Cairo University  
Faculty of Computers and Information



**CS251**

**Software Engineering I**

Childhood Arena

Software Requirements Specifications

The Brainy Fools

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# Team

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# 1 Document Purpose and Audience

This document illustrates the software requirements for eLearning web application – learning with games- and the target audiences of this document are the developers, CTO, the project management, and the client.

# 2 Introduction

## 2.1 Software Purpose

The purpose of this project to make a “Childhood arena” web application which is eLearning web application based on games. The web application shall provide or deliver some concepts in math and programming in form of games to make the learning process more fun and easy.

## 2.2 Software Scope

This software is a web application that has 2 sections, a section for the teachers and a section for the students. As for the students, the web application shall provide two categories of educational games; math and programming category, and each category divided into 3 levels – beginner, intermediate, professional- and each level has some games can be increased by time.

As for teachers, the web application will provide additional option to make his own games and publish them on the web application but he must follow the templates we’ll provide in the web application to make them, he also must evaluate the level of the game and choose the category to be able to publish his game.

The web application will have some methods of motivation like rating and leaderboard for both the teachers and students, and also it shall provide a trophy/achievement system to reward the students for their progress.

The web application also has an administrative user to monitor it and approving some games.

This web application targets the users between 7 and 16 years old.

## 2.3 Definitions, acronyms, and abbreviations

* **E-Learning web application**
  + A web application that provides educational knowledge via a web application and this can be in form of online course, some articles and videos or in our case in form of educational games.
* **Leaderboard**
  + This is like a board to display the ranking of people who participate in competition or in games to display the people with highest scores.
* **Trophy system**
  + This system is used for rewarding players or to give them motivation, and the trophy can be like a medal, cup or even some imaginary shapes.

# 3 Requirements

## 3.1 Functional Requirements

### 3.1.1 Loading homepage

The user enters the web application Link, the web application is loaded and the home page is automatically displayed.

### Account Confirmation (Sign up)

The user select the sign up option then choose if he wants to sign up as Student or as teacher and depending on the user’s choice the system will open the teacher’s “Sign up” form or the student’s “Sign up” form.

The user will fill all the information in the form to have an account on the web application, the system will check these information and if all the data are valid, the system will send a confirmation mail to his /her E-mail, then the user have to open the link in the mail to confirm & activate his/her account, else if the entered data are not valid the system will notify the user to reenter valid data.

P.S: the teacher’s “sign up” form has more info to be entered like the mobile number, the field of teaching and his experience.

### User verification (Sign in)

When a user opens the web application he/she will enter his/her email and password to login to the account, the system then will check the validation of the data entered by the user and will show an error message if there’s any wrong data.

If the user enters wrong data 5 times in row, the system will block the user for logging in for 2 minutes,

### Browsing

This function is responsible for handling the movement from tab to tab and loading the webpages content from database or show a failure messages if anything goes wrong.

This function won’t have explicit definition in code but most of their work shall be built-In with HTML tags.

P.S: The web application will be separated in home page and some sub webpages. The home page contains some info about the web application, and two main option “login” and “sign up”.

When you finally enter your account, if you’re student, you have 4 main options: “Play game” which opens a page to choose the category and level, “Edit profile”, “Chat Room” to move you to a webpage that contains a Chat box, and “Show trophies” to show the gained trophies.

If you enter as a teacher, you have 3 additional options: “Make a game” to make his own games, “Replay on comments” ,and “Edit game” which move him/her to a webpage that contains all his/her pre-made games and each game has 2 options beside it “edit” and “delete”.

### Search for the game

Instead of browsing the web application for the games, the user can type the game name that he/she know in the search text box and click “search” to move directly to the games that have similar names to select from.

### Display the game

When the player clicks on the game, the current webpage must be changed to the webpage that contains the game.

This function is also responsible for loading all the game webpage contents, as first the game screen will be in the center of the webpage with adaptive size to the device screen size.

Second, graphics in game, textual game content like the questions and answers, and UI in game like score, exit button, textbox or choices to answer.

