

I. Contributions of each team member

Taylor: Taylor wrote 10 functional requirements and 2 non-functional requirements. She also created the use case diagram and 2 use case specifications. Taylor developed the software and system architecture describing Stimulation, and provided a description of the architecture. She also modeled the class diagram, and created all the user interface descriptions for each in-app menu.

Abi: Abi wrote one use case specification. She planned and created the State Machine Diagram. She also made the sequence diagrams. She wrote 3 functional requirements and 1 non-functional requirements.

Sean: Sean wrote 5 functional requirements and 1 non-functional requirements. He also modeled the activity diagram. Sean helped write the Typeracer and Blind Date game interface descriptions as well.

Tanner: Tanner wrote 5 functional requirements and 1 non-functional requirement, and 4 use case specifications. He also created the entity-relationship diagram and described the data dictionary. Tanner also helped write the Find the Kiddo, Maze Runner, and Paint Picker game interface descriptions. He also helped create the sequence diagrams.

II. Requirements

Abi:

1. F - Users will be able to refuse to add to the leaderboard..
2. F - Users will be able to view personal stats on their account
3. F - Users will be able to view each game's leaderboard created
4. NF - Users will have their scores automatically saved to their accounts to view later

Taylor:

1. F - Users will be able to select which game they wish to play.
2. F - Users will be able to submit scores to each game's leaderboard if they score within the top 100 scores.
3. F - Users will be able to toggle sound on and off.
4. F - Users will be able to toggle notifications on and off.
5. F - Users will be able to set a timed notification as a reminder to play each day.
6. F - Users will have access to an English game - Bookworm.
7. F - Users will have access to an English game - Editor.
8. F - Users will have access to a problem solving game - Maze Runner.
9. F - Users will be able to pause games.
10. F - Users will be able to access Settings from Pause screen.
11. NF - Users will be able to see which disabilities each game can help target.
12. NF - User interface will utilize high contrast and complementary colors to keep users engaged and stimulated.

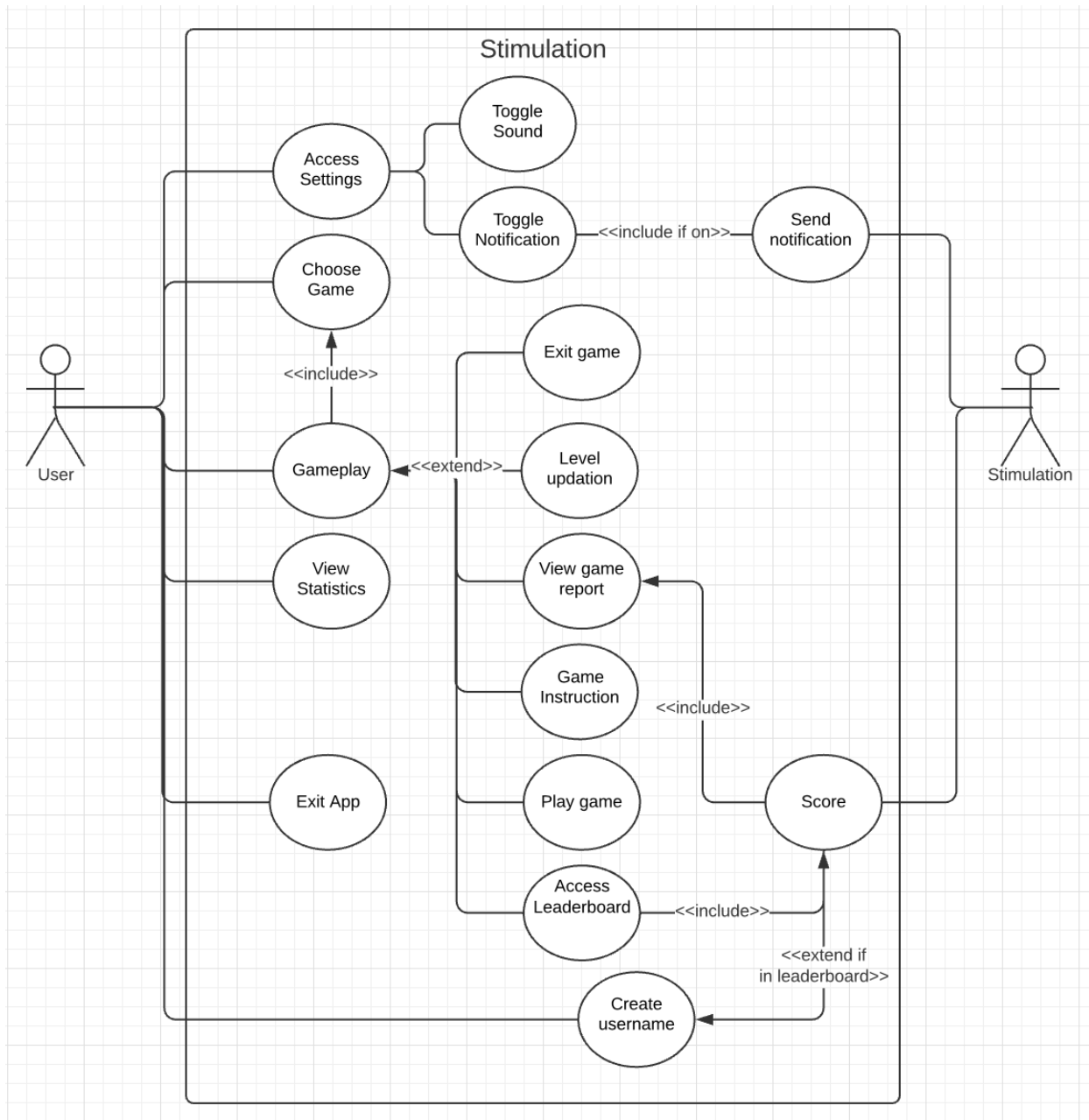
Tanner:

1. F - Users will be able to enter a username to create their account for leaderboard entries.
2. F - Users will have access to a memory game - Paint Picker.
3. F - Users will have access to a typing game.
4. F - Users will be able to track their personal progress privately.
5. F - Users will be able to access a leaderboard system for each game.
6. NF - Users will be provided a completely cost and advertisement free experience.

Sean:

1. F - User will be required to have an online connection if adding to the leaderboard
2. F - User will have access to a problem solving game - Space Oddity.
3. F - User will have access to a memory game - Find the Kiddo.
4. F - User will have access to a math game - Quick Change.
5. F - User will be able to view their percentile based on existing scores
6. NF - User will be able to instantly compare themselves to top 100 users before them.

III. Use Cases of the Software System



A. Use Case Diagram

B. Use case specifications

Use case name: Access Settings

Summary: User accesses a settings menu to change sound and notification preferences

Actor: User

Precondition: User is on the main menu

Main sequence:

1. User clicks "Settings" button
2. Both the "Toggle Sound" and "Toggle Notification" buttons are displayed with their current statuses (enabled or disabled)
3. User clicks a "Back" button to exit the Settings menu.

Alternative sequence:

3. User completes "Toggle Sound" or "Toggle Notifications"

Postcondition: The settings menu is displayed

Use case name: Toggle Sound

Summary: User can enable or disable sound through a toggle button and display their chosen setting

Actor: User

Precondition: User is in the settings menu (Access Settings)

Main sequence:

1. User clicks "Toggle Sound" button
2. Stimulation is either muted or unmuted based on previous sound setting
3. "Toggle Sound" indicates new status of sound setting

Alternative sequence:

N/A

Postcondition: The sound setting is either enabled/disabled based on the user's actions.

