

# Online Games System Simulation

System Analysis Design & Testing

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## Summary

To begin with, we would like to introduce the reader to the overall concept of our system – an online games application, which provides the users with the most entertaining way to play online games.

First of all, the application itself is going to be desktop, containing a game catalogue. The game catalogue is available to all users, where the user can browse through all the available games as well as read the description of each game. By providing a detailed description of each game, the user will have a good understanding of how each game works and eventually will be able to choose a game based on the preferences.

In addition, a user must be registered in order to play any game. It is worth to mention that before starting any game, the user must input game's currency money. This is only possible if the user has sufficient funds in their account, otherwise, the user is prompted to deposit more into their account. After placing, the game starts.

Secondly, there are currently two main games – slots and mines. These games have been chosen based on their complexity and popularity among online games. If a user wins a game, a specified amount (based on the input size and multiplier) is added to his balance. These changes are stored in the user database (referred to as *UserDB*), as well as the details (such as the game ID, player ID, timestamp, bet size, and outcome) about each game played are stored in a game database (referred to as *GameDB*). These details can be used for analytical purposes, such as determining the profitability of each game. There is a possibility that there will be more games added in the future.

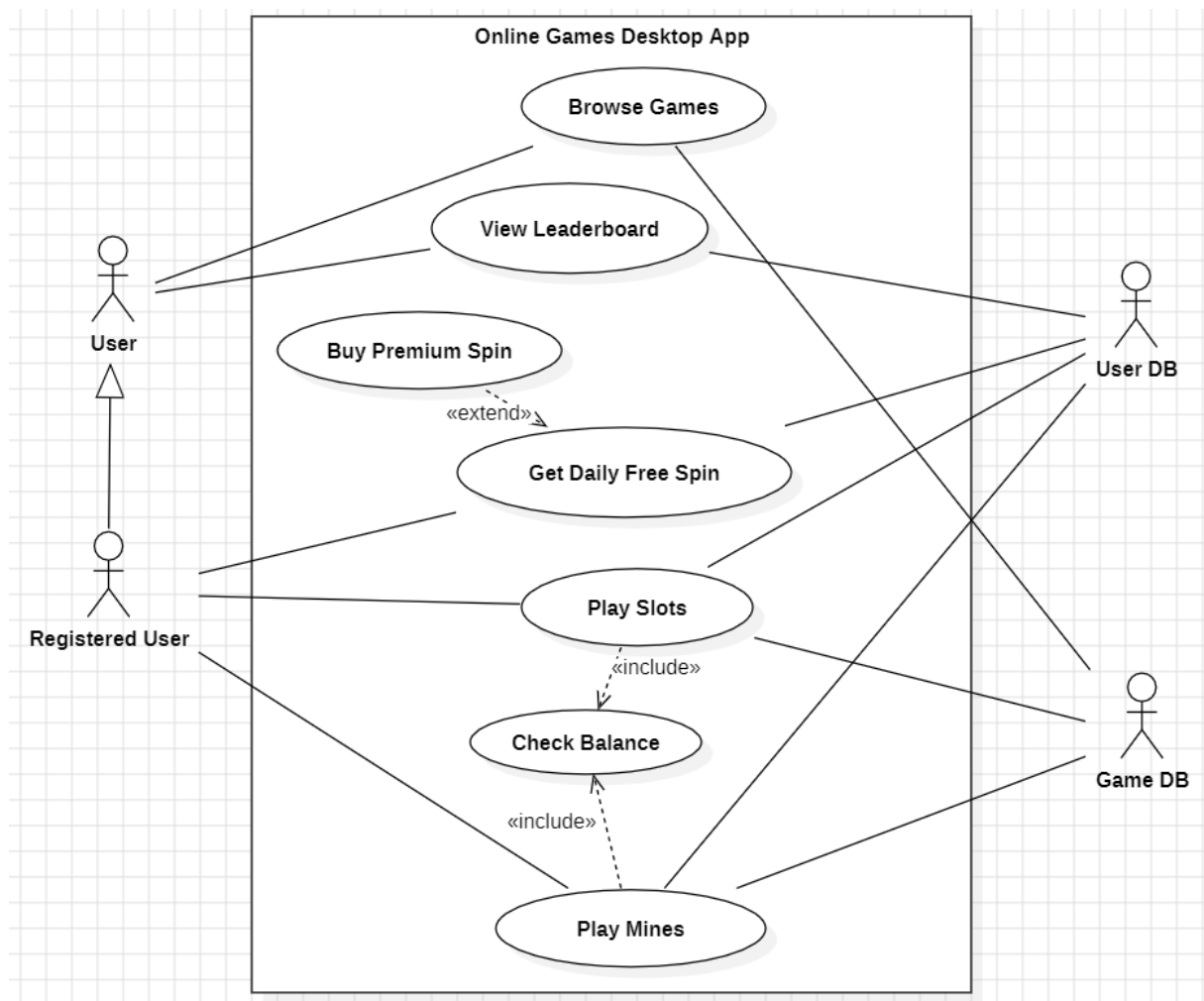
To increase participation, registered users are rewarded with one free spin on a Wheel of Fortune each day. This has mutual benefits. On one hand, a user has a chance to win extra money. On the other hand, this will motivate the user to come back each day, increasing user engagement.

