks "Edit Profile" after logging in.
4. Player is able to edit username or profile picture. They are also able to change email address or password with proper verification.
5. If invalid details detected the user performs actions again until valid details are put in.  
*This is more of an exception*
6. When player's details are valid, it changes the desired information.

### **Post-Conditions:**

- The player has successfully edited or changed their information.
- The database is updated as required.

### **Exceptions:**

- Server malfunction due to overloading  
*What happens in the event of this exception?*
- Priority:** Medium.

**When Available:** Second Iteration.

**Frequency of Use:** Only when desired by user.

*Be specific*

**Channel to Actor:** Click of a button using touchscreen or mouse click.

**Secondary Actors:** User Database.

**Channels to Secondary Actors:** Code

*Should also be more specific here*

### **Open Issues:**

1. Security measures for user verification?

*There's a Multifactor Authentication use case below. This could be referenced, even as just a future possibility*

2. Require password input to edit profile?

*Use better grammar for clarity*

## Multifactor Authentication (MFA) Primary Actor Game Player

Goal in Context: Require users to provide an additional verification step beyond standard username/password to increase account security

### Pre-Conditions

- the system is accessible and online
- the player has a registered account and a valid username/password
- MFA feature is enabled on the platform

Trigger: PLayer attempts to log in with correct username and password, prompting the system to initiate the MFA process

### Scenario

1. Player enters valid username and password on the login screen.
2. System validates these credentials.  
*Is this in another use case that can be referenced? If not, be more specific here*
3. Upon successful validation, the system requests a second factor (e.g., code sent to email, SMS, authenticator app).
4. Player inputs the one-time code or approves the request via an authenticator app.
5. System verifies the code or approval.
6. If the second factor is correct, the player is fully logged in.
7. If the second factor is incorrect or not entered within a certain time frame, the system denies access and prompts the user to try again.

### Post-Conditions

- Upon successful MFA, the player gains access to their profile and game features.
- If MFA fails, the player remains locked out until they provide the correct second factor.

### Exceptions

- Delivery delay or failure for the one-time code (e.g., email or SMS not received).
- Authenticator app malfunction or time-synchronization errors causing valid codes to be rejected.  
*Again, how are these exceptions handled?*

### Priority

- Medium

### When Available:

- Third iteration

### Frequency of Use:

- Every login attempt if MFA is enforced by default.
- Optional if the player chooses to enable it.

#### **Channel to Actor**

- Click of a button using touchscreen or mouse click.

#### **Secondary Actor**

- External authentication service (e.g., authenticator app)

#### **Open Issues**

- Handling of backup authentication methods when the user cannot access their primary second factor?

- Storage and management of user MFA preferences?

Good points but use better grammar for clarity here

## Viewing Match History

Primary Actor: Game Player

### Goal in Context:

- To enable the user to view his/her match history and other stats related to it  
Inclusive language is preferred

### Pre-Conditions

- the system is accessible and online
- the user is registered and has a username

No trigger

Exceptions: The user has not played any previous match is using the platform for the first time.

What happens in this event?

Better if exceptions appear after scenario

### Scenario:

1. Player enters valid username and password on the login screen.  
Logging in does not need to be part of this use case. There is a separate use case that could be referenced or included in the use case diagram
2. System validates these credentials.
3. The player clicks on match history
4. The match history is visible to the player through a user interface.
5. If the player has no match history, the UI shows a 0/NA or an error window letting the user know the absence of the match history  
Could have been part of exception

### Post-Conditions

- The player is able to view the matches, their serial number and the stats related to the match.

### Priority

- High- Match History is crucial in matchmaking and keeping the stats of the player

### When Available

- first iteration

### Frequency of Use:

- Optional: if the player wants to use it
- high for the system for the process of matchmaking  
Should the system have its own use case for this? They are also not the primary actor here

### Channel to Actor

- Click of a button using touchscreen or mouse click.

**Secondary Actor:**

- Database

**Open Issues:**

- what stats should the player be able to see?
- should the stats that the system can utilize be the same as the stats that the player can see.

The player is the primary actor not the system. For the above issue, a separate use case would be preferred



# Use Case: Failed Login Attempt

## Primary Actor

- Game Player

## Goal in Context

- Highlight the scenario where a player fails to provide valid login credentials and the resulting system behaviour **Multiple failed attempts? (system lockout as mentioned above)**

## Pre-conditions

- The system is accessible and online.
- The player has a registered account. **Should not need an account to fail a login**
- The player is attempting to log in.

## Trigger

- Player enters incorrect login credentials (e.g., username or password) during the login process.

## Scenario

1. Player clicks the "Login" button.
2. Player inputs their username and password incorrectly. **Both? Should be "or"?**
3. System checks the credentials against the stored user data.
4. System detects invalid credentials.
5. System displays an error message indicating the login has failed. **Any indication of how many attempts remain?**

## Post-Conditions

- The player is not granted access to the system if credentials remain invalid.
- The system may lock the account if the failed attempts exceed the allowed number. **Is a player allowed to login as a Guest if their account is locked out? How long is the lockout?**

## Exceptions

- Data inconsistency or database error causing valid credentials to be rejected.

## Priority

- High This doesn't seem like it should be high priority, please provide rationale for this rating

## Availability

- First Iteration

## Frequency of Use

- Occasional – Occurs only when the user enters incorrect credentials.

## Channel to Actor

- Web interface via mouse click or touch interaction.

## Secondary Actors

- Database

## Channel to Secondary Actor

- Code

## Open Issues

1. How many failed attempts should be allowed before locking the account?
2. Should the lock duration be fixed or dynamic based on repeated offenses?
3. Are Guest logins also locked out?
4. Will the system specify which field (username/password) was incorrect?

## Password Reset

Primary Actor: Game Player

Goal in Context: Allow a player to reset their password if they forget it.

Pre-Conditions:

- The system is accessible and online.
- The player has a registered account.
- The player has access to the registered email.

Trigger: Player clicks on "Forgot Password" on the login page.

Scenario:

1. Player clicks on "Forgot Password"
2. System prompts the player to enter their registered email address.
3. Player enters the email and submits a request.
4. System verifies if the email is registered to an account.
5. If the email is valid, the system sends a password reset link to the email.
6. Player clicks on the password reset link. Which leads them to a password reset page.
7. Player enters a new password.
8. System verifies the new password against security requirements.
9. If valid, the password is updated and the player is notified.
10. Player can now login using the new password.

Post-Conditions:

- The password is updated, and the player is notified.
- System prevents the old password from being used.

Exceptions:

- Email entered does not match a registered email.
- Reset link expires after a certain time.
- The new password does not meet security requirements.
- System fails to send the reset email.

What happens in these events?

Priority:

- High. Essential for account recovery.

When Available:

- First increment.

Frequency of Use:

- Medium. Only for when players forget their passwords.

Channel to Actor:

- Web interface via mouse click or touch interaction.

**Secondary Actors:**

- Database

**Channels to Secondary Actors:**

- Code

**Open Issues:**

1. How long should the reset link remain valid?
2. Should MFA be required?
3. Should there be a limit to the number of resets within a certain timeframe?

# Use Case: Delete Account

## Primary Actor:

Game Player

## Goal in Context:

Enable any person to delete their account from the profile management page.

## Pre-Conditions:

- Network is running as needed.
- Person is logged into their account

## Trigger:

- Player clicks the delete account button from their profile management page.

## Scenario:

1. Player logs in to their account.
2. Player goes the profile management page.
3. Player clicks on the delete account button.
4. Player gets asked to confirm if they want to delete account.
5. If players confirms deletion, they are asked to input their password again and if the passwords matches with the database then player is officially logged and account gets deleted **Recommend entering password and confirmation of deletion order to swap.**  
**What happens if the password is incorrect?**

## Post-Conditions:

- The person gets logged out of the account and lands to the homepage.
- The person gets a sidebar notification saying account deleted.

## Exceptions:

- database/server malfunction.
  - **Incorrect password?**

## Priority:

- Mid – not essential to the function of the platform.

**When Available:**

- Second increment.

**Frequency of Use:**

- moderate – once in a while. Like low: more likely a person will simply stop logging in rather than delete their account

**Channel to Actor:**

- Click of a button using touchscreen or mouse click under the profile management page.

**Secondary Actors:**

- Developers, Testers, Database

**Channels to Secondary Actors:**

- Code

**Open Issues:**

1. Should we let players recover account during a period of time if it's already deleted from database? Why would account recovery be time-limited? (Could be an “undo deletion” if sessions hasn't terminated, but account recovery should be allowed at any time)
2. Are guest logins able to go to account management? (if yes, what happens if they try to delete their account?)

## View Player Profile

Primary Actor: Game Player

Goal in Context: Allow user to view other players profile.

Pre-Conditions:

- Networking is running as needed.
- Player has an existing profile.
- Player is logged in and has started a game.
- Player wants to view opponent profile.

Trigger:

- Player clicks on the opponents name/ profile picture.

Scenario:

1. Player loads the platform through a web browser.
2. Player is able to log in to the system.  
*Part of pre conditions*
3. Player selects a game from the library and is matched with an opponent.
4. Player wishes to view opponent information.  
*Should not be here*
5. Player clicks on the opponent username or profile picture.
6. Player is able to see information like ranking, games played etc.
7. Player is able to successfully exit out of the opponent profile and can continue the game as desired.

Post-Conditions:

- The player has successfully viewed other player's profile.

Exceptions:

- Server malfunction.
- Malfunction in code/matchmaking.

*What happens in these events?*

Priority:

- Medium.

When Available:

- Second Iteration.

Frequency of Use:

- Only when desired by user.  
*Not specific*

Channel to Actor:

- Click of a button using touchscreen or mouse click.

Secondary Actors:

- Database

Channels to Secondary Actors:  
Code

Open Issues:

- Extent of information the player is able to see?

This seems significant. Provide more detail. There is also a use case related to this



# Use Case: View Other Players Profile/Statistics

Iteration: 1

## Primary Actor:

Game Player

## Goal in Context:

Allow a player to view detailed information about other players' profiles, game statistics, and performance metrics.

## Preconditions:

The system is accessible and online.

Player is logged into the platform. **Are guest logins able to view other player stats?**

The player whose profile is being viewed has a public profile or appropriate privacy settings.