And lastly, description for the game that appears beside the game screen.

It also must provide the user with loading bar if the content takes time to be loaded and it also shows an error message if the game doesn’t load successfully.

### Submit answer & verify

* Mathematical games shall follow one of two templates, multiple choices or enter the answer in textbox.

So after the user answers and clicks submit, the system will compare the user’s answer with the right answer and will show him/her a box that contains a message to illustrate if he/she answered right or wrong, some suggested games in the same level and category to choose from, also a “show more “option to shows the user all the games in the level, and the last thing a “rate & comment” option which open you a rating box when you click on it.

* For programming games, they must follow one template in answering which is completing the text or, In other words, writing the instructions to get the required result.

After the users answers and submit, the system will verify the answer:

* + If the answer is wrong, the system will give the player another try and give the player the chance to repeat for only 2 times meaning that the player has 3 chances before losing the game but after the 3 times the system must show a popping box contains: message saying “Game over”, the right answer, animation of the result if it’s there, some suggested games with “show more” option, and lastly a “rate & comment” option.
  + If the answer is right, the system must pop a box contains: message to congratulate him/her , animation of the result if it’s there, a “next level” option if there’s more than level of this game, suggested games with “show more” option, and “rating” option.

After finishing whether the mathematical games or programming games, the player info must be updated like his score points on web application, number of played games, the leaderboard (if the player is in it), the top 10 on this game (if the player is in it), and last thing to call the “Give trophy” function to check if he/she deserves a trophy.

### Rating

After the user clicks “rate & comment” option, a screen will be shown to him/her containing rating scale, so he/she can rate the game as he/she wants, and a comment section to ask or send comment to the teacher who made the game.

The rating scale will be five stars and the user will choose number of stars to rate the game.

### Send comment

After the user writes his comment in rating window and clicks “send comment”, the teacher of the game will be notified of the user’s comment or question.

### Give trophies

After User finishes certain levels in game, the system start giving the user trophies in the form of medals or cups, depending on the level they finished.

### 3.1.11 Show trophies

User selects “show trophies” in order to see his/her previous trophies on the web application.

### Game design

When the teacher clicks the “Make game” option, he shall move to another page containing the toolbox and edit window to make his/her own game.

* For mathematical games, the teacher will have a textbox that have the content of the game, a toolbar to insert photos, links or some predefined symbols like fractions, roots, etc.

Every photo or symbol he/she selects is translated into text in the textbox to be easier to deal with it in programming wise.

For the answer, the teacher can follow one of 2 templates: the multiple choices or the answer as text.

For the multiple choices, he must enter 4 choices, 1 right and 3 wrong, to make his/her game valid.

* For programming games, the teacher will have 2 templates, a graphical template and textual template.
  + For the graphical template, he/she will have like a game scene window to design his game, and for the resources he/she will have a window to insert all the background elements into it, a window to insert all the characters used in game, and the last window to have the obstacles that used in game.

He also can include some sounds into the game.

The games target will be moving from point A to B through writing some code statements. The syntax of the code is not syntax of real programming language like python or java but it’s a special syntax for our web application to be easier for students to solve the problems.

The teacher can show the right answer, by inserting the final image of the level to be compared with the student answer later, or submit the instructions to achieve the game target.

* + For the textual form, it shall be like a textual puzzle and the teacher shall have a textbox to insert the puzzle description and the final answer in another box.

The teacher also must enter the game description and he/she has option to include links in description to help the students in understanding the topic related to game and also he/she must enter the game name which should be unique.

After that the teacher has 2 options, “publish” or “preview” game which is illustrated in details later in functional requirements.

If the teacher interrupt the game making process with anything that can change the current page, the system will pop up a message box to confirm if he/she wants to leave or not. If he/she leaves, all the settings and customization will be discarded.

### Edit game

After the teacher select the “Edit games” tab and click “edit” on any of his own games, a new webpage is opened containing all the content as the “Make game” screen but with additional feature the previous settings of the game are set not to start from scratch.