Use case name: Toggle Notification

Summary: User can enable or disable notifications through a toggle button and display their chosen setting

Actor: User

Precondition: User is in the settings menu (Access Settings)

Main sequence:

1. User clicks "Toggle Notification" button
2. Stimulation may send notifications, or have permission to send notifications revoked based on previous notification setting
3. "Toggle Notification" indicates new status of notification setting

Alternative sequence:

N/A

Postcondition: The notification setting is either enabled/disabled based on the user's actions.

Use case name: Send Notification

Summary: A push notification is sent to the user's device

Actor: Stimulation

Precondition: User has notifications enabled (Toggle Notification) and system clock is at designated time for daily reminder

Main sequence:

1. Device sends a push notification

Alternative sequence:

N/A

Postcondition: A push notification has been sent to the device

Use case name: Gameplay

Summary: Users will be able to play games.

Actor: User

Precondition: User must select the game from the main screen.

Main sequence:

1. Game Instruction interface will be opened.
2. User will select "Play Game".
3. User plays game.
4. Game ends.

Alternative sequence:

2. User selects "Back" and exits to main screen.
3. User can pause mid-game and access settings.

Postcondition: User played game.

Use case name: View Statistics

Summary: User will be able to view personal statistics

Actor: User

Precondition: N/A

Main sequence:

1. User will be able to view statistics such as best score per game and how many games they have played.

Alternative sequence:

N/A

Postcondition: User viewed statistics.

Use Case Name: View Leaderboards

Summary: User will be able to view leaderboards per game.

Actor: User

Precondition: User selects a game to view that particular leaderboard.

Main sequence:

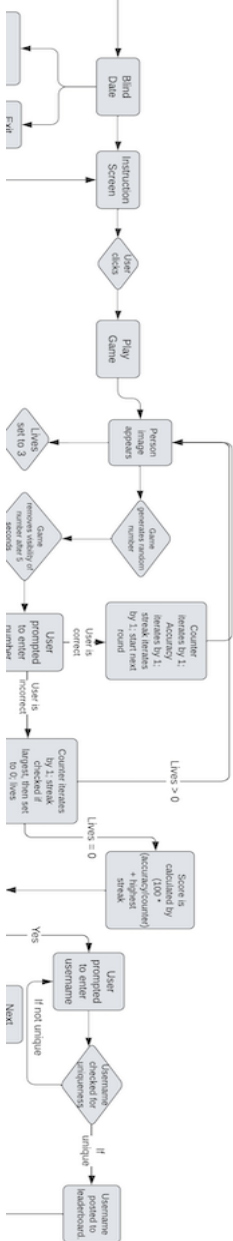
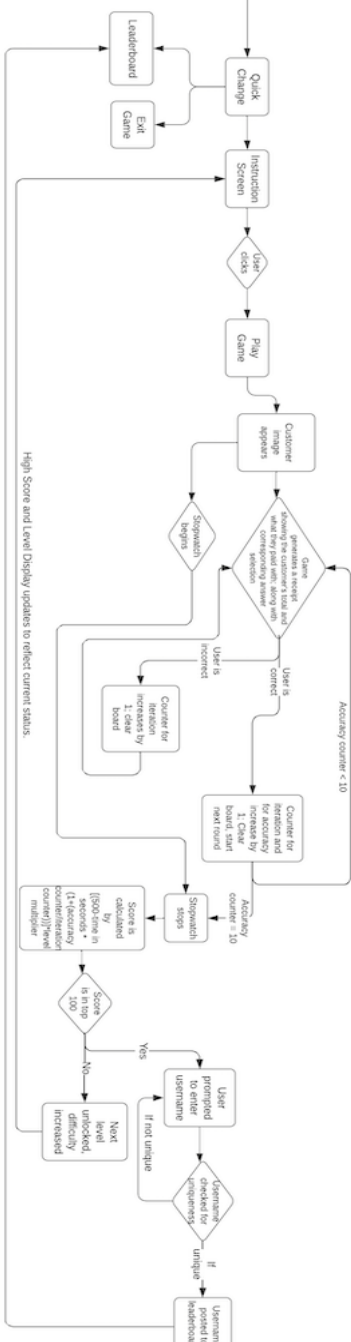
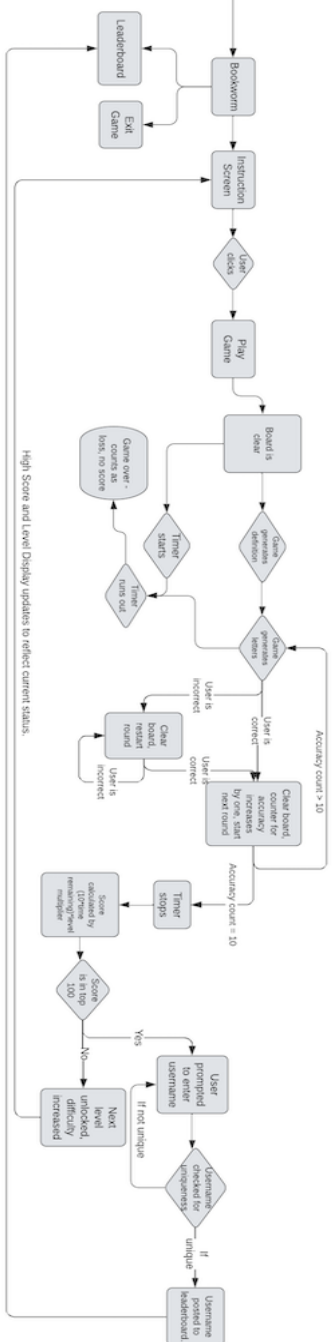
1. User selects the leaderboard button.
2. User will view leaderboard best scores of the selected game.