## Trigger:

Player selects another player's username from a leaderboard, match history, or search results.

## Scenario:

1. Player finds another player through leaderboard, search function, or match history.
2. Player selects/clicks on the other player's username.
3. System retrieves the selected player's profile data and statistics from database.
4. System displays the profile page showing the player's:
  - a. Username and profile information
  - b. Game-specific statistics (wins, losses, draws)
  - c. Ranking and rating across different games
  - d. Recent match history
  - e. Achievements and badges
5. Player can toggle between different statistical views (by game type, by time period).
6. Player can select the option to challenge this player to a game if desired.

## Post conditions:

~~Player has viewed the requested profile and statistics.~~ (Not really a necessary post-condition)

**Exceptions:**

1. Private Profile: If the selected player has set their profile to private, system displays limited information or a privacy notice.
2. Data Unavailable: If player has no match history or statistics, system displays appropriate message indicating no data available. **Should still have account info with "no data" message for games, but shouldn't cause an exception**
3. System Error: If database connection fails, system displays error message and suggests trying again later.

**Priority:**

Medium – Important for social and competitive aspects of the platform.

**When Available:**

First increment.

**Frequency of Use:**

High – Players will regularly check other players' statistics for competitive analysis.

**Channel to Actor:**

Click of a button using touchscreen or mouse click.

**Secondary Actors:**

Database System

**Channel to Secondary Actors:**

Data retrieval interface.

**Open Issues:**

Should players be able to hide certain statistics from public view? **Expand this to: what are the levels of privacy available? (eg. All public, account visible w/ stats hidden, etc.)**

Use Case: Challenge Player from Friends List

Iteration: 1

Primary Actor: Game Player

Goal in Context: Allow a player to directly challenge a friend to a game without affecting either player's ranking.

Preconditions:

The system is accessible and online.

Player is logged into the platform.

Player has at least one friend added to their friends list.

The friend is currently online and available.

Trigger: Player selects a friend from their friends list and clicks "Challenge to Game".

Scenario:

1. Player navigates to their friends list in the platform.
2. System displays all online friends with their current status (available, in-game, busy).
3. Player selects a specific friend who is marked as available.
4. Player chooses "Challenge to Game" option.
5. System presents game selection menu with available board games.
6. Player selects desired game type (e.g., Chess, Connect Four).
7. Player selects "Friendly Match" option to indicate the game won't affect rankings.
8. Player confirms and sends challenge request.
9. System delivers notification to friend.
10. Friend receives and accepts challenge.

11. System initializes the game session between both players.

Post conditions:

Both players are placed in the same game session with selected parameters.

Match is recorded in the system as a "Friendly Match" that doesn't affect player rankings.

Players' match history is updated to include the friendly match. Exceptions:

1. Friend Unavailable: If the selected friend changes status to unavailable before challenge is sent, system notifies player and prevents challenge.
2. Challenge Declined: If friend declines challenge, system notifies challenger and returns to friends list.
3. Challenge Timeout: If friend doesn't respond within 2 minutes, challenge expires and system notifies challenger.

Priority: Medium – Important for social aspects but not critical to core gameplay.

When Available: First increment.

Frequency of Use: Moderate – Will be used regularly by players who prefer playing with friends.

Channel to Actor: Click of a button using touchscreen or mouse click.

Secondary Actors: Friend (Challenged Player)

Channel to Secondary Actors: Game client interface, notification system.

Open Issues:

1. Should players be able to spectate friendly matches between other players?  
*Seems like a more unrelated suggestion. Is there first a spectate match use case?*
2. Should there be an option to convert a friendly match into a ranked match if both players agree?

3. Should friendly matches have different rules or settings available compared to ranked matches?

This one is good

## Use Case: Find Matchmade Opponent

This is the second use case with the same goal

Iteration: 1

Primary Actor: Game Player

Goal in Context: Enable a player to be matched against another player of similar skill level for a selected game.

Preconditions:

The system is accessible and online.

Player is logged into the platform.

Player has completed enough games to have an established skill rating.

Trigger: Player chooses a game type and selects 'Find Opponent'. Scenario:

1. Player chooses a game type and selects 'Find Opponent'.
2. System retrieves player's current skill rating and game history from database.
3. System searches for other online players who are also seeking matches for the same game.
4. System identifies players within an appropriate skill range ( $\pm 100$  rating points).
5. System selects the best match based on skill similarity, connection quality, and wait time.
6. System notifies both players that a match has been found.
7. Both players confirm readiness within 30 seconds.
8. System initializes the game session with both players.
9. Game begins with standard rules and settings.

Post conditions:

Both players are placed in the same game session.

Match is recorded in the system for future skill calculations.

Players' status is changed to "In Game".

Exceptions:

1. No Suitable Opponent: If no suitable opponents are found within 45 seconds, system expands search criteria to include wider skill range.
2. Search Cancellation: If player cancels search, system removes player from matchmaking queue.
3. Readiness Confirmation Failure: If matched player doesn't confirm readiness, system cancels match setup and searches again.

Priority: High – Essential for the matchmaking functionality of the platform.

When Available: First increment.

Frequency of Use: Very frequent – Will be used constantly as players seek matches.

Channel to Actor: Click of a button using touchscreen or mouse click.

Secondary Actors: Matchmaking System, Other Players

Channel to Secondary Actors: Game client interface, network communication.

Open Issues:

1. How quickly should the skill range expand if matches aren't found?
2. Should players be able to set preferences for opponents beyond skill level?
3. How to handle disconnections during the matchmaking process?

Good but duplicate use case

Use case: Player can view Game Leaderboard

Iteration: 1

Primary actor: Player

Goal in context: To allow the player check their regional/global ranking and able to see their rank with other players

Preconditions:

The player has an active and verified account

The player has played all of their placement game(s) and received a ranking

The leaderboard system is active and accessible

Trigger: The player select the leaderboard button from the game menu

Scenario:

1. The player selects the Leaderboard option from the game menu.
2. The player can select the filter to display the local regional leaderboard or the global leaderboard
3. The system retrieves and displays the top 100 ranked players based on Elo/MMR.  
**How rank is calculated could have more detail as it isn't elsewhere here**
4. The player sees their current rank, statistics and match history.

Exceptions:

If the leaderboard fails to load, the system displays an error message.

If the player hasn't played any ranked matches, the system will display an unranked status

Priority: High

When available: First increment

Frequency of use: Frequent as players like to check their ranking

Channel to actor: When leaderboard button in menu is selected

Secondary actors: Server database (fetching and updating leaderboard)

Channel to secondary actors: API request to server database



Open issues: None  
Good job

Use case: Player viewing their own statistics

This is the second use case with the same goal

Iteration: 1

Primary actor: Player

Goal in context: To allow the player to view their personal profile, including their game statistics, ranking, match history, and highest ranked achieved

Preconditions:

The player has an active and verified account

The player has played all of their placement game(s) and received a ranking

Trigger: The player select their profile from the game menu

Scenario:

The player clicks on their profile from the game menu

The system retrieves the player's stored profile data from the database.

The system displays key information, including:

- Username and profile picture - Current ranking and rank title

- W/L ratio

- Recent match history - Total games played

The player clicks on any one of the options above and each options will display its own features (i.e. when clicked on recent match history it will show the player and opponent name and ranking, results, match duration)

Exceptions:

If there is a server issue or missing data, the system displays an error message and prompts the player to retry

If the player hasn't played any ranked matches but has played casual matches, the system will display an unranked status and statistics for casual matches will

be provided and vice versa

Priority: High

When available: First increment

Frequency of use: Frequent as players like to check their profile as they want to check for improvements

The justification is not great and at least not needed

Channel to actor: When profile in game menu is selected

Secondary actors: Server database (fetching and updating profile data)

Channel to secondary actors: API request to server database

Open issues: None

Duplicate use case

# Use case: Rematch Request

Iteration: 1, last modification: Mar 7 by Min Oh

Don't submit team member names or UCIDs

## Primary actor:

Player

## Goal in context:

To allow the player to send a rematch request to their most recent opponent

## Preconditions:

The player has an active and verified account Guest logins may not rematch?

The player just completed a match Please specify. Is this based on time? At game end screen? Within the same session? The most recent regardless of logged-in status?

The opponent is still online and agrees to the rematch

## Trigger:

The player selects "Request Rematch" after game ends

## Scenario:

1. After finishing a game the request rematch prompt appear under the continue prompt
2. The player selects rematch request
3. The system sends a rematch invitation to the opponent.
4. The opponent can accept or decline.
5. If accepted, the system starts a new game

## Exceptions:

If the opponent is no longer online the system will prompt a message "Your opponent is no longer online."

If the opponent refused the rematch then the system will prompt a message "Rematch Declined"

## Priority:

High

**When available:**

First increment

**Frequency of use:**

Frequent as players like to check their profile as they want to check for improvements

**Channel to actor:**

In game screen after a finished match

**Secondary actors:**

Server database (fetching and updating info from most recent match)

Opponent user

**Channel to secondary actors:**

API request to server database

Opponent's client

**Open issues:**

1. (Suggestion) Consider allowing to challenge to a different game



**Actor Actions**

User selects **the** matchmaking option.

Actor accepts the match.

**Actor Actions**

# User System Flows

## CONNECT WITH PLAYERS IN MATCHMAKING

**Name:** Connect with Players in Matchmaking

**Requirement ID:** ID01

**Actors:** User, Opponent, Matchmaking System, Server

**Pre-conditions:** User is connected to the server and has an active matchmaking request.

**Trigger:** User searches for a match.

**Post-conditions:** User is successfully connected to an opponent and enters a game session.

### Main Success Path (Primary Flow)

**System Response**

Client receives matchmaking request and searches for an appropriate match based on skill level and availability.

Server finds a match and notifies both players.

Game session is initialized, and players are connected.

### Alternate Path A1

**System Response**

Actor rejects the match. Goes back to main menu/application screen.

### Exception Path E1

**Exception System Response**

No suitable match is found immediately. User is placed in a waiting queue. Server encounters an issue while matching players. User receives an error message.

User receives an error message and matchmaking request is canceled.

## Scenario

### Scenario

User enters matchmaking but disconnects before finding an opponent.

Server removes the user from the matchmaking queue.

Unable to matchmake error message given to actor.

### Actor Action

Can requeue again.

Can requeue again.

