**🎮 Project Report: Memory Card Game**

**📌 Project Title:**

**Memory Card Game using HTML, CSS, and JavaScript**

**🧠 Objective:**

The primary goal of this project is to develop an interactive and fun **Memory Card Matching Game** that enhances memory skills. The project aims to demonstrate the use of **DOM manipulation**, **event handling**, and **game logic implementation** in JavaScript, along with visually appealing UI using **HTML and CSS**.

**🛠️ Tools & Technologies Used:**

* **HTML5** – For structuring the game elements (cards, layout).
* **CSS3** – For styling the game board, animations, and transitions.
* **JavaScript (Vanilla)** – For implementing game logic, shuffling cards, handling user interactions, and tracking game state.

**🎯 Features:**

* Grid of **flip cards** with matching icons or images.
* Cards flip on click and reveal their content.
* Two flipped cards are compared:
  + If they match, they stay flipped.
  + If not, they flip back after a short delay.
* Score counter and move tracker.
* Optional: Timer, reset button, and win message.

**📐 Game Design & Flow:**

1. **Game Initialization**:
   * Array of card pairs (e.g., emoji or images).
   * Shuffle the array and render cards face down.
2. **Card Flip Logic**:
   * On card click, reveal card.
   * If two cards are flipped:
     + Check for a match.
     + If matched, keep them visible.
     + If not matched, hide them after a short delay.
3. **Win Condition**:
   * Game ends when all pairs are matched.
   * Optionally display a congratulatory message or restart option.
4. **Reset/Restart Functionality**:
   * Reload the game board.
   * Reset moves, timer, and matched cards.

**📄 Code Structure:**

**1. HTML:**

* A container for the game board.
* Each card consists of two divs: front and back.

html

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<div class="memory-game">

<div class="card" data-name="cat">

<img class="front-face" src="cat.png" />

<img class="back-face" src="back.png" />

</div>

<!-- Repeat for other cards -->

</div>

**2. CSS:**

* Flex layout for card grid.
* Flip animation using transform: rotateY().
* Styles for matched and unmatched cards.

css

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.card {

transform-style: preserve-3d;

transition: transform 0.5s;

}

.card.flip {

transform: rotateY(180deg);

}

**3. JavaScript:**

* Shuffle function using Fisher-Yates algorithm.
* Game logic for flipping and matching cards.
* Timer and score tracking.

javascript

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function flipCard() {

if (lockBoard || this === firstCard) return;

this.classList.add('flip');

if (!hasFlippedCard) {

hasFlippedCard = true;

firstCard = this;

return;

}

secondCard = this;

checkForMatch();

}

**🧪 Testing:**

* Tested for:
  + Correct match detection.
  + Proper flip animations.
  + Functioning reset button.
  + Handling rapid clicks.

**🚀 Future Enhancements:**

* Add levels of difficulty.
* Include timer-based scoring.
* Store high scores using **localStorage**.
* Add background music or sound effects.
* Make it responsive for mobile devices.

**📚 Learning Outcomes:**

* Deep understanding of DOM manipulation and event handling in JavaScript.
* Experience with CSS animations and transitions.
* Improved problem-solving and game logic implementation.
* Hands-on experience in creating a fully functional interactive web app.

**📷 Screenshots: *(Optional if you're submitting a report or portfolio)***

* Game start screen
* Card flip animation
* Game win screen