Finally, another way to increase user engagement is by having a *Leaderboard*, which shows the top players, based on their earnings & performance within the game. This should motivate unregistered users to create an account, and registered users to keep trying their luck.

In conclusion, the system contains several features, such as the game catalogue, the games (slots and mines by now), and the *leaderboard*. What makes our system better is rewarding registered users with daily free spins.

The rest of this document provides UML diagrams to explain the technical aspects of our system.

## Use Case Diagram



## Scenario Tables

<b>Use case name:</b> Browse Games		<b>UniqueID:</b> SS-001
<b>Area:</b> Online Games Desktop App		
<b>Actor(s):</b> User		
<b>Description:</b> User browses available games		
<b>Triggering Event:</b> User has opened the application		
<b>Trigger type:</b> <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal		
<b>Steps Performed (Main Path)</b>		<b>Information for Steps</b>
1. User navigates to the game catalogue.		
2. User scrolls through the game catalogue.		
3. User selects a game and clicks on a “more info” button, which opens a new window with the game’s description.		Game, Description Window
4. User reads the game’s description.		Game, Description Window
5. User click on the “Play” button, which opens a new window with the selected game.		Game, Game Window
<b>Preconditions:</b> User has an installed application.		
<b>Postconditions:</b> A game has been selected.		
<b>Assumptions:</b> All games are stored locally.		
<b>Requirements met:</b> As a user I want to browse the game catalogue, so that I can choose a game to play.		
<b>Outstanding issues:</b> Updating and adding games may cause users having different versions		
<b>Priority:</b> High		
<b>Risk:</b> Low		

<b>Use case name:</b> View Leaderboard	<b>UniqueID:</b> SS-002
<b>Area:</b> Online Games Desktop App	
<b>Actor(s):</b> User, User DB	
<b>Description:</b> User views the leaderboard with top players (players with the largest winning amounts)	
<b>Triggering Event:</b> User clicks on the “View Leaderboard” button	
<b>Trigger type:</b> <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal	
<b>Steps Performed (Main Path)</b>	<b>Information for Steps</b>
1. Leaderboard window opens.	Leaderboard Window
2. Leaderboard entries are displayed.	Leaderboard Entries, User DB
3. User scrolls through the leaderboard.	Leaderboard Entries
4. User clicks on the “Refresh” button.	
5. Leaderboard entries are updated.	Leaderboard Entries, User DB
<b>Preconditions:</b> User is logged in into the system.	
<b>Postconditions:</b> User has viewed the current leaderboard.	
<b>Assumptions:</b> Database entries are sorted.	
<b>Requirements met:</b> As a user I want to view the leaderboard, so that I can see who has won & earned the most.	
<b>Outstanding issues:</b> Connecting to the database	
<b>Priority:</b> Low	
<b>Risk:</b> Low	