The formatting for this use case (and those with similar styles below) is different from others. It is also not as clear. This also seems similar to another use case but more technical. It's hard to tell the goals of having two since this one does not clearly specify the primary actor

---



# DATA RETRIEVAL OF USER FROM SERVER

**Name:** Data Retrieval of User from Server

**Requirement ID:** ID02

**Actors:** User, Server, Database

**Which is the primary actor and which of these are secondary?**

**Pre-conditions:** User is connected to the server and authenticated.

**Trigger:** User requests to view their profile or leaderboard.

**Post-conditions:** User data is retrieved and displayed on the client side.

## Main Success Path (Primary Flow)

### Actor Actions System Response

User opens app and logs in. Client sends request to server for user data. Server retrieves data from the database. Server sends the data back to the client.

User reviews their profile and data.

Could be clearer and appears to be missing some parts of a use case description

---

# REAL-TIME GAME SYNCHRONIZATION

**Name:** Real-Time Game Synchronization

**Requirement ID:** ID03

**Actors:** User, Server, Opponent, Game System

**Which is the primary actor and which of these are secondary?**

**Pre-conditions:** User is connected to the server and in an active game session.

**Trigger:** A player makes a move.

**Post-conditions:** Game state updates are synchronized across all players' clients.

## Main Success Path (Primary Flow)

### Actor Actions System Response

Player makes a move. Client sends move data to the server.

Server validates and updates the game state.

Server broadcasts the updated game state to all clients. Other players see the new game state in real time.

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Could be clearer and appears to be missing some parts of a use case description

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# CHAT

**Name:** Chat

**Requirement ID:** ID04

**Actors:** User, Recipient, Chat System, Server

Which is the primary actor and which of these are secondary?

**Pre-conditions:** User is connected to the server and has an active matchmaking request

**Trigger:** User types and sends a chat message.

**Post-conditions:** Message is successfully delivered to the recipient(s).

## Main Success Path (Primary Flow)

### Actor Actions System Response

User types a message. Client sends message to the server.

Server routes the message to the intended recipient(s).

Recipient(s) receive and display the message.

## Alternate Path A1

### Actor Actions System Response

Actor does not type a message System waits for any message from the actor.

## Exception Path E1

### Exception System Response

Network failure occurs. User receives an error message and message is not sent.

## Scenario

### Scenario System Response

Recipient is offline. Server queues the message for later delivery. User sends a message but experiences lag. No response due to latency issue.

Could be clearer

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# REDIRECT CLIENT QUERIES

**Name:** Redirect Client Queries

**Requirement ID:** ID05

**Actors:** User, Server, Database

**Which is the primary actor and which of these are secondary?**

**Pre-conditions:** User is connected to the server.

**Trigger:** User initiates an action.

**Post-conditions:** The request is processed and directed to the appropriate system.

## Main Success Path (Primary Flow)

### Actor Actions System Response

User performs an action. Client sends the request to the server.  
Server routes the request to the relevant system.

The system processes the request and returns a response. User receives confirmation or the requested information.

## Alternate Path A1

### Actor Actions System Response

User does not perform any query System waits for any query from the user.

## Exception Path E1

### Exception System Response

Server fails to process the request. User receives an error message.

## Scenario

### Scenario System Response

Server fails to route the query. Server error - Unable to process request error thrown.  
Database is down or unavailable. Profile data unavailable. Please try again later.  
Chat message fails to deliver. Message failed to send.

Could be clearer

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# CONNECT TO SERVER

See general comments related to consistency of design and missing components of a use-case description

**Name:** Connect to Server

**Requirement ID:** ID06

**Actors:** User, Server, Authentication System

**Pre-conditions:** User has an internet connection, application installed, met system requirements, and followed instructions.

**Trigger:** User launches the application and tries to connect.

**Post-conditions:** User is successfully connected to the server and can access the platform and all features and games.

Main Success Path (Primary Flow)

## Actor Actions System Response

User opens app. Client sends request to server. Server authenticates the request.

Server maintains a connection and sends response back. User gains access to the system.

---

# SESSION RECONNECTION

**Name:** Session Reconnection

**Requirement ID:** ID07

**Actors:** User, Server, Game System

**Pre-conditions:** User was previously connected to a game session but got disconnected due to network issues.

Is there a time limit to this? Number of attempts? What stops the system from trying?

**Trigger:** User attempts to reconnect to the game.

**Post-conditions:** User successfully rejoins the active game session without data loss.

## Main Success Path (Primary Flow)

### Actor Actions System Response

User loses connection. Server detects disconnection and stores session state. User reconnects to the game. Server verifies session ID and checks match status. Server restores user's state. User resumes gameplay from where they left off.

## Alternate Path A1

### Actor Actions System Response

User takes too long to reconnect. Server removes the user from the session. User must start a new match. Matchmaking system finds a new opponent. **Is the user faced with the login screen after being removed from the session? What does the opponent see?**

## Exception Path E1

### Exception System Response

Game session has already ended. User is notified that the match is no longer available.

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# LATENCY COMPENSATION & NETWORK STABILITY

**Name:** Latency Compensation & Network Stability

**Requirement ID:** ID08

**Actors:** User, Opponent, Server, Game System

**Pre-conditions:** Users are actively playing a match, but network conditions fluctuate. **Trigger:** A player's network latency increases beyond an acceptable threshold. **Post-conditions:** Gameplay remains smooth with minimal disruption despite network instability.

## Main Success Path (Primary Flow)

### Actor Actions System Response

User experiences network lag. (e.g., input delay buffering, rollback adjustments). **Will there be a set ping value (or some other measurable parameter) that triggers this? Is it binary on/off, or do measures scale with latency?**

Opponent Server ensures the game state remains synchronized for both players. continues playing.

## Alternate Path A1

### Actor Actions System Response

Latency is temporary and stabilizes. Server automatically resynchronizes the game state.

## Exception Path E1

**What happens if the games become unsynchronized?**

### Exception

Player's connection drops long-term.

### System Response

Player is disconnected, and match continues or ends based on game rules.

**Use case: Click Square**

This might make more sense if it were broken into “select piece”, “move piece”, etc. It would make identifying pre/post conditions easier.

**Iteration:** 1

**Primary Actor:** The Players

**Goal in context:** To receive input from player **Preconditions:** The chess game has started

**Trigger:** Player clicks square on screen with mouse **Scenario:**

1.  
A player wants to select one of their pieces
2.  
A player wants to deselect their currently selected piece
3.  
A player wants to move their currently selected piece

**Post conditions:** The GUI checks who the current player is and decides whether to accept the click based on whether it was made on the active player’s screen or not

**Exceptions:**

1. If it isn’t the turn of the player that clicked the square, the click will be ignored.

**Priority:** High. It is necessary for playing the game. **When available:** 1<sup>st</sup> iteration

**Frequency of use:** High (ie. every time a player decides to select, deselect, or move a piece in a chess game)

**Channel to actor:** Window on personal device screen that corresponds to the player’s assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** Should the inactive player’s screen be designed to not listen to clicks or should the clicks be heard but lead to no action?

This use case is unnecessary as it is broad and overlaps with many other components. It would better to include these features across other use case, especially for clarity

**Use case: Process Click**

**Iteration:** 1

**Primary Actor:** The active player

**Goal in context:** To perform the action the active player instructed the game to do when they clicked a square.

**Preconditions:** The active player clicked a square

**Trigger:** The active player clicked a square.

Trigger and precondition should not be the same

**Scenario:**

1. The active player wants to select one of their pieces
2. The active player wants to deselect their currently selected piece
3. The active player wants to move their currently selected piece

The scenario description isn't great as this doesn't make a good use case to begin with

**Post conditions:** Based on whether a square was already selected and whether the click was performed on a valid move destination, the necessary game state and screen presentation updates will be made.

**Exceptions:** Hardware issues.

What happens then?

**Priority:** High. Necessary for playing the game.

**When available:** 1<sup>st</sup> iteration.

**Frequency of use:** High (i.e. every time the active player decides to select, deselect, or move a piece in a chess game)

**Channel to actor:** Window on personal device screen that corresponds to the player's assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** Should the GUI call different methods from the Game Logic layer based on whether the click was performed on a valid move option and then update the screen in a targeted manner that is enabled by that knowledge or should there be a generic processClick() function that is executed followed by a generic process to update the screen?



This is alright but it would be much better to be more specific about the game in question.

**Use case: Select Square**

**Iteration:** 1

**Primary Actor:** Active player

**Goal in context:** To select a square that contains one of the active player's pieces and present the associated move options, as well define the piece to be moved as a set up for making a move.

**Preconditions:** It was determined that the square that the active player clicked on contains one of their pieces.

Should clarify what game this is for

**Trigger:** The active player clicks on a square that contains one of their pieces

**Scenario:**

1. The active player wants to select one of their pieces in order to move it.
2. The active player wants to select one of their pieces in order be presented with the possible moves that can be made in order to be aided in deciding what to do.

**Post conditions:** The square that was clicked on will be selected and the corresponding move options will be stored in the game logic as well as be visible on the screen. If the active player clicks on a square that represents a valid move option the currently selected piece will be moved.

**Exceptions:** Hardware issues.

What happens then?

**Priority:** High. Necessary for playing the game.

**When available:** 1<sup>st</sup> iteration.

**Frequency of use:** High (i.e. every time the active player in a chess game clicks on a square that contains one of their pieces)

**Channel to actor:** Window on personal device screen that corresponds to the player's assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** Since the GUI will present the move options, it could theoretically determine whether a clicked square is a valid move option based on whether it is marked as a move

option, so should the GUI take advantage of this possibility or instead rely on the Game Logic to determine if a clicked square is a valid move option?

**Use case: Deselect Previously Selected Square**

**Iteration:** 1

**Primary Actor:** The active player

**Goal in context:** To deselect the currently selected square so as to remove the distraction of being presented with the possible moves corresponding to a particular piece on the board and/or avoid the risk of accidentally making a move by clicking on a valid move option.

**Preconditions:** It was determined that the square that the active player clicked on is neither a valid move option nor a square that contains one of the player's pieces.

**Trigger:** The active player clicks on a square that both isn't a valid move option and doesn't contain one of their pieces.

