CST2120

Web Applications and Databases

Coursework 1- Game Website Final Submission
Jellyfish Pop Mania Project Report

Autumn/Winter term
2023/2024

Date of Submission: 15th December 2023

Student Name: Uchechi Joan Johnson

Student ID Number: M00857430

Lab Tutor: Mrinal Sharma

Table of Contents

Table of Figures

1. Introduction

This report consists of the description of a tile-matching puzzle shooter game website, the tools used to create the game, aim of the game, instructions on how the game should be played, screenshots and description of the different pages of the game, explanation of different functions of the game and how they should be handled, and what is expected from the user at each stage of play.

2. The Game

This game is a tile-matching puzzle shooter single player game inspired by the popular 2003 Zuma game, which I chose to recreate because the game was a significant part of my childhood but is not as popular anymore.

The game has been implemented using HTML and CSS for content and design, JavaScript for functionality and HTML local storage data for storage.

The game includes characters and graphics from the popular SpongeBob SquarePants TV show. The SpongeBob character is the shooter launching jellyfishes at the jellyfishes swimming towards him. The background music is gotten from the ending theme song of the SpongeBob SquarePants cartoon. The background image is also gotten from the SpongeBob SquarePants cartoon.

The game has multiple levels with varying difficulties The levels get progressively harder as the speed and number of swimming jellyfishes increases.

2.1 Game Instructions

The aim of the game is to eliminate all jellyfishes swimming towards the SpongeBob character before he runs out of moves and before they get to him. To eliminate the jellyfishes, the SpongeBob character must shoot at a swimming jellyfish with a jellyfish of the same colour.

To play the game, the user clicks the spacebar which triggers the SpongeBob character to launch/ shoot a jellyfish in a horizontal direction to eliminate swimming jellyfish. The user can click on the left or right arrow keys to move the SpongeBob character in either direction for more precise shots. If the swimming jellyfish shot at is the same colour as the eliminating jellyfish, the swimming jellyfish is eliminated. If the swimming jellyfish shot at is not the same colour as the eliminating jellyfish, the eliminating jellyfish becomes a swimming jellyfish and is added to the school of swimming jellyfishes, and no jellyfish is eliminated. If the jellyfishes swim to the SpongeBob character before they are all eliminated, the SpongeBob gets shocked to death the user loses the game.

The scoring of the game is calculated by the number of swimming jellyfishes eliminated. For each jellyfish eliminated, the user earns 5 points. If no jellyfish is eliminated and the launched eliminating jellyfish is added to the school of swimming jellyfishes, no points are earned and no points are lost. The rankings of the game are determined by the user with the highest score.

3. Game Pages

Header

The header, which is present on the preview, instructions, settings, leaderboard, and gameplay page is a navigation bar containing the name of the game, home, start, how to play, leaderboard, settings, and logout widgets. On clicking the ‘home’ widget, the user will be redirected to the preview page which contains a sample video on the game and a few details about the game. On clicking the ‘start’ widget, the user will be redirected to the gameplay page where they get to play the game. On clicking the ‘how to play’ widget, the user will be redirected to the instructions page which contains information on how to play the game. On clicking the ‘leaderboard’ widget, the user will be redirected to the leaderboard page where the ranks of different users will be displayed. On clicking the ‘settings’ widget, the user will be redirected to the settings page where they can view their profile information and alter the default settings of the game. On clicking the ‘logout’ widget, the user will also be redirected to the settings page where they can logout in the account settings section. The header is only available on the pages accessed after the user signs in because the navigation widgets will not be useful to the user if not signed in.

Footer

The footer is present on all pages of the game and contains the copyright details.

3.1 Landing Page (landing.html)

Figure 1 Landing Page

This is the first page to be displayed, consisting of the name of the game, the Sign in, Sign-up buttons, footer, and the SpongeBob SquarePants themed background image with animated bubbles to depict a sea. The user can decide to either log into their game account if they have one using the sign in button and they will be redirected to the sign in page or create a new account if they are playing for the first time using the sign-up button and they will be redirected to the sign-up page.

