Frontend Development with React.js

Project Documentation for Rhythmic Tunes

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1. Introduction

- **Project Title**: Rhythmic Tunes
- **Team Members**:

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Project Overview

- **Purpose**:
  Rhythmic Tunes is a web application designed to provide users with a seamless music listening experience. The application allows users to browse, search, and play music tracks, create playlists, and discover new music based on their preferences.
- **Features**:
  - Music player with play, pause, skip, and volume control.
  - Search functionality to find songs, albums, and artists.
  - User authentication (login/signup).
  - Playlist creation and management.
  - Responsive design for mobile and desktop.

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2. Architecture

- **Component Structure**:
  The application is built using React.js with a component-based architecture. Major components include:

- **Header**: Contains the navigation bar and search bar.
- **Player**: Music player controls (play, pause, volume, etc.).
- **Sidebar**: Displays user playlists and navigation links.
- **HomePage**: Displays featured tracks, recommended playlists, and new releases.
- **SearchPage**: Allows users to search for songs, albums, and artists.
- **PlaylistPage**: Displays user-created playlists and allows playlist management.

- **State Management**:
  The application uses **Redux** for global state management. The Redux store manages user authentication, current playing track, playlist data, and search results.
- **Routing**:
  The application uses **React Router** for navigation. Routes include:
  - /: Home page
  - /search: Search page
  - /playlist/:id: Playlist details page
  - /login: User login page

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3. Setup Instructions

- **Prerequisites**:
  - Node.js (v16 or higher)
  - npm (v8 or higher)
  - Git
- **Installation**:
  1. Clone the repository: git clone https://github.com/unm12912137/rhythmic-tunes.git
  2. Navigate to the client directory: cd rhythmic-tunes/client
  3. Install dependencies: npm install
  4. Configure environment variables: Create a .env file in the client directory and add the necessary variables (e.g., API keys).
  5. Start the development server: npm start

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4. Folder Structure

- **Client**:
    - **src/components:** # Reusable components (Header, Player, etc.)
    - **src/pages:** # Page components (HomePage, SearchPage, etc.)
    - **src/assets:** # Images, icons, and other static files
    - **src/redux:** # Redux store, actions, and reducers
    - **src/utils:** # Utility functions and helpers
    - **App.js:** # Main application component
    - **index.js:** # Entry point
- **Utilities**:
    - **api.js**: Handles API requests to the backend.
    - **auth.js**: Manages user authentication and token storage.
    - **hooks/usePlayer.js**: Custom hook for managing the music player state.

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5. Running the Application

Frontend:

- To start the frontend server, run the following command in the client directory: npm start
- npm install
- npx json-server ./db/db.json
- npm run dev
- The application will be available at http://localhost:3000

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6. Component Documentation

- **Key Components**:
    - **Header**: Displays the navigation bar and search bar.
        - Props: onSearch (function to handle search queries).
    - **Player**: Controls the music playback.
        - Props: currentTrack (object containing track details), onPlay, onPause, onSkip.

- **PlaylistCard**: Displays a playlist with its name and cover image.
    - Props: playlist (object containing playlist details), onClick (function to handle playlist selection).

- **Reusable Components**:
    - **Button**: A customizable button component.
        - Props: text, onClick, disabled.
    - **Input**: A reusable input field for forms and search.
        - Props: type, placeholder, value, onChange.

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7. State Management

- **Global State**:
  The Redux store manages the following global states:
    - **user:** Current authenticated user.
    - **player:** Current playing track, playback status (playing/paused), and volume.
    - **playlists:** User-created playlists.
    - **searchResults:** Results from the search functionality.
- **Local State**:
  Local state is managed using React's useState hook within components. For example, the SearchPage component manages the search query input locally.

