Software Requirements Specification

1. Introduction

1.1. Purpose

This document delivers a comprehensive description of the Dyslexia Diagnosis and Educational Game System. It will explain the system's objectives, features, user interface, what the plan is built for, and how it will be constrained to operate and respond to external stimuli. This system aims to improve children's intelligence and help early diagnosis of dyslexia. This document aims for both the stakeholders and the developers of the system.

1.2. Scope of Project

The Dyslexia Diagnostic and Educational Game System is designed for children at least four years old with dyslexia. The system will be developed to provide parents with a practical and accessible tool for early diagnosis of dyslexia in their children, making this diagnosis very easy and inexpensive. The system will help educate dyslexic children about the disease through educational games (s). Essentially, the scheme aims to reduce the financial barriers associated with diagnosing dyslexia, improving the efficiency of the diagnostic process and reducing associated costs.

1.3. Glossary

TERM	DEFINITION
WCAG	Web Content Accessibility Guidelines
2FA	Two-Factor Authentication
IOS	iOS is a mobile operating system filed by Apple.
UML	UML is a standard modeling language used for visually designing and understanding systems, software, and business processes.
Actor	Users, roles, or other systems that interact with and exist outside the system are essential components.
UC	They are functions or goals that actors can achieve using the system.
Database	It is the structure where the system stores and manages its data.
System	It represents the software or business process boundaries where usage scenarios within applications and games occur.
Simon Task	It is a test of attention and reaction time. It is a test that has visible or colored stimuli in different positions and measures its accuracy.

2. General Description

2.1. System Environment

The "Dyslexia Diagnosis and Educational Game System" is designed for children aged four and above with dyslexia. The system also considers parental profiles. Its primary goal is to provide an effective and accessible tool for early dyslexia diagnosis, making the process easy and cost-effective. Additionally, the system aids in alleviating dyslexia through educational games tailored for dyslexic children.

2.2. User Characteristics

The primary user base includes children aged four and above, focusing on those diagnosed with dyslexia. Additionally, parents are considered users for monitoring their children's progress within the system. An administrator with special privileges is also included to address user and system-related issues.

2.3. General Constraints and Assumptions

2.3.1. Constraints

- The system targets children aged four and above
- The games should be user-friendly and engaging for children.

2.3.2. Assumptions

- Users have access to a device with the necessary hardware capabilities.
- Users are familiar with basic interactive interfaces.
- Parents oversee and assist their children's interaction with the system.

3. Specification Requirements

3.1. Interface Requirements

3.1.1. User Interface

The user interface of the application will be simple and user-friendly. This application will be in a web application and mobile application type.

When the user enters the system, a Main page will greet him, and he must make two choices. The first choice leads to a page for preliminary diagnosis and is presented with a test consisting of games, at the end of which accuracy and knowledge are suppressed. The second selection is the Educational games section. In this part, accuracy should be increased by giving a certain number of lives in the games so that the user can improve their skills.

3.1.2. Hardware Interface

It is compatible with devices commonly used by children, such as tablets or computers.

3.1.3. Software Interface

Responsive and adaptable software for different devices. Admin interface for system management.

3.1.4. Communication Interface

Online communication for user login and data storage.

3.2. Functional Requirements

3.2.1. Diagnostic System

The system will allow users to access a diagnostic page to obtain information based on performance results in various games for a preliminary diagnosis of dyslexia. The system will provide a total average accuracy score and score-related preliminary information based on the user's performance in different games.

3.2.2. Diagnostic Games

The system will provide a variety of diagnostic games to evaluate different cognitive abilities. The first of these games is a letter-matching game for letters and reading skills. The second game is a Navigation game inspired

by Simon Task. The third and last game is the symmetry game to measure people's visual problems. Each game will include a mechanism to measure the user's accuracy and provide feedback at the end of all games.

3.2.3. Educational Games

The system will offer educational games designed to develop specific skills or areas of knowledge. Educational games will include progress tracking to show the user's progress over time.

3.2.4. Navigation

The system will offer intuitive navigation between games and system pages. Users can quickly return to the home page from any game or diagnostic tool.

3.2.5. Accuracy Tracking

The system will monitor the accuracy of user responses in diagnostic and educational games. It will store accurate data to track user progress and provide analysis.

3.2.6. Admin Controls

Administrators can moderate content, view analytics, update game content, and handle support requests.
The system will provide an admin panel with maintenance and user support tools.

3.2.7. Platform Compatibility

The system will be compatible with multiple platforms, including desktop and mobile devices.

3.2.8. Responsive Design

The system will use a responsive design to adapt to various screen sizes and orientations. Interactive elements will be accessible and usable on all target devices.

3.2.9. Exit and Return

Users will be able to exit the games and return to the main menu whenever they want. The system will save the game state so users can return and continue where they left off.

3.2.10. Efficiency and Cost Reduction

The system will be designed to optimize resource usage to minimize operating costs. It will implement efficient data processing and storage to ensure fast loading times and reduce server costs.

3.2.11. User Account Management

The system will allow users to create accounts, log in, and recover forgotten passwords. Users will be able to view profile information.

3.3. Non-Functional Requirements

3.3.1. Performance

The system should provide a smooth and responsive experience by responding to user interactions within a reasonable time frame (2 seconds or less).

3.3.2. Scalability

The system should be designed to handle increasing users and content without significant degradation in performance.

3.3.3. Reliability

The system must be stable and reliable, minimize downtime (Azure's average uptime (availability time) for overall services is stated to be 99.928 percent), and ensure that users can access the platform consistently.

3.3.4. Usability

The user interface should be intuitive, with straightforward navigation and easy-to-understand instructions, ensuring a positive and frustration-free user experience.

- Intuitive interfaces and straightforward navigation should meet users' goal of accessing desired features in 3 clicks.
- There must be a maximum of 1 click target to access the main menu and submenus.
- During any action, the number of clicks required for users to return to the previous step should be 1.
- Important information (such as help, support, and terms of use) should be accessible in 2 clicks from the home page or any page.

3.3.5. Accessibility

The system must comply with accessibility standards to ensure it can be used by people with different abilities, including those with visual, auditory, or motor disabilities. Must be 99.9% compliant with WCAG 2.1 AA standards such as keyboard usage, timing adjustability, readability, and clarity.

3.3.6. Security

Robust security measures should be implemented to protect user data and ensure the privacy and confidentiality of sensitive information. User data is encrypted for privacy. Secure login and authentication mechanisms with data encryption, 2FA.

3.3.7. Compatibility:

The system should be compatible with a range of devices, browsers, and operating systems, enabling users to access it from various platforms.

- Supported Browsers and Devices: For example, the two latest versions of Chrome, Safari, and Firefox, and the three latest

versions for iOS(17.2.1 and above) and Android(Android 14.2.1 and above).