3.2 Sign- Up Page (signup.html)

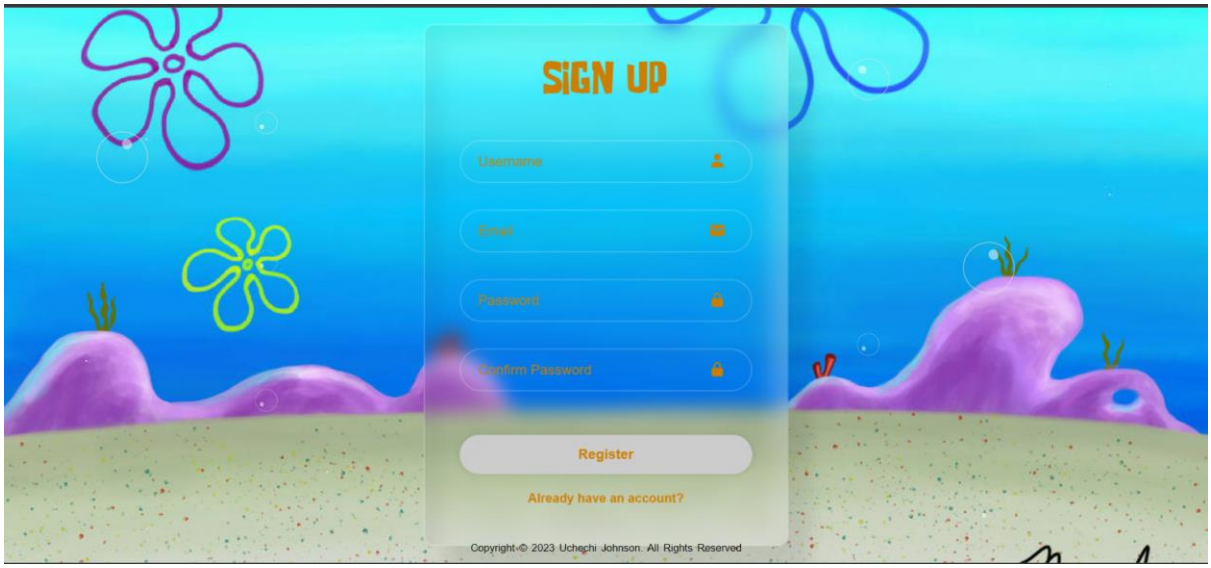

Figure 2 Sign Up Page

This is the page user will be redirected to when they click on the sign-up button on the home page or the “Don’t have an account” question on the Sign In page.

The user is expected to enter a username, valid email address and a password into the respective fields to create a game account which will be stored as an object in a users array in HTML local storage using JSON format. The user is also expected to re-enter the exact same password entered in the password entry field in the confirm password entry field.

The user entry is validated using JavaScript validation. The username entry is validated to check if the field is empty and displays a “Username is required” error message or if a user account already has the username and displays a “Username already exists” error message. The email entry is validated to check if the field is empty and displays an “Email address is required” error message, or if the email provided is not a valid email and displays a “Provide a valid email address” error message, or if a user account already has the email and displays an “Email address already exists error message”. The password entry is validated to check if the field is empty and displays a “password is required” error message or if the password provided is less than 8 characters and displays a “Password must be atleast 8 characters” error message. The password confirmation entry is validated to check if the field is empty and displays a “Please confirm your password” error message or if the password confirmation provided does not match the password provided and displays a “Passwords don’t match” error message.

After successfully entering their details into the respective fields the user is expected to click on the Sign-Up button to sign into the game where they will be redirected to the preview page The user’s details will be stored as an object in a users array in HTML local storage in JSON format and a “Your account has been created successfully!” message will be displayed.

If the user is on the sign-up page and realizes, they have a game account, they can click on the “Already have an account” question to be redirected to the Sign In page.

3.3 Sign in Page (signin.html)

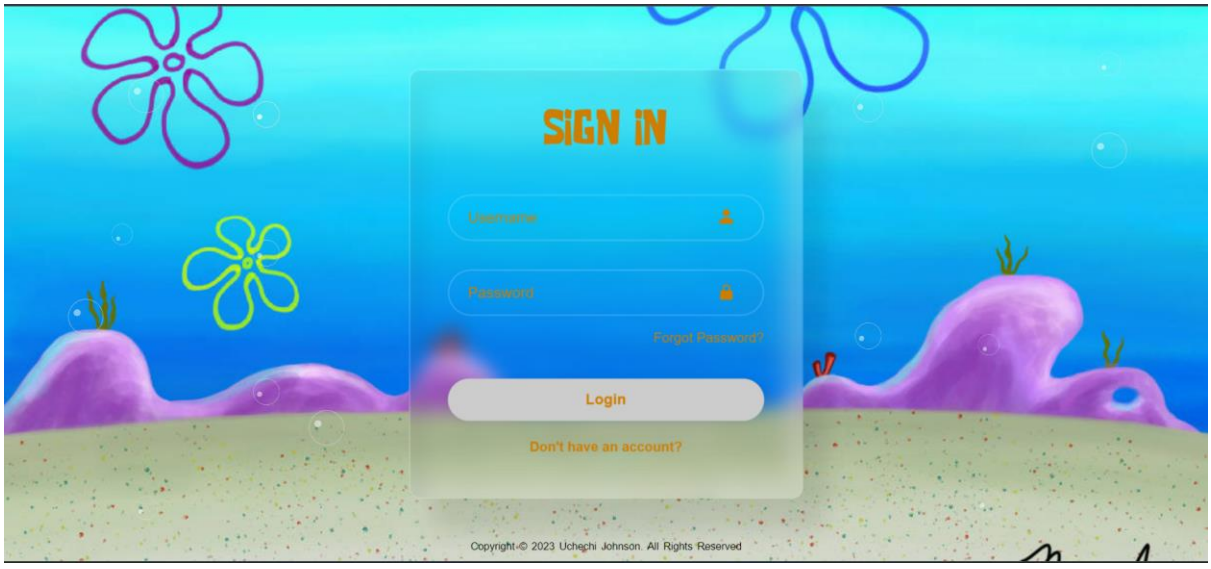

Figure 3 Sign in Page

Figure 4 Sign in Page (Forgot password feature)

This is the page user will be redirected to when they click on the sign in button on the landing page or the “Already have an account” question on the Sign-Up page.

