

**Mobile Recharge Portal**

## A PROJECT REPORT

### Submitted by

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# BONAFIDE CERTIFICATE

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**ABSTRACT**

The Mobile Recharge Project is a cutting-edge web application designed to offer users a seamless and efficient platform for managing mobile recharges. Built on a modern tech stack that includes React.js for the frontend and Redux Toolkit for state management, the application emphasizes scalability and performance. The use of Vite ensures fast development and optimized builds, while Tailwind CSS facilitates responsive and visually appealing designs.

The project integrates essential functionalities like real-time recharge processing, user account management, and transaction history. Axios is employed for efficient asynchronous data fetching, ensuring smooth communication between the frontend and backend services. Moreover, the user interface is enriched with dynamic elements, such as loading skeletons and carousels, to enhance the overall user experience.

This project showcases advanced web development practices, including component-based architecture, robust state management, and a focus on performance optimization. The integration of tools like ESLint and Prettier in the development workflow ensures code quality and maintainability. In summary, the Mobile Recharge Project is a comprehensive solution that provides a user-friendly interface for hassle-free mobile recharges.

**TABLE OF CONTENTS**

|  |  |  |
| --- | --- | --- |
| **CHAPTER NO** | **TITLE** | **PAGE NO** |
|  | **ABSTRACT** | **iv** |
|  |  |  |
| **1.** | **INTRODUCTION** |  |
|  | 1.1 PROJECT OVERVIEW | **1** |
|  | 1.2 OBJECTIVES | **1** |
|  |  |  |
| **2.** | **TECHNOLOGIES USED** | **3** |
|  | 2.1eINTEGRATIONeOF TOOLS AND LIBRARIES | **3** |
|  |  |  |
|  |  |  |
| **3** | **PROJECT SETUP** | **5** |
|  | 3.1 PREREQUISITES | **5** |
|  | 3.2 INSTALLATION | **5** |
|  | 3.3 RUNNING THE  APPLICATIONS | **5** |
|  |  |  |
| **4** | **FEATURES** | **6** |
|  |  |  |
| **5** | **COMPONENT ARCHITECTURE** | **7** |
|  | 5.1eCOMPONENT HIERARCHY | **7** |
|  | 5.2 KEY COMPONENTS | **8** |
|  |  |  |
| **6** | **STYLINGeAND THEMING** | **10** |
|  | 6.1eSTYLED-COMPONENTS | **10** |
|  | 6.2 THEME PROVIDER | **11** |
|  |  |  |
| **7** | **API INTEGRATION** | **12** |
|  | 7.1eFETCHINGeDATA WITH AXIOS | **12** |
|  | 7.2eHANDLINGeAPI RESPONSESeAND ERRORS | **12** |
|  |  |  |
| **8** | **USER AUTHENTICATION AND AUTHORIZATION** | **14** |
|  | 8.1 SIGN UP AND LOGIN PROCESSES | **14** |
|  | 8.2 PROTECTED ROUTES | **15** |
|  | 8.3 ROLE-BASED ACCESS CONTROL | **15** |
|  |  |  |
| **9** | **USER-INTERFACE** | **16** |
|  | 9.1 LOGIN | **16** |
|  | 9.2 SIGNUP | **17** |
|  | 9.3 HOME | **18** |
|  | 9.4 PROFILE | **19** |
|  | 9.5 RECHARGE | **18** |
|  | 9.6 HISTORY | **19** |
|  | 9.7 RECHARGE OTHER | **20** |
|  | 9.8 ADMIN | **20** |
|  | 9.9 ABOUT US | **21** |
|  |
|  |  |  |
| **10** | **CONCLUSION** | **22** |
|  | **REFERENCES** | **23** |

**CHAPTER 1**

**INTRODUCTION**

**1.1 PROJECT OVERVIEW**

The Mobile Recharge Platform is a comprehensive solution designed to meet the needs of users who seek an efficient and user-friendly way to manage mobile recharges. The primary goal of the platform is to provide a seamless experience for users, enabling them to perform mobile recharges quickly and easily. The platform offers a wide range of services, including real-time recharge processing, account management, and transaction history tracking.

