

ChessEDU
Use-Case Specifications

Version <2.4>

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Revision History

Date	Version	Description	Author
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26/10/2022	2.1	Reformatting from old requirements document. Most requirements were reworded for clarity or detail. Specified a security requirement for Changing User Settings.	Jack Reynolds
27/10/2022	2.2	Removed blue text.	Jack Reynolds
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30/10/2022	2.4	Edited for consistent formatting and spacing, updated table of contents.	Adair Torres

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Use-Case Specifications

1. Use-Case Model

1.1 Introduction

This system involves the interaction of web client with a web application server that maintains two databases. The list of human actors includes *Users That Are Not Signed-In* or *Unregistered Users* – human actors that are not signed into an account, *Signed-In Users* – human actors that are signed into an account, and *Administrators*. Additionally, there are nonhuman actors, such as the *Product Server Host*, and in some use cases the *Credentials Database* and *Lessons Database* are treated as separate nonhuman actors.

1.2 General Actors Descriptions

1.2.1 Unregistered Users

Unregistered users, **Users not signed in**, and similar phrasing is used for a human actor on a client that is not currently signed in. A distinction may be made between **unregistered** and **not signed in** to differentiate between users that do not have an account in contrast to users that simply are not signed into their account.

These users have limited data associated with them but may have locally stored data indicating progress through lessons.

1.2.2 Signed-In Users

Signed-in users refers to any human actor on a client that is signed in.

These users always have a *username*, *password*, and *email address* associated with them. To allow for the changing of usernames, these users may also have an internally stored *user ID*. Additional information, such as *their name*, is also associated with their account.

1.2.3 Administrators

Administrators refers to any human actor that is associated with the development of ChessEDU.

These users are similar to signed-in users, but they have additional data flags associated with their account that may allow them to bypass restrictions a regular user cannot. They might alternatively access segments of the product from a terminal or separate interface.

1.2.4 Product Server Host

The **Product server host**, most likely referred to as the **server**, **host**, or as **ChessEDU** in a use case, refers to the running instance of the server or the computer this instance of the server is hosted on.

It may communicate with clients that have contacted it through the web, the databases stored on the same device, or may be contacted by an administrator.

1.2.5 Credentials Database

The **Credentials database** refers to the database that stores all information associated with user accounts, such as usernames, passwords, email addresses, and progress on lessons. It can only be contacted through the server.

1.2.6 Lessons Database

The **Lessons database** refers to the database that stores all information associated with lessons, such as HTML pages, scripts, and visual or audio assets stored in separate files. It can only be contacted through

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the server.

1.3 Use-Case Model Hierarchy

1.3.1 Account Package

- **Description**

This package contains all functions necessary to the operation of ChessEDU but are not part of the distinguishing functionality of the product.

- **Use Cases**

Account Creation
Signing In
Signing Out
Editing User Settings

- **Actors**

Unregistered Users
Signed-In Users
Administrators
Product Server Host
Credentials Database

- **Relationships**

Total Dependency on Credentials Database – no use cases within this package can function to a satisfactory level without communication between user client and the Credentials Database.

- **Packages Owned**

None.

1.3.2 Interactive Package

- **Description**

This package contains all functions regarding the distinguishing features of the ChessEDU product.

- **Use Cases**

Selecting A Lesson
Playing On Your Own

- **Actors**

Unregistered Users
Signed-In Users
Administrators
Product Server Host
Lessons Database
Credentials Database

- **Relationships**

Total Dependency on Lesson Database – Selecting a Lesson use case cannot function to a satisfactory level without communication between user client and the Lessons Database.

Partial Dependency on Credentials Database – Selecting a Lesson use case lacks desire function (committing progress flags to memory) without communication between user client and the Credentials

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Database.

- **Packages Owned**

None.

1.4 Diagrams of the Use-Case Model

None.

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2. Account Creation

2.1 Brief Description

ChessEDU as a service can be used without an account, as anyone who can access the website will have access to the free and interactive chess lessons available. For users that want to save their progress through lessons, they can freely register with ChessEDU to log progress in the product's servers.

2.2 Flow of Events

2.2.1 Basic Flow

A user who is not signed-in can create an account by navigating to the "Account" section of the ChessEDU website. Users who are not signed-in will see an option to "Register" in this section of the page. Here they will be prompted to provide an email address, a username, and a password for their account. They will also be prompted to confirm their password. This information will be validated for uniqueness in the credentials database to prevent duplicate accounts, and following unique information, the new account is added to the database. The user is automatically signed-in afterwards.

2.2.2 Alternative Flows

2.2.2.1 User Login Information is Already Taken

In the event that the account information that is provided by the user trying to register – email address or username – is taken by an existing account, the user will be prompted to enter different information for these fields. Both the email address and username need to be available for use. This alternative flow loops until unique information is provided.