The user is expected to enter the username and password of their existing game account into the respective fields. If a user forgets their password and clicks on the forgot password question, an entry field will be prompted for the user to enter the answer a security question which they must have saved previously to confirm their account. If the answer provided matches their saved answer in HTML local storage, the password field will be auto filled with the recovered password .

The user entry is validated using JavaScript validation. The username entry is validated to check if the field is empty and displays a “Username is required” error message or if the username doesn’t exist in the users array in HTML local storage and displays a “User not found” error message. The password entry is validated to check if the field is empty and displays a “Password is required” error message or if the password provided doesn’t match the username provided in the users array of the HTML local storage and displays an “Incorrect password” error message.

After successfully entering the username and password, the user is expected to click on the Sign In button to sign into the game where they will be redirected to the preview page. A “Login successfully!” message will be displayed.

If the user is on the sign in page and realizes, they do not have a game account, they can click on the “Don’t have an account” question to be redirected to the Sign-Up page.

3.4 Home Page (preview.html)

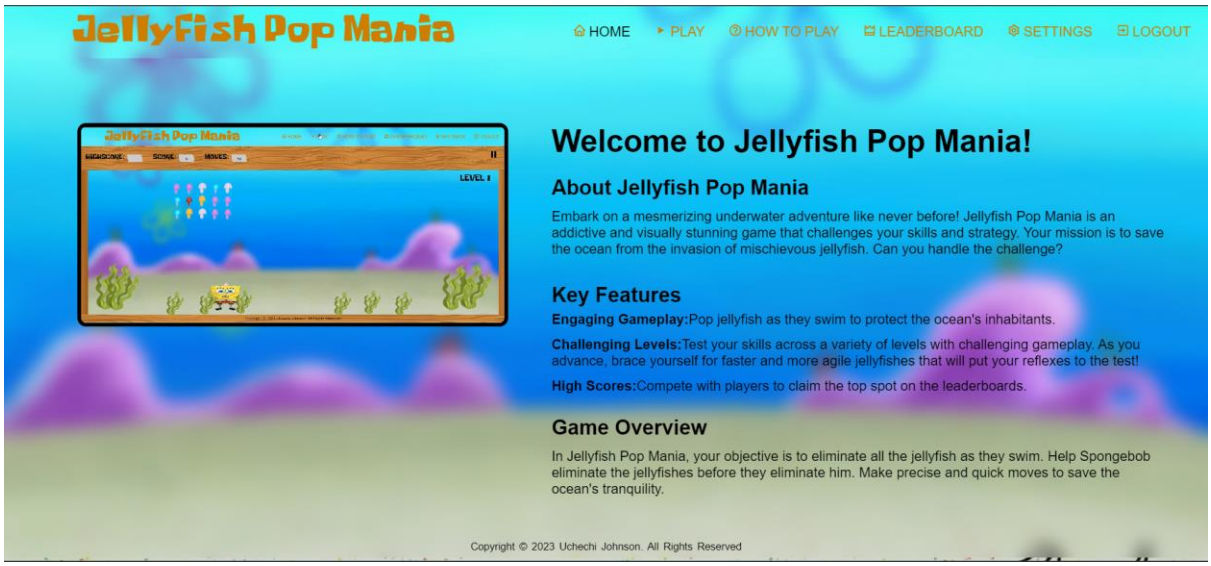

Figure 5 Preview Page

This is the page the user will be redirected to after successfully Signing in, Signing Up or clicking the home widget on the header navigation bar.

This page displays a video tutorial of the game for the user to get an idea of how the game is played. It also has a section which describes the game and its key features briefly. The widgets in the header navigation bar can be used to navigate to other pages of the game.