The platform is built to support a diverse user base, providing an intuitive interface that simplifies the recharge process. Users can access a detailed overview of their recharge history, explore various plans and offers, and receive personalized recommendations based on their usage patterns. The system is designed to be scalable, ensuring reliable performance even as the user base grows.

**1.2 OBJECTIVES**

* **Develop a Robust Recharge System:** Create a reliable and efficient platform for processing mobile recharges across multiple service providers, ensuring fast and secure transactions.
* **Enhance User Engagement:** Build a user-friendly interface that encourages active participation, allowing users to easily manage their accounts, track transactions, and explore available offers.
* **Provide Personalized Recommendations:** Implement advanced algorithms to deliver tailored recharge suggestions based on users' past activities and preferences, ensuring a personalized experience.
* **Ensure High User Satisfaction:** Aim to achieve high levels of user satisfaction by providing a seamless recharge experience, reflected in positive feedback and regular platform usage.
* **Expand Service Offerings:** Continuously update the platform with new features and services, keeping the content library extensive and up-to-date to meet the evolving needs of users.

**Target Audience:**

**Mobile Users:** Individuals who regularly use mobile services and require a reliable platform for managing their recharges.

**Needs:** Access to a streamlined recharge process with multiple payment options, detailed transaction history, and personalized recommendations. The platform should be easy to navigate, allowing users to quickly find and select the best recharge plans for their needs. Additionally, users expect secure transactions and real-time processing to ensure uninterrupted mobile services.

**CHAPTER 2**

**TECHNOLOGIES USED**

**2.1 INTEGRATION OF TOOLS AND LIBRARIES**

The Mobile Recharge Platform is a powerful and efficient system designed to provide users with a seamless experience in managing mobile recharges. The application leverages modern web technologies to deliver an intuitive and responsive user interface, along with robust backend services for secure transaction processing and data management.

**Core Components:**

**React.js:**

* + Purpose**:** Build the user interface with reusable and dynamic components.
  + Implementation: Develop the core structure and components of the platform, such as recharge forms, plan listings, and user dashboards.

**Redux Toolkit:**

* + Purpose: Manage the global state of the application.
  + Implementation: Handle user data, recharge information, and UI state, ensuring consistency and efficient state management across the application.

**Axios:**

* + Purpose: Perform HTTP requests to interact with external APIs and backend services.
  + Implementation: Make API calls to fetch recharge plans, process transactions, and update user account details, integrating this data into the Redux store.

**React Router:**

* + Purpose: Manage navigation between different views or pages.
  + Implementation: Define and manage routes for various sections of the platform, such as home, recharge history, user profiles, and plan selection.

**Tailwind CSS:**

* Purpose**:** Provide utility-first CSS for rapidly building custom designs.
* Implementation**:** Style components and layouts, ensuring a responsive and visually appealing user interface.

**Backend:**

**Node.js with Express**:

* Purpose: Handle server-side logic, process user requests, and manage transactions.
* Implementation: Manage backend services that process recharges, handle authentication, and communicate with the database.

**MySQL**:

* Purpose: Store and manage the platform’s database, including user accounts, transaction history, and recharge plans.
* Implementation: Organize and maintain data for efficient retrieval and processing, ensuring data integrity and security.

**CHAPTER 3**

**PROJECT SETUP**

**3.1 PREREQUISITES**

To set up the Mobile Recharge Platform for development, ensure you have the following tools and software ready:

* **Integrated Development Environment (IDE):** A code editor like Visual Studio Code or WebStorm.
* **Version Control System:** Git for managing source code versions.
* **Node.js and npm:** For running the development environment and managing packages.
* **React.js and Redux:** For building the front-end interface and managing application state.
* **APIs and Data Sources:** External APIs or backend services for handling mobile recharge operations.
* **UI Component Libraries:** Tailwind CSS for styling and building responsive designs.
* **Webpack or Vite:** For bundling and optimizing the application.
* **Testing Frameworks:** Tools like Jest or React Testing Library for unit and integration testing.
* **Deployment Tools:** Services like Vercel, Netlify, or Docker for deploying the application.
* **Communication Tools:** Slack or Microsoft Teams for team collaboration.

