Research Document: Design & Development Choices for the Memory Card Flip Game

1. Color Selection for the Memory Game

Primary Color Choice: #f43f5e (Pinkish-Red)

Why This Color?

The chosen color (#f43f5e) is a vibrant pinkish-red, which is known for its ability to grab attention and enhance memory retention. Studies suggest that red hues can stimulate cognitive activity and improve concentration, making them ideal for memory-based games.

Supporting Research:

- According to Imagination Soup, red enhances memory retention and focus, making it a suitable choice for cognitive-based games.
- Research from the National Library of Medicine indicates that color contrast and brightness impact learning and retention, supporting the use of bold colors like red.

Supporting Color Palette:

To balance the intensity of red, additional colors were selected:

- **Background:** Light gray (#f0f0f0) for contrast and reduced eye strain.
- **Accent Colors:** Blue (#2196F3), Green (#4CAF50), and Amber (#FFC107) for visual differentiation and accessibility.
- **Text & UI Elements:** White (#ffffff) for clarity and readability.

2. Target Audience & Age Group

Memory games appeal to a wide range of users, from children to older adults, due to their cognitive benefits.

Key Demographics:

- **Children (Ages 3-12):** Memory games help with cognitive development, pattern recognition, and problem-solving (Find My Kids).

- **Adults (Ages 18-50):** Casual players enjoy them as a brain exercise and stress reliever.
- **Older Adults (50+):** Memory games can help improve cognitive functions and delay memory decline (Very Well Health).

3. Programming Language Choice: React & React Native

Why React & React Native?

For cross-platform accessibility, **JavaScript with React (for web) and React Native (for mobile)** was chosen as the primary development stack. This choice ensures that the game is playable on **any device with an internet connection** and can also be **downloaded as a mobile app**.

Advantages:

1. **Cross-Platform Accessibility:**
    a. React allows the game to run in **any browser (Chrome, Firefox, Safari, Edge, etc.)**.
    b. React Native enables development for **iOS and Android**, making the game available on app stores.
2. **Web & App Compatibility:**
    a. **No Installation Required:** The web version is accessible from any device with an internet browser.
    b. **Downloadable App:** The React Native version allows users to install and play offline.
3. **Single Codebase for Web & Mobile:**
    a. A large portion of the code can be shared between React and React Native, reducing development time and effort.
4. **Performance & Scalability:**
    a. React ensures **fast load times**, **smooth animations**, and an optimized user experience.

Supporting Research:

- React Documentation: Official documentation explaining its efficiency and flexibility.
- React Native Documentation: Highlights its capability for mobile app development.

- Comparison of Cross-Platform Development Frameworks: Shows React Native's advantages over other frameworks.

4. Game Features & Requirements

Core Game Mechanics:

1. **Card Setup:** A grid of face-down cards with pairs of matching images.
2. **User Interaction:** Players flip two cards per turn to find matches.
3. **Match Detection:** Matched pairs remain face-up; mismatches flip back.
4. **Scoring System:** Points awarded for correct matches; optional penalties for incorrect flips.
5. **Game Completion:** Victory message when all pairs are matched.

Data Storage:

- **Local Storage (Web):** Saves high scores and user progress.
- **AsyncStorage (React Native):** Ensures persistent storage on mobile devices.

User Interface (UI) Considerations:

- **Responsive Design:** Adapts to different screen sizes.
- **Intuitive Navigation:** Simple controls for all age groups.
- **Accessibility Features:** Color-blind-friendly design, sound cues, and easy-to-read text.

5. Conclusion

By using **React and React Native**, the game is accessible **on any device with an internet connection** and can be **downloaded for offline play**. The **color scheme** enhances memory retention, while the **target audience** includes a broad age range from children to older adults. These choices ensure an engaging, user-friendly, and widely accessible memory game.

References:

- Color Psychology in Learning
- React Official Documentation
- React Native Documentation

- Memory Games for Kids
- Brain Exercises for Adults