- Screen Resolutions: Adaptive design that can decode at least 95% of the most common screen files.

3.3.8. Interoperability

The system should integrate with other educational platforms, tools, or systems that schools, educators, or parents may use.

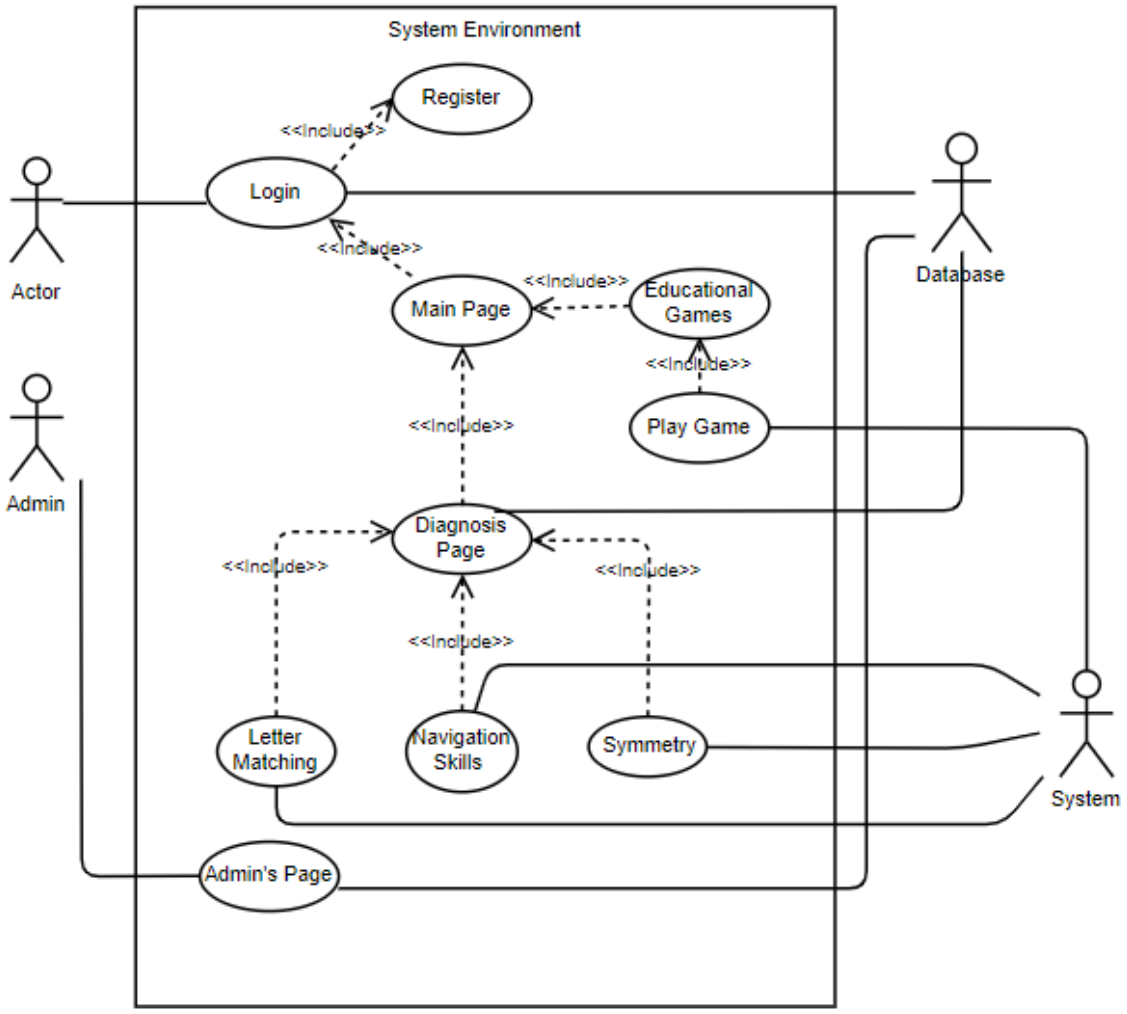
3.3.9. Ethical Considerations

The system should be designed and operated ethically, considering the well-being and rights of the users, particularly children.