**3.2 INSTALLATION**

To set up the Mobile Recharge Platform, follow these steps:

1. **Open Your Terminal or Command Prompt:**
   * Launch your terminal or command prompt to begin the setup process.
2. **Navigate to the Project Directory:**
   * Use the cd command to move to the directory where you have cloned the project repository.
3. **Install Dependencies:**
   * Run the following command to install all necessary dependencies listed in the package.json file:

**npm install**

* + This will download and set up all the required packages for the project.

1. **Start the Development Server:**
   * To start the development server and run the application locally, use the following command:

**npm run dev**

* + Once the server is running, access the application at <http://localhost:5173>.

**3.3 RUNNING APPLICATIONS**

Starting the development server for the Mobile Recharge Platform is straightforward. Follow these steps to run the application and begin development:

1. **Start the Server:** Use the npm run dev command to start the server.
2. **Access the Application:** Open your web browser and go to http://localhost:5173 to view and interact with the application.

**CHAPTER 4**

**FEATURES**

**Displaying Recharge Information in the Mobile Recharge Platform:**

**Recharge Detail Page Components:**

* **Header:** Displays the user's account balance and navigation controls**.**
* **Plan Selection:** Shows available recharge plans, including data, talk time, and validity options**.**
* **Recharge Summary:** Provides an overview of the selected plan, including cost and benefits**.**
* **User Account Information:** Displays user-specific details like account balance and recent transactions**.**
* **Transaction History:** Lists past recharges and transaction details**.**
* **Related Offers:** Optionally displays personalized offers or discounts based on user activity**.**

**Route Configuration:**

Use **React Router** to set up routes for various sections, such as plan selection, recharge history, and user profile pages.

**Data Fetching and Display:**

* + Fetch detailed plan and transaction information from the backend or external APIs when the page loads, and display it in a user-friendly format.

**CHAPTER 5**

**COMPONENT ARCHITECTURE**

**5.1 COMPONENT HIERARCHY**

In the Mobile Recharge Platform, components form the core building blocks of the user interface. These components are designed to be modular, reusable, and maintainable. Here's an outline of the component hierarchy:

* **Root Component:** Serves as the entry point of the application, rendering other components and managing global state**.**
* **Layout Components:** Handle the overall layout, including the header, footer, and navigation bar**.**
* **Page Components:** Represent different views, such as the recharge page, history page, and profile page**.**
* **Reusable UI Components:** Include buttons, forms, modals, and cards used across various pages.
* **State-Connected Components:** Connect to the Redux store or manage local state for specific features or sections.
* **Nested Components:** Used within container components to structure complex UI elements.

**Component Relationships:**

* **Parent-Child Relationship:** A parent component renders one or more child components.
* **Sibling Relationship:** Components at the same level of the component hierarchy that share the same parent component.
* **Container vs. Presentational Components:** Container components manage state and data logic, while presentational components focus on rendering UI elements based on props.

This structure ensures that the Mobile Recharge Platform remains organized, scalable, and easy to maintain

**5.2 KEY COMPONENTS**

##### Recharge Card Component:

##### Purpose: Represents a card displaying basic information about a recharge plan, such as the cost, benefits, and validity.

##### Features:

##### Renders plan details in an attractive and easy-to-understand format.

##### Handles user interactions, such as selecting a plan to initiate the recharge process.

##### Recharge Detail Component:

##### Purpose: Displays comprehensive information about the selected recharge plan, including benefits, cost breakdown, and related offers.

##### Features:

##### Fetches detailed information about the selected plan from the backend.

##### Renders a summary of the recharge, including user balance and payment options.

##### Transaction History Component:

##### Purpose: Shows a list of past recharges and transactions made by the user.

##### Features:

##### Fetches transaction data from the backend and displays it in a chronological order.

##### Allows users to filter and search through their transaction history.

##### User Profile Component:

##### Purpose: Displays information about the user's profile, including account balance, recent activity, and personal details.