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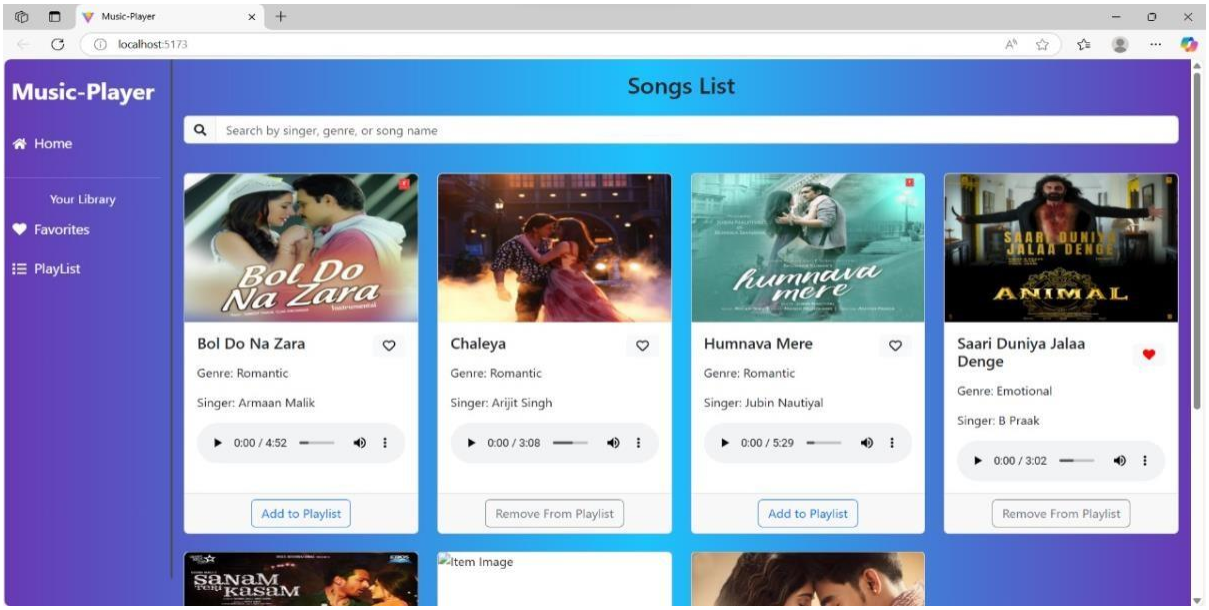
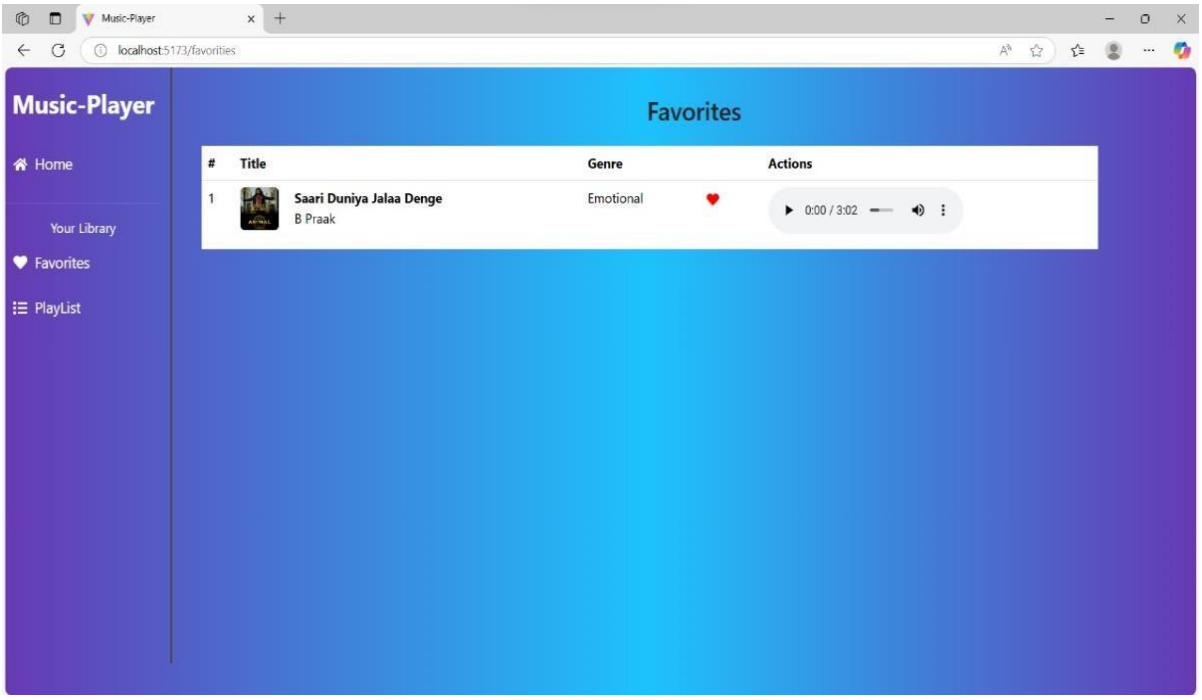
8. User Interface