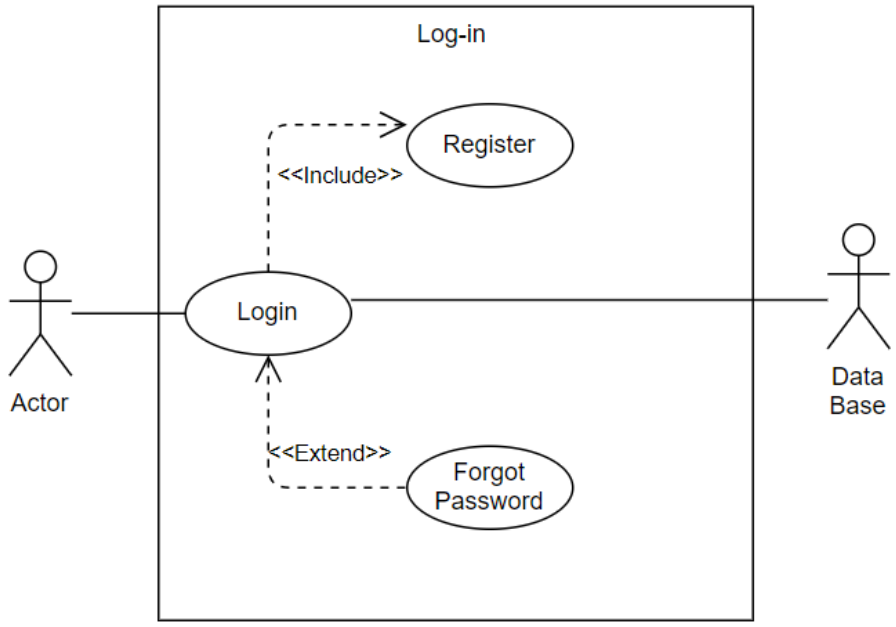
4. Analysis- UML

4.1. Use Cases

4.1.1. System Use Case



4.1.2. Login Page Use Case

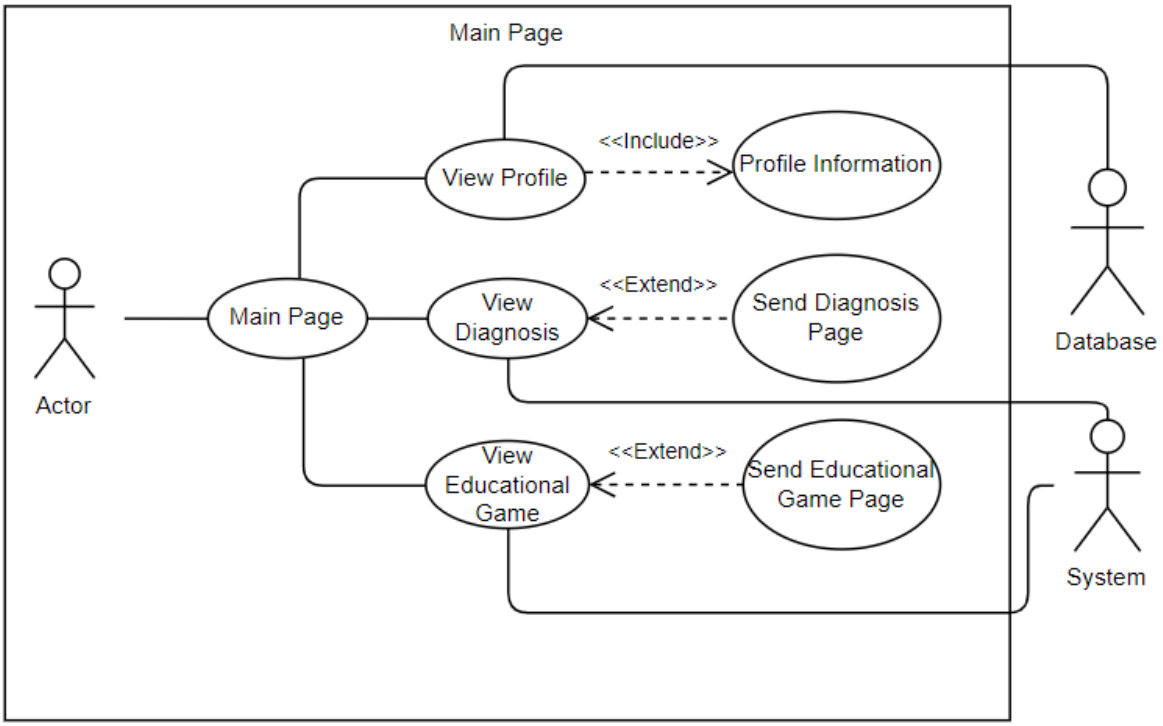


Use Case Number	UC-1
Use Case Name	Login Page
Actor	Actor, Database
Description	The user logs into the application using their email and password. The user is redirected to the Forgot Password page if the password entered is incorrect. If the user is not registered, they are prompted to go to the Register page.
Precondition	The user must have the application open and be on the login page.
Scenario	1. The user opens the application and is presented with a login page. 2. They enter their email and password. If the login attempt fails, they can reset their password. 3. If they are a new user, to register.
Postcondition	The user successfully logs into the application and is directed to the Main Page, begins the password reset process, or is directed to the registration page.
Exceptions	Possible exceptions include entering an incorrect password, a failed login attempt due to a system error, or trying to log in with an email that is not registered.
Related Use Cases	UC-2, UC-3

Use Case Number	UC-2
Use Case Name	Register
Actor	User, Database
Description	The user goes through the registration process to create a new account, which includes providing personal details and setting up login credentials.
Precondition	The user has launched the application and chosen to register a new account.
Scenario	1. Upon registering, the user is prompted to enter the necessary information (name, surname, email, password). 2. The information is submitted to the application for account creation.
Postcondition	If the registration is successful, the user is taken to the Login Page.
Exceptions	The registration process might only be successful if the user provides valid details, an account with the provided email already exists, or if there is an error during the registration process.
Related Use Cases	UC-1

Use Case Number	UC-3
Use Case Name	Forgot Password
Actor	User, Database
Description	The user initiates a password reset process to regain access to their account.
Precondition:	The user must be on the Login page and have already tried to log in or selected the "Forgot Password" option directly.
Scenario	1. The user selects "Forgot Password". 2. Input their email address. 3. Follow the steps, typically including receiving a password reset link via email. 4. Create a new password and confirm the change.
Postcondition	The user has successfully reset their password and is automatically redirected to the Login page.
Exceptions	Potential exceptions include the system not recognizing the email address. The user cannot access their email account; alternatively, a system error prevents the password reset process from being completed successfully.
Related Use Cases	UC-1

4.1.3. Main Page Use Case



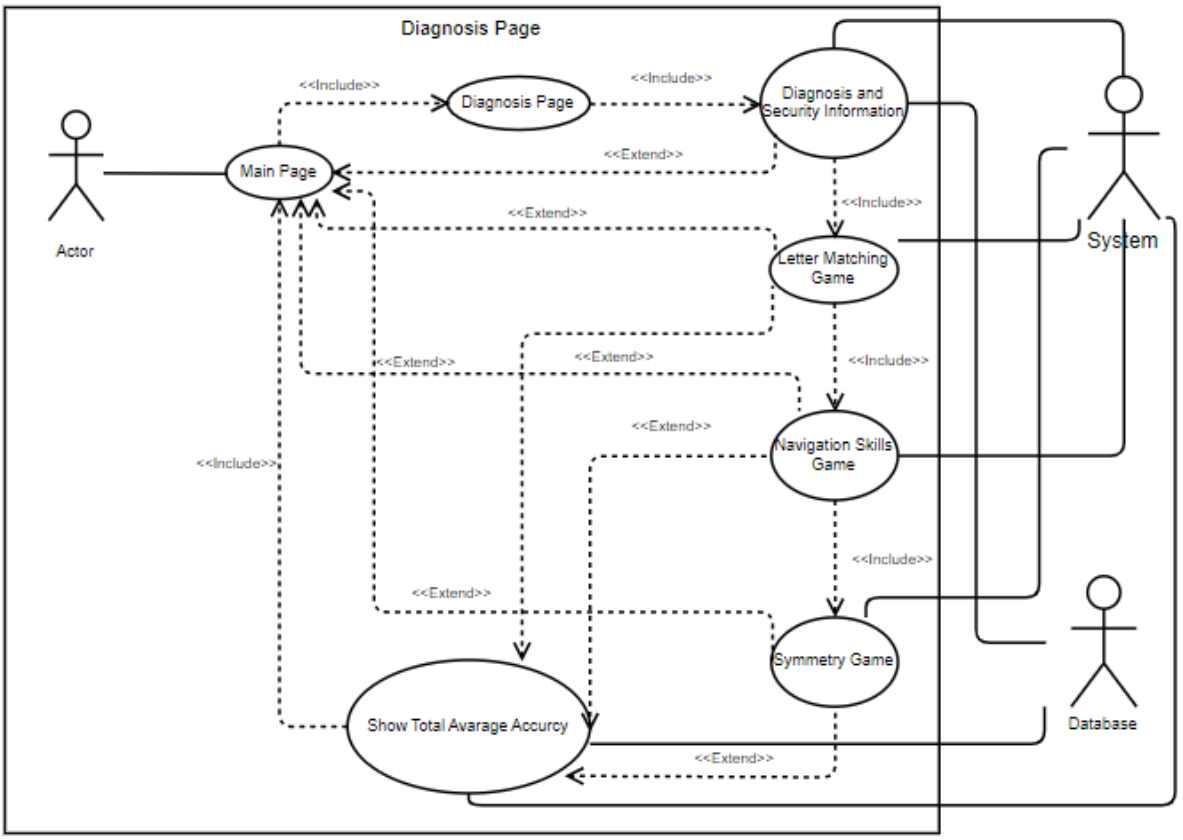
Use Case Number	UC-4
Use Case Name	Main Page
Actor	User, System
Description	The user views the application's main page to access the profile, diagnosis, and games. (The user accesses the Main Page to navigate to Profile, Diagnosis, or Educational Games.)
Precondition	The user must be logged in to access the Main Page.
Scenario	1. After the user logs in, the user is presented with the Main Page. 2. User can choose to view their profile, access the diagnostic tool, or select educational games designed to help with dyslexia. 3. The selected page is displayed.
Postcondition	The user successfully navigates to one of the three options and is engaged with the selected functionality.
Exceptions	Errors may occur if the user is not logged in or if a system error prevents the Main Page from displaying correctly. Additionally, an error will prompt if the user attempts to access the diagnostic tool or educational games without proper permissions.
Related Use Cases	UC-5, UC-6, UC-7