3.5 Game Play Page (gameplay.html)

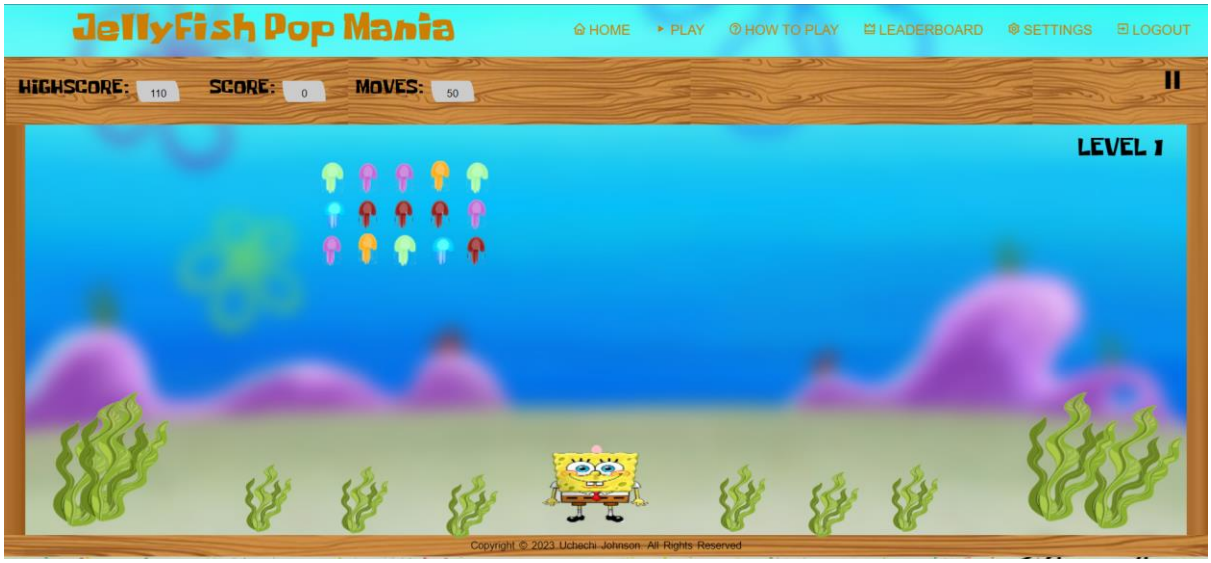

Figure 6 Game Play Page

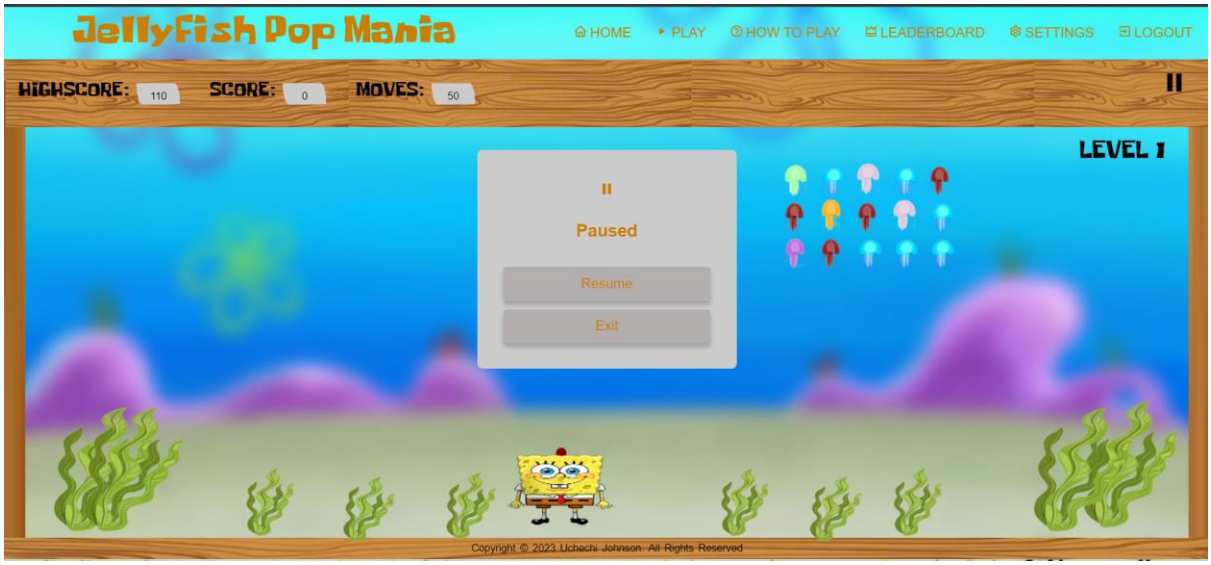

Figure 7 Game Play Page (Pause feature)

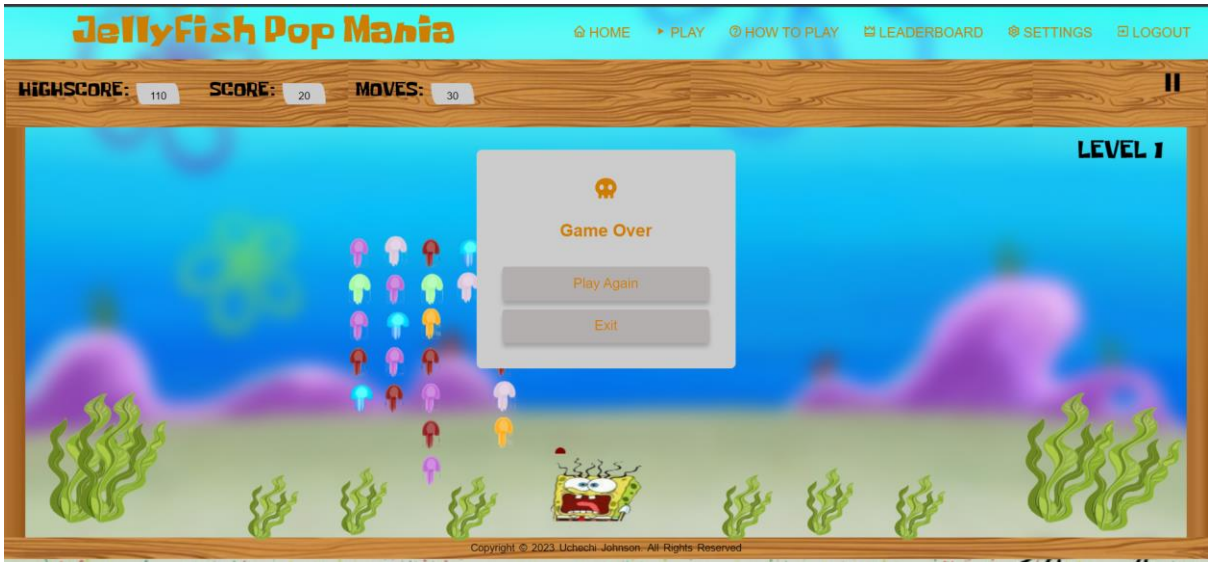

Figure 8 Game Play Page (Game Over feature)

This is the page the user will be redirected to after clicking on the play widget in the header navigation bar. This page is where the game is played.

