**1. Project Overview**

The Smart Income Expense Budget Tracker Web App is a web-based platform designed to help users track and manage their income, expenses, budgets, and financial health. The app provides an interactive dashboard, insightful reports, and notifications for bill reminders.

**2. Functional Requirements**

**2.1 User Authentication and Profiles**

* User sign up / sign in (email/password or social login).
* User profile management.

**2.2 Setup Categories**

* Users can create categories for **Income** and **Expense**.
* Each category has:
  + Name
  + Type (Income or Expense)
  + Description (optional)
  + Color code (optional for easier identification)

**2.3 Accounts Management**

* Users can manage multiple accounts:
  + Bank
  + Online wallet
  + Cash
* Account details:
  + Account name
  + Account type
  + Balance
  + Description (optional)

**2.4 Transactions / Records**

* Users can record transactions.
* Each transaction includes:
  + Date
  + Amount
  + Category (linked to Setup Category)
  + Account (linked to Accounts)
  + Note (optional)
  + Recurrence (optional for repeating transactions)

**2.5 Budget Setup**

* Users can create budgets for:
  + Specific categories
  + Time periods (monthly, yearly)
* Budget fields:
  + Category
  + Amount
  + Period
  + Notification threshold (e.g., 80% of budget spent)

**2.6 Notifications and Reminders**

* Users can set reminders for bill due dates.
* Notifications and reminders are sent in real-time using WebSockets.
* Reminders include:
  + Bill name
  + Due date
  + Amount (optional)
  + Notification time

**2.7 Reports**

* Visual and tabular reports of:
  + Total income/expense
  + Category-wise breakdown
  + Account balances
  + Budget tracking vs actual expenses
* Export reports (PDF/CSV).

**2.8 Dashboard**

* Summarized view:
  + Total income and expense
  + Recent transactions
  + Budget status
  + Upcoming bill reminders
* Interactive charts and graphs (e.g., pie charts, bar charts).

**3. Non-Functional Requirements**

* **Performance**: App should load within 3 seconds.
* **Security**: SSL encryption, secure user authentication.
* **Responsiveness**: Mobile, tablet, and desktop friendly.
* **Scalability**: Support for multiple simultaneous users.

**4. Data Tables**

**4.1 Users**

| **Field Name** | **Type** | **Description** |
| --- | --- | --- |
| user\_id | UUID | Primary key |
| email | String | User’s email |
| password\_hash | String | Hashed password |
| name | String | User’s name |
| created\_at | DateTime | Account creation date |

**4.2 Categories**

| **Field Name** | **Type** | **Description** |
| --- | --- | --- |
| category\_id | UUID | Primary key |
| user\_id | UUID | Foreign key to Users |
| name | String | Category name |
| type | Enum | Income or Expense |
| description | String | Optional description |
| color\_code | String | Color for UI |

**4.3 Accounts**

| **Field Name** | **Type** | **Description** |
| --- | --- | --- |
| account\_id | UUID | Primary key |
| user\_id | UUID | Foreign key to Users |
| name | String | Account name |
| type | String | e.g., Bank, Wallet, Cash |
| balance | Decimal | Current balance |
| description | String | Optional description |

**4.4 Transactions**

| **Field Name** | **Type** | **Description** |
| --- | --- | --- |
| transaction\_id | UUID | Primary key |
| user\_id | UUID | Foreign key to Users |
| date | Date | Transaction date |
| amount | Decimal | Transaction amount |
| category\_id | UUID | Foreign key to Categories |
| account\_id | UUID | Foreign key to Accounts |
| note | String | Optional note |
| recurrence | String | e.g., Monthly, Weekly |

**4.5 Budgets**

| **Field Name** | **Type** | **Description** |
| --- | --- | --- |
| budget\_id | UUID | Primary key |
| user\_id | UUID | Foreign key to Users |
| category\_id | UUID | Foreign key to Categories |
| amount | Decimal | Budget amount |
| period | String | e.g., Monthly, Yearly |
| notification\_threshold | Decimal | % to notify |

**4.6 Bill Reminders**

| **Field Name** | **Type** | **Description** |
| --- | --- | --- |
| reminder\_id | UUID | Primary key |
| user\_id | UUID | Foreign key to Users |
| bill\_name | String | Bill or expense name |
| due\_date | Date | Due date |
| amount | Decimal | Optional amount |
| notification\_time | DateTime | When to notify |

**5. Data Dictionary**

| **Field Name** | **Data Type** | **Description / Purpose** |
| --- | --- | --- |
| UUID | UUID | Unique identifier for entities (users, transactions) |
| String | Variable text | Free text fields (names, notes, descriptions) |
| Enum | Text/Enum | Predefined options (Income, Expense) |
| Decimal | Decimal | Monetary amounts |
| DateTime | ISO format | Date and time |
| Date | ISO format | Date only |

**6. Technologies**

* **Frontend**: React, Chart.js for graphs.
* **Backend**: Node.js with Express (WebSockets for notifications).
* **Database**: PostgreSQL (relational DB for structured data).
* **WebSockets**: Real-time notifications (bill reminders).