The teacher cannot change the category of the game but he/she will be able to change the level.

### Preview game

This is for the teacher after finishing his/her game and he/she would like to see the live preview for the game before publishing it ,he then will press Preview game button and this will open a tap which contains the final edit for the game.

The teacher cannot edit the game from Preview page he should return back to the edit page to complete his game.

The Preview game will have two buttons: one for Go back to edit, and one for publishing the game right now.

### Publish game

This step is the final step after finishing and previewing the game , the teacher could press button Called Publish Now the system will ask him “Are you sure you want to publish now?“ And if he/she said yes the game will be sent to the System and if he/she said no he will return to the game edit page.

From the system side : The system will check the similarity among this game and all the other games in the web application and print the similarity percentage with other games and if this percentage exceeds 80%, the system won’t approve the game and notify the teacher to edit it more.

Admin side: if the percentage was below 80%, the system will notify the admin to approve the game.

P.S: The teacher cannot publish more than 2 games in a day.

### Approve game

After the system send notification to the admin of the new games waiting for the approval, the admin can click on these notification then he/she will be moved to another page containing all the games waiting for approval and each game has three options beside it: “Preview”, “Approve”, and “Disapprove”.

The “Preview” option to test the game and the “Approve” option to add the game to the web application

If the game is approved or disapprove, the system will send to the teacher who made the game a mail to notify him.

### Delete game

If the teacher wants to delete the game he will enter his/her profile and find all the games which are made by him and next to each game there will be 3 buttons: Preview Game, Edit Game and Delete Game when he/she clicks delete the game he/she will be notified “Are you sure you want to delete this game?” if he said Yes The game will be deleted and if he said no he will return to his/her profile again.

### Replay on comments or questions

The teachers open the student’s comments that he/she is previously notified with,

Then he/she finds an inbox webpage like in any mail web application and he/she will have 2 options: replay or ignore.

If the teacher replays, the student will be notified with the answer and if he/she ignores, the student won’t know.

### Chat box

The chat box will be for the users who only logged in with valid account. It will contain text area for the messages and the message will start by the username then his/her message, it will also contain input area for typing a message and submitting button to send the message, finally it will contain exit button and when the user exit from the chat box he won’t retrieve his/her messages again as all message will be deleted from his window.

This chat box will be for all users, not one to one user.

### Contact us

If the user has a problem with something in the web application he will click on “Contact us” so he/she will find a form to send his/her problem or request to someone who is responsible for checking the problems that the user faces.

The form contains 4 components: subject, body, a checkbox to indicate if it’s negative feedback or not and the last thing a “send” button.

After clicking the “send” button, if the feedback is negative, the system will show a message says “The admins will replay to you very soon” or any message like that.

### Monitor the feedback

This function is for the admins.

When any user send a feedback through the form in the contact us and system notify the admin, the admin can view all these feedbacks and just read it or send a replay to the user personal mail.

All the feedbacks that the admin opened marked as read to not be notified with them again.

### Logout

When accessing the web application is no longer needed, the users can logout from the web application.

If the user logged out within the game session, the score he achieved in this session will be discarded.