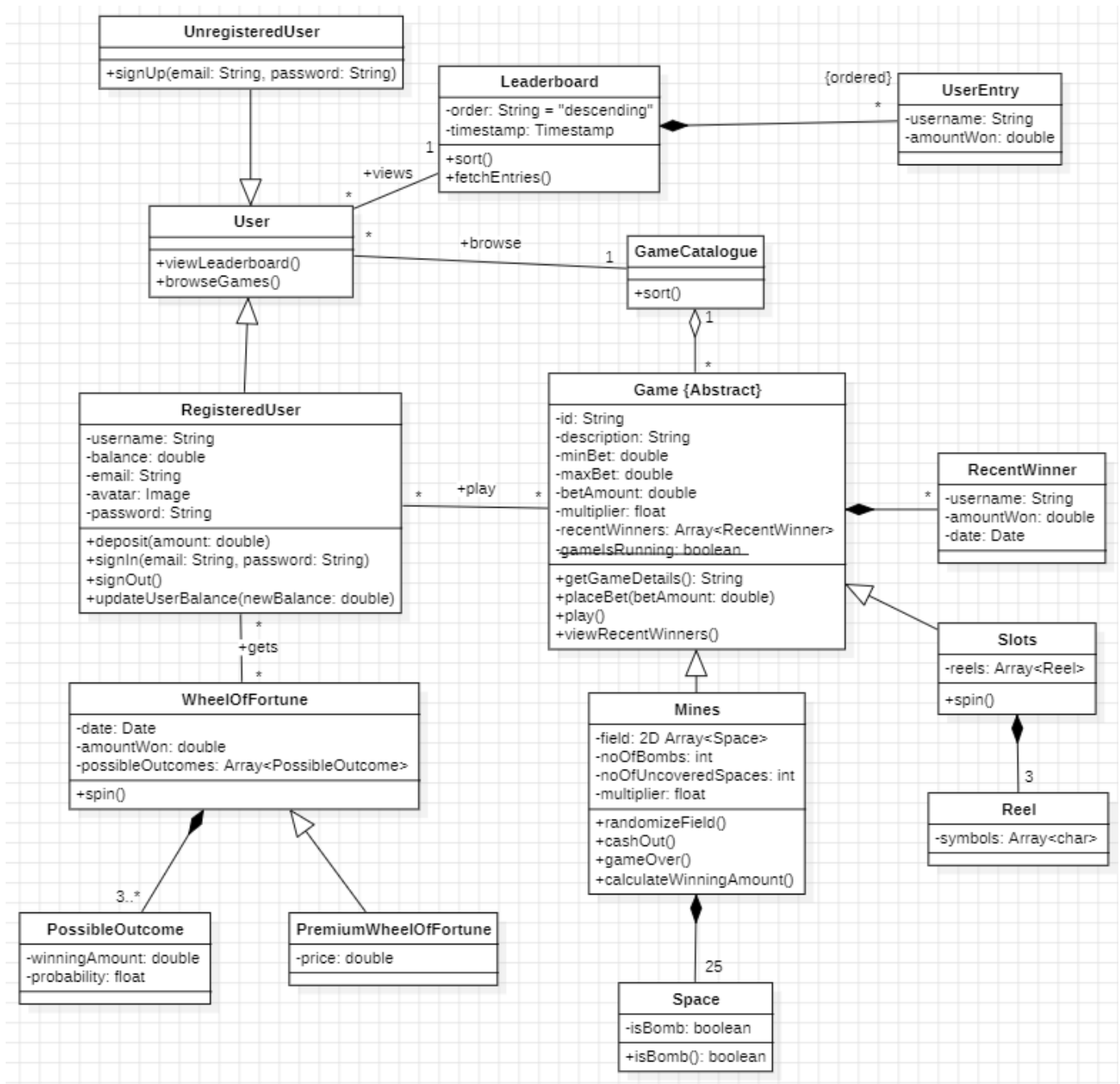
<b>Use case name:</b> Daily Free Spin	<b>UniqueID:</b> SS-003
<b>Area:</b> Online Games Desktop App	
<b>Actor(s):</b> Registered user, User DB	
<b>Description:</b> User gets one daily free spin on the Wheel of Fortune per day.	
<b>Triggering Event:</b> User logs in for the first day during the day	
<b>Trigger type:</b> <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal	
<b>Steps Performed (Main Path)</b>	<b>Information for Steps</b>
1. User is notified about the daily free spin.	Does user has a free spin available, Registered user
2. User clicks on the "Play Wheel of Fortune" button.	
3. A new window with the Wheel of Fortune is opened.	Wheel of Fortune Window
4. User clicks on the "Spin" button, which spins the wheel.	Wheel of Fortune
5. The winning amount is added to user's balance.	User DB
<b>Preconditions:</b> User has a registered account	
<b>Postconditions:</b> User has used his free daily spin and the User DB is updated	
<b>Assumptions:</b> User signs in for the first time in the day and the button allowing to spin the wheel is displayed properly	
<b>Requirements met:</b> As a registered user I want to get a free daily spin, so that I'll be able to spend more game's currency on playing the games.	
<b>Outstanding issues:</b> Connecting to User DB and making sure a day has been passed.	
<b>Priority:</b> Medium	
<b>Risk:</b> High	

<b>Use case name:</b> Play Slots	<b>UniqueID:</b> SS-004
<b>Area:</b> Online Games Desktop App	
<b>Actor(s):</b> Registered user, User DB, Game DB	
<b>Description:</b> User plays Slots	
<b>Triggering Event:</b> User has selected Slots from the game catalogue.	
<b>Trigger type:</b> <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal	
<b>Steps Performed (Main Path)</b>	<b>Information for Steps</b>
1. User selects the amount he wants to bet.	Betting amount, User DB
2. User clicks on the “Start” button, which spins the reels of the slot machine.	
3. The winning amount is added to user’s balance.	User DB, Game DB
4. User can play again with the same input or the user quits to update the amount entered previously and plays again	Betting amount, User DB, Game DB
<b>Preconditions:</b> User has logged into the system and opened the Slots window.	
<b>Postconditions:</b> User has played the game and User DB is updated.	
<b>Assumptions:</b> User has sufficient funds to start a game	
<b>Requirements met:</b> As a registered user I want to play Slots, so that I could win game’s currency money.	
<b>Outstanding issues:</b> Connecting to the database	
<b>Priority:</b> High	
<b>Risk:</b> High	