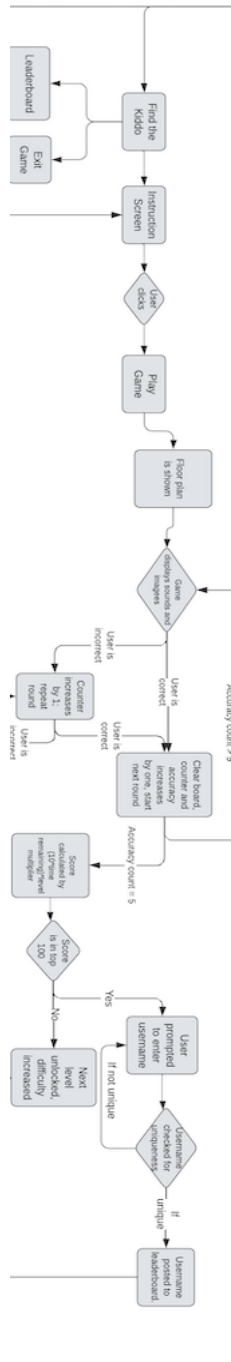
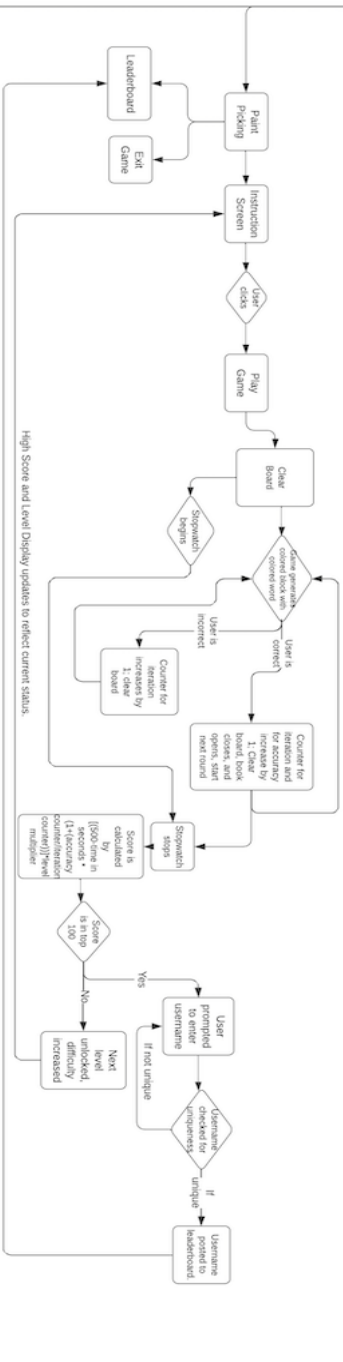
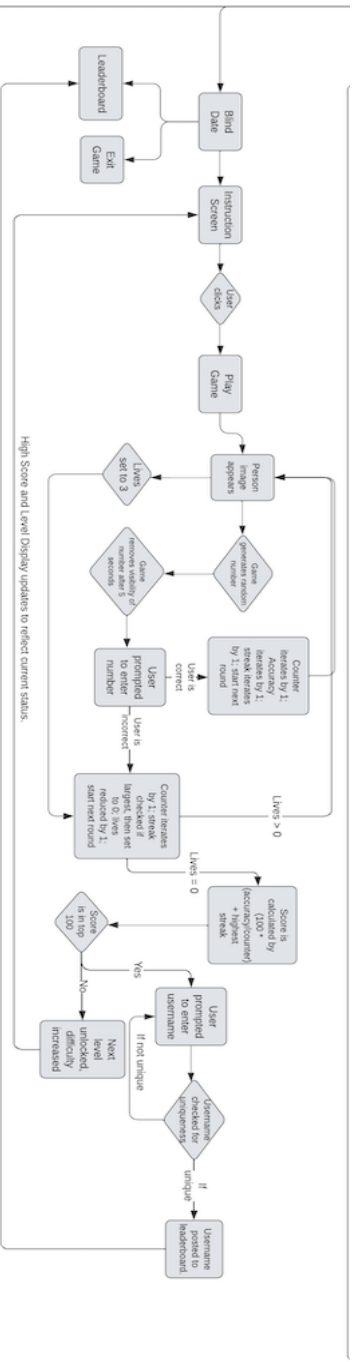
Alternative sequence:

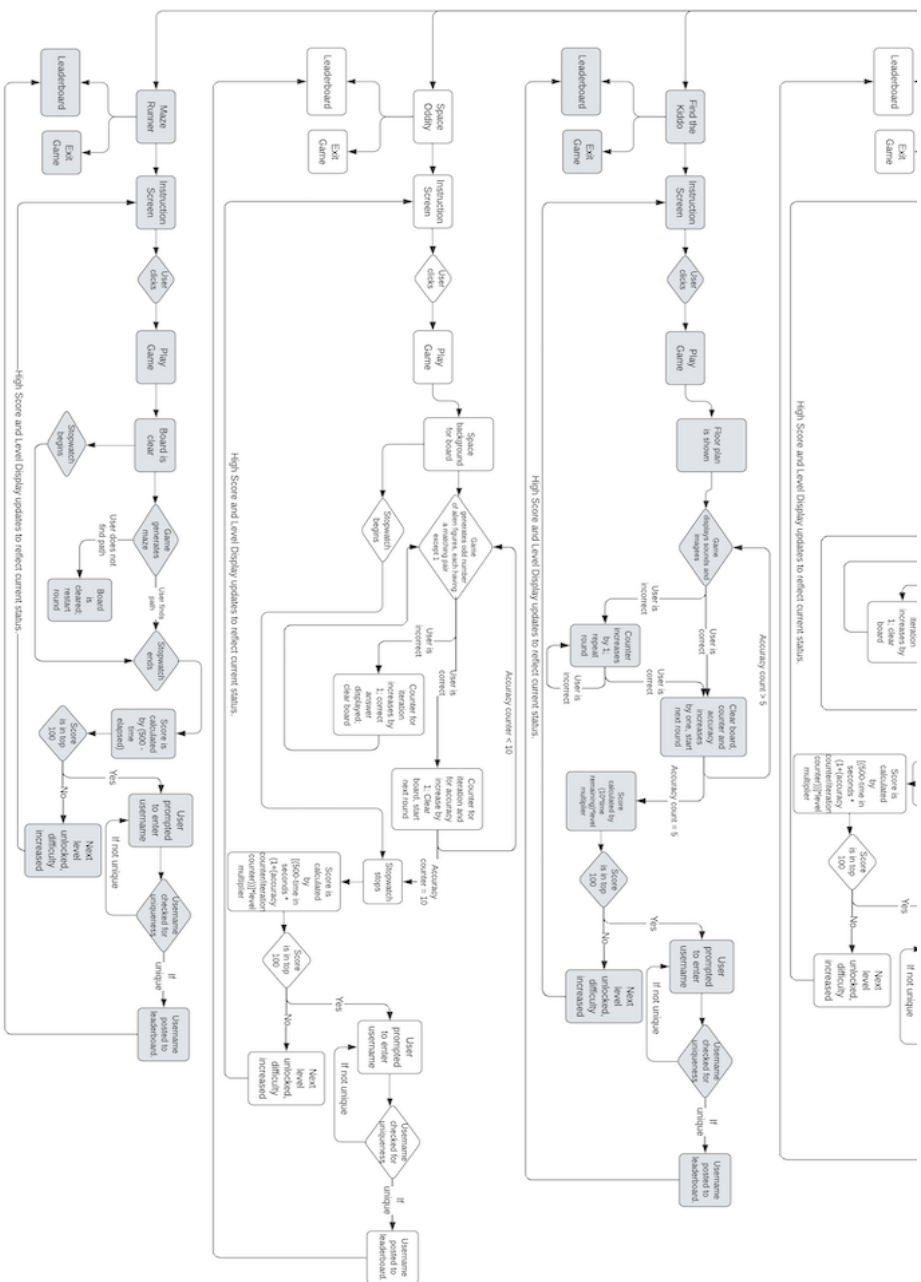
1. User does not select the leaderboard button.

Postcondition: User viewed leaderboard scores for the selected game.

[illegible]







Above is a construction of our software architecture for the application Stimulation. Upon running the application, the user is met with the Main Menu user interface. The main menu consists of a Settings button and a list of games. If a user clicks on the Settings button, the Settings Menu interface will appear. In a list, a Sound Toggle, Notifications Toggle, and Daily Reminder input, and Back Buttons. Sound toggle will control whether the sounds play or not. Notifications toggle will control a single daily reminder notification. If toggled off, the Daily Reminder input will be disabled. If toggled on, the Daily Reminder input is enabled, and a user may choose what time the reminder is pushed to notifications. The Back button exits the Settings interface to the previous screen.

The list of games is actually a construct of Buttons, all within a Scrolling container. Each game will have an assigned button, and they will be sorted alphabetically within genre sections. Some games will be repeated within different genres, if they fit in multiple. The following genres will be used: English, Focus, Math, Memory, Problem Solving, and Reaction

English games will include Bookworm and Editor.