##### Features:

##### Renders user-specific information retrieved from the backend.

##### Allows users to update their profile details and view their recharge history.

##### These components work together to deliver a comprehensive and user-friendly experience in the Mobile Recharge Platform, enabling users to manage their mobile recharges effectively.

##### 

**CHAPTER 6**

**STYLING AND THEMING**

**6.1 STYLED COMPONENTS**

In the mobile recharge project, you can leverage styled-components for CSS-in-JS styling to create reusable and encapsulated styles for React components. Here's how to use styled-components to style components such as the Recharge Card:

1. Installation:
   * Ensure that styled-components is installed in your project. You can install it via npm or yarn:
     + npm install styled-components
     + yarn add styled-components
2. Benefits:
   * Scoped Styles: Styles are scoped to individual components, preventing style conflicts and improving maintainability.
   * Dynamic Styling: Utilize props and theme variables to create dynamic and responsive styles.
   * CSS-in-JS: Write CSS directly within JavaScript code, making it easier to understand the relationship between styles and components.
3. Creating Styled Components:
   * Use styled-components to build reusable and composable styled components, which can then be combined to create complex UI elements like mobile recharge forms or history lists.
4. Enhanced Features:
   * Enjoy features like auto-prefixing, code completion, and linting support for styled-components.
5. Theming:
   * Define a theme object to store common styles (e.g., colors, fonts) and use them consistently across styled-components.
6. Customization:
   * Customize the styles according to your project's design requirements and branding guidelines.
7. Advanced Features:
   * Explore advanced features of styled-components, such as media queries, animations, and theming, to create rich and responsive user interfaces.

Styled-components offer a powerful and flexible way to style the mobile recharge application. By integrating these techniques, you can maintain consistency in design while ensuring that your application is scalable and easy to maintain.

**6.2 THEME PROVIDER**

Implement theming in the mobile recharge project using styled-components to ensure consistent styling:

**Create a Theme Object:** Store common styles and design tokens (colors, fonts, spacing).

**Wrap with ThemeProvider:** Make the theme available across the application.

**Access Theme Properties:** Use `props. theme` to apply theme values in styled components.

**Dynamic Theming:** Support features like dark mode by swapping theme objects.

**Responsive Design in the Mobile Recharge Project**

Ensure the mobile recharge application is responsive across devices:

**Flexible Layouts:** Use CSS Grid/Flexbox for adaptable layouts.

Top of Form

Bottom of Form

**CHAPTER 7**

**API INTEGRATION**

**7.1 FETCHING DATA WITH AXIOS**

Axios is a popular JavaScript library for making HTTP requests from the browser or Node.js. It provides a simple and intuitive API for performing asynchronous operations, including making API calls for mobile recharge functionality. Here's how to use Axios in your project:

1. **Installation**:
   * Install Axios in your project:
     + npm install axios
     + yarn add axios
2. **Making API Calls**:
   * **GET Request**: Use the axios.get() method to make a GET request to a specified URL, such as fetching available recharge plans.
   * **POST Request**: Use the axios.post() method to send data to a backend endpoint, like processing a recharge request.
3. **Error Handling**:
   * Use the .catch() method to handle errors that occur during the API call, allowing for graceful handling of network errors, timeouts, or server-side errors.
   * **Request Configuration**: Pass additional options to Axios methods, such as headers, query parameters, or request timeout settings.
4. **Interceptors**:
   * **Request Interceptors**: Use interceptors to globally handle authentication or transform request data before it’s sent.
   * **Response Interceptors**: Intercept and transform responses, or handle errors globally.

**7.2 HANDLING API RESPONSES AND ERRORS**

Effective processing of API responses and error handling is crucial for ensuring a robust mobile recharge application. Here are some techniques:

1. **Response Interceptors**:
   * Intercept and preprocess response data, handle common error scenarios, or implement custom error handling logic globally.
2. **Error Handling in .catch()**:
   * Handle API errors within the .catch() block of the Axios promise chain to log errors, display error messages to users, or retry requests.
3. **HTTP Status Codes**:
   * Check HTTP status codes in the response to determine the outcome of the request, handling different scenarios such as successful responses (2xx), client errors (4xx), or server errors (5xx).
4. **Error Objects**:
   * Access detailed error objects provided by Axios, which include properties like response, request, config, and message.
5. **Global Error Handling**:
   * Implement error interceptors to globally handle errors across all Axios requests, centralizing error handling logic and avoiding code duplication.