Use Case Number	UC-5
Use Case Name	View Profile
Actor	User, Database
Description	The user can view their profile within the application. This typically includes personal information, diagnostic results, and other relevant data stored in the profile.
Precondition	The user must be logged into the application and located on the Main Page.
Scenario	1. The user selects "View Profile". 2. Retrieves and displays the system's profile information.
Postcondition:	The user's profile information is readable and presented to him/her orderly.
Exceptions	Warn when profile information cannot be accessed or there is an error retrieving profile data from the database
Related Use Cases	UC-4

Use Case Number	UC-6
Use Case Name	View Diagnosis
Actor	User, System
Description	It directs the user to the main diagnostic page within the application, making it easier to access diagnostic information. The diagnostic page can provide preliminary diagnostic results, historical data, and recommendations based on the user's specific preliminary diagnosis of dyslexia.
Precondition	The user must be logged in and present on the application's Main Page.
Scenario	1. The user selects the "Preliminary diagnosis" option on the Home Page. 2. The system directs them to the main diagnosis page, where they can see detailed information about the dyslexia diagnosis and start testing.
Postcondition	The user is redirected to the diagnostic page, where he can interact with the diagnostic information, better understand his condition, and access relevant functionalities or recommendations provided by the application.
Exceptions	If there is a problem navigating the system or the diagnostic page fails to load, it will issue an error to try again.
Related Use Cases	UC-4

Use Case Number	UC-7
Use Case Name	View Educational Games
Actor	User
Description	Allows users to access the application's Educational Games from the Home Page. It is the first stage in the process of a user navigating games designed to help dyslexia.
Precondition:	The user must be logged in and present on the application's Main Page.
Scenario	1. The user clicks on "View Educational Game" on the Home Page. 2. The system directs the user to the Educational Games Home page.
Postcondition:	The user enters the Educational Game section and can browse, select, and interact with the available games.
Exceptions	The Educational Games section cannot be accessed due to system problems or an error when loading game content.
Related Use Cases	UC-4

4.1.4. Diagnosis Page Use Case



Use Case Number	UC-8

Use Case Name	Diagnosis Page
Actor	Actor
Description	The user uses the main page to access the diagnosis page. The user can access the diagnosis and security information page on the diagnosis page. The user clicks “ Start Diagnosis” and then plays the first Diagnosis game. After completing each game, the user's average accuracy is calculated and displayed.
Precondition	The user must be logged in to access the Main Page.
Scenario	1. The user navigates to the diagnosis page from the main page. 2. The diagnosis page displays information about the user's diagnosis. 3. The user navigates to the diagnosis and security information page. 4. The diagnosis and security information page is displayed. 5. The user starts the first game. 6. The game is launched. 7. The game is completed. 8. Accuracy is calculated and displayed.
Postcondition	The user receives their total average accuracy after completing all games and can navigate back to the Main Page.
Exceptions	If a game is not completed or there is an error in displaying accuracy, the user may not receive the total average accuracy.
Related Use Cases	Main Page, Letter Matching Game, Navigation Skills Game, Symmetry Game