This page has a status bar where the high score of the player, current score and moves are displayed. It has a pause button to enable the user to pause the game and a level text which displays the current level of game play. It also has animated seaweed graphics which are SVGs animated using CSS. It enables a background music and designated sounds to be made for different actions on default.

The background music plays in a continuous loop throughout the duration of the game. When an eliminating jellyfish is shot with a swimming jellyfish of the same colour, a pop sound is played on collision. When the swimming jellyfishes meet the SpongeBob character, a shocking and screaming sound is played and the background music is stopped signifying game over.

The school of jelly fishes which is a random selection of jellyfishes of different colours swim from left to right and back moving down by a row on the game canvas each time it collides with the vertical walls of the canvas. At the first level, the size of the school is 15 jellyfishes at a speed of 0.3 seconds. For each additional level, the size of the school increases by 3 jelly fishes and a speed of 0.2 seconds. At the first level, 50 eliminating jellyfishes of randomly selected colours are provided for the SpongeBob character to use in eliminating the swimming jellyfishes. The small dome above the SpongeBob character displays the next colour of eliminating jellyfish to be launched. For each additional level, extra 10 eliminating jellyfishes are provided. A user progresses to the next level when all swimming jellyfishes provided at the current level have been eliminated.

For each jellyfish eliminated, 5 points are added to the current score. If the current score is higher than the high score, the high score is updated to be the current score. The high score of the user is stored in the users array in HTML Local storage in JSON format and retrieved for display. The level which the high score is obtained is also stores in HTML Local storage using JSON format.

The pause button when clicked enables the user to pause the game till they are ready to resume provided they remain on the gameplay page. When the game is paused, the swimming jellyfishes are stopped in their tracks and the SpongeBob character is unable to move along its axis or eliminate a jellyfish. The background music is also paused until the user resumes the game. While the game is in a paused state, a pop-up window is displayed with two buttons giving the user the choice to either resume from where they left off or exit the game and be redirected the home page.

The moves show the number of eliminating jellyfishes left. If the moves are exhausted before the jelly fishes are eliminated, the swimming jellyfishes swim to the SpongeBob character and shock him to death and the game is over. If the moves are not exhausted and the SpongeBob character is unable to eliminate the swimming jelly fishes before they get to him, the swimming jelly fishes still shock him to death and the game is over. On game over, the background music stops, the shock and screaming sound is played, the SpongeBob character looks petrified, and a pop-up window is displayed with two buttons giving the user an option to either restart the game from level 1 or exit the game and be redirected to the home page.

All functions of the game have been implemented using JavaScript.

3.6 Instructions Page (instructions.html)

Figure 9 Instruction page

This is the page the user will be redirected to after clicking the how to play widget on the header navigation bar.

This page consists of a set of instructions to guide the user on how to play the game to achieve the aim of the game. It has screenshots of the game giving visual representation of specific instructions.