**CHAPTER 8**

**USER AUTHENTICATION AND AUTHORIZATION**

**8.1 SIGN UP AND LOGIN PROCESS**

Implementing user registration and login functionality in the mobile recharge project involves several steps:

1. **Backend Endpoints**:
   * Set up endpoints (e.g., /register, /login) for handling user registration and login requests.
   * Implement logic for user input validation, account creation, and authentication.
2. **Registration Form**:
   * Create a form with fields for username, email, password, and any other required information.
   * Validate user input on the client side to ensure data integrity.
3. **Login Form**:
   * Create a form for username/email and password.
   * Validate user input on the client side.
4. **Session Management**:
   * Implement session management on the backend to track user sessions and handle logout functionality securely.

**8.2 PROTECTED ROUTES**

To secure routes in your mobile recharge application:

1. **Middleware**:
   * Create middleware to verify JWT tokens and attach the authenticated user to the request object.
2. **Protected Routes**:
   * Apply authentication middleware to routes that require authentication, ensuring that only authenticated users can access these routes.

**8.3 ROLE-BASED ACCESS CONTROL**

Implement role-based access control (RBAC) in the mobile recharge project:

1. **Role Identification**:
   * Identify roles such as admin, user, or guest.
2. **Permissions Assignment**:
   * Define and assign specific permissions to each role, determining what actions each role can perform.
3. **Role Management**:
   * Assign roles to users during registration or through backend management, storing this information securely.

**CHAPTER 9**

**USER-INTERFACE**

**9.1 LOGIN PAGE**

The **LOGIN** page is the gateway for users to access their accounts within the mobile recharge platform. The design of this page is user-friendly and straightforward, ensuring a seamless login process. Key features include:

* **Background Image:** Use a background that reflects the theme of mobile connectivity, such as abstract patterns symbolizing networks or signals.
* **Form Fields:** Include fields for entering the username/email and password, with clear placeholder text.
* **Call to Action:** The "Login" button should be prominent, encouraging users to access their accounts quickly. Consider using text like "Connect Now" to resonate with the mobile recharge theme.
* **Sign-Up Prompt:** Include a prompt for users without an account, such as "New here? Create an account to recharge in seconds!"

**9.2 SIGNUP PAGE**

The **SIGNUP** page invites new users to join the platform. It should convey the ease and benefits of creating an account. The page design focuses on a smooth onboarding experience:

* **Form Fields:** Include fields for essential details such as name, email, password, and mobile number. Ensure the form is concise to avoid overwhelming the user.
* **Benefits Highlight:** Showcase the advantages of signing up, such as quick recharges, tracking history, and exclusive offers.
* **Call to Action:** Use a prominent "Sign Up" button with text like "Start Your Recharge Journey."

**9.3 HOME PAGE**

The **HOME** page is the central hub for users, offering quick access to all primary features. It is designed to be intuitive and responsive, with the following elements:

* **Featured Services:** Display the most popular recharge options and offers at the top of the page.
* **Quick Recharge:** Provide an easily accessible section where users can quickly enter their number and select their plan for immediate recharge.
* **Navigation:** Include clear navigation to other sections such as RECHARGE, HISTORY, and PROFILE.
* **Notifications:** Display personalized messages, promotions, and alerts about upcoming recharge deadlines.

**9.4 PROFILE PAGE**

The **PROFILE** page provides users with an overview of their account details and preferences. It is organized for easy access and management:

* **Account Information:** Show basic account details such as name, mobile number, and email. Allow users to edit their information.
* **Recharge History:** Include a section summarizing recent recharges and transactions.
* **Preferences:** Allow users to manage their communication preferences and notification settings.