**Scenario:**

1. The active player wants deselect the currently selected square without selecting another square in order to remove the distraction of seeing the move options for a specific piece.
2. The active player wants to not have any piece selected in order to avoid accidentally making a move by clicking on a valid move option.

**Post conditions:** There will no longer be a selected piece and no move options. The only action the player can take to continue the game is to select a piece.

**Exceptions:** Hardware issues.

**What happens then?**

**Priority:** Low. Not necessary for playing the game, but slightly improves the experience of the players.

**When available:** 1<sup>st</sup> iteration.

**If something is low priority, it probably shouldn't also be targeted to be in the first iteration**

**Frequency of use:** Medium to High (i.e. every time the active player decides to remove all selections from their screen during a chess game)

**Channel to actor:** Window on personal device screen that corresponds to the player's assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** Should it instead be the case that when a player clicks on a square that is neither a valid move options nor a square that contains one of their pieces, that this action causes the square to be selected instead of just deselecting the currently selected square.

This is mostly good

## **Use case: Make Move**

**Iteration:** 1

**Primary Actor:** The active player

**Goal in context:** To move the currently selected piece to the square that is clicked on

**Preconditions:** A piece that is capable of moving is selected on the active player's screen and it is determined that the square that the active player clicked on is a valid move option.

**Trigger:** The active player clicks on a square that constitutes a valid move option for the currently selected piece.

**Scenario:**

1. The active player has decided what move they want to make and wants to instruct the game to make that move.

**Post conditions:** The move will have been made and the new game state will be stored in the Game Logic and presented on both of the player's screens. The other player will be the active player.

**Exceptions:** Hardware issues.

**What happens then?**

**Priority:** High. Necessary for playing the game.

**When available:** 1<sup>st</sup> iteration.

**Frequency of use:** High (i.e. every time a player makes a move in a chess game)

**Channel to actor:** Window on personal device screen that corresponds to the player's assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** Since the GUI will present the move options, it could theoretically determine whether a clicked square is a valid move option based on whether it is marked as a move option, so should the GUI take advantage of this possibility or instead rely on the Game Logic to determine if a clicked square is a valid move option?

## **Use case: Update Active Player's Screen**

**Iteration:** 1

**Primary Actor:** The active player

**Goal in context:** To update the active player's screen to present the new state of selection and corresponding move options.

**Preconditions:** The active player clicks on a square that either results in a new square selection to be made or an absence of a square selection to be established.

**Trigger:** The active player clicks on a square that either results in a new square selection to be made or an absence of a square selection to be established.

**Scenario:**

1. The active player has changed or undone the current square selection and so the new state of selection and move options must be presented to the active player.

**Post conditions:** The active player will be able to see the new state of selection and move options.

**Exceptions:** Hardware Issues

**What happens then? What are hardware issues**

**Priority:** High. Very important to show the active player which of their pieces is currently selected

**When available:** 1st iteration

**Frequency of use:** High (i.e. every time a player changes the state of their selection during a chess game)

**Channel to actor:** Window on personal device screen that corresponds to the player's assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** What specific method will we implement to mark squares as valid move options on the screen?

**Duplicate**

## **Use case: Update Both Player Screens**

**Iteration:** 1

**Primary Actor:** the active player

**Goal in context:** To update both player's screens to show the new state of the game after a move is made.

**Preconditions:** The active player has made a move and the screens have not yet been updated to the new state of the game.

**Trigger:** The active player makes a move.

**Scenario:**

1. A player has made a move and so both player's need to be presented with the new state of the game.

*This is not how to properly do the scenario portion. This is more of a precondition*

**Post conditions:** The new active player is able to see the current state of the game and make selections and perform the next move.

**Exceptions:** Hardware issues.

*Be specific and explain what happens?*

**Priority:** High. It is necessary for the player's to know the state of the game.

**When available:** 1<sup>st</sup> iteration

**Frequency of use:** High (i.e. every time a move is made by a player during a chess game)

**Channel to actor:** Window on personal device screen that corresponds to the player's assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** Should we follow through with the current plan of having two separate windows for each player?

## **Use case: Switch Active Player**

**Iteration:** 1

**Primary Actor:** The active player

**Goal in context:** To switch which player is considered the active player after a move is made.

**Preconditions:** A player has made a move and the resulting state of that player's captured pieces has been recorded in the Game Logic

**Trigger:** A move is made by the active player.

**Scenario:**

1. A player makes a move which results in it becoming the other player's turn

**Post conditions:** The player that was previously considered the inactive player will now be considered the active player and be able to select pieces on their screen and make a move, while the player that was previously considered the active player will be considered the inactive player, and will no longer be able to interact with the chess board on their screen until the other player makes a move.

**Exceptions:** Hardware issues.

**Again more detail, what happens then?**

**Priority:** High. Necessary for playing the game.

**When available:** 1<sup>st</sup> iteration.

**Frequency of use:** High. (i.e. every time a player makes a move in a chess game)

**Channel to actor:** Window on personal device screen that corresponds to the player's assigned colour (i.e. white or black)

**Secondary actors:** n/a

**Channel to secondary actors:** n/a

**Open issues:** What is the best way of implementing a turn based game in a GUI and, as asked above, will we follow through with the current plan of having two separate windows for each player?

**Good point and this seems significant**

## Use Case: Playing Multiplayer Tic Tac Toe

### Primary Actor:

- Tic Tac Toe player one and player two

Should only be one primary actor. Instead, one possibility is making a player the primary actor, and making the other as a secondary actor

### Goal in Context:

- The goal of each player is to win the game by placing their selected symbol side by side three times either in a row, column or diagonally.

### Precondition

- Each player must log into their accounts for the online board game platform.
- To play the game in multiple players must have access to wi-fi.
- In order to run the game, the player must select Tic Tac Toe in the board games menu.

### Trigger:

- Once the game has begun running the player selects start and joins an online session with another online player.

### Scenario:

1. Player one selects X or O, the symbol that remains unselected gets assigned to player two.
2. Player one selects any empty cell inside of the three-by-three grid.
3. The game places player one's symbol inside of the selected cell.
4. The display changes to show that it's player two's turn  
This could reference another use case such as "Update Both Player Screens" or "Update Active Player's screen"
5. Player two selects an empty cell
6. The game places player two's symbol inside of the selected cell.
7. Steps 2 – 6 repeats until either a player wins the game or until all the cells get filled.
8. If a player wins the display changes to show the winner and each player can choose to exit the game, rematch or choice to play another match with someone else.

### Exceptions:

1. All cells become occupied: The game ends in a draw and each player can choose to rematch or exit the game.



2.Player selects a cell when it's not their turn: The grid does not change but the player is alerted through a pop up that it's not their turn

3.A player exits their game before the game ends: The remaining player is connected to a new match

4.A player has not interacted with the game for more than two minutes: The inactive player is kicked out of the match and the active player wins the game.

5.Player has a weak or non-existent internet connection: A pop-up window alerts the player of the issue, after which the player is not allowed to join the online game until they have a strong enough connection.

Priority:

- Essential: required to the test basic functionality of the platform.

When available:

- End of second project iteration.

Frequency of use: - Frequent.

Channel to actor:

- Trackpad, mouse and keyboard used by player.

Secondary Actor:

- Dev team responsible for creating and maintaining the online board game platform.

Channel to secondary actor: - Technical support: Email

Open issues:

- Should we implement an offline version of the game?
- For the offline version are we going to incorporate different difficulty levels. - Should we provide the option for players to play on different grid sizes?

This is mostly good and the clarity is great

## 1. Start New Game

Primary Actor: Game Player

Goal: Initiate a new Connect 4 game session within the application.

Pre-Conditions:

- The game application is running locally.
- No active game session is in progress.
- Networking is available.
- The player is logged into the game client.

Trigger:

- The player selects the "New Game" option from the game menu.

Scenario:

1. The player launches the game client.  
*This is one of the preconditions*
2. The player selects "New Game" from the main menu.
3. The system initializes an empty custom-size board.
4. The system determines which player goes first(either randomly or by a predefined rule).
5. The initialized board and the turn indicator are displayed on the local interface.  
*The game matches the player with another player*

Post-Conditions:

- A new game session is started with a fresh board.
- The active player is prompted to make the first move.

Exceptions:

- System or application error during game initialization.
- Network issues in multiplayer mode.

Priority: High (Essential for starting gameplay)

When Available: At the beginning of every game session.

Frequency of Use: Every time a player wants to start a game.

Channel to Actor: Local game interface

Secondary Actors: System *the gamelogic server needs notification of this.*

Channels to Secondary Actors: Internal application processes

Open Issues: Handling unexpected shutdowns or reconnections during game startup.

*What are the constraints on the size of the board?*

## 2. Making a Move

Primary Actor: Game Player

Goal: Allow the active player to drop a disc into a chosen column.

*This seems like it's for 'Connect Four' but please specify*

Pre-Conditions:

- A game session is active with an initialized board.
- It is the active player's turn.
- The current board state is displayed on the game client.

Trigger:

- The player selects a column within the allowed range using the local input device (e.g., keyboard).

Scenario:

1. The active player selects a column via the game client interface.
2. The system verifies that the chosen column number is within the valid range.
3. The system checks that the selected column is not already full.
4. The disc is placed in the lowest available row of the selected column.
5. The board is updated immediately on the local interface to reflect the new move.

Post-Conditions:

- The game board displays the new move.
- The turn passes to the opposing player unless a win/draw condition is met.

Exceptions:

- Column selection is out-of-range.
- The chosen column is already full.
- An error occurs during the board update process.

Priority: High (Core gameplay functionality)

When Available: Each turn during an active game session.

Frequency of Use: Multiple moves per game session.

Channel to Actor: Local game UI (input devices such as keyboard or mouse)

Secondary Actors: System

Channels to Secondary Actors: Internal processing and UI rendering

Open Issues: Resolving simultaneous move attempts in multiplayer mode and providing visual feedback (animations, sounds) for move validation.

Specify the game for clarity. Are there other use cases that can be referenced for its functionality?

### 3. Checking for Win/Draw

Primary Actor: System

**Which part of the system?**

Goal: Automatically determine if the latest move results in a win or if the game concludes in a draw.

Pre-Conditions:

- A move has just been made and the board state has been updated.
- The game session is active.

Trigger:

- Completion of a player's move.