3.7 Leaderboard Page (leaderboard.html)

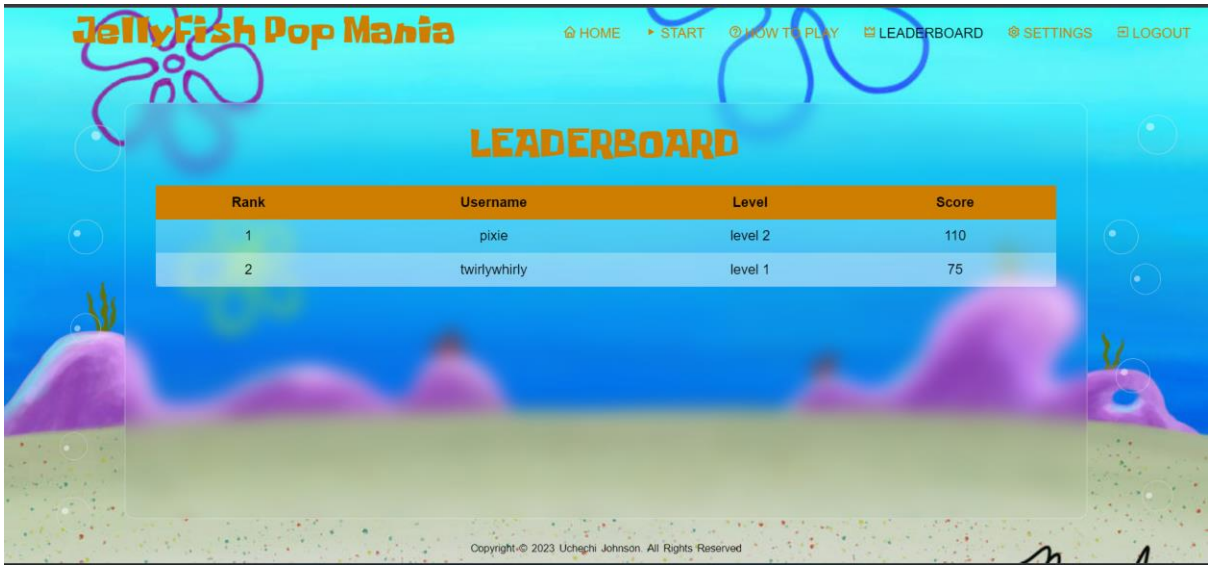

Figure 10 Leaderboard Page

This is the page the user will be redirected to after clicking the leaderboard widget on the header navigation bar.

This page displays the different users, their high scores, and the levels thy achieved the high scores in a table. The users are ranked in descending order of high scores with the user with the highest score being at the top of the rank. The user details are retrieved from the user array in HTML local storage, placed in a players array and sorted in descending order of high scores to get the rank before being displayed in the table.