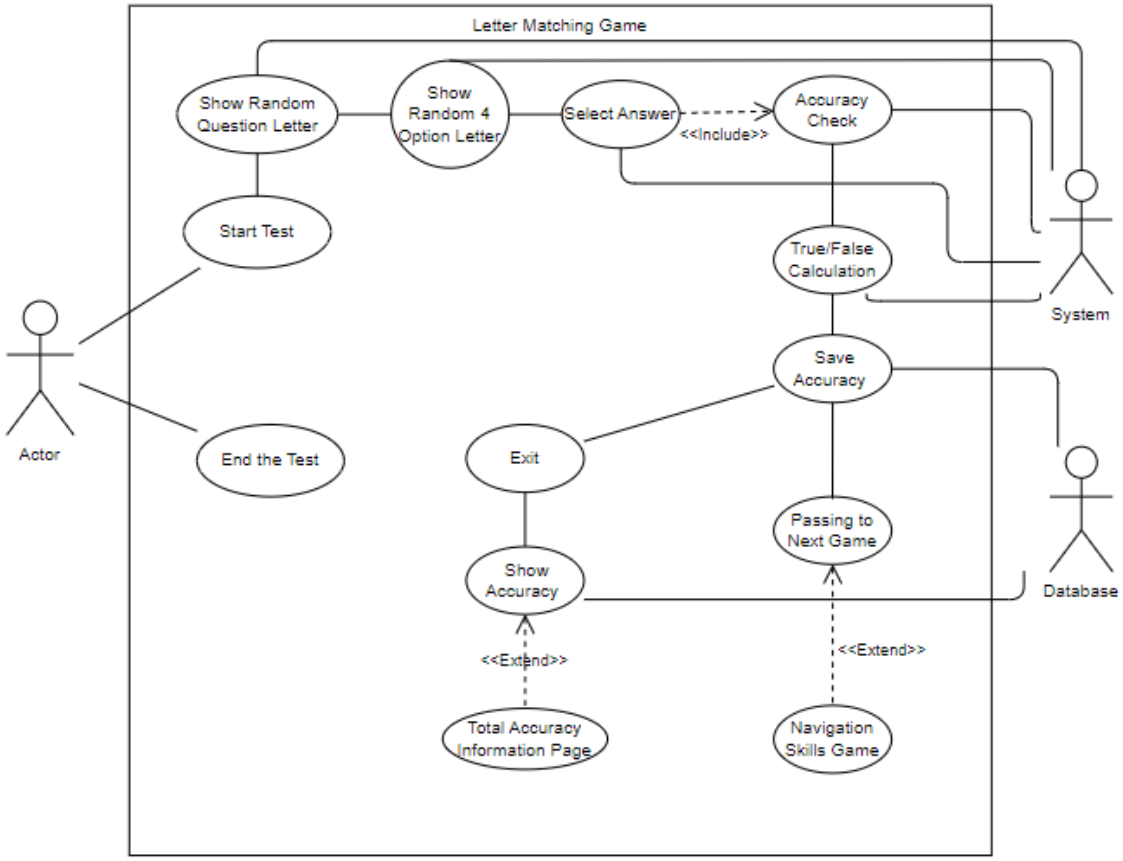
Use Case Number	UC-9

Use Case Name	Diagnosis and Security Information
Actor	Actor, System, Database
Description	The User reaches the Diagnostics Page after selecting "View Diagnostics" on the Home Page. This page provides information about the preliminary diagnostic test and data security. It provides a start button to start the test or an exit option to return to the Main Page.
Precondition	The user must be logged in and access the Main Page. You must have clicked the View Diagnosis button on the Main Page
Scenario	1. The user selects “View Diagnostics”. 2. Show information and options to start or exit the test.
Postcondition:	The user starts the diagnostic test or returns to the Main Page.
Exceptions	The user may decide not to continue testing.
Related Use Cases	UC-4, UC-11

Use Case Number	UC-10

Use Case Name	Show Total Accuracy and Information
Actor	Actor, System, Database
Description	After completing the third game, the user is automatically directed to the information page where the overall average accuracy and a preliminary diagnosis based on percentage accuracy are provided.
Precondition	The user may have completed the Letter Matching game and the test. The user may have completed the first two games(Letter Matching and Navigation Skills) and finished the test. The user may have completed all three games (Letter Matching, Navigation Skills, and Symmetry Game).
Scenario	1. The user presses the finish test button. 2. The user is given the Total Accuracy Average and Information. 3. When the user clicks exit, the user returns to the Main menu.
Postcondition	The user receives the overall average accuracy and preliminary diagnosis with the option to return to the Home Page.
Exceptions	The user may exit the game before the second and third games are completed.
Related Use Cases	UC-4