Scenario:

1. The game engine scans the board after each move.
2. It checks for four consecutive discs in a row horizontally, vertically, or diagonally.
3. If a win is detected:
  - The system declares the active player as the winner.
  - The game session is ended.**Player stats are updated**
4. If no win is detected and the board is full:
  - The system declares a draw.
  - The game session is ended.**Player stats are updated**
5. If neither condition is met:
  - The turn is passed to the opposing player.

Post-Conditions:

- The game session either continues with the next turn or concludes with a win/draw.

Exceptions:

- System error during evaluation.
- Inconsistencies in the board state.

**What kind of inconsistencies?**

Priority: High (Critical for game resolution)

When Available: After every move.

Frequency of Use: Every turn during the game.

Channel to Actor: Internal processing with results displayed on the game client

Secondary Actors: System

**Be more specific**

Channels to Secondary Actors: Backend evaluation

Open Issues: Optimizing win/draw detection, especially for customizable board sizes.

#### 4. Handling Invalid Moves

Primary Actor: Game Player

**The player doesn't handle invalid moves (UI or Game logic server)**

Goal: Prevent and handle invalid move attempts gracefully during gameplay.

Pre-Conditions:

- A game session is active.
- It is the player's turn.

Trigger:

- The player attempts to drop a disc into an invalid column (either out-of-range or full).

Scenario:

1. The player selects an invalid column.
2. The system detects that the column is either out-of-range or full
3. An error message is immediately displayed on the local interface, indicating the nature of the invalid move
4. The system maintains the turn for the same player until a valid move is made.

Post-Conditions:

- The board remains unchanged.
- The player is prompted to select a valid move.

Exceptions:

- Multiple invalid attempts might trigger additional warnings or a temporary move lock-out (if configured).

Priority: High (Essential for maintaining game integrity)

When Available: Every time an invalid move is attempted.

Frequency of Use: As frequently as players may make input errors.

Channel to Actor: Local game UI using available input devices

Secondary Actors: System

Channels to Secondary Actors: Internal input validation and feedback mechanisms

Open Issues: Defining thresholds for temporary lock-outs after repeated invalid moves.

**How long does a player get to move?**

## 5. Ending the Game

Primary Actor: System

Goal **in Context**: Conclude the game session when a win, draw, or game end by player condition is met.

Pre-Conditions:

- A winning move, draw, or game end by player condition has been detected.
- A game session is active.

Trigger:

- A move results in a win or draw, or the player issues a game end by player command.

Scenario:

1. The game engine detects a win, a draw, or receives a game end by player signal.
2. The system terminates the active game session.
3. The final board state is displayed on the game client.  
**This could connect to another use case**
4. The system announces the game result (win, draw, or game end by player) on the interface.
5. Optionally, the player is offered the option to start a new game.

Post-Conditions:

- The game session is concluded.
- The result is clearly communicated to the player.
- The game client returns to the main menu or game summary screen.

Exceptions:

- System error during game termination.

**What happens then?**

Priority: High (Necessary for clear and proper game closing)

When Available: At the end of every game session.

Frequency of Use: Once per game session. **How many game sessions? Be specific**

Channel to Actor: Local game client displaying alerts and final game summary

Secondary Actors: System

Channels to Secondary Actors: Internal processes and UI notifications

Open Issues: Offering a detailed summary screen with game statistics and a rematch option.

A similar use case exists so this may be redundant

## 6. Writing Chat Message

Primary Actor: Game Player

Goal: Allow the active player to send a chat message to their opponent or other players during a multiplayer game session.

Pre-Conditions:

- A game session is active.
- Players are in a multiplayer environment (local or online).
- The chat feature is available and enabled in the game client.

Trigger:

- The player selects the "Chat" option from the game interface and types a message.

Scenario:

1. The player accesses the chat window from the game interface.
2. The player types a message and hits the "Send" button.
3. The system validates the message (e.g., checking for inappropriate content or enforcing length restrictions).
4. The system displays the message on the screen for the opposing player(s) to view in real time.  
*Is this related to another use case?*
5. Optionally, the system plays a notification sound to inform the opponent(s) of the new message.

Post-Conditions:

- The message is successfully sent and displayed to the other players.
- The game continues without interruption.

Exceptions:

- The message contains invalid characters or inappropriate language.
- The message fails to send due to network issues.

*What happens then?*

Priority: Medium (Enhances player interaction but is not critical for gameplay)

When Available: Throughout the game, during both player turns and intermissions.

*This should refer to which increment*

Frequency of Use: Occasional, based on player communication needs.

Channel to Actor: Game client interface (via keyboard or chat UI)



Secondary Actors: System

Channels to Secondary Actors: Internal message validation and display

Open Issues: Defining chat message filters for inappropriate content and ensuring smooth performance in multiplayer scenarios. **Good**

# Use Case Description: BoardGame Go

## 1. Title

Launch and Play a Game of Go (JavaFX Implementation)

## 2. Primary Actors

- **Player/User:** Interacts with the game by clicking on the board.
- **System/Application:** The JavaFX program managing game initialization, rendering, and move processing.

## 3. Preconditions

- **Application Launch:** The JavaFX application is successfully started.
- **Board Initialization:** A 19×19 board is created (represented by a two-dimensional array) and displayed on a canvas.
- **Initial Settings:** The board is rendered with grid lines, star points, and no stones. The turn is set to Black (indicating Black moves first).

## 4. Main Success Scenario (Basic Flow)

### 1. Game Initialization:

- The application window opens with the title "围棋游戏".  
**Interesting title**
- A Canvas is created with dimensions based on the board size and tile size.  
**The board is initialized already as a precondition**
- The board array is initialized with all positions set to 0 (empty).  
**The board is initialized already as a precondition**
- The drawBoard() method is called to render the grid, star points, and any existing stones.
- Mouse click event handling is enabled on the Canvas.

### 2. Player Move Input:

- **User Action:** The player clicks on a desired intersection on the board.
- **System Response:** The application calculates the board coordinates by adjusting the mouse click position relative to the tile size.

**Validation:** The system checks if the clicked coordinates are within bounds and that the corresponding cell in the board array is empty.

### Valid Move:

- i. The board array is updated with a value (1 for Black, 2 for White) based on whose turn it is.
- ii. The drawBoard() method is called again to refresh the display with the new stone.

- iii. The turn toggles to the opposing player.

**Invalid Move:**

- i. If the selected position is out-of-bounds or already occupied, an Alert is triggered informing the player with the message "Please select a correct location."

**4. Game Continuation:**

- a. The process repeats as players take turns placing stones until the application is closed or additional game logic (such as game termination or scoring) is introduced.

Or until the end of the game.

## 5. Alternative Flows

• **Invalid Move Attempt:**

- o Scenario: The player clicks on a cell that is either occupied or outside the valid board area.
- o Outcome: The system displays a warning Alert, and the move is rejected. The turn does not change.

• **No Further Move Handling:**

- o Scenario: The game currently lacks features such as capturing stones or scoring.  
Then the game should not be available
- o Outcome: The game continues solely with stone placement and turn alternation until the application is terminated.

## 6. Postconditions

- **Board State Update:** The board (both the visual display and the internal array) reflects the stones placed during the session.
- **Turn Management:** The application maintains which player's turn is next.
- **User Feedback:** Players are informed of invalid moves via alerts, ensuring proper move validation.

## 7. Extensions and Future Considerations

- **Game Rule Enhancements:** Future versions may include capture detection, scoring logic, and end-game conditions.
- **User Interface Improvements:** Additional UI elements such as a status bar, move history, or reset options could enhance the user experience.
- **Error Handling:** More robust error handling could be introduced to manage unexpected input or runtime exceptions.

This use case does not follow the provided format.

There are similar use cases to this so it may be redundant

## **Use Case 1: Challenge Players**

**Iteration: 1**

**Primary Actor:** Registered Player

**Goal in context:** Allow a registered player to challenge another player to a match in an available board game

**Preconditions:**

1. The user is logged into their account
2. The user has an active internet connection
3. The opponent they wish to challenge must also be a registered user and online
4. The game server must be running
5. At least one game must be available for selection

**Trigger:** The player selects the option to challenge another player from the GUI

**Scenario:**

1. The player navigates to the "Challenge Players" section in the GUI
2. The system displays a list of available online players
3. The player selects an opponent from the list
4. The system prompts the player to select a game from the available options
5. The player selects a game and confirms the challenge
6. The system sends a challenge request to the selected opponent
7. The opponent receives a notification of the challenge
8. The opponent either accepts or declines the challenge
9. If accepted, the system initializes the game and directs both players to the game lobby

Does every game have a lobby? Is this clarified anywhere else?

10. If declined, the system notifies the challenger of the declined request

**Postconditions:**

1. If the challenge is accepted, both players enter the game lobby, ready to start the match

2. If the challenge is declined, the challenger is returned to the "Challenge Players" screen

**Exceptions:**

1. The opponent goes offline before responding: the system must notify the challenger and cancel the challenge, sending the user back to the game lobby
2. The game server is unavailable or down: the system must inform the user and prevent challenges from being sent or game selection
3. The opponent is already in another match: the system must notify the challenger and direct them back to the screen of online players
4. The challenger cancels the request before the opponent responds: the system must withdraw the challenge and cancel the challenge notification to the opponent

**Priority:** High, this feature is essential for multiplayer games and direct player interaction and matchmaking

**When available:** This feature is always accessible to players in the GUI once they are logged in and connected to the game server

*This should refer to the increment*

**Frequency of use:** Every time a player logs in to the server and wants to play a game with another user online

*Be more specific*

**Channel to actor:** The player interacts through the GUI by selecting from the options to challenge another player who is online

**Secondary actors:**

1. Opponent Player (receives the challenge and chooses whether to accept)
2. Game Server (handles matchmaking and game initialization)

**Channel to secondary actors:**

1. Opponent Player: receives an in-game notification
2. Game Server: Processes and maintains server status, game availability and matchmaking status for players

**Open issues:**

1. Multiple incoming challenges to the same player
2. Ability to block another user to avoid receiving challenge requests from them
3. Timeout mechanism for responding to challenges to prevent inactive or AFK players from slowing matchmaking times
4. Having a friends list of specific players you frequently play with

There is a use case for this. Why isn't it referenced?