When a user clicks Bookworm, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *Are you a bookworm? Use the letters to find the word matching the definition! This game may help those with dyslexia to improve symptoms with continued use over time.* The interface includes a Button labeled “Play Game”. When a user clicks “Play Game”, the Game Instruction interface will close and the Gameplay interface will open. A countdown timer will begin. Stimulation will generate a definition, along with scrambled letter blocks that form the matching word. There is a text input box in which the user will input their answer. If correct, the board clears, a counter is increased by one, and the next set is generated. If incorrect, their input is cleared, and the user is prompted to answer again. If the user finishes 10 levels before the timer runs out, the timer stops, and the player’s score is calculated. This is done by the following formula:

$$score = (10 * time\ remaining) * level\ multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user’s submissions to the scoreboard in other games within Stimulation.

When a user clicks Editor, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *This author needs your help! Unscramble the author's spelling errors as fast as you can! This game may help those with dyslexia to improve symptoms with continued use over time.* The interface includes a Button labeled "Play Game". When a user clicks "Play Game", the Game Instruction interface will close and the Gameplay interface will open. A book laid open will be the background. A stopwatch will begin. Stimulation will generate a sentence with a scrambled word. There is a text input box in which the user will input their answer. If correct, the board clears, a counter for iteration and accuracy are increased by one, and the next set is generated. If incorrect, a counter for iteration is increased by one, their input is cleared, and the user is prompted to answer again. If the counter for accuracy reaches 10, the stopwatch stops, and the player's score is calculated. This is done by the following formula:

$$score = [(500 - time) * (1 + (accuracy/iteration))] * level multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user's submissions to the scoreboard in other games within Stimulation.

Focus games will include Find the Kiddo and Paint Picking.

When a user clicks Find the Kiddo, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *Listen to the sound of the toddler's giggles as they run through the house, and follow their path! This game may help those with ADHD to improve symptoms with continued use over time.* The interface includes a Button labeled "Play Game". When a user clicks "Play Game", the Game Instruction interface will close and the Gameplay interface will open. A stopwatch timer will begin. A basic floor plan of a home will be the background. Stimulation will display sounds and images in the rooms in a pattern. The user will then tap the rooms, following the pattern. If correct, the board clears, a counter for iteration and accuracy are increased by one, and the next set is generated. If incorrect, a counter for iteration is increased by one, their input is cleared, and the user is prompted to answer again. If the counter for accuracy reaches 5, the game ends, and the player's score is calculated. This is done by the following formula:

$$score = (10 * time remaining) * level multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user's submissions to the scoreboard in other games within Stimulation.

When a user clicks Paint Picking, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *Your partner needs help painting! Memorize the color you see, not the color you read! This game may help those with ADHD or Alzheimer's to improve symptoms with continued use over time.* The interface includes a Button labeled "Play Game". When a user clicks "Play Game", the Game Instruction interface will close and the Gameplay interface will open. A colored box will appear with a contrasting word (name of a color) inside. A timer will begin. The box will disappear after 5 seconds. There is a text input box in which the user will input their answer. If correct, the board clears, a counter for iteration and accuracy are increased by one, and the next box is generated. If incorrect, a counter for iteration is increased by one, their input is cleared, and the next box is generated. When the timer reaches zero, the game ends, and the player's score is calculated. This is done by the following formula:

$$score = (500 - time) * (accuracy/iteration) * level multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user's submissions to the scoreboard in other games within Stimulation.

Math games will include Quick Change.

When a user clicks Quick Change, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *Customers want their change in this fast paced subtraction cafe! This game may help those with ADHD to improve symptoms with continued use over time.* The interface includes a Button labeled "Play Game". When a user clicks "Play Game", the Game Instruction interface will close and the Gameplay interface will open. A stopwatch timer will begin. A receipt will appear with the customer's total and what they paid with. 4 Buttons will appear with different answers that the user will select from. If correct, the board clears, a counter for iteration and accuracy are increased by

one, and the next receipt is generated. If incorrect, a counter for iteration is increased by one, their input is cleared, and the next receipt is generated. When the accuracy counter reaches 10, the game ends, the stopwatch stops, and the player's score is calculated. This is done by the following formula:

$$score = [(500 - time) * (1 + (accuracy/iteration))] * level multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user's submissions to the scoreboard in other games within Stimulation.

Memory games will include Blind Date, Find the Kiddo, and Paint Picking.

When a user clicks Blind Date, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *You went on a blind date that went great! Memorize their number to call them later! This game may help those with Alzheimer's to improve symptoms with continued use over time.* The interface includes a Button labeled "Play Game". When a user clicks "Play Game", the Game Instruction interface will close and the Gameplay interface will open. The shadow of a person will appear, and the user's lives are set to 3. A number will appear on the screen and stay for 5 seconds before disappearing and a text input box will appear in which the user will input their answer. If correct, the board clears, a counter for streak is increased by one, and the next number is generated. If incorrect, the current value of streak is stored in a variable maxStreak (if more than current value of maxStreak) then set to 0, user lives will reduce by one, and the next number is generated. When the user lives reaches zero, the game ends, and the player's score is calculated. This is done by the following formula:

$$score = (100 * maxStreak) * level multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user's submissions to the scoreboard in other games within Stimulation.

Problem Solving games will include Bookworm, Maze Runner, and Space Oddity.

When a user clicks Maze Runner, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *Find the way out as quickly as you can! This game may help those with ADHD to improve symptoms with continued use over time.* The interface includes a Button labeled “Play Game”. When a user clicks “Play Game”, the Game Instruction interface will close and the Gameplay interface will open. A stopwatch will begin. Stimulation will generate a maze. User must find a path as quickly as possible. If incorrect, the input is cleared. Game does not end until a pathway is found. Once a pathway is found, the stopwatch stops, and the game ends. This is done by the following formula:

$$score = (500 - time) * level multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user’s submissions to the scoreboard in other games within Stimulation.

When a user clicks Space Oddity, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *Choose the odd-alien out in this space-themed problem solving game! This game may help those with ADHD to improve symptoms with continued use over time.* The interface includes a Button labeled “Play Game”. When a user clicks “Play Game”, the Game Instruction interface will close and the Gameplay interface will open. A stopwatch will begin. Stimulation will generate images of aliens to appear on the screen. Each alien will have a corresponding match except for one. The user must click the odd alien out. If correct, the board clears, a counter for iteration and accuracy are increased by one, and the next set is generated. If incorrect, the odd alien is revealed, and a counter for iteration is increased by one, and the next set is generated. If the counter for accuracy reaches 10, the stopwatch stops, and the player’s score is calculated. This is done by the following formula:

$$score = [(500 - time) * (1 + (accuracy/iteration))] * level multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user’s submissions to the scoreboard in other games within Stimulation.