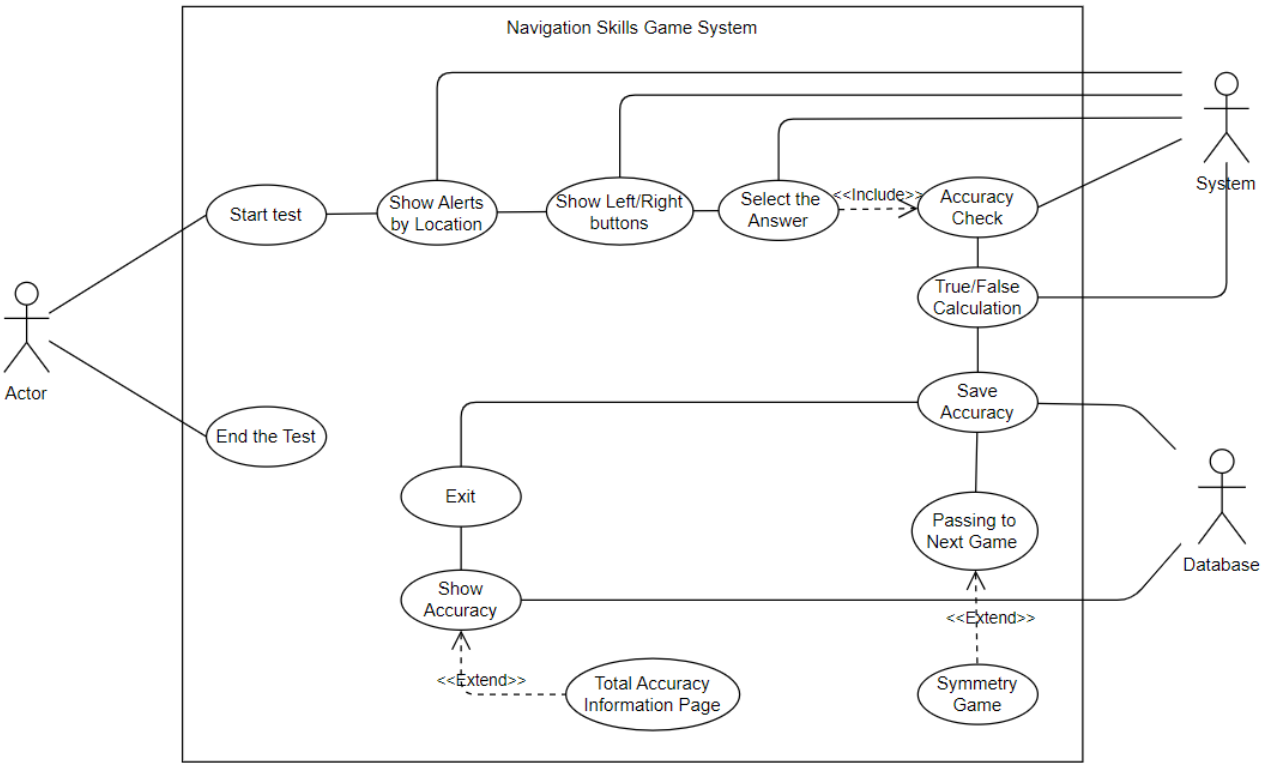
4.1.4.1. Letter Matching Game Use Case



Use Case Number	UC-11

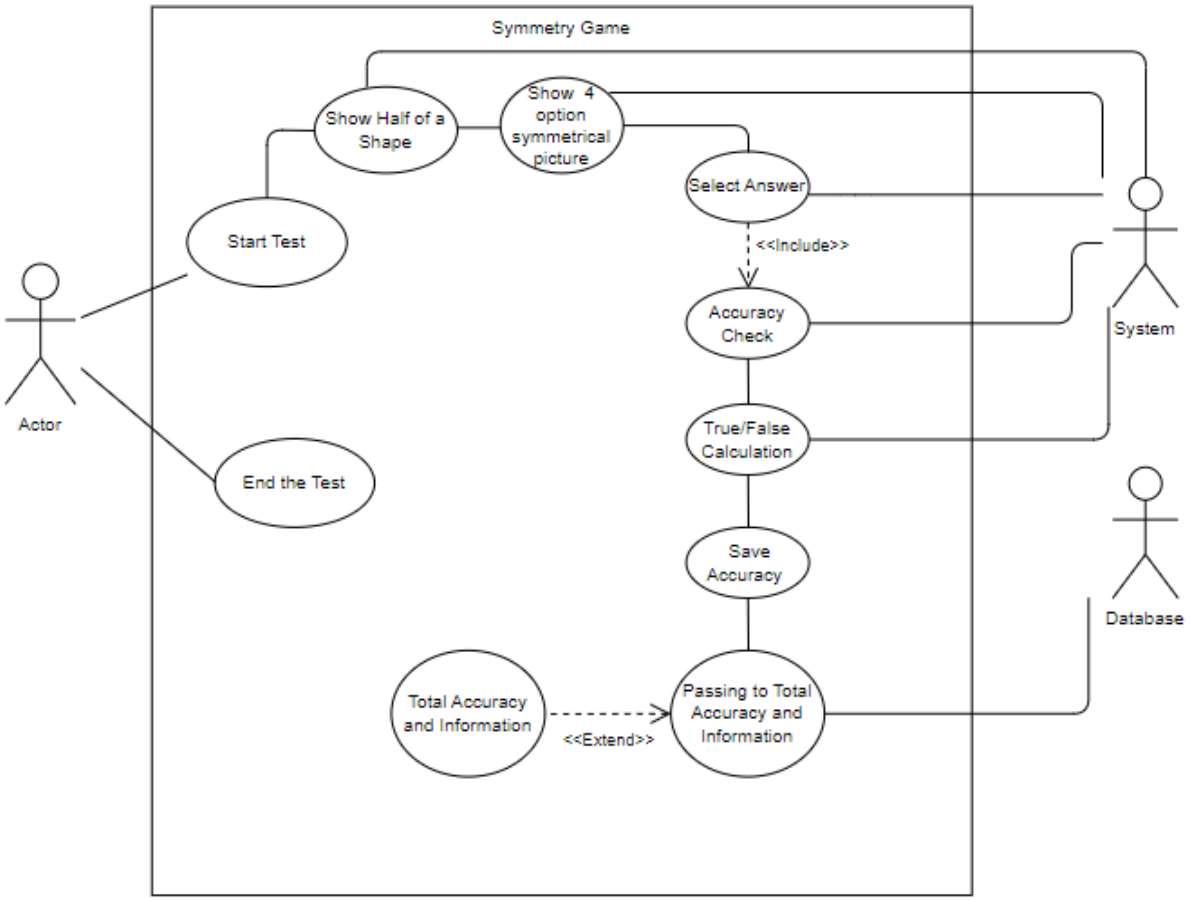
Use Case Name	Letter Matching game
Actor	Actor, System, Database
Description	The user enters a game where they are shown a random letter and must choose the correct match from four options. Accuracy is calculated after all game options have been completed. The user can then choose to move on to the next games or view total accuracy average information and exit the Main Page.
Precondition:	The user can start this game “In Diagnosis Page” after completing the diagnosis information stage.
Scenario	1. The user starts the game. 2. Choose each letter shown and complete the game.
Postcondition	After completing the game, users can choose to proceed to the next game (Navigation Skills Game) or view detailed accuracy information and return to the Main Page.
Exceptions	The user can choose to exit at any time. The user will receive an Error message if a technical issue affects the game.
Related Use Cases	UC-4, UC-10, UC-12

4.1.4.2. Navigation Skills Game Use Case



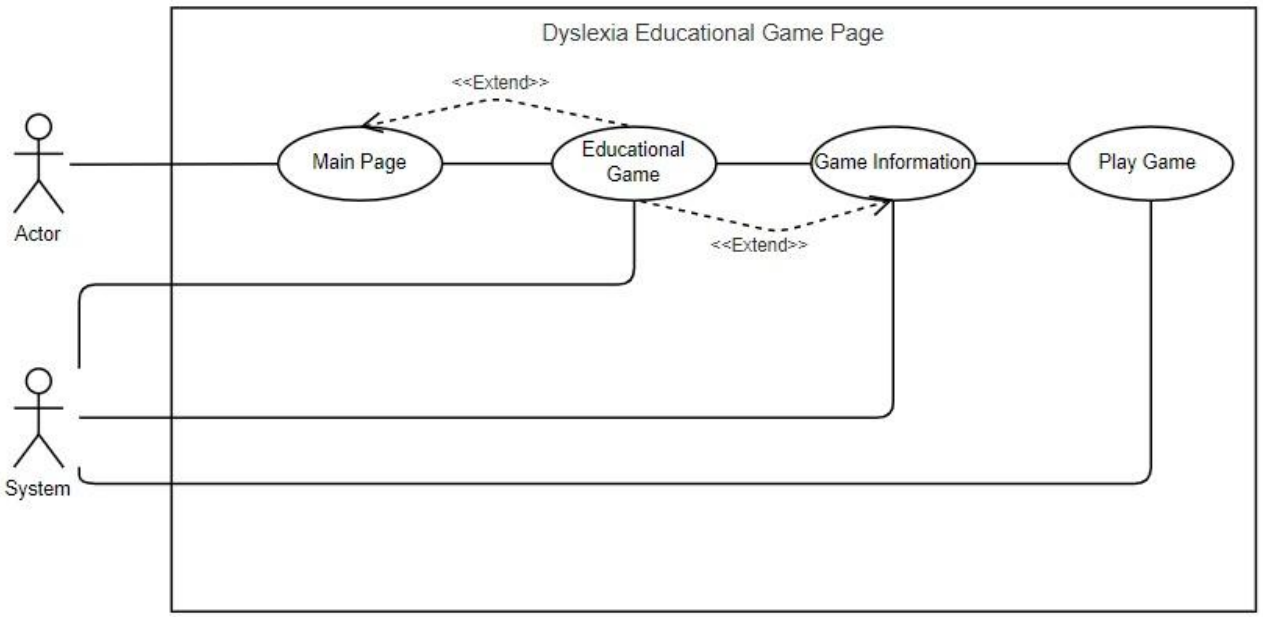
Use Case Number	UC-12
Use Case Name	Navigation Skills Game
Actor	Actor, System, Database
Description	The user uses the system to improve navigation skills through a game that tests their ability to follow directions and respond to alerts.
Precondition	The user must log in to the system and play the Letter Matching game.
Scenario	1- The user starts the test. 2- The system displays alerts based on location. 3- The system shows left/right buttons for selection. 4- The user selects the answer. 5- The system performs an accuracy check. 6- The system calculates true/false and saves accuracy. 7- The user may exit the test or proceed to the next game.
Postcondition	The user's accuracy is recorded in the system. The user can view their accuracy or proceed to the next game.
Exceptions	The User selects the wrong answer; the system fails to record the response; the user exits before completion.
Related Use Cases	UC-10, UC-13