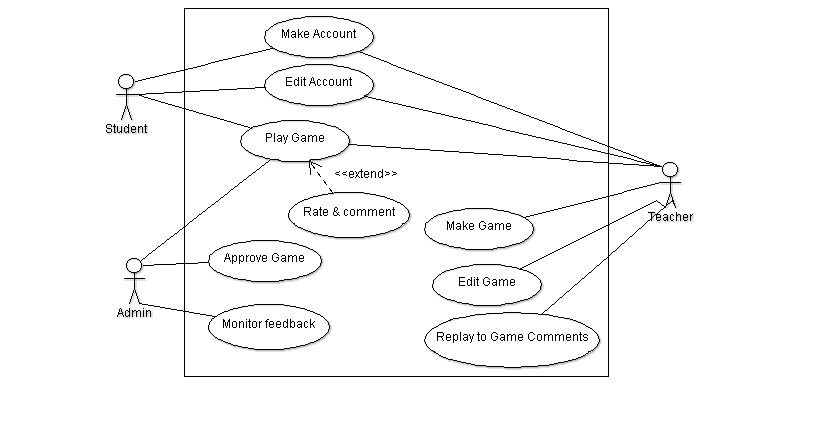
## Non Functional Requirements

|  |  |
| --- | --- |
|  | **Details** |
| **Performance** | * Short response time when click on buttons. * If the game contains animation, it shall run smoothly with no freezing moments. |
| **Usability** | * Dealing with games is easy and require no instructions. * Friendly UI. |
| **Scalability** | * Content updated frequently. * Adaptive to the increase in users. |
| **Supportability** | * Monitor the bugs frequently and fix them. * Option to contact us if there’s any problem. * Making surveys to receive suggestion from users. |

# 

# 5 System Models

## 5.1 Use Case Model



## 5.2 Use Case Tables

### 5.2.1 Make Account

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Make Account | |
| Actors: | Students and Teachers | |
| Pre-conditions: | Open web application – select “sign up” | |
| Post-conditions: | Confirmation mail | |
| Flow of events: | **User Action** | **System Action** |
| 1- User Enter required data |  |
|  | 2- System Verify user data |
| 3- User Submit |  |
|  | 4- System send confirmation mail if data is valid |
| Exceptions: | **User Action** | **System Action** |
| 1- User Enter Invalid data |  |
|  | 2- System send warning to user to reenter data |

### 5.2.2 Edit Account

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Edit Account | |
| Actors: | Students and Teachers | |
| Pre-conditions: | User is Logged in | |
| Post-conditions: | Account is updated | |
| Flow of events: | **User Action** | **System Action** |
| 1- User edit information |  |
|  | 2- System check if data entered is valid |
| 3- User save entered data |  |
|  | 4- System update and save entered Data |
| Exceptions: | **User Action** | **System Action** |
| 1- User changes password |  |
|  | 2- System check validation & send confirmation mail |

### 5.2.3 Play Game

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Play Game | |
| Actors: | Students and Teachers | |
| Pre-conditions: | Logged in – Select play game | |
| Post-conditions: | Game Ended | |
| Flow of events: | **User Action** | **System Action** |
| 1- User Select Game category |  |
|  | 2- System display options in category |
| 3- User select level in category |  |
|  | 4- System display games in selected level |
| 5-User Select a game to play |  |
|  | 6-system moves user to play screen |
| 7-User enter the answer |  |
|  | 8-System validate the answer |
| Exceptions: | **User Action** | **System Action** |
| A.1-User search for the game instead of browsing for it |  |
|  | A.2- System instead display all the games with similar names to select from |
| B. 1-if the user wants to exit during gameplay |  |
|  | B. 2-System will confirm first before exit as the progress in current game session will be discarded |

### 5.2.4 Rate and Comment

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Rate Game & Comment | |
| Actors: | Students and Teachers | |
| Pre-conditions: | Logged in – user finished playing of the game and clicks “rate and comment” | |
| Post-conditions: | Rating is Submitted | |
| Flow of events: | **User Action** | **System Action** |
| 1- User rate game |  |
|  | 2- System saves rating |
| 3- User write Comment |  |
|  | 4- System post comment and notify teacher |
| Exceptions: | **User Action** | **System Action** |
| 3-user wants to exit during rating |  |
|  | 4-System warns user before confirming exit command |
| Notes and Issues: | This a optional feature for the user after ending the gameplay | |