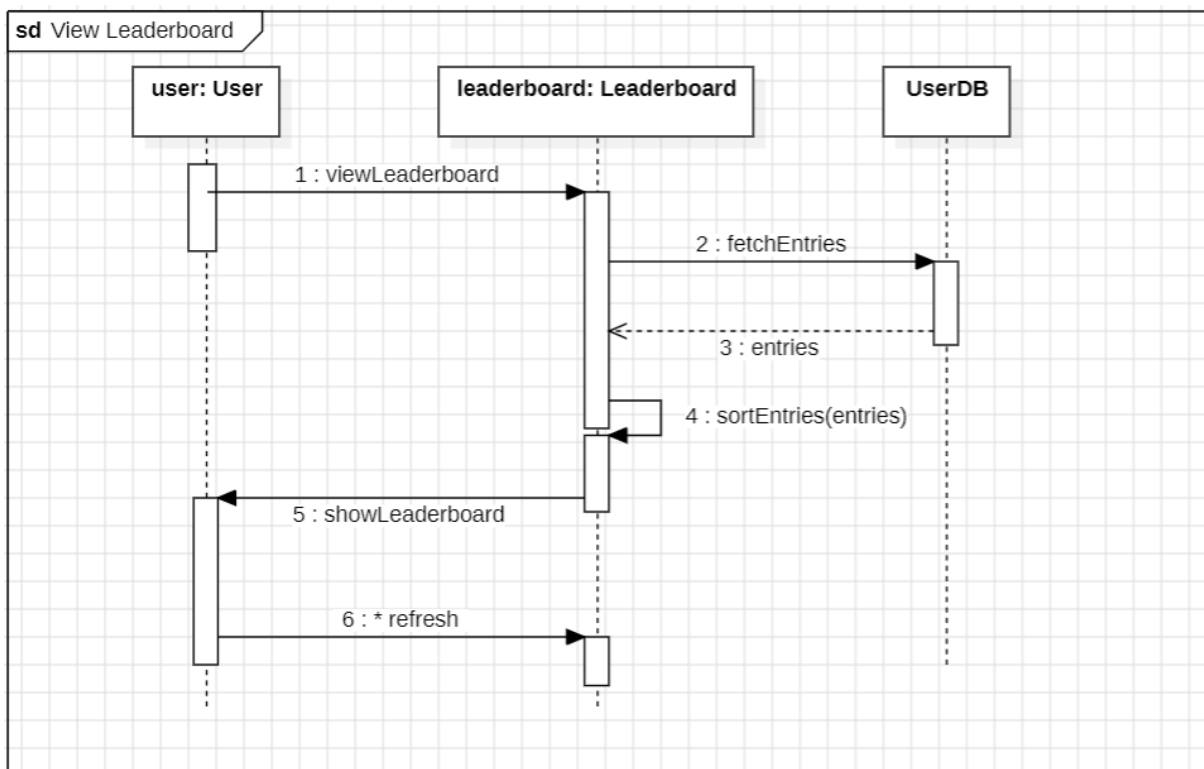
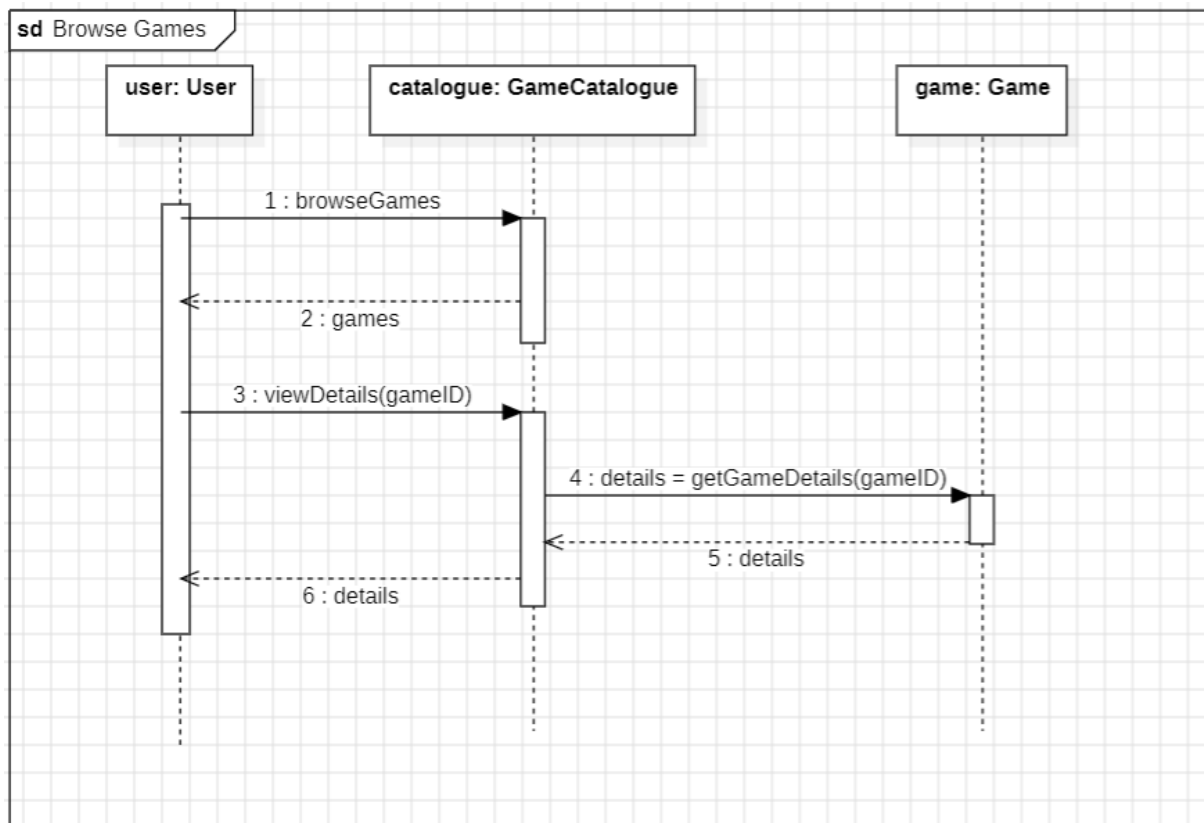