2.2.2.2 User is Signed-In

A user who is signed-in will be prompted with a different menu than a user who is not when they navigate to the "Account" section of the ChessEDU webpage. An option to "Sign Out" will be available instead, where the user will be able to see a "Register" menu afterwards.

2.2.2.3 Password and Confirm Password Prompts Do Not Match

A user who provides two password fields that do not match will be alerted that the confirmation of their password failed. The user will then be allowed to enter their password and confirm it again. This process will loop until the confirmation is successful.

2.3 Special Requirements

None.

2.4 Preconditions

2.4.1 Internet Connection

The user must be connected to the internet.

2.4.2 Not Signed-In

The user must not already be signed-in to another account.

2.5 Postconditions

2.5.1 Database Update

The Credentials database is always updated after a successful execution to include a new instance of

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Account.

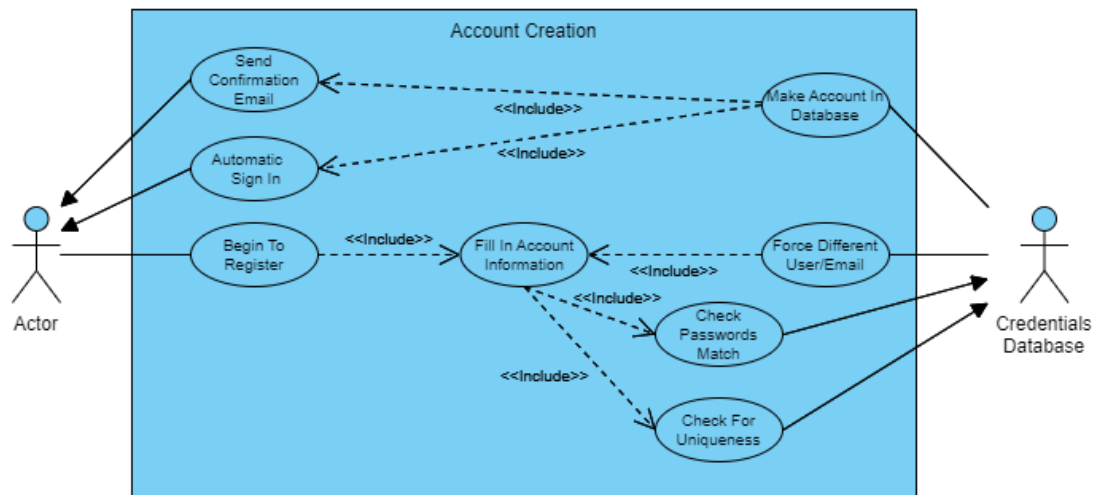
2.6 Extension Points

2.6.1 Automatic Sign-In

Following successful execution of this use case, the behavior of the “Signing In” use case is extended into Account Creation.

2.7 Use-Case Diagrams

Visual Paradigm Online Free Edition



Visual Paradigm Online Free Edition

Figure 1 Account Creation.

2.8 Other Diagrams

None.

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3. Signing In

3.1 Brief Description

A user that has created an account with ChessEDU can utilize the unique features of having an account by signing in. This process also verifies that the account created by the user remains in control of the user, forcing them to prove ownership of the account on sign in.

3.2 Flow of Events

3.2.1 Basic Flow

A user that is not already signed-in can do so by selecting the “Account” section on the ChessEDU website. Under this section, this user will be able to see an option to “Sign In” to an existing account. Selecting this option will redirect the user to a separate page that requires the user to input their username and password. This information is relayed to the Credentials database, which will verify that the username exists under some account and the password entered matches the password associated with this account. If the username can be found and the password is correct, the user is signed-in and now has access to menus and other information exclusive to users with accounts.

3.2.2 Alternative Flows

3.2.2.1 Username for Account Cannot be Found

If the user enters an invalid username – a username that is not associated with any account in the Credentials database – the user will be alerted that the account they are trying to access does not exist. They will also receive a message that they can alternatively register for a new account. The user can attempt to sign in again.

3.2.2.2 Password Entered Does Not Match Stored Password

If the user enters an invalid password – a password that does not match the password associated with the account that the username is – the user will be alerted that the password or username is incorrect. The user can attempt to sign in again.

3.3 Special Requirements

None.

3.4 Preconditions

3.4.1 Internet Connection

The user must be connected to the internet.

3.4.2 Not Signed-In

The user must not already be signed-in to another account. Any user already signed in will not be able to see the option to sign in.

3.5 Postconditions

3.5.1 Progress Flags

Following sign in, any lessons the user accesses while signed-in will log the progress made by the user. Any progress flags set by the user after completing a section of a lesson will be committed to the Credentials database.