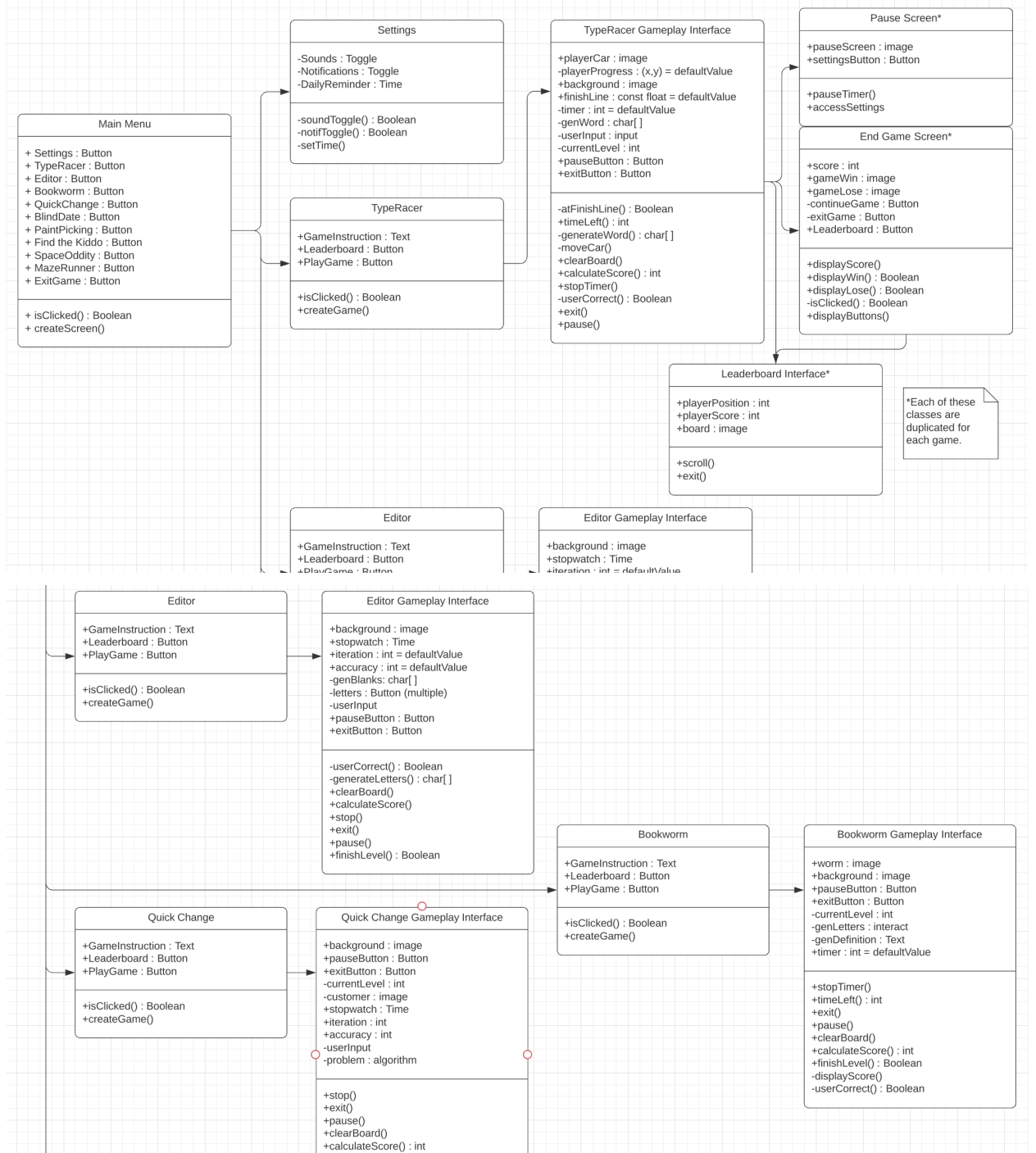
Reaction games will include Type Racer and Blind Date.

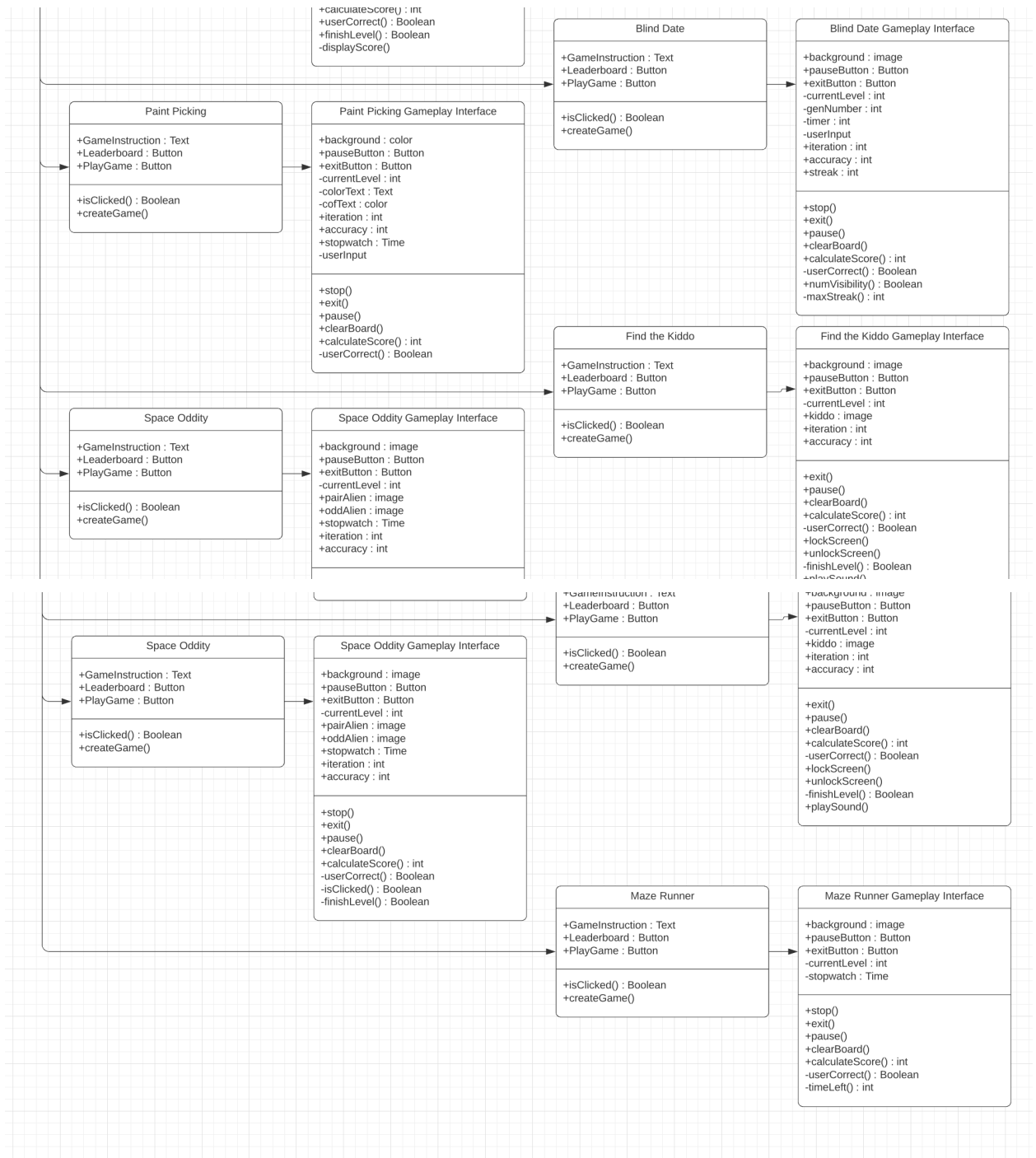
When a user clicks Type Racer, the Game Instruction interface is opened. This interface consists of a Text containing a description of how to play the game. The description is as follows: *Test your typing skills in this race against time! This game may help those with dyslexia to improve symptoms with continued use over time.* The interface includes a Button labeled “Play Game”. When a user clicks “Play Game”, the Game Instruction interface will close and the Gameplay interface will open. On the left of the screen, there will be a racecar. In the top center, there will be a countdown timer. The finish line will appear on the right after a few rounds. Stimulation will generate a word. The user must then type the word as quickly as possible without errors. If done correctly, the race car will move forward, and the game continues. If typed incorrectly, the race car will not move, and the user input will clear. The game will prompt the user to type the same word again. If the timer runs out before the user reaches the finish line, the game is over. If the user makes it to the finish line before the timer reaches zero, their score is generated with the following formula:

$$score = (500 - time\ remaining) * level\ multiplier$$

There is a particular score threshold for this game. If the user surpasses this threshold, they move up a level, and the difficulty is increased. Then, if the score is within the top 100 of the scoreboard. The user will be prompted to create a unique username. This username will be stored in the database and used for this user’s submissions to the scoreboard in other games within Stimulation.