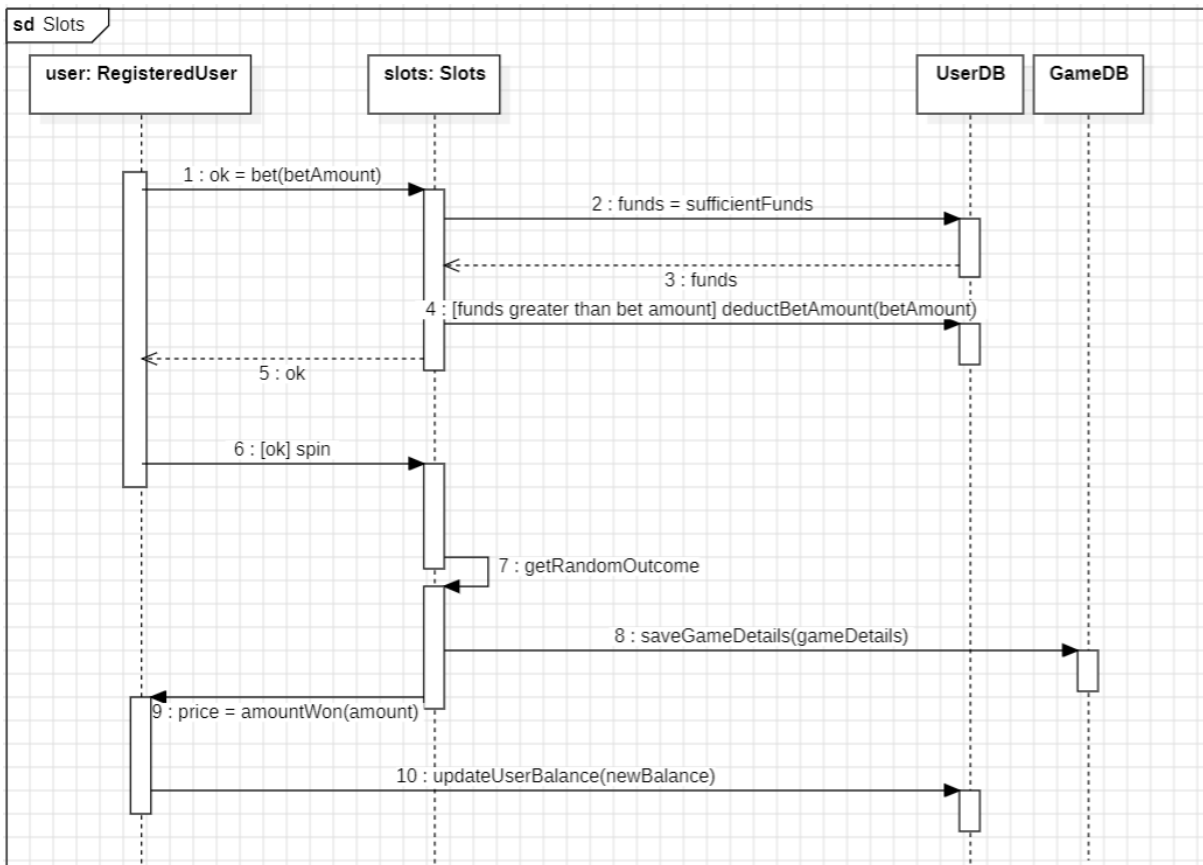
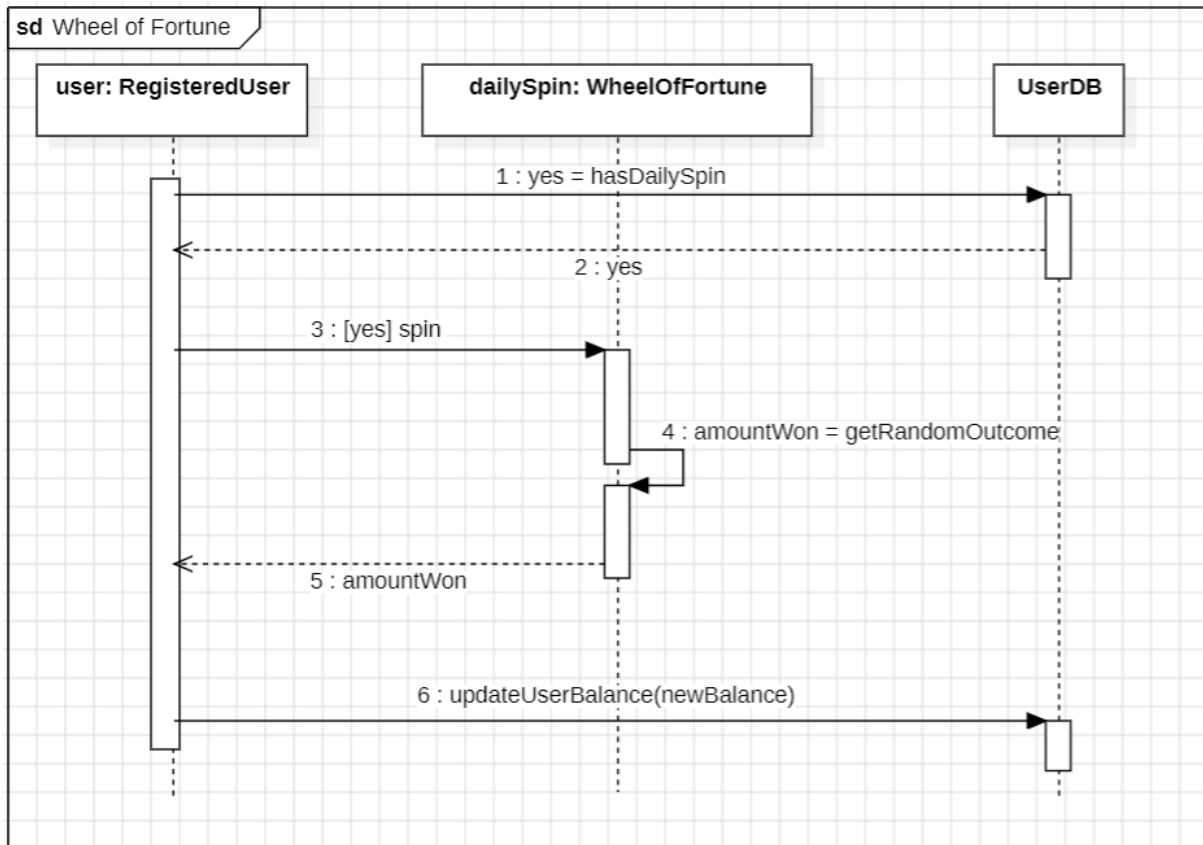
<b>Use case name:</b> Play Mines	<b>UniqueID:</b> SS-005
<b>Area:</b> Online Games Desktop App	
<b>Actor(s):</b> User, User DB, Game DB	
<b>Description:</b> User plays Mines	
<b>Triggering Event:</b> User has selected Mines from the game catalogue.	
<b>Trigger type:</b> <input checked="" type="checkbox"/> External <input type="checkbox"/> Temporal	
<b>Steps Performed (Main Path)</b>	<b>Information for Steps</b>
1. User selects the amount he wants to bet.	Betting amount, User DB
2. User clicks on the "Start" button.	
3. A 5X5 field is displayed.	Field
4. User clicks on one of the spaces that has not been uncovered yet.	Uncovered space – is it a bomb?
5. User keeps uncovering spaces until he encounters a bomb or wants to cash out.	Multiplier
6. If user want to cash out, he clicks on the "Cash out" button.	Multiplier, Game DB
7. User's balance is updated, depending on the entered amount as input and the number of spaces uncovered.	User DB, Multiplier, Betting amount
<b>Preconditions:</b> User has logged into the system and opened the Mines window	
<b>Postconditions:</b> User has played the game and User DB is updated.	
<b>Assumptions:</b> User has sufficient funds to start a game	
<b>Requirements met:</b> As a user I want to play mines, so that I could win game's currency money.	
<b>Outstanding issues:</b> Connecting to the database	
<b>Priority:</b> High	
<b>Risk:</b> High	