Use better grammar for clarity

## Use Case 2: Look up game

**Iteration:** 1.0, last modification: March 5th by Kemuel

*Do not submit team member names or UCIDs*

**Primary Actor:** Registered player

**Goal in context:** Allows for a player to look through their list of games and read a description of its gameplay.

### Preconditions:

1. Player is logged in.

### Trigger:

1. When the customer starts the application.
2. When you return to your games list after playing a game.

*Don't use second person*

**Priority:** High priority needed to interact with the rest of the program.

**When is it available:** Available anytime the application is open, and when a game has ended.

*This should be the increment at which it's available*

### Scenario:

1. Player starts game suite application
2. Games on suite popup in a list
3. Player clicks on a game in the list and sees their descriptions

### Exceptions:

1. Player Does Not Start application *Shouldn't be here then*
2. Player is playing another game simultaneously *What happens then?*
3. Player is not logged in *Shouldn't be here, it conflicts with the precondition*

**When available:** Available as soon as the application starts.

*Should refer to the increment*

**Frequency of use:** High Frequency. Every time a user wants to look through their games

**Channel to actor:** Player uses Keyboard/ mouse interactions to interact with the application

### Secondary actors:

1. Game application client.

2. Game servers.

### **Open Issues:**

1. Searching up games by text
2. Different ways to sort games. Example: Aplhabedicly, last played date, most played, self sort.  
Better grammar for clarity



## **Use Case 3: Look up Players**

**Iteration:** 1

**Primary actor:** Registered Player

**Goal in context:** To allow users to search for players using the GUI search feature, to access their profiles, and to examine stats before challenging them.

**Preconditions:**

1. The user is logged in.
2. The user has an internet connection.
3. The dashboard window is fully loaded, displaying a button called “Look up Player”

**Trigger:** The user selects the user “Look up Players” button with their mouse.

**Scenario:**

1. The user enters a player's name into the search bar and the list updates dynamically with similar names.
2. The user applies filters (e.g., level, games played) via dropdown menus.
3. The user sorts the list by name, level, or other attributes using sorting buttons.
4. The user enters a player's name into the search bar.
5. The user scrolls through the list using their mouse or the scroll bar.

**Postconditions:**

1. The selected player's profile is displayed in a new window.
2. Hovering over a name in the list triggers a pop-up showing the player's name and stats.

**Exceptions:**

1. If no matching players are found, the GUI displays a "No players found" message.
2. If the user loses connection while searching, the GUI displays a "Connection lost. Couldn't load list." message.

**Priority:** High. A multiplayer GUI has to provide a way to access player stats of all players, for users to find and interact with others.

**When available:** Third iteration.

**Frequency of use:** High. Players will frequently use this feature to find opponents.

**Channel to actor:** The GUI

**Secondary actors:**

1. The player database.
2. The backend server.

**Channels to secondary actors:** 1. Internet

**Open issues:** None

Good use case. Nice and specific. Should be good to integrate

A similar use case exists so this may be redundant

## **Use Case 4: Join a game from the library**

**Iteration:** 1.0

**Primary actor:** registered player

**Goal in context:** After looking up for games read descriptions of gameplay or rules, allowing a registered player to participate in the game by clicking and choosing the gameplay.

### **Pre-conditions:**

1. The player is successfully logged into their account.
2. The player is directed to the game library page.
3. The game library is not empty and is available for selection

**Trigger:** The registered players join a game by choosing and clicking on the game icon or “start” button from the game library

**Priority:** High-needed, the players should join in the game first, either want to play solo or join a team in multi-player games later.

**When available:** Available any time if the players have good internet connection and have logged into the game as a registered player to see the game library and pick one from it.

### **Scenario:**

1. Players log into the game application
2. Players navigate to the game library
3. Players read the descriptions and rules of the game
4. Players engage in a game by clicking game icon to start game session

### **Exceptions:**

#### **1. Internet corruption**

- i. The Wi-fi is so unstable that the game cannot continue
- ii. The system prompts a message on refreshing the Wi-fi or reloading the game.

#### **2. Requirement for update**

- i. The game has updated new features
- ii. The system prompts a message on updating the game that players chose.

### **3. Unavailable participation due to full session**

- i.  
The game is full as the number of players for that game reaches the capacity
- ii.  
The system prompts a message for matchmaking the player with the AI bot; or suggests estimated waiting time until the new session is available.

**Frequency of use:** High frequency, the players engage in the game by first logging in and joining in a game

**Channel to actor:** the GUI

**Secondary actors:** the game server

**Channel to the secondary actors:** Game server: maintain the server to run 24/7

**Open issues:** N/A

Mostly good. See final use case description comments

At least one similar use case exists so this may be redundant

## Use case 5: In-Game Chatting

Iteration: 1

**Primary Actor:** Player (active in game session)

**Goal in context:** Enable real-time texting between players during gameplay without interrupting the gaming experience, allowing for social interaction, game strategy, and sportsmanship.

### Preconditions:

1. User is logged in to the system
2. User is currently participating in an active game session
3. At least one opponent or teammate is connected to the same game session
4. User has not been muted or restricted from the chatting feature  
Could be part of an exception

### Trigger:

1. User activates chat interface by clicking chat icon or using keyboard shortcut User receives message from another player
2. System event occurs requiring player notification (game state changes, turn alerts)

### Scenario:

1. The player initiates the chat interface during an active game
2. System displays chat window in a non-intrusive position relative to the game board
3. System loads and displays the most recent message history (last 20 messages or configurable amount).
4. Player types the message in the text input box.

5. Player sends a message by pressing Enter key or clicking Send button
6. System validates messages for length and content restrictions.
7. System transmits message to messaging service with metadata (sender, timestamp, game session)
8. System displays the message in the local chat history with appropriate formatting
9. Recipients receive and view the message in their chat window
10. System sends a subtle notification sound (if enabled in user preferences)
11. Chat window can be minimized or relocated by user if desired
12. User can scroll through message history while game continues
13. If chat is inactive for 30 seconds, it automatically minimizes (optional tweak)

**Postconditions:**

1. Messages are left in the chat history throughout the game session
2. All active participants can view the message
3. Game state and performance remain unaffected
4. Chat history is saved with game record for potential review

**Exceptions:**

1. Message exceeds length limit - System displays character count warning and prevents submission
2. Inappropriate content detection - System filters content according to platform policy, or blocks message and warns user
3. Rapid message flooding - System implements cooldown and notifies user to prevent spam
4. Connectivity issue - System queues message for retry and displays sending status indicator

5. Recipient has blocked sender - Message is sent but not delivered, with no notification to sender
6. User has enabled "focus mode" - Incoming messages are queued but notifications suppressed
7. Game is in critical state (time pressure, final moves) - System may delay non-urgent notifications

**Priority:** Medium-High

**When available:** Iteration 2

**Frequency of use:** Very frequent - multiple times per game session

**Channel to actor:**

1. Visual chat interface within game UI
2. Notification system (visual and/or audio)
3. Optional keyboard shortcuts

**Secondary actors:**

1. Other players in the game (Opponents/Opponent)
2. The system that handles messages
3. Basic content filtering

**Channel to secondary actors:**

1. Basic communication between game components
2. Real-time connection for instant messaging
3. Connection to the main game session

**This is not specific enough**

**Open issues:**

1. Should private messaging between specific groups (e.g., team members) be allowed in team-based game modes?
2. How should chat history be saved between game sessions for regular opponents?
3. Should chat have rich text formatting or emoji reactions?
4. How to balance chat visibility with space constraints in small screens

5. Should voice chat be considered a future enhancement?
6. How to manage international player translations?
7. What level of administrative control is needed for chat moderation?
8. Should chat support auto-send game event notifications?
9. How will the "chat" feature scale between different game types (e.g., turn-based vs. real-time)?

Good questions

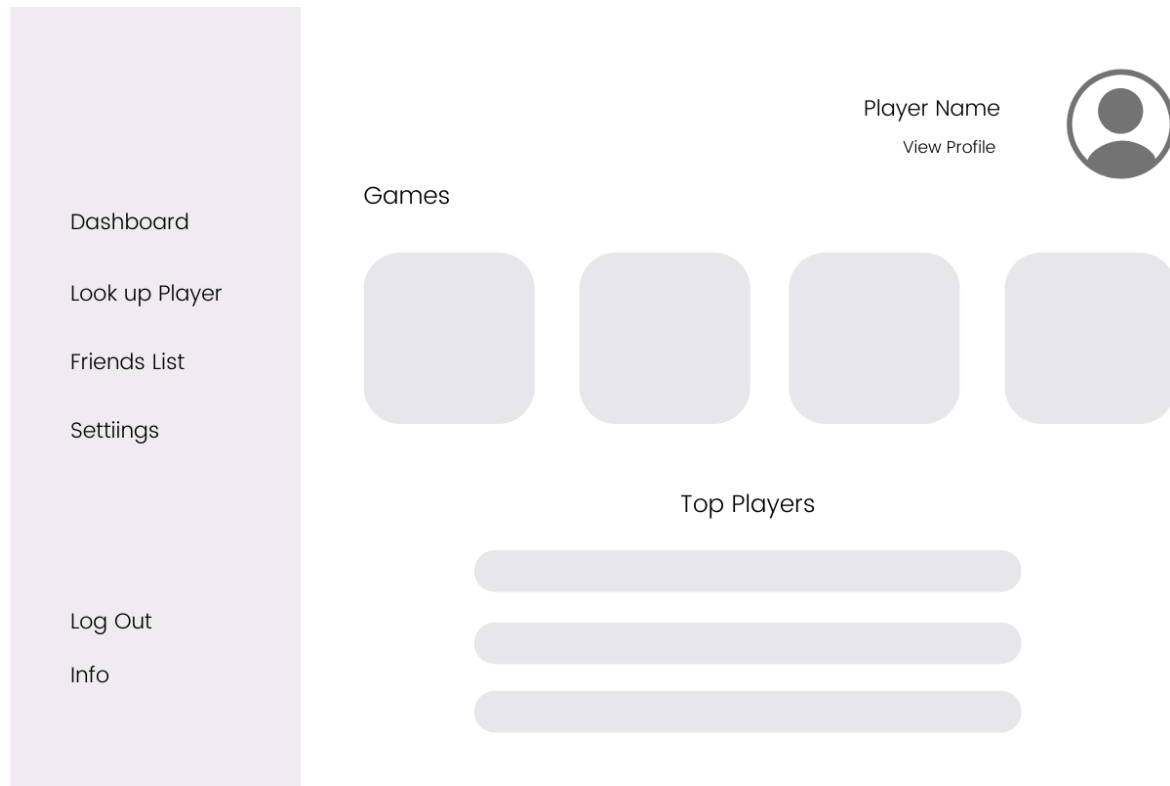
**Integration issue present across the use cases:** Terms like game server, the system, the internet, client, and API request are used in place of one another. This is very unclear and suggests lack of collaboration and integration all together