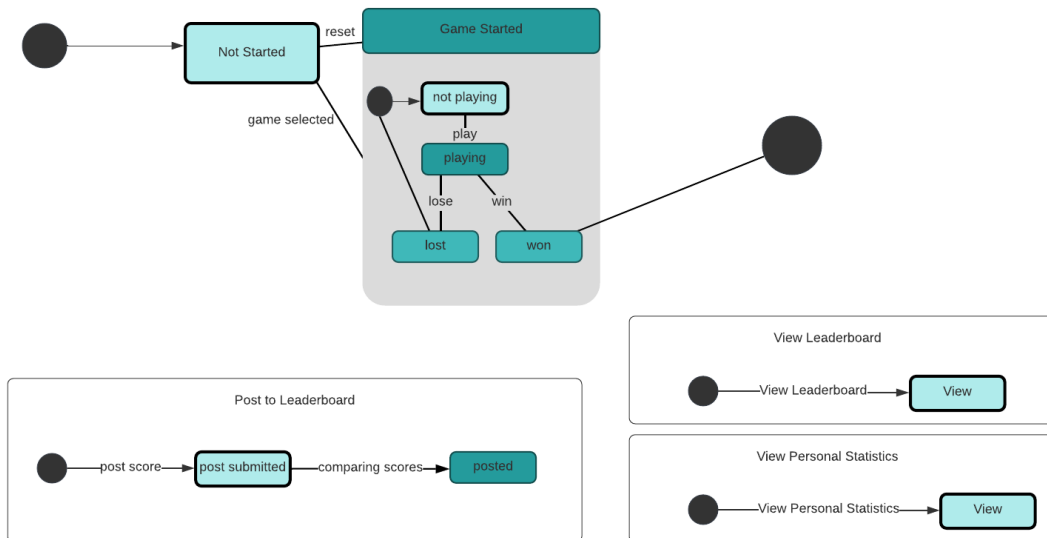
V. Static Structure of the Software - Class Diagram