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3.6 Extension Points

3.6.1 *Optional Register*

The user interface will prompt a user attempting to sign into an account that does not exist with the option to register instead. This will redirect the user to the “Register” use case.

3.7 Use-Case Diagrams

None.

3.8 Other Diagrams

None.

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4. Signing Out

4.1 Brief Description

A user with a ChessEDU account, to protect the security of their account, may want to sign out from a device. This option also provides users with the ability to switch to a different account, especially helpful if more than one user uses the same device.

4.2 Flow of Events

4.2.1 Basic Flow

A user who is signed-in can access the option to sign out from the “Account” section of the ChessEDU website. Under this section, a user who is signed-in will be able to see the option to “Sign Out.” Selecting this option will update the page and contact the server that the user is no longer signed in from this device. Following confirmation from the server, the user will now see the same options as any user without an account.

4.3 Special Requirements

None.

4.4 Preconditions

4.4.1 Internet Connection

The user must be connected to the internet.

4.4.2 Signed-In

The user must be signed in to see this option. Any user not signed in will have no option to “Sign Out” displayed.

4.5 Postconditions

4.5.1 Progress Flags

Following sign out, any progress flags the user would send to the Credentials database are not committed to any account. If local data is deleted or the user signs into their account on another device, this progress will be lost.

4.6 Extension Points

None.

4.7 Use-Case Diagrams

None.

4.8 Other Diagrams

None.

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5. Selecting a Lesson

5.1 Brief Description

The main service that ChessEDU provides is free, interactive lessons on the ChessEDU website. These lessons can be accessed by anyone online, and contain written explanations as well as interactive elements, such as chess board simulations. Individual lessons can be accessed from a main menu and will save user progress upon completion.

5.2 Flow of Events

5.2.1 Basic Flow

A user (signed-in or not) can access lessons by navigating to the “Lessons” section on the ChessEDU website. This will direct the user to a page that displays the list of available lessons that contain a lesson name and a short description of the lesson. To build this page, the client instance sends a request for basic data on lessons to the Lessons database, which returns the summary information for each lesson in the database. A user can then select an available lesson, which will send a request for the total lesson information for that specific lesson to the Lessons database. The client will build the lesson from these lesson files.

Within a given lesson, a user can interact with several different elements of the page. Depending upon the lesson, the user may have access to the option to navigate forward or backward through pages and manipulate an interactive chess board. The page needs to be able to display these elements in an easy-to-read format, and update with requests from the user.

The interactive chess board element, depending on the lesson, may be of varying sizes or features. Pieces must be movable, and upon making a move the board may provide several different kinds of feedback (“Good move!”, “That was a mistake!”, etc.). Some pieces may be “locked” by the interactive element as pieces the user cannot interact with on that move, such as if the piece belongs to the opponent or if the lesson wants the user to learn how to use a specific piece or tactic.

If the user completes a section of a lesson, this information will be saved locally so the user may continue to the next lesson. A user may back out at any time to return to the list of available lessons.

5.2.2 Alternative Flows

5.2.2.1 User is Signed-In

A user that is signed-in will have data that marks their progression through lessons (progress flags) stored in server data rather than locally. This data is committed to the Credentials database and updates the record of progress stored in the user’s account.

5.3 Special Requirements

None.

5.4 Preconditions

5.4.1 Internet Connection

The user must be connected to the internet.

5.5 Postconditions

5.5.1 Progress Flags

Upon completion of a lesson or a section of a lesson, new data is created locally that saves the progress of

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the user. This data, depending on the user, may also be saved to the ChessEDU servers.

5.6 Extension Points

None.

5.7 Use-Case Diagrams

None.

5.8 Other Diagrams

None.

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6. Playing On Your Own

6.1 Brief Description

The other major service that ChessEDU as a product provides is local play – the option to practice a game against another person in the same area. The ChessEDU website will provide a full chessboard as an option for all users, which can be used to run a game in a standard format on the user’s device.

6.2 Flow of Events

6.2.1 Basic Flow

A user (signed-in or not) can access the ability to play a game by navigating to the “Practice” section of the ChessEDU website. Here the user will be provided with a full interactive chessboard, as well as any options that they may want to configure before starting a game.

Control flow alternates between a “white” player and a “black” player during the game, but both are controlled by the same device. During one player’s turn, the other player’s pieces are “locked” and cannot be manipulated by the user. Once the user makes a valid move for the piece they select, the board is updated, including any possible captures.

The page also will regularly check for special board states, such as Check, Checkmate, and Stalemate. If Checkmate or Stalemate is found, the user is notified that the game is over and of the results of the game.