**9.5 RECHARGE PAGE**

The **RECHARGE** page is where users can recharge their mobile numbers with ease. It should be designed for simplicity and speed:

* **Number Input:** Users can quickly enter the mobile number they wish to recharge or select from their saved contacts.
* **Plan Selection:** Display available recharge plans with descriptions, prices, and validity periods.
* **Payment Options:** Offer various payment methods, such as credit/debit cards, digital wallets, and net banking.

**9.6 HISTORY PAGE**

The **HISTORY** page allows users to view their past transactions and recharges. The layout is clear and organized:

* **Transaction List:** Display a list of past recharges with details such as date, amount, and plan.
* **Filter Options:** Allow users to filter history by date, amount, or mobile number.
* **Export Option:** Provide an option for users to download or export their transaction history for their records.

**9.7 RECHARGE OTHER PAGE**

The **RECHARGE OTHER** page lets users recharge mobile numbers other than their own, such as those of family or friends:

* **Recipient Input:** Allow users to enter the mobile number of the recipient or select from saved contacts.
* **Plan Selection:** Similar to the RECHARGE page, users can select from available plans for the recipient’s number.
* **Gift Option:** Consider adding a feature where users can send a recharge as a gift, with a personalized message.

**9.8 ADMIN PAGE**

The **ADMIN** page is designed for administrators to manage the platform effectively. It provides comprehensive tools and dashboards:

* **User Management:** Administrators can view, edit, or delete user accounts, and handle user queries.
* **Transaction Overview:** A dashboard that shows the overall transaction volume, recent activities, and trends.
* **Reports and Analytics:** Generate reports on user behavior, recharge patterns, and financial performance.
* **Settings:** Manage platform settings, including payment gateways, plan updates, and promotional offers.

**9.9 ABOUT US PAGE**

The **ABOUT US** page introduces users to the platform’s mission, vision, and team. It should create a sense of trust and community:

* **Mission Statement:** Clearly state the purpose of the platform, emphasizing its commitment to easy and reliable mobile recharges.
* **Team Introduction:** Introduce the key team members and their roles, along with any notable achievements or milestones.
* **Contact Information:** Provide users with ways to contact support, including email, phone numbers, and social media links.

**CHAPTER 10**

**CONCLUSION**

**PROJECT SUMMARY**

The purpose of the project was to develop a robust mobile recharge platform called "LIBER," designed to provide users with a seamless and efficient experience for managing their mobile recharge needs.

* **Comprehensive Recharge Management:** Integrated with APIs to fetch and process mobile recharge data, enabling users to select operators, view available plans, and complete recharges smoothly.
* **User Profiles and Preferences:** Allowed users to create profiles, manage their recharge history, and store preferences for a personalized experience.
* **User Registration and Authentication:** Implemented secure account creation, login, and authentication mechanisms to protect user data and ensure secure transactions.
* **Recharge and Payment Processing:** Developed functionality for users to perform mobile recharges, including selecting plans, making payments, and receiving transaction confirmations.
* **Responsive Design:** Designed a responsive and mobile-friendly user interface to ensure a consistent experience across devices and screen sizes.
* **Admin Features:** Incorporated an admin panel to manage users, monitor transactions, and handle other backend operations.
* **Search and Filtering:** Enabled advanced search and filtering options to help users quickly find specific recharge plans or review their transaction history.
* **Theming and Styling:** Applied styled-components and theming to create a visually appealing and cohesive UI that aligns with the project's branding.
* **API Integration:** Integrated with third-party APIs for recharge services, payment gateways, and data retrieval to ensure a fully functional and dynamic platform.
* **Continuous Improvement:** Focused on user feedback, analytics monitoring, and iterative development to refine features and enhance the user experience over time.

In conclusion, the development of the "LIBER" platform has been a comprehensive effort involving multiple facets of mobile recharge functionality. This project not only provided valuable insights into user-centric design and development but also resulted in a powerful tool that enhances the mobile recharge experience for users. Through collaboration, learning, and iteration, "LIBER" has become a reliable and user-friendly platform for managing mobile recharges.

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