**Final Project**

**Letter Matching Game**

**Submitted By**

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**Organizer University:** Jagannath University **Venue:** International University of Business, Agriculture and Technology (IUBAT) **Dept./Institute/Centre:** Computer Science and Engineering (CSE) **Unique Batch Number:** 03 **Training Track/Course Name:** Front-End Development (ReactJS)

**Project Description: Letter Matching Game**

## **1. Project Overview**

The Letter Matching Game is a browser-based educational mini-game designed to improve user’s reflexes and familiarity with the English alphabet. The player must quickly match displayed letters by either clicking on an on-screen keyboard or typing the corresponding key. The game runs for a total of 60 seconds, during which users accumulate points for each correct input. Visual and audio feedback enhance the interactivity and engagement.

## **2. Project Objective**

The primary objective of the project is to create an interactive and accessible web-based game that:

* Enhances user familiarity with the English alphabet.
* Trains quick reaction time and hand-eye coordination.
* Demonstrates the integration of HTML, CSS, and JavaScript for dynamic web applications.
* Provides a foundation for further development into more complex educational tools or typing games.

## **3. Features**

* **Random Letter Generation:** Displays a random uppercase letter for the user to match.
* **Dual Input Support:** Accepts both keyboard and mouse input for flexibility.
* **Score Tracking:** Updates score with each correct answer.
* **Countdown Timer:** Limits game duration to 60 seconds with a live countdown.
* **Letter Timeout:** Each letter must be answered within 5 seconds, encouraging quick response.
* **Visual Feedback:** Background color changes during gameplay and on incorrect input.
* **Audio Feedback:** Plays different sounds for wrong answers and game end.
* **Game Restart Option:** Allows the user to restart and play multiple sessions.
* **Responsive Layout:** Optimized for both desktop and mobile devices.

## **4. Technical Details**

### Frontend Development:

* Built entirely using **HTML**, **CSS**, and **JavaScript**.

### Game Logic:

* **Random Letter Generator** picks a new letter after each correct response.
* **Letter Timeout Mechanism** ends the chance for that letter after 5 seconds if not answered.
* **Timer Logic** tracks the 60-second game time using setInterval.
* **Event Handlers** for both keydown and mouse click events determine correct or incorrect inputs.

### UI Elements:

* **Game Container** (.game-container) holds the main interface with score, time, and the letter to match.
* **Keyboard Grid** dynamically generates clickable letter keys.
* **Responsive Design** adapts to different screen sizes using media queries.

### Audio:

* Includes two <audio> elements:
  + wrong.mp3: Played for incorrect answers or timeouts.
  + end.mp3: Played when the game ends.
* Sound effects are triggered programmatically for user feedback.

## **5. Future Improvements**

* **Add Difficulty Levels:** Introduce adjustable time limits or faster-paced gameplay.
* **Letter Animation:** Add animations for the letter or keys when matched correctly.
* **Leaderboard Integration:** Store and display high scores using browser storage or a backend.
* **Multilingual Support:** Extend the game to support letters from other alphabets.
* **Mobile Enhancements:** Improve touch interaction with better spacing and feedback on tap.
* **Accessibility Features:** Add screen reader support and more colorblind-friendly feedback mechanisms.

## **6. Conclusion**

The Letter Matching Game is a simple yet engaging educational tool that demonstrates the effective use of core web technologies for creating interactive browser games. Its clean structure, responsive design, and real-time feedback mechanisms make it both fun and instructional. The project offers ample opportunity for future upgrades, making it a strong foundation for building more advanced interactive learning applications.