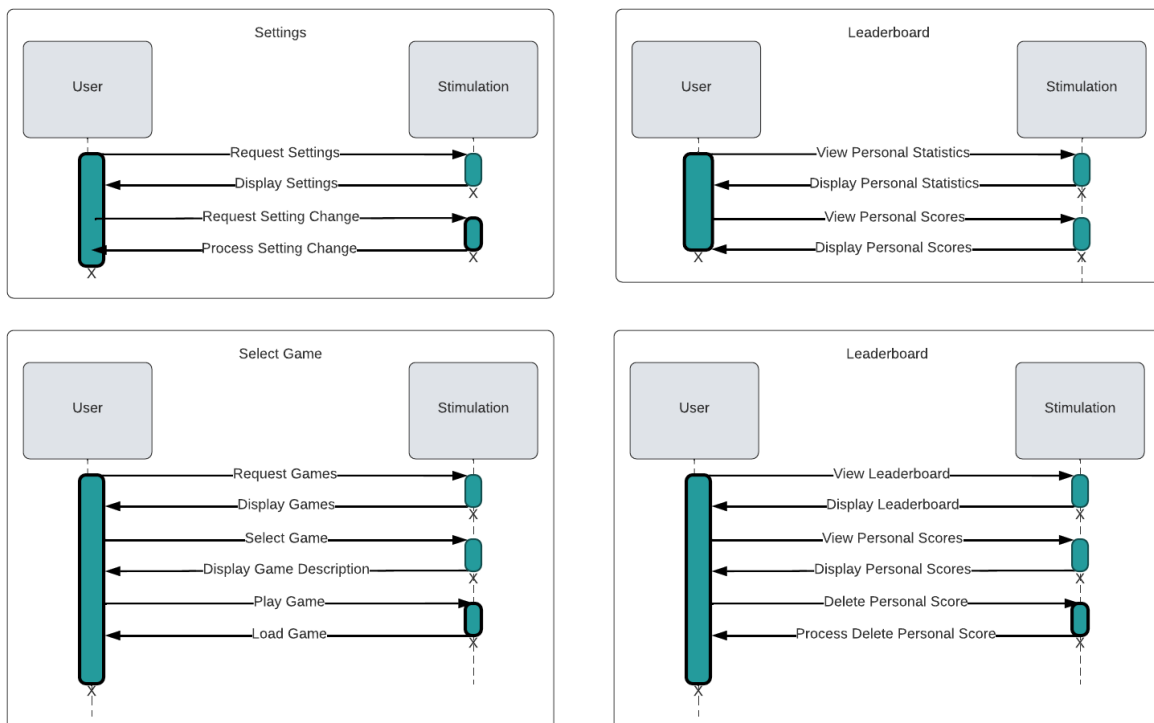


VI. Dynamic Structure of the Software

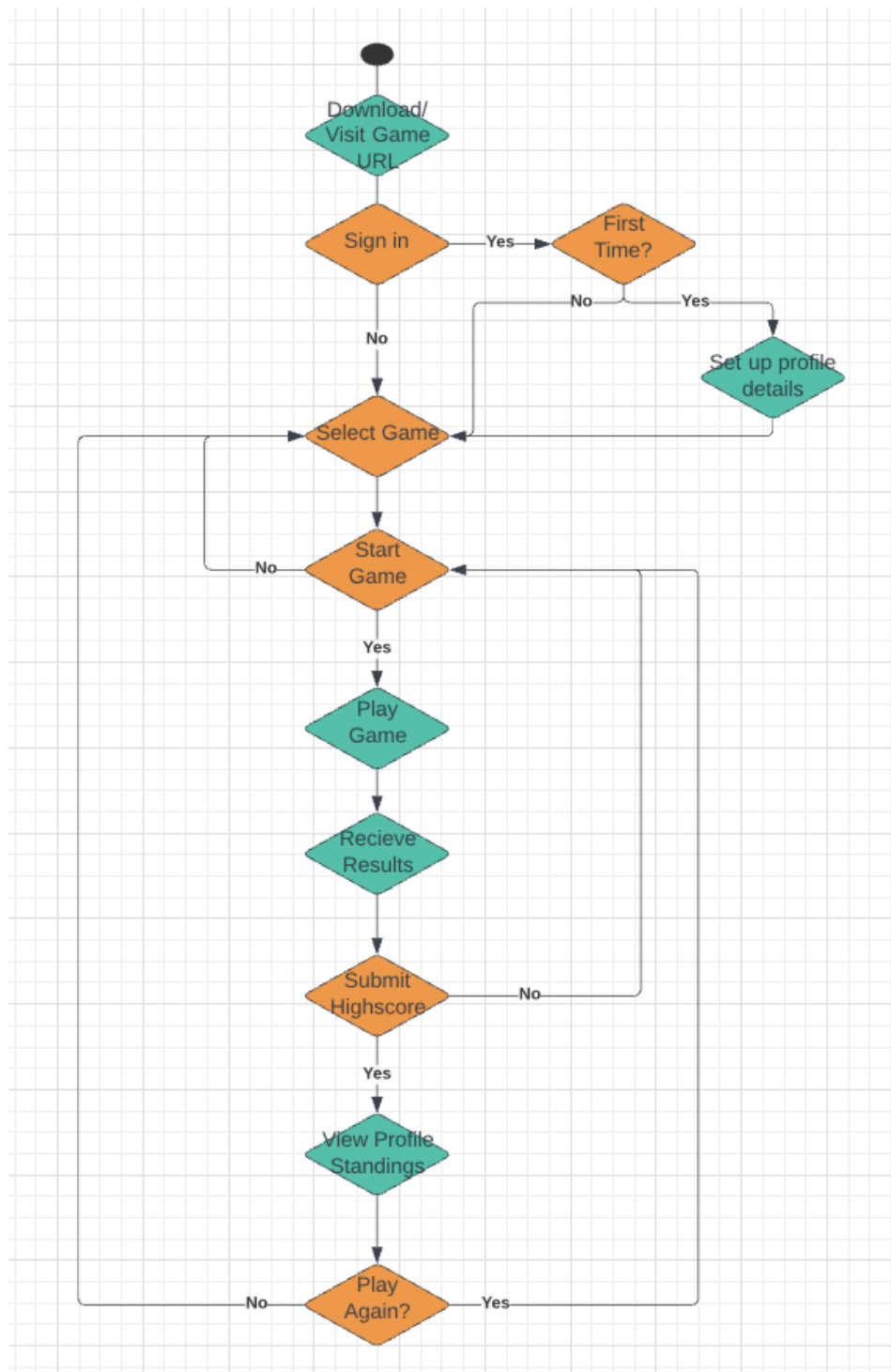
A. State machine



B. Set of sequence diagrams



C. Activity diagram



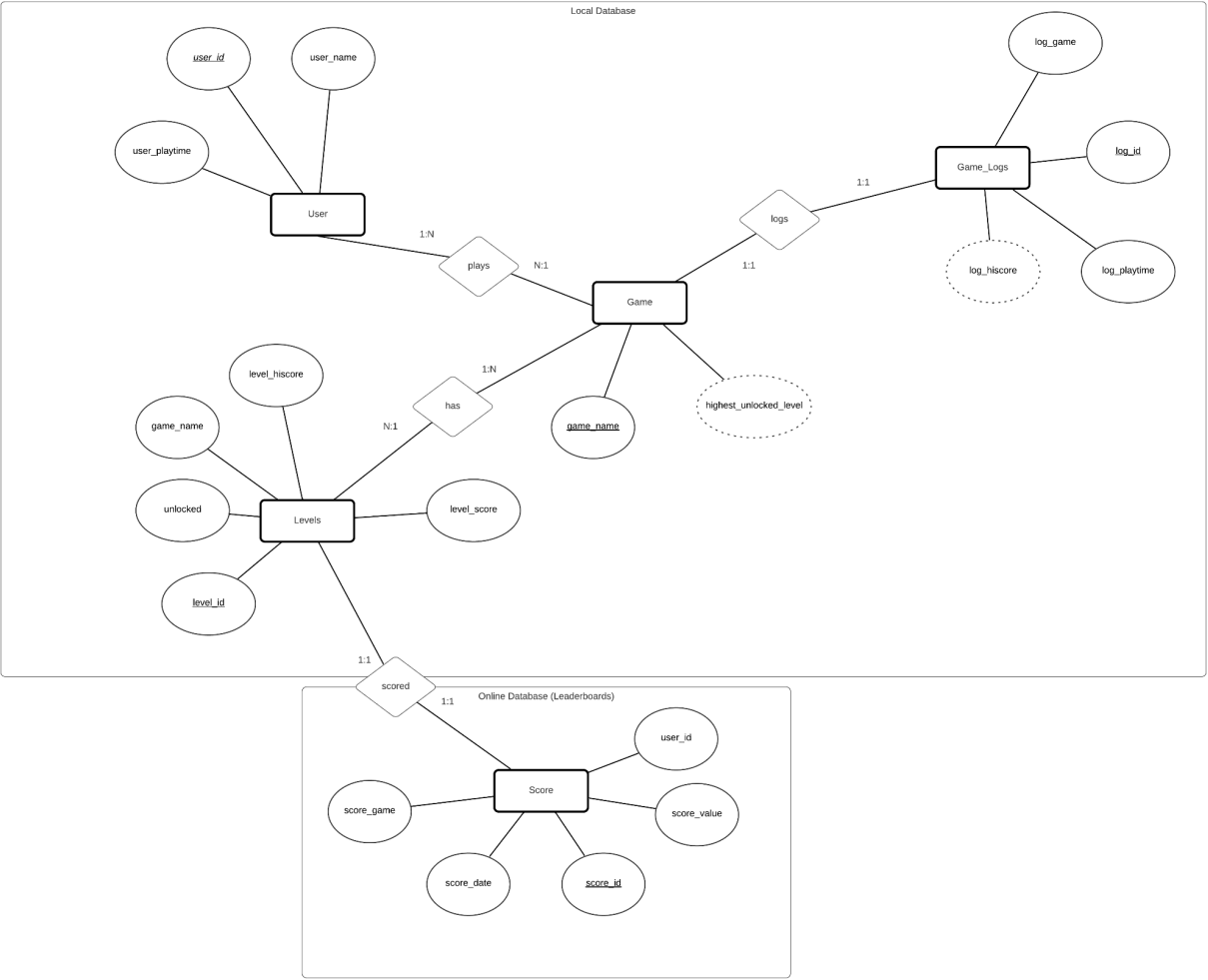
VII. Database Design

Stimulation will feature 2 separate databases to complete 2 major functionalities desired in our system. The first requirement that we have for our database is a feature to save the user's progress. We do not want to require an internet connection for use of Stimulation, so the first database will be locally hosted on the device to ensure that progress saves even during offline play. Basic game data related to several aspects will be saved in this manner.

The user's data will be saved, including their username, their id, and their playtime statistics. Game data will also be saved, with the game's name being used as an identifier to keep track of the farthest progress of each individual game. Our save/load system will not save progress in the middle of a puzzle or game, but will store the last level completed in each game, even during offline play. This we don't predict will create an issue because each of our games are only intended for short 5-10 minute intervals, so not much progress will be lost if the app is terminated in the middle of a game. Each game will have multiple levels, which will also store some important data. The primary attribute will be a level identifier for simplicity of the database. It will also store a foreign key tying it to the game it belongs to. Another attribute will be a simple boolean unlocked, stating whether or not that level has been unlocked by the user. There will be several unlock conditions which will vary from game to game, such as speed in solving or completing the previous level. A level score will also be stored for each completed level, alongside a level high score. These will be taken into account for the scoring process for the leaderboards. Each game will also keep a log, tracking player progress. Each log will be tied to a game, and keep track of the player's playtime for that game, and their cumulative high score for the game.

The online database will be completely related to the scoring system for the leaderboards. To maintain the leaderboard system, we will be using the offline and online databases, and they will communicate with each other to get the user's scores from the Levels attribute, and when they do have an internet connection they will be able to push their scores onto the leaderboard. The online database's only entity is the score entity, in which it will store a score identifier as its primary key. It will have foreign keys tying each score to the user who uploaded the score and to what game that score is for. The score will also have an upload date so that the leaderboard can have filters to organize the scores.

A. Entity relationship Diagram



VIII. User Interfaces

Main Screen

The main screen will have a bar at the top of the screen. On this bar, there will be a button for Statistics on the left and a button for Settings on the right. Below the bar, a scrolling container will contain a button for each of the games Stimulation has to offer. User input will require the user to touch one of the buttons listed above. If a user clicks Statistics, the Statistics interface will appear. This interface includes text boxes detailing the user's statistics. There is a back button in the top right corner, which user must press to exit the Statistics interface. If a user clicks Settings, the Settings interface will be opened (look at Settings for details). If a user selects a game, the corresponding Game Instruction interface will open (look at Game Instruction interface for details).