The user may also exit the page at any time.

6.2.2 Alternative Flows

6.2.2.1 User Makes an Invalid Move

If the user makes a move that is disallowed for some reason – the piece does not belong to the player that currently has their turn, the movement is impossible for that piece, the user makes a move that would be allowed under normal circumstances but is not allowed while the current player’s King is in check – then the page alerts the user that this move is not allowed, and gives them the ability to move again. This alternative flow loops until a valid move is made by the user.

6.3 Special Requirements

None.

6.4 Preconditions

6.4.1 Internet Connection

The user must be connected to the internet.

6.5 Postconditions

None.

6.6 Extension Points

None.

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6.7 Use-Case Diagrams

None.

6.8 Other Diagrams

None.

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7. Editing User Settings

7.1 Brief Description

Alongside storing lesson progress with accounts, ChessEDU accounts can be updated with new information as needed. Users who may want to edit their account (such as to change their password or email) can update their information online within the product.

7.2 Flow of Events

7.2.1 Basic Flow

A user who is signed-in can access the option to change their settings from the “Account” section on the ChessEDU website. On the Account page or a connected page, the user will be able to see their settings associated with their account and will be shown options next to any configurable setting to update that setting.

If a setting is not sensitive – entailing the user’s security or ability to access their account – the user will have the ability to edit the option using some web input (buttons, text box, etc.) on the same page. The user will then confirm the change, which will cause their client to send a request to the Credentials database to update this information on their profile. A confirmation will be sent back to the user.

If a setting would involve the security of the user’s account – such as the user’s account’s associated username, password, or email address – the user will be redirected to a separate page to verify themselves. Here they will be prompted to enter their password, or alternatively access a page through their email if they wish to reset their password. Successful authentication will similarly update these features.

7.2.2 Alternative Flows

7.2.2.1 User Fails to Authenticate Password

If the user fails to verify their password when changing a sensitive setting, the user will be alerted that they have entered the wrong password for their account. They will be allowed to try again after this. After a set number of failures, the user will be automatically signed out on their device.

7.3 Special Requirements

7.3.1 Security

The user should not have a means to edit any setting that would change how they sign in without some form of security barrier, either through their password or their email address. The security barrier should be easy for an average user to succeed – such as entering their current password or accessing a page through their email address – but be difficult for a user that did not create the account.

The associated password or email address should not be able to be easily updated with just the current password or the current email address respectively. A user should need to know the opposing piece of information to edit the setting, so that a user that maliciously gains the current password but not the current email address cannot gain control of the account, and vice versa. A possible security barrier could include a time restriction on how quickly the user can edit both of these settings.

7.4 Preconditions

7.4.1 Internet Connection

The user must be connected to the internet.

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7.5 Postconditions

7.5.1 Database Update

Upon a setting change, the Credentials database will be updated with new information, possibly affecting how the user would sign in next.

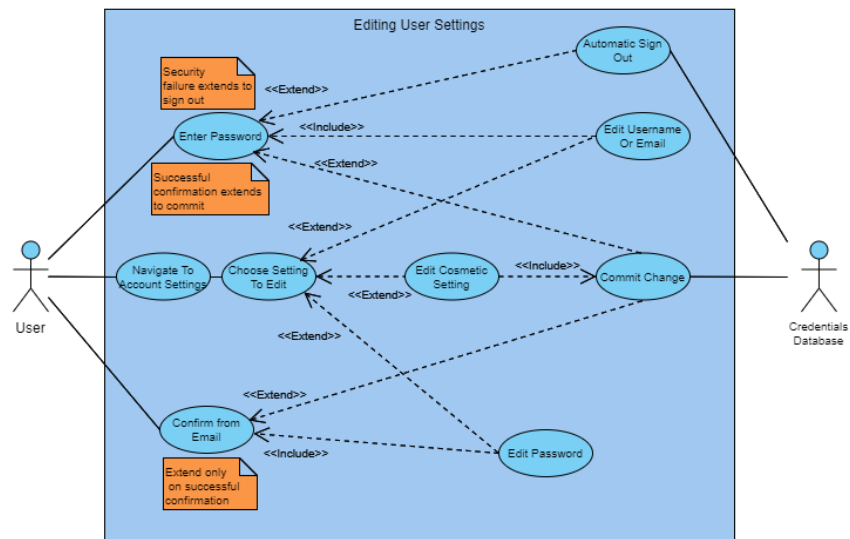
7.6 Extension Points

7.6.1 Automatic Sign Out

If a user fails to verify their security information, the functionality of the “Sign Out” use case may be extended to this use case.

7.7 Use-Case Diagrams

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Figure 2 *Editing User Settings.*

7.8 Other Diagrams

None.