### 5.2.5 Make Game

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Make Game | |
| Actors: | Teachers | |
| Pre-conditions: | User is Logged in (As Teacher )– Select make a game | |
| Post-conditions: | Game is Added | |
| Flow of events: | **User Action** | **System Action** |
| 1- User choose game category |  |
|  | 2- System show templates of that Category |
| 3- User select template |  |
|  | 4- System open the edit box |
| 5-User enter game instructions and clicks “Preview game” |  |
|  | 6-System approve the game initially & show game preview |
| 7-User confirm publishing |  |
|  | 8-system notifies the admin for the game approval if it’s valid in the first check. |
| Exceptions: | **User Action** | **System Action** |
| A.1- User Enter non-valid game |  |
|  | A.2- System don’t approve the game |
| B.1-user wants to exit |  |
|  | B.2-System warns user before confirming exit command as all the settings discarded. |
| Notes and Issues: | The approval of the game split into 2 steps, the automatic validation which check the similarity in content with other games and if it exceeds 80%, it’s considered as non-valid.  If it’s below 80%, the 2nd approval step is performed by the admin by checking the game and approving it. | |

### 5.2.6 Edit Game

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Edit Game | |
| Actors: | Teachers | |
| Pre-conditions: | User is Logged in (As Teacher ) – select Edit Game | |
| Post-conditions: | Game is Updated | |
| Flow of events: | **User Action** | **System Action** |
| 1- User Select game |  |
|  | 2- System open the edit box |
| 3- User edit the game |  |
|  | 4- System check validation & preview the game |
| 5-User confirm updates |  |
|  | 6-System update game automatically if the difference between the original and the updated version doesn’t exceed 20%, else the updated version will wait first for the admin approval to be published. |
| Exceptions: | **User Action** | **System Action** |
| 1- User edit game |  |
|  | 2- System don’t approve the updates |
| 3-user wants to exit |  |
|  | 4-System warns user before confirming exit command |
| Notes and Issues: | The same approval steps of the game creation apply here but with a condition as mentioned in the flow of events. | |

### 5.2.7 Replay to Game Comments

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Replay to Game Comments | |
| Actors: | Teachers | |
| Pre-conditions: | User is Logged in (As Teacher ) – Select game comments | |
| Post-conditions: | Answers is posted | |
| Flow of events: | **User Action** | **System Action** |
| 1- User Clicks on question or comment marked as unread |  |
|  | 2- System view the comment |
| 3-User replay on comment |  |
|  | 4-System send the replay |
| Notes and Issues: | This is an option for the teacher to be able to replay to the comments of the users who played the game he/she made. | |

### 5.2.8 Approve Game

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Approve Game | |
| Actors: | web application admin | |
| Pre-conditions: | There is game to be approved | |
| Post-conditions: | Game is approved | |
| Flow of events: | **User Action** | **System Action** |
| 1- User select a game to preview |  |
|  | 2- System preview selected game |
| 3-user test game if it’s valid , then it will be approved |  |
|  | 4-System add the game to the web application. |
| Exceptions: | **User Action** | **System Action** |
| 1-if the game is not valid |  |
|  | 2- System warns the teacher who made the game that it’s not approved. |
| Notes and Issues: | This is the 2nd step approval which is under the authority of the admin | |

### 5.2.9 Monitor Feedback

|  |  |  |
| --- | --- | --- |
| Use Case Name: | Monitor feedback | |
| Actors: | web application admin | |
| Pre-conditions: | User sends feedback | |
| Flow of events: | **User Action** | **System Action** |
| 1-User click on notification of received feedback |  |
|  | 2- System preview the unread feedbacks |
| 3-User checks the feedback |  |
|  | 4-System marks the feedback as read |
| 5-The user can replay by sending mail if the feedback requires that |  |
|  | System print “successfully sent” |
| Notes and Issues | Handling the feedbacks that have been sent by users through the “Contact us” form | |

# 6 Ownership Report

|  |  |
| --- | --- |
| **Item** | **Owners** |
| **Handling accounts(Make, edit)** | *Mohamed Mamdouh* |
| **Creating and editing the games** | *Amr Atef* |
| **Trophy system** | *Nourhan Essam* |
| **Verifying answers in the games** | *Manar Ashraf* |
| **Rating and comments feature** | *Nourhan Essam* |
| **Chatting feature** | *Mohamed Mamdouh* |
| **Feedback handling ( Contact us, Monitor)** | *Manar Ashraf* |
| **Publishing the game** | *Amr Atef* |