3.8 Settings page (settings.html)

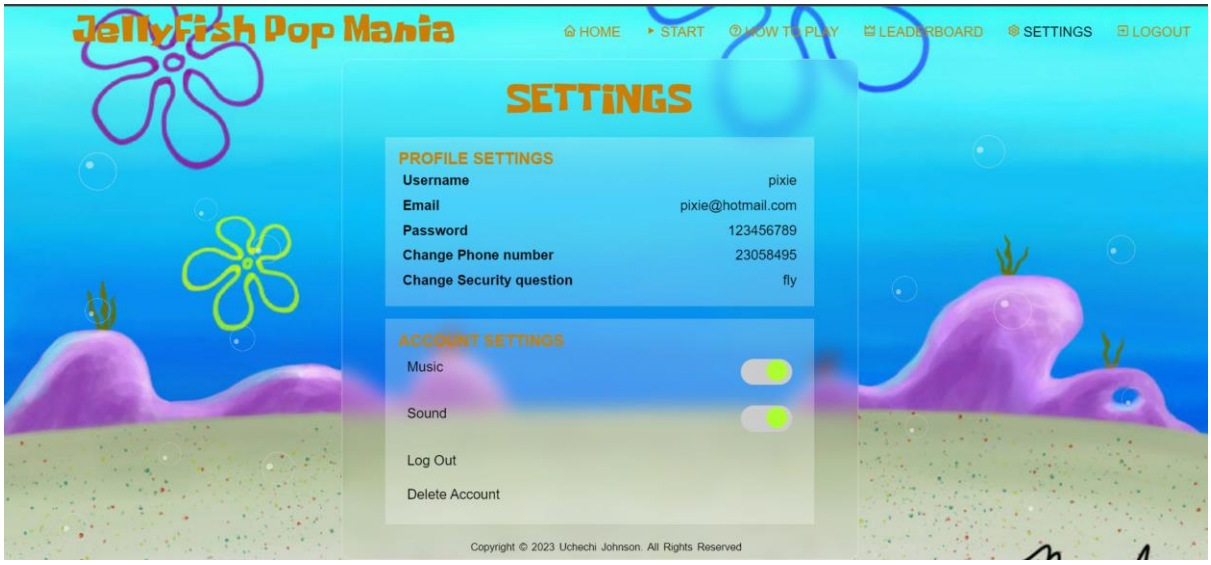

Figure 11 Settings Page

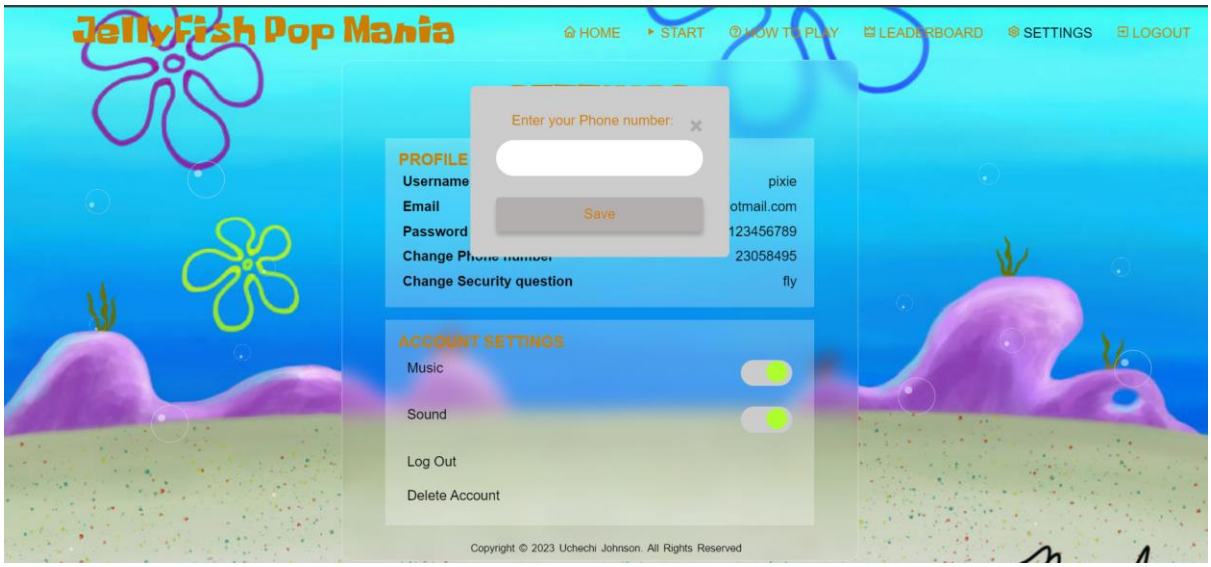

Figure 12 Settings Page (Phone number feature)

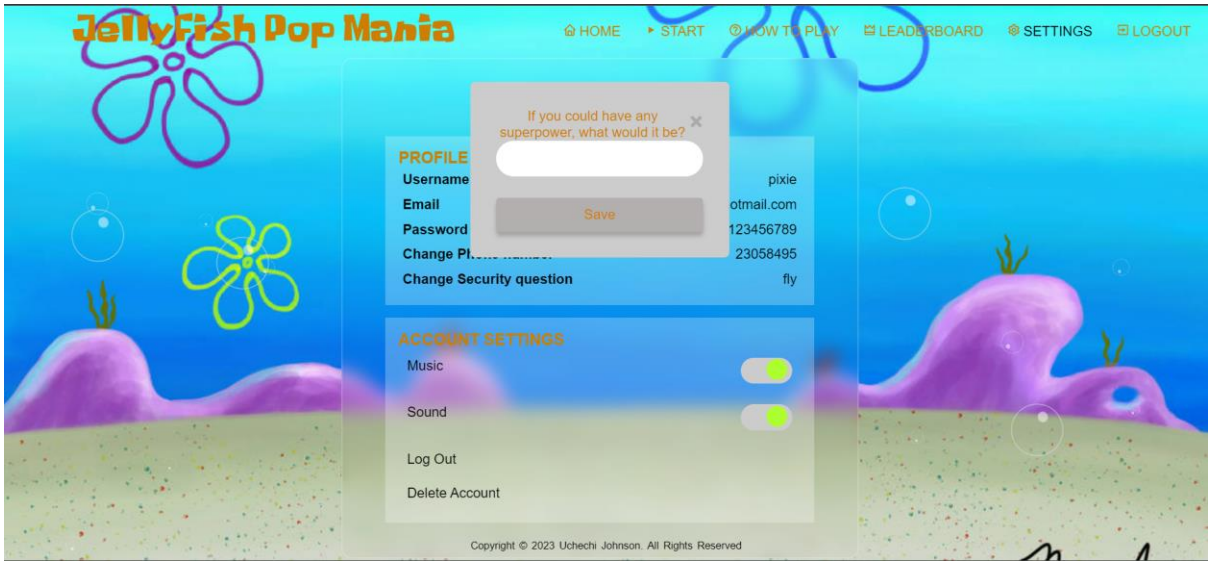

Figure 13 Settings Page (Security question feature)

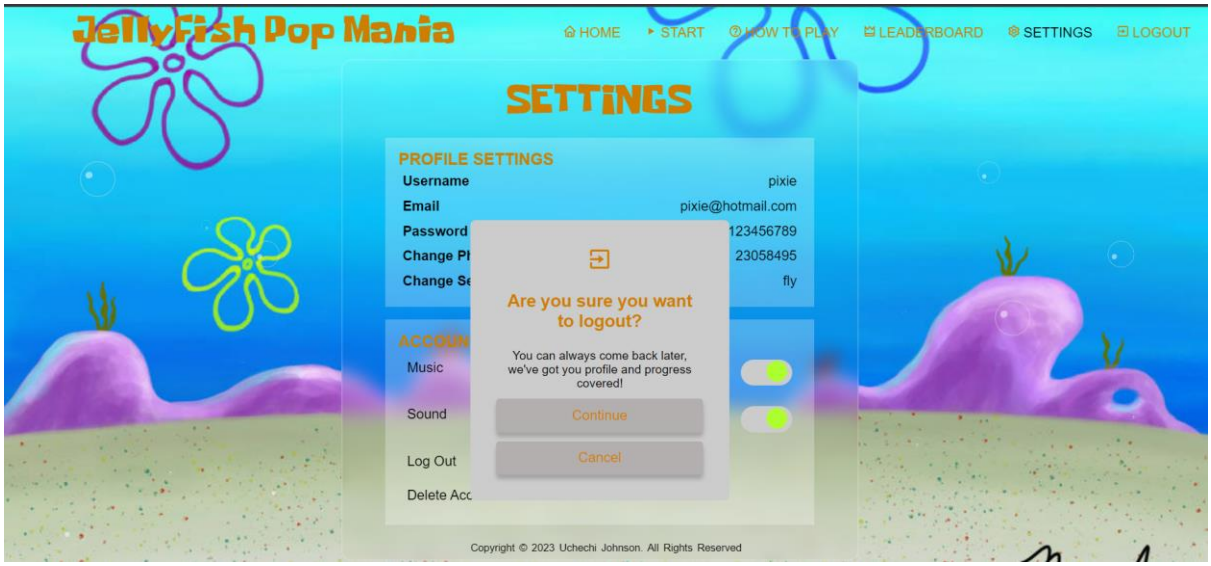

Figure 14 Settings Page (logout feature)

