**Final Project**

**Memory Card Game**

**Submitted By**

**Name:** Pranto Kumar

**ID:** 22103021

**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: Memory Card Game**

**1. Project Overview**

The **Memory Card Game** is a classic, brain-stimulating card-matching game designed to enhance short-term memory and concentration. Players are presented with a grid of face-down cards, and they must flip over two cards at a time in an attempt to find matching pairs. The goal is to match all pairs in the least number of moves and as quickly as possible.

**2. Project Objective**

The objective of this project is to create an interactive and visually appealing memory-based game using core web technologies. The game helps improve cognitive skills by challenging the player’s memory and pattern recognition abilities in a fun and engaging way.

**3. Features**

1. **Card Grid Layout:** A grid of face-down cards is displayed. Clicking a card flips it over to reveal an image or symbol.
2. **Matching Logic:** Players can flip two cards at a time. If the two revealed cards match, they remain face-up; otherwise, they flip back down after a short delay.
3. **Move Counter:** The game keeps track of the number of moves the player makes.
4. **Timer:** A timer tracks how long the player takes to complete the game.
5. **Game over Screen:** When all card pairs are matched, a congratulatory message appears with the total time and move count.
6. **Responsive Design:** The layout adjusts to various screen sizes, ensuring playability across devices.

**4. Technical Details**

**Frontend Development:**

* **HTML5:** For structuring the game elements (card grid, timer, move counter, etc.).
* **CSS3:** For styling the cards, animations (like flipping), and overall layout.
* **JavaScript (ES6):** For handling the game logic — card flipping, matching, score tracking, and game resets.

**Game Logic:**

* **Card Setup:** A shuffled deck is generated with pairs of images or symbols.
* **Flip Animation:** Smooth animations for flipping cards using CSS transitions.
* **Match Checking:** Compare two selected cards and manage state accordingly.
* **Timer & Counter:** Track player performance with a dynamic timer and move count.

**UI Elements:**

* **Card Grid:** Display of shuffled cards.
* **Move Counter:** Shows how many attempts have been made.
* **Timer:** A real-time clock starts on the first move.
* **Reset Button:** Allows the user to restart the game.

**5. Future Improvements**

* **Leaderboard:** Track and display high scores (lowest moves or fastest times).
* **Themes:** Add customizable themes (animals, numbers, emoji’s, flags, etc.).
* **Difficulty Levels:** Varying grid sizes for easy, medium, and hard modes.
* **Audio Effects:** Sounds for flipping cards, successful matches, and game completion.
* **Multiplayer Mode:** Allow turn-based gameplay between two players.

**6. Conclusion**

The Memory Card Game is a timeless and mentally engaging game that provides both entertainment and cognitive training. Developed using HTML, CSS, and JavaScript, this project offers a smooth, responsive, and enjoyable user experience. It not only demonstrates front-end development skills but also provides a foundation for future improvements and more advanced game features.

This project will be fully responsive, ensuring accessibility for a wide range of devices. Furthermore, additional features and improvements can be added over time, making the game more enjoyable and competitive for users.