4.1.4.3. Symmetry Game Use Case



Use Case Number	UC-13
Use Case Name	Symmetry Game
Actor	Actor, System, Database
Description	The user will try to find the correct symmetrical half to match the picture box provided at the top of the screen in one of the four options given below.
Precondition:	The user must log in to the system and play the Letter Matching and Navigation Skills games.
Scenario	1. Symmetry Game displays a picture box at the top of the screen. 2. Four random image boxes appear at the bottom of the screen. 3. The User selects one of four options. 4. The system checks whether the selected option is the correct symmetrical match. 5. After the game, it directs the user to the total accuracy and information page.
Postcondition	After completing the game, view detailed accuracy information and return to the Main Page.
Exceptions	The user can choose to exit at any time. The user will receive an Error message if a technical issue affects the game.
Related Use Cases	UC-4, UC-10

4.1.5. Educational Game Page Use Case

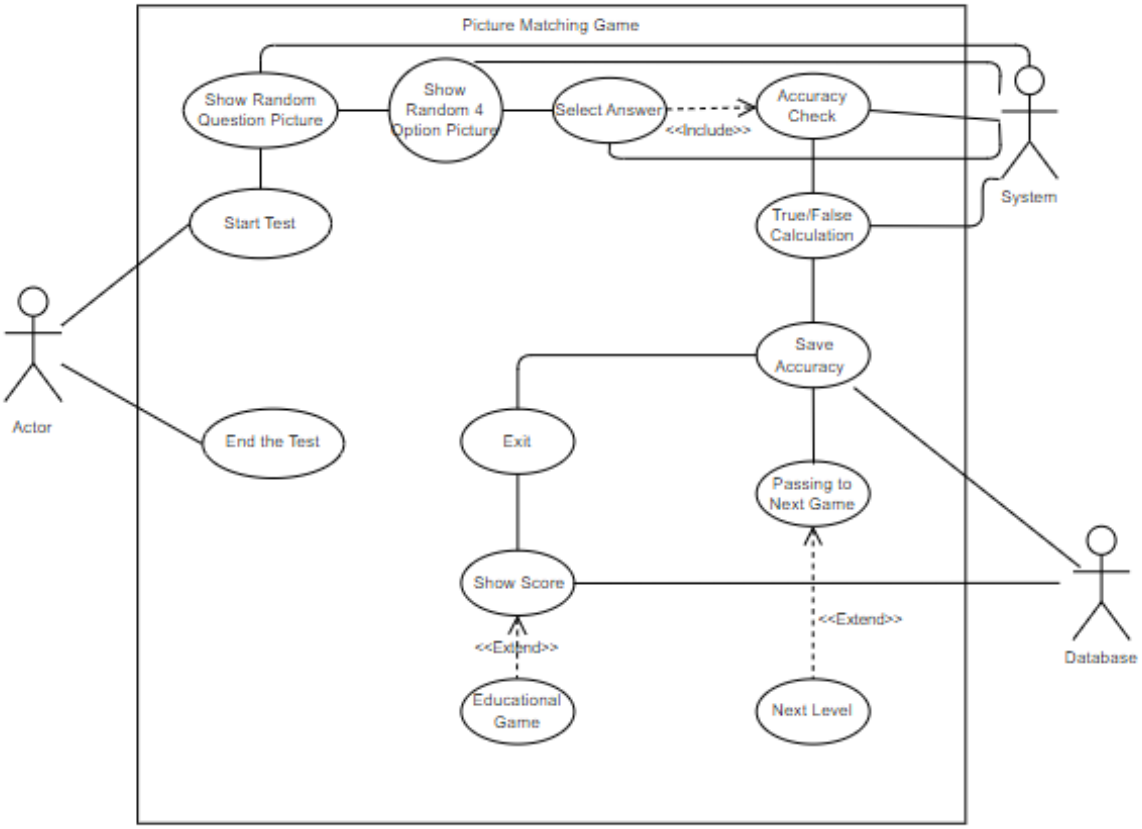


Use Case Number	UC-14
Use Case Name	Educational Game
Actor	Actor, System
Description	After the child user logs in to the system, he goes to the game section and chooses the game he will play. Before the game starts, an informative window opens, and the user must agree to start the game.
Precondition	The user must log in to the system and be directed to the home page.
Scenario	1. The user logs into the system 2. The user clicks on the game box 3. The user selects a game 4. The user will be presented with an information page before entering the game. 5. If the user accepts, the system starts the game; if the user rejects it, it returns to the game selection. 6. If the user clicks the exit button, he returns to the home page.
Postcondition	The user is either playing a game, browsing the game selection, or returning to the home page.
Exceptions	If the user tries to go to the game section without logging in, they will be asked to log in.
Related Use Cases	UC-1, UC-14, UC-15

Use Case Number	UC-15
Use Case Name	Game Information
Actor	Actor, System
Description	This page explains how to play the selected game, provides rules and objectives, and offers a "Start Game" button to start the game or an "Exit" button to return to the previous page.
Precondition	The user has gone to the Educational Game section and selected a specific game to explore.
Scenario	1. The user selects a game. 2. The Game Information page opens. 3. The user is informed about the instructions and rules of the game. 4. He decides to start playing by clicking the "Start Game" button or to return to the Educational Game list by clicking the "Exit" button.
Postcondition	The user either starts playing the game or returns to the list of educational games to select a different option.
Exceptions	An error occurs if a system failure prevents the Game Information page from displaying correctly or if certain game information is unavailable for any reason.
Related Use Cases	UC-14, UC-16