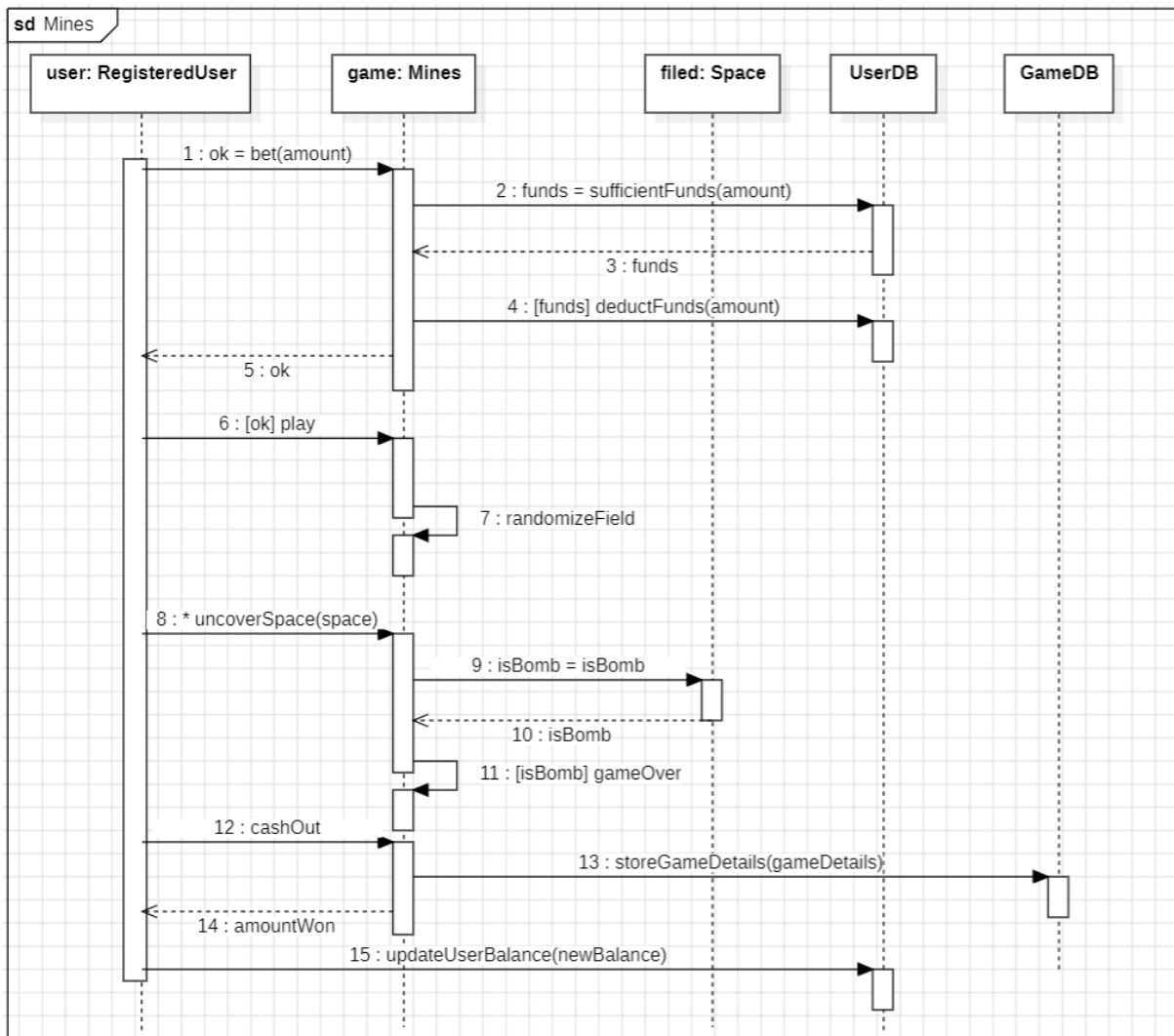
# Class Diagram



## Sequence Diagrams







## Message Analysis Tables

### Browse Games

Seq. Num	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1.	User	Catalogue	Browse Games	Synchronous	-	-
2.	Catalogue	User	Games	Synchronous	-	-
3.	User	Catalogue	View Details	Synchronous	Game ID	-
4.	Catalogue	Game	getGameDetails	Synchronous	-	-
5.	Game	Catalogue	Details	Synchronous	-	-
6.	Catalogue	User	Details	Synchronous	-	-

### View Leaderboard

Seq. Num	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constraint
1.	User	Leaderboard	viewLeaderboard	Synchronous	-	-
2.	Leaderboard	UserDB	fetchEntries	Synchronous	-	-
3.	UserDB	Leaderboard	Entries	Synchronous	-	-
4.	Leaderboard	Leaderboard	Sort Entries	Synchronous	Entries	-
5.	Leaderboard	User	Show Leaderboard	Synchronous	-	-
6.	User	Leaderboard	Refresh	Synchronous	-	-