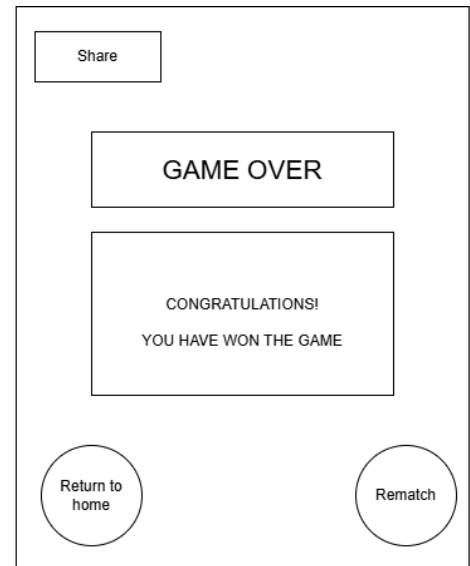
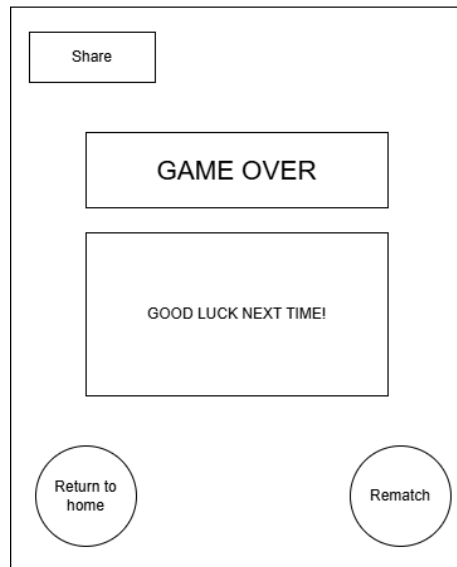
## UI Mockups

General comments:

- Various styles for the following mockups look disconnected (inconsistent)

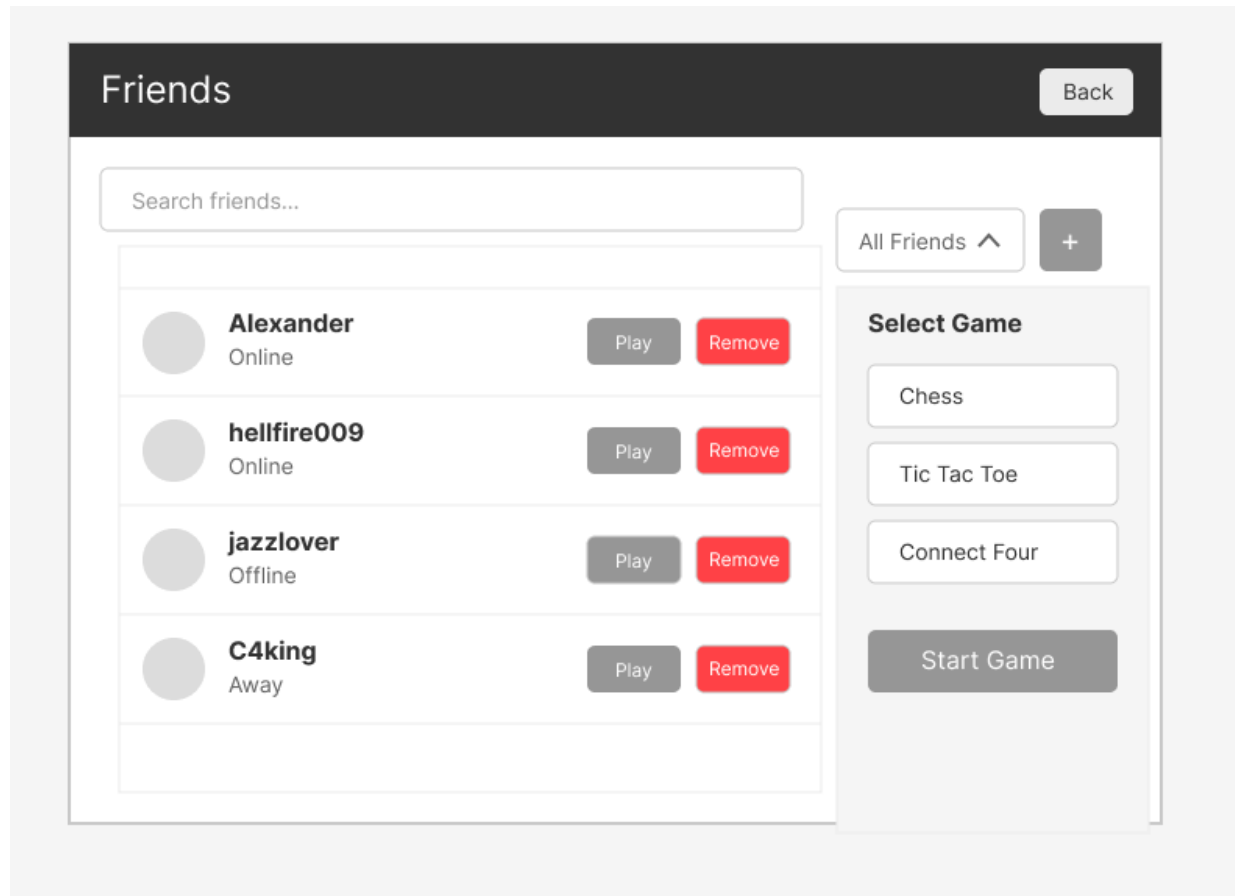


This is beautiful and looks professional!  
Excellent UI design  
Also appears fairly consistent with use cases



This looks great

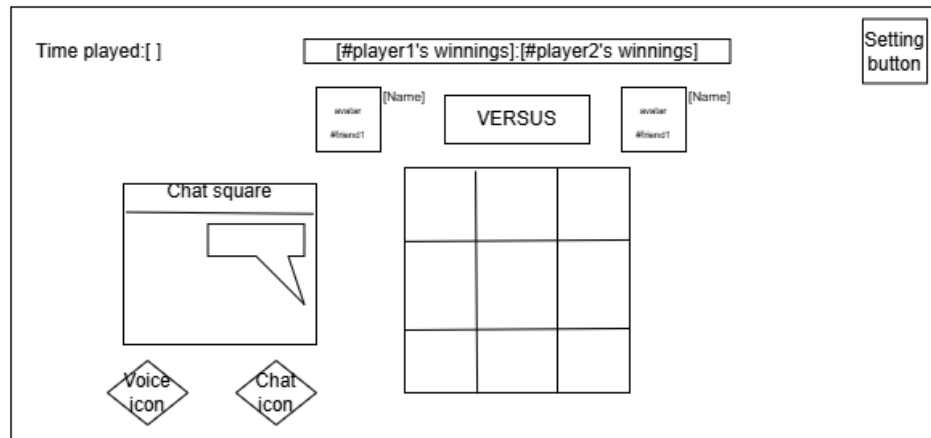
It appears to follow a split screen design for multiplayer. This might be inconsistent with the rest of the design based on what's in the use cases. Some clarification is needed then



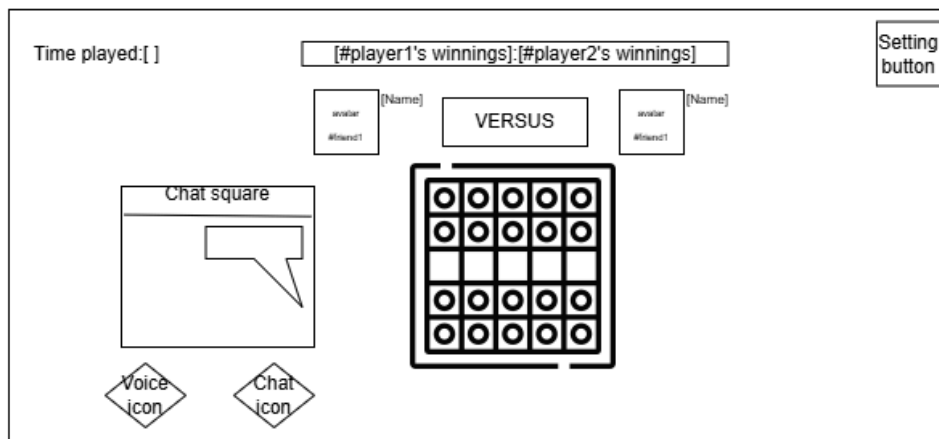
Looks good, curious about some things:

- Friend names are not in alphabetical order, so I assume dynamic ordering to put "Online" status at the top. Would recommend "Away" above "Offline"
- The intended flow for this page is not clear. If I want to challenge Alexander, do I click "Play" then get prompted with a game? Do I need to select the game first? Does "Play" button initiate or "Start Game"?