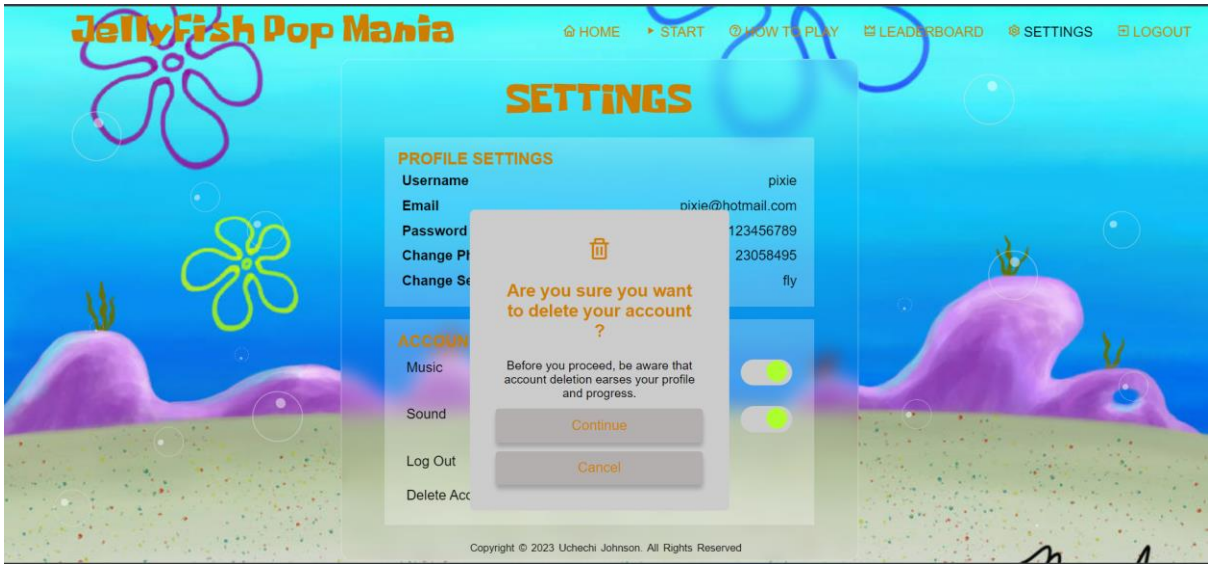

Figure 15 Settings Page (delete account feature)

This is the page the user will be redirected to after clicking the settings or logout widget on the header navigation bar. This page consists of the profile settings and account settings sections.

The profile settings section displays the username, email and password of the current user retrieved from HTML local storage. It also displays Phone number which when clicked, enables the user to add a phone number to their profile and stores it in HTML local storage in JSON format or change their phone number if already added. It also displays a Security question answer which when clicked, enables the user to add a security answer to a default security question to their profile and stores it in HTML local storage in JSON format or change their answer if they previously added and answer.

The account settings section displays functions for the background music, sounds, logout and delete account.

The toggle switch assigned to the music and sound function is set to ON by default each time the use logs in. The user can mute the background music of the game by clicking on the music toggle switch changing it from green to grey and unmute the music by clicking, changing it from grey to green. The user can also mute the game sounds (popping sound, shocking sound, and screaming sound) by clicking on the sound toggle switch changing it from green to grey and unmute the music by clicking, changing it from grey to green. The states of the music and sound are saved in HTML local storage. When the user is on the game play page, these states are then retrieved from HTML local storage.

The logout option on this page enables the user to log out of their account if they decide to switch to a different user on the same device or for any other reason. On clicking on “Log Out”, a confirmation window is prompted with an “Are you sure you want to logout” question. If “Cancel” is selected, the pop-up window is closed and nothing changes. If “Continue” is selected, the user is redirected to the landing page where they can decide to sign into a different account, create a new account or sign into the same account.

The delete account option on this page enables the user to delete their entire account from the game storage. On clicking on “Delete Account”, a confirmation window is prompted with an “Are you sure you want to delete your account” question. If “Cancel” is selected, the window is closed and nothing changes. If “Continue” is selected, the object containing the user’s details is deleted from the users array in HTML local storage, and they are redirected to the landing page where they can decide to sign into a different account or create a new account.

4. Conclusion

This website was created on the Visual studio Code text editor and tested using the Chrome browser through the visual studio code live server extension. For the best experience, enable the background music and sound to fully immerse yourself in the experience, use a pc to play this game and ensure your pc’s keyboard works well.

I encountered a couple difficulties while making the game like getting the eliminating jellyfish to only eliminate a swimming jellyfish of the same colour, repopulating the eliminating jellyfish array at each new level and matching the colour of the dome above the

SpongeBob character to colour the next eliminating jellyfish to be launched from the eliminating jellyfish array.