### Wheel of Fortune

Seq. Num	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1.	Registered User	UserDB	Has Daily Spin	Synchronous	-	-
2.	UserDB	Registered User	Yes	Synchronous	-	-
3.	User	Wheel of Fortune	Spin	Synchronous	-	Yes==true
4.	Wheel of Fortune	Wheel of Fortune	Get Random Outcome	Synchronous	-	-
5.	Daily Spin	Registered User	Amount Won	Synchronous	Amount Won	-
6.	Registered User	UserDB	Update User Balance	Synchronous	New Balance	-

## Slots

Seq. Num	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1.	Registered User	Slots	Bet	Synchronous	Bet Amount	-
2.	Slots	UserDB	Sufficient Funds	Synchronous	-	-
3.	UserDB	Slots	Funds	Synchronous	-	-
4.	Slots	UserDB	Deduct Bet Amount	Synchronous	Bet Amount	-
5.	Slots	Registered User	Ok	Synchronous	-	-
6.	Registered User	Slots	Spin	Synchronous	-	Ok==true
7.	Slots	Slots	Get Random Outcome	Synchronous	-	-
8.	Slots	GameDB	Save Game Details	Synchronous	Game Details	-
9.	Slots	Registered User	Amount Won	Synchronous	Amount	-
10.	Registered User	UserDB	Update User Balance	Synchronous	New Balance	-

## Mines

Seq. Num	Caller	Callee	Msg Name	Msg Type	Msg Param	Msg Constrain
1.	Registered User	Mines	Bet	Synchronous	Bet Amount	-
2.	Mines	UserDB	Sufficient Funds	Synchronous	-	-
3.	UserDB	Mines	Funds	Synchronous	-	-
4.	Mines	UserDB	Deduct Bet Amount	Synchronous	Bet Amount	-
5.	Mines	Registered User	Ok	Synchronous	-	-
6.	Registered User	Mines	Play	Synchronous	-	Ok==true
7.	Mines	Mines	Randomize Field	Synchronous	-	-

8.	Registered User	Mines	Uncover Space	Synchronous	Space ID	-
9.	Mines	Space	Is Bomb	Synchronous	-	-
10.	Space	Mines	Is Bomb	Synchronous	-	-
11.	Mines	Registered User	Game Over	Synchronous	-	Is Bomb==true
12.	Registered User	Mines	Cash Out	Synchronous	-	-
13.	Mines	GameDB	Store Game Details	Synchronous	Game Details	-
14.	Mines	Registered User	Amount Won	Synchronous	-	-
15.	Registered User	UserDB	Update User Balance	Synchronous	New Balance	-



## Test Cases

ID	REQUIREMENT	PRECONDITIONS	TEST STEPS	EXPECTED RESULT
TC001	User gets only one free spin per day.	The user is registered.	<ol style="list-style-type: none"> <li>1. User logs in</li> <li>2. A window pops up, informing the user about the free spin</li> <li>3. User clicks the "Spin" button, which spins the Wheel of Fortune</li> <li>4. The winning amount is added to user's balance</li> <li>5. User signs out</li> <li>6. User logs in again</li> </ol>	Once a user has used his one free spin on the Wheel of Fortune, he doesn't get another free spin.
TC002	User cannot stop a game once the game has started	The user is registered.	<ol style="list-style-type: none"> <li>1. User selects a game from the game catalogue</li> <li>2. User clicks on the "Play", which opens a new window with the selected game.</li> <li>3. User selects an amount he wants to bet.</li> <li>4. User clicks on the "Start" button, which starts the game.</li> <li>5. User tries to close the application.</li> <li>6. A pop up appears, asking the user if he really wants to terminate the ongoing game.</li> </ol>	If user chooses to terminate the game, the outcome of the game is "loss". Otherwise, the game continues.
TC003	User cannot bet (nor play) without having sufficient funds (balance).	The user is registered, however the user balance does not contain sufficient funds to play any game, and has not deposited any money into his account.	<ol style="list-style-type: none"> <li>1. User selects a game from the game catalogue</li> <li>2. User clicks on the "Play" button, which opens a new window with the selected game.</li> <li>3. User selects an amount he wants to bet.</li> </ol>	The user is notified about insufficient funds. The "Start" button is disabled. A pop up window appears, asking the user to deposit money into his account.
TC004	Only registered users can play games.	The user has not registered.	<ol style="list-style-type: none"> <li>1. User selects a game from the game catalogue.</li> <li>2. User clicks on the "Play" button, which opens a new window with the selected game.</li> </ol>	User is notified that in order to play games, he must be registered. The "Start" button is disabled. A pop up window appears, asking the user to sign in.
TC005	The game of Mines ends when a user encounters a bomb.	User is registered and has selected the Mines game.	<ol style="list-style-type: none"> <li>1. User selects a betting amount.</li> <li>2. User click the "Start" button.</li> <li>3. User uncovers a single space on a 5X5 field at a time.</li> <li>4. After uncovering a space, the user encounters a bomb.</li> </ol>	The game ends. The user is not allowed to uncover another space. The betting amount is deducted from user's balance.