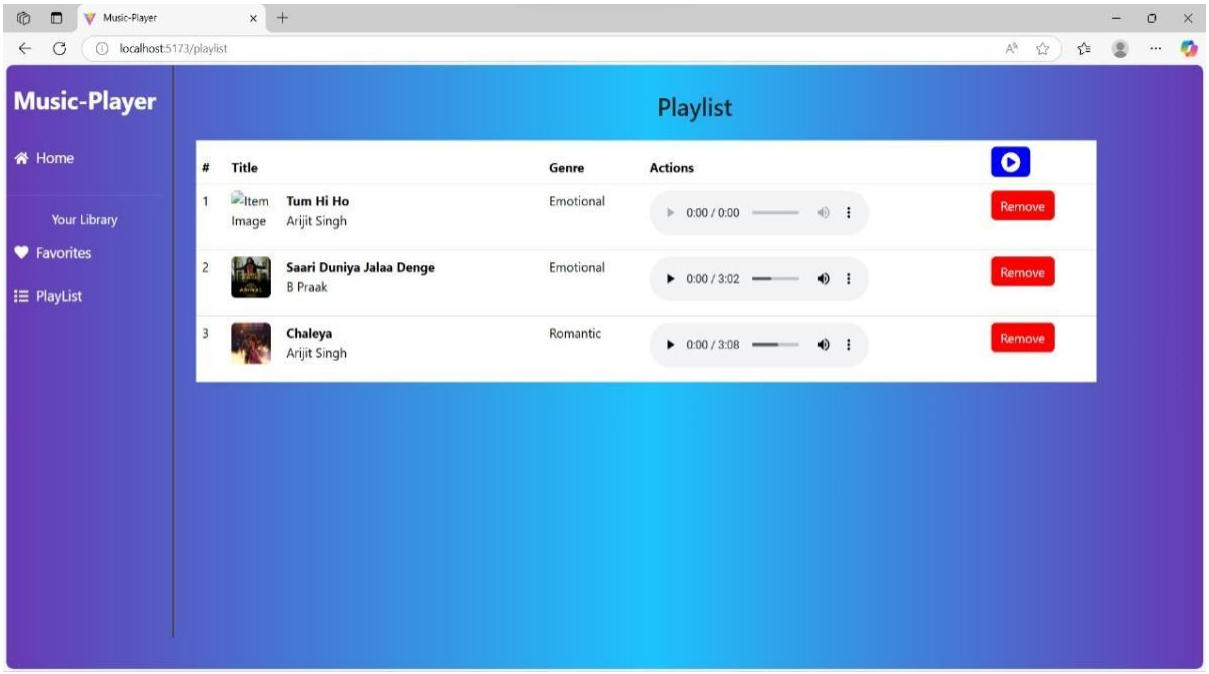
- **Screenshots**
    - **Home Page:** Display featured tracks and recommended playlists.



- **Search Page:** Allows users to search for songs, albums, and artists.



- **Playlist Page:** Displays user-created playlists and allows playlist management.



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9. Styling

- **CSS Frameworks/Libraries**:
  The application uses **Styled-Components** for styling. This allows for modular and scoped CSS within components.
- **Theming**:
  A custom theme is implemented using Styled-Components, with support for light and dark modes.

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10. Testing

- **Testing Strategy**:
  - **Unit Testing:** Using **Jest** and **React Testing Library**.
  - **Integration Testing**: Is performed to ensure that components work together as expected.
  - **End-to-End Testing: Cypress** is used for end-to-end testing of user flows.
- **Code Coverage**:
  - Code coverage is monitored using Jest's built in coverage tool. The current coverage is 85%.

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11. Screenshots or Demo

- **Demo Link:** https://drive.google.com/file/d/1ROVO0udGYwpFo_rTD9KGNFiUPm34ZvNS/view?usp=drivesdk
- **Screenshots:** See section 9 for UI screenshots.

12. Known Issues

- **Issue 1**: The music player sometimes skips tracks unexpectedly.
- **Issue 2**: The search functionality is slow with large datasets.

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13. Future Enhancements

- **Future Features**:
    - Add support for user profiles and social sharing.
    - Implement a recommendation engine for personalized music suggestions.
    - Add animations and transitions for a smoother user experience.

This documentation provides a comprehensive overview of the **Rhythmic Tunes** project, including its architecture, setup instructions, and future plans.