Settings

The settings interface will consist of multiple text boxes and toggle switches. The first is for Sound. The user will be able to toggle the sound on and off. If the user toggles sound off, all music, game, and ambient sounds will be disabled. When toggled on, all sounds will be enabled. The second will be for Notifications. The user will be able to toggle notifications on and off. If the user toggles notifications off, the third text box containing Daily Reminder, and its corresponding time input will be disabled. If the notifications are toggled on, the before mentioned text box and input is enabled. When the Daily Reminder text box is enabled, the user will be able to set a time for when they wish to have a push notification sent to their device. Once set, the user will receive a single push notification at the chosen time to remind them to play Stimulation. There will be a back button in the top right corner that will allow users to exit Settings and return to the previous screen.

Game Instruction

The Game Instruction interface will have the same layout for each game. There will be a Settings button in the top right corner, and a back button in the top left corner. A text box containing a description of how to play the game will be centered on the screen. A Play Game button will be centered at the bottom of the screen. If a user taps the Settings button, the Settings interface will open. If the back button is clicked, the Main Screen interface will open. If the Play Game button is pressed, Stimulation will launch the corresponding game.

Game Interface - Blind Date

The Blind Date Game Interface will have a background image of a shadow of a person. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. There will be a text box containing the number of lives the user has left (default 3) at the top of the screen. There will be a text box containing a Stimulation-generated random number that will appear for 5 seconds in the center of the screen. After 5 seconds, the number will disappear and a text input box will appear. The user will input the number that appeared by memory. If the user is correct, the screen is cleared, a streak counter is increased by one, and the next round is started. If the user is incorrect, the streak counter is compared to the value of the maximum streak the user had reached. Then the streak counter is set to 0, the lives are reduced by one and the next round is started. When the user's lives reach zero, the game ends, and the user score is calculated. The Score interface is then displayed.

Game Interface - Bookworm

The Bookworm interface will have an image of a "Bookworm" that will be saying a definition. The definition will be generated by Stimulation, along with scrambled letters that spell out the word matching the definition. The letters will be in a text box below the Bookworm image. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. A countdown timer will be at the top of the screen. There will be a text input box in which the user will input their answer. If correct, the definition and letters are cleared, a counter is increased by one, and the next set is generated. If incorrect, the user input will be erased, and the game will wait for user input again. If the user finishes 10 levels before the timer runs out, the timer stops and the user's score is calculated. The Score interface is then displayed. If the timer runs out before 10 levels are completed, the Game Over interface will be displayed.

Game Interface - Editor

The Editor interface will have an image of a book laid open as the background. Stimulation will then generate a sentence with a single scrambled word. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. A stopwatch timer will be at the top of the screen. There will be a text input box in which the user will input their answer. If correct, the board is cleared, a counter for iteration and accuracy is increased by one, and the next set is generated. If incorrect, the user input will be erased, counter for iteration will be increased by

1, and the game will wait for user input again. When the counter for accuracy reaches 10, the stopwatch stops and the user's score is calculated. The Score interface is then displayed.

Game Interface - Find the Kiddo

The Find the Kiddo interface will show a floor plan of a house as the game map. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. A stopwatch will begin, shown in the top of the screen.. Stimulation will create a pattern where a sound and image will display in rooms, and the player will have to memorize the pattern. Once the pattern has been shown, the player will click the rooms like buttons in the pattern shown. If they are correct, the game will show another pattern. If they are incorrect, the pattern will be repeated. Once the user gets 5 patterns right, the stopwatch will stop and the user's score is calculated. The Score interface is then displayed.

Game Interface - Maze Runner

The Maze Runner interface will be a Stimulation-generated maze as the game map. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. A stopwatch will begin and be shown in the top of the screen. The user will find a path out of the maze, and their current time in the maze will be shown on the screen. If the pathway does not work, the maze will reset. This will continue until the user finds the pathway out of the maze. Then, the stopwatch stops, and the user score is calculated. The Score interface is then displayed.

Game Interface - Paint Picker

The Paint Picker interface will show a counting down timer of either 30 seconds or 1 minute based on the level. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. The game's background will change throughout the level, showing different colors with text, also in a different color. The user will have a text input box to type the *color* of the text being displayed, not what the text says. If the user input is correct, a counter for iteration and accuracy are increased by 1, and the next puzzle is generated. If incorrect, a counter for iteration is increased by 1, and the next puzzle is generated. When the timer reaches zero, the stopwatch stops and the user's score is calculated. The Score interface is then displayed.

Game Interface - Quick Change

The Quick Change interface will have an image of a receipt as the background. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. A stopwatch timer will begin. Stimulation will generate a math problem in the form of a customer's total and what they paid with, displayed on the receipt. Four buttons will appear, each with a different amount. The user must click the button that corresponds to the answer (what the customer paid with - customer's total). If the user input is correct, a counter for iteration and accuracy are increased by 1, and the next receipt is generated. If incorrect, a counter for iteration is increased by 1, and the next receipt is generated. When the counter for accuracy reaches 10, the stopwatch stops and the user's score is calculated. The Score interface is then displayed.

Game Interface - Space Oddity

The Space Oddity game interface will have a space themed background. There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. A stopwatch will begin and be displayed at the top of the screen. Stimulation will generate an odd number of alien images, each having a corresponding pair. There will be one alien without a matching partner. The user must click on the image of this alien. If the user is correct, a counter for iteration and accuracy are increased by one, and the next set is generated. If incorrect, the odd alien out is revealed, the counter for iteration is increased by one, and the next set is generated. When the counter for accuracy reaches 10, the stopwatch stops and the user's score is calculated. The Score interface is then displayed.

Game Interface - Type Racer

The Type Racer game interface will consist of a racetrack background, with a moving racecar (controlled by user input.) There will be a pause button in the top right of the game. If a user clicks this button, the Pause interface will be opened and any timers or stopwatches will be paused. A timer will begin, displayed in the top center of the screen. Stimulation will then generate a word that will be displayed in the center of the screen. A text input box centered at the bottom of the screen is where the user will type their answer. The user must type the word as quickly as possible without errors. If done correctly, the race car will move forward, and the game continues. If typed incorrectly, the race car will not move, and the user input will clear. The game will prompt the user to type the same word again. If the user makes it to the finish line before the timer reaches zero, the user's score is calculated. The Score interface is then displayed. If the timer

reaches zero before the user makes it to the finish line, the Game Over interface will be displayed.

Score Interface

The Score interface will be the same for each game. It will consist of an image that displays “Good Job!” and a text box below that has the score of the user. In the top right corner, the user can access the settings through a Settings button. At the bottom, a Continue button will be centered on the screen. When pressed, it will take the user back to the Game Instruction screen of the game they just finished playing.

Pause Interface

The Pause interface will be the same for each game. It will consist of an image that displays “Game Paused” and a Settings button to access the settings, and a Continue button that will return the user back to the game they were playing. Clicking Continue will resume any timers or stopwatches that were in use for the game.

Game Over Interface

The Game Over interface will be the same for each game. It will consist of an image that displays “Game Over!” and a text box telling the user to try again.. In the top right corner, the user can access the settings through a Settings button. At the bottom, a Continue button will be centered on the screen. When pressed, it will take the user back to the Game Instruction screen of the game they just finished playing.