**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 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 4×3 grid of face-down cards that flip to reveal images when clicked.
2. **Matching Logic:** Players flip two cards at a time; matching pairs stay face-up, while non-matching pairs flip back.
3. **Move Counter:** Tracks the number of flips (attempts) made by the player.
4. **Timer:** Counts down from 60 seconds, with game-over triggered when time expires.
5. **Win/Lose Popups:**
   * + **Win Popup:** Appears when all pairs are matched, showing total time and flips.
     + **Time's Up Popup:** Appears when the timer reaches zero, showing progress.
6. **Responsive Design:** Adapts to mobile and desktop screens with media queries.
7. **Animations:** Smooth card-flip and shake effects for mismatches.
8. **Reset Functionality:** Refresh button to restart the game at any time.

**4. Technical Details**

**Frontend Development:**

* **HTML5:** Structured the game board, cards, and UI elements.
* **CSS3:** Styled cards, animations (flip/shake), and responsive layouts.
* **JavaScript (ES6):** Implemented game logic:
  + - Card shuffling and matching
    - Timer and move counter
    - Win/lose condition handling

**Game Logic:**

* **Card Setup:** 12 cards (6 pairs) shuffled randomly on load/reset.
* **Flip Animation:** CSS transforms for 3D-like card flipping.
* **Match Checking:** Compares image sources of flipped cards.
* **State Management:** Tracks flipped cards, matches, and game status.

**UI Elements:**

* **Header:** Game title ("Memorize").
* **Stats Panel:** Displays time remaining and flip count.
* **Cards:** Visual elements with consistent sizing and hover effects.
* **Popups:** Modal dialogs for game outcomes with replay options.

**5. Future Improvements**

1. **Leaderboard:** Save high scores using local Storage.
2. **Themes:** Custom card sets (animals, flags, etc.).
3. **Difficulty Levels:** Adjustable grid sizes (e.g., 4×4, 6×6).
4. **Audio Effects:** Sound for flips, matches, and game end.
5. **Multiplayer Mode:** Turn-based competition.

**6. Conclusion**

This Memory Card Game demonstrates core front-end development skills with HTML, CSS, and JavaScript. It provides a responsive, interactive experience that challenges memory and focus. The project serves as a foundation for future enhancements, such as advanced scoring systems or multiplayer functionality.

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.