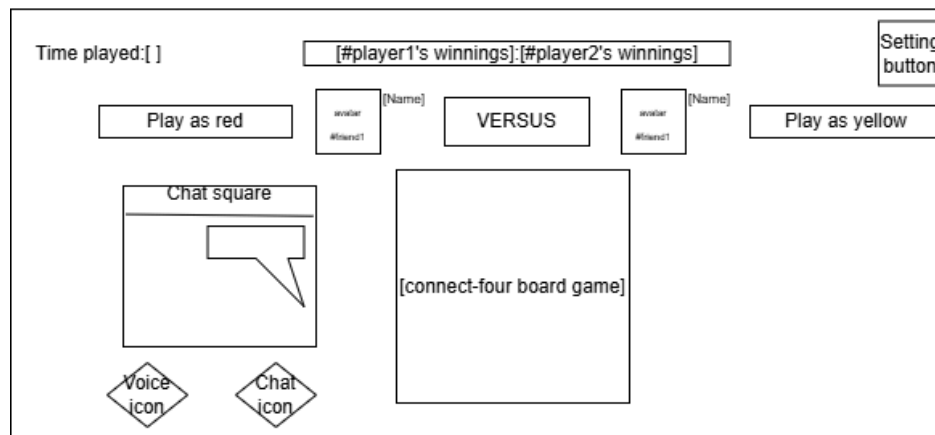
## TIC TAC TOE



## Chess



## Connect four



#### Tic Tac Toe, Chess, and Connect Four:

- Is the “winnings” bar just for displaying a current session? If overall, how will this be affected if the opponent has a high privacy setting?
- Will voice chat be implemented? Many games I've played the in-game voice chat functionality is eschewed in favour of Discord (or another external program), would recommend considering this low-priority
- Chess board takes up the same space as tic-tac-toe, which might feel squishy (even just showing a 5x5 board instead of 8x8 looks like it will be small)
- How will your turn be indicated? Ie what is the visible cue that it's my turn vs my opponent's?
- Is “VERSUS” a clickable button? (what would it do?) It's taking a prominent position to just be a label to mean “vs”
- Will X/O, white/black, red/yellow be global settings, or personal? (could display your own pieces as your preference, showing your opponent as the opposite, or have one player assigned to “X”, the other to “O”. Wondering about the “Play as red” and “Play as yellow” buttons shown on Connect Four; how do these interact with the opponent's screen?

# ONLINE MULTIPLAYER PLATFORM

[Login](#)[Sign Up](#)

## Online Multiplayer Platform

- Needs a catchy name
- If I wanted to play as a guest, it's not clear that I need to still hit the "Login" button
- Exit button?



## Login

Don't have an account yet ? [Sign up](#)

Username

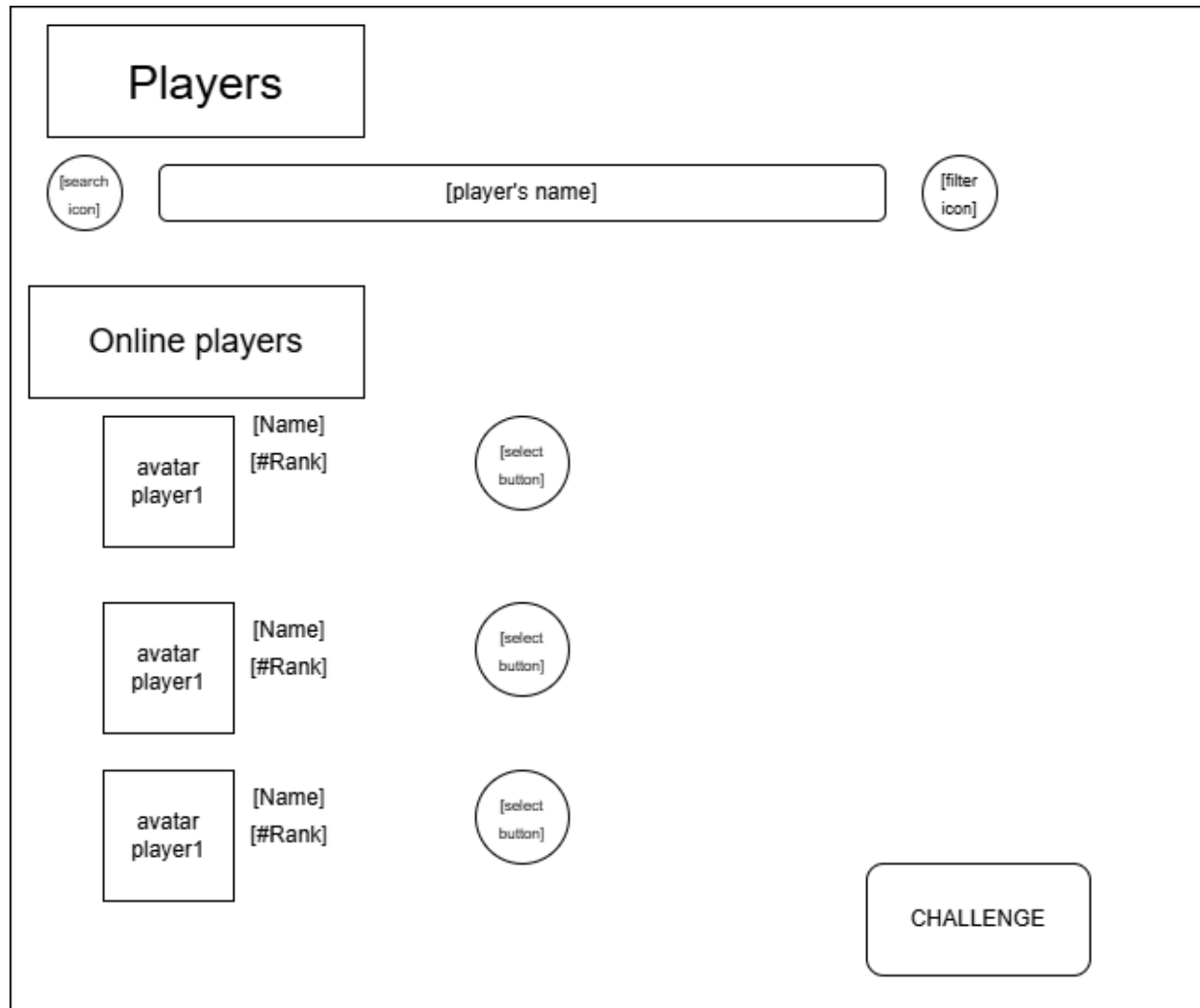
Password

## Guest Login

Username

### Login Screen

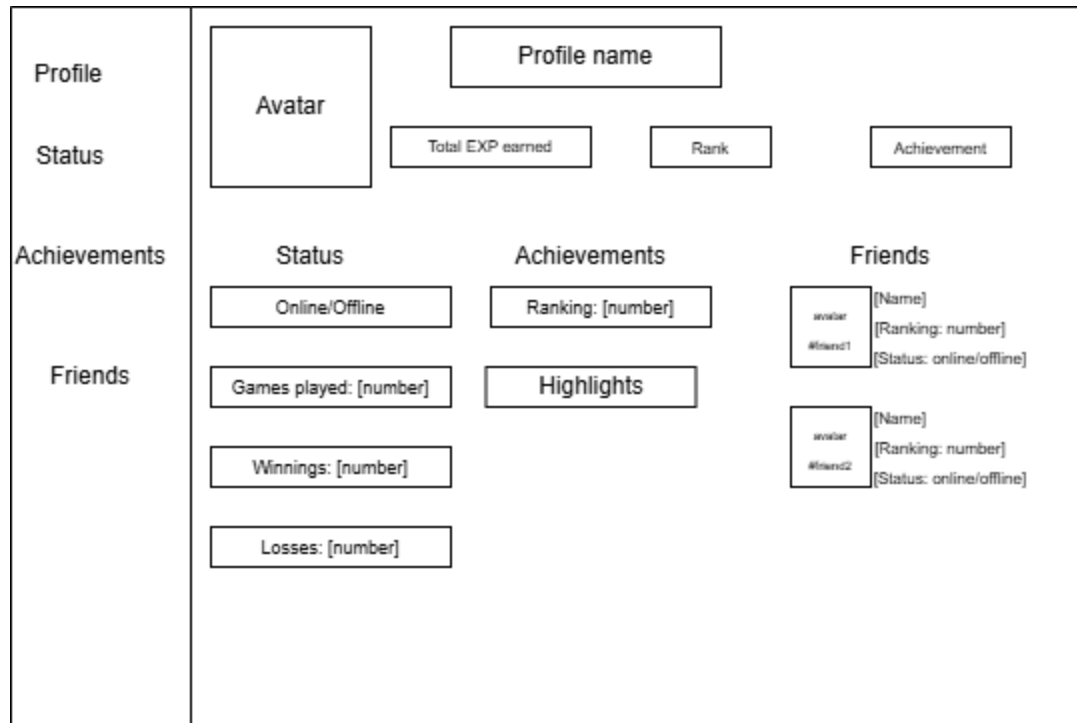
- Forgot password option?
- Perhaps a quick explanation detailing any restrictions about logging in as a guest (no stat tracking, etc.)
- Are accounts made through this platform, or on an external site? The blue, underlined “[Sign up](#)” indicates an external site, where a button like the “Login” one would suggest that it’s made through this platform.



Players:

- The function of this screen is not clear
- Is this a Friend's screen? (there is a different one above)
- Is this a screen for a single game? (which game?)
- Is the "[#Rank]" for a specific game? Some sort of average? How does this display if the player has highest privacy settings?





### Profile Screen

- Are stats (winnings/losses) ((should be “wins”)) and “Games played” for an individual game, or overall?
- Is Online/Offline a setting a player can set? (ie is “appear offline” an option?)
  - Can this screen be reached from offline?
- Does the “Friends” sidebar need to be here? (dedicated Friends page exists)
- Where would I click for privacy settings?
- Seem to have “Status” and “Statistics” both in the left column
- “Achievement” (label? button?) near top should be closer to “Achievements” column

# Settings

Back

Profile

Display

Match History

## Display Settings

Theme



Light



Dark

Text Size



Small

Large

Show Notifications



In Game Chat



Save Changes

# Settings

[Back](#)[Profile](#)[Display](#)[Match History](#)

## Match History

[All Games](#) ^[Last 30 Days](#) ^**Total Games: 48**

Wins: 23

Losses: 19

Draw: 06

Win Rate: 47.92%

**Alexander vs. C4king**

Connect Four • March 5, 2025 • 16:32

**Loss**[Rematch](#)**AstroidDestroyer vs. liah009**

Chess • March 3, 2025 • 09:45

**Win**[Rematch](#)**knighowl vs. 505Arctic**

Tic Tac Toe • March 1, 2025 • 14:20

**Win**[Rematch](#)

# Settings

Back

Profile

Display

Match History

## Profile Settings

Delete Account

Username

User\_1

Email

user\_1@example.com

Bio

Hi! I love Chess !!

Avatar

?

Change Avatar

### Change Password

Current Password

New Password

Save



# Sign Up

Already have an account? [Login](#)

Username

Password



Re-type Password

Sign Up

Dashboard

Look up Player

Friends List

Settings

Log Out

Info

## Tic Tac Toe



Join a Match

Find an Opponent

## Leaderboard