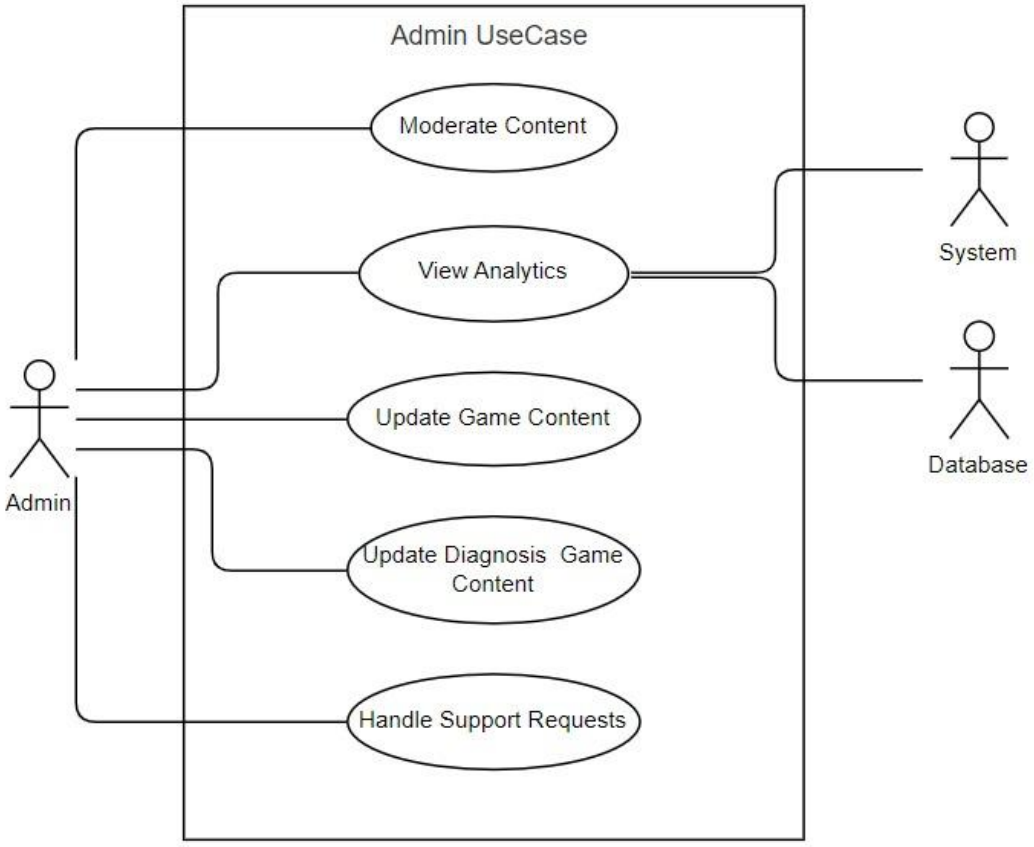
4.1.5.1. Play Game Use Case

4.1.5.1.1. Picture Matching Use Case



Use Case Number	UC-16
Use Case Name	Picture Matching Game
Actor	Actor
Description	The User plays a game where they must match a random picture with one of four options presented, aiming to improve memory and recognition skills.
Precondition	On the educational game page, the user must select the game and press the start button.
Scenario	1. Shows a random image to the user. 2. The system displays four random images as possible matches. 3. The system gives the user three wrong rights. If the user chooses three wrong options, the game ends, or the restart button is activated. 4. The user selects the image they believe matches the original. 5. The system checks if it is correct. 6. The game can move on to the next level or exit if the user reaches the correct answers the system determines.
Postcondition	The user receives feedback on their choice and chooses to continue or exit another game.
Exceptions	The user may want to quit while in the game or may receive an error while in the game.
Related Use Cases	-

4.1.6. Admin Use Case



Use Case Number	UC-17
Use Case Name	Admin’s Main Page
Actor	Admin, System, Database
Description	This use case encompasses all the activities an Admin can perform on the main page of the system, including content moderation, analytics review, game content updates, diagnosis game content updates, and handling support requests.
Precondition	Admin must be authenticated and authorized to access the main admin page and its functions.
Scenario	Admin logs into the system with admin credentials. The system directs the Admin to the main page dashboard. Admin chooses an activity from the dashboard: Moderate Content, View Analytics, Update Game Content, Update Diagnosis Game Content, or Handle Support Requests. Admin completes the chosen activity using the system's tools and interfaces. The system processes the changes or updates made by the Admin. The system updates the Admin with the status of the activity and logs the action. Admin logs out or chooses another activity.
Postcondition	The system reflects any changes or updates made by the Admin, maintaining data integrity and ensuring that all user interactions are logged.
Exceptions	If the Admin attempts an unauthorized activity, the system restricts access and logs the attempt. If there is a system error during any activity, the system notifies the Admin and logs the error. If incorrect data is submitted, the system rejects the changes and requests the Admin to correct the data.
Related Use Cases	All specific use cases under the Admin main page (Moderate Content, View Analytics, Update Game Content, Update Diagnosis Game Content, Handle Support Requests) are interrelated as part of the Admin's responsibilities.

Use Case Number	UC-18
Use Case Name	Moderate Content
Actor	Admin
Description	The administrator monitors and moderates user-generated content to maintain community standards.
Precondition	Admin is authenticated and has the necessary permissions.
Scenario	1. The administrator reviews user submissions. 2. Flags or remove inappropriate content. 3. It warns users when necessary. 4. Communicate problems to the legal team when necessary.
Postcondition	Game content is safe and complies with community guidelines.
Exceptions	Include failure to detect some types of inappropriate content and user disputes.
Related Use Cases	UC-20

Use Case Number	UC-19.
Use Case Name	View Analytics
Actor	Admin, Database
Description. The	Admin reviews game analytics to make informed game updates and community management decisions.
Precondition	Analytics tools are operational and accessible. Admin is authenticated and has the necessary permissions.
Scenario	1. Admin logs into analytics dashboard. 2. Select desired metrics 3. The system interprets data patterns and trends. 4. Generates reports for stakeholders.
Postcondition	Admin has the information needed for decision-making.
Exceptions	Analytics tools down, data corruption.
Related Use Cases	UC-18, UC-20

Use Case Number	UC-20
Use Case Name	Update Game Content
Actor	Admin
Description	The Admin updates the game's content to provide new features, bug fixes, or enhancements to the players.
Precondition	Admin is authenticated and has the necessary permissions.
Scenario	1. Admin logs into the admin portal. 2. Select the content update section. 3. Uploads new game assets or edits existing ones. 4. Submits changes for review. 5. Publish the updates to the game.
Postcondition	Game content is successfully updated.
Exceptions	Upload fails, incorrect file format, unauthorized changes.
Related Use Cases	UC-18, UC-19

Use Case Number	UC-21
Use Case Name	Update Diagnosis Game Content
Actor	Admin
Description	Admin updates diagnostic tools and scripts in the game to ensure proper functioning and to fix any identified issues.
Precondition	Admin has logged in with sufficient privileges.
Scenario	Admin accesses the diagnostics section. Review current diagnostic tools and scripts. The system implements updates or corrections when necessary. Tests the updated diagnostics.
Postcondition	Diagnostic tools are up to date.
Exceptions	Diagnostics fail, and updates are not compatible.
Related Use Cases	Handle Support Requests.

Use Case Number	UC-22
Use Case Name	Handle Support Request
Actor	Admin
Description	Admin reviews and responds to user support requests submitted through the system.
Precondition	Admin must be logged in and have access to the support request dashboard.
Scenario	1. Admin logs into the system. 2. Admin navigates to the support request dashboard. 3. Admin selects a support request from the queue. 4. Admin reviews the request details. 5. Admin takes appropriate action to resolve the request. 6. Admin updates the support request status 7. Admin communicates the resolution to the user.
Postcondition	The support request is resolved, and the user is informed of the resolution. The support request status is updated accordingly.
Exceptions	If the admin cannot resolve the request, it is escalated to a higher level. If the support request details still need to be completed, the admin contacts the user for more information.
Related Use Cases	UC-4, UC-10