Low Level Design Document

Introduction

This Low Level Design (LLD) document outlines the implementation details for **FinSight - Personal Finance Trends Visualizer**. The project delivers a Tableau dashboard to visualize personal finance data, including income, expenses, and savings, with calculated fields for monthly trends and category highlights.

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1. System Components

Component	Description	Key Responsibilities
Data Source	CSV/Excel/Database with finance records	Store and provide raw finance data
Tableau Data Model	Tableau data connection and schema	Map and structure data for analysis
Calculated Fields	Tableau formulas for trends and highlights	Compute monthly trends, savings, categories
Dashboard Views	Tableau sheets and dashboards	Visualize trends, categories, summaries

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2. Class/Interface Overview

Class/Interface	Description	Key Methods/Attributes
DataConnector	Connects Tableau to data source	`connect()`, `refresh()`, `getSchema()`
FinanceRecord	Represents a finance entry	`date`, `amount`, `category`, `type`
CalculatedField	Tableau calculated field logic	`MonthlyIncome`, `MonthlyExpense`, `Savings`
DashboardView	Tableau worksheet/dashboard	`render()`, `filterByCategory()`, `highlightTrends()`

Relationships:

- `DataConnector` feeds data to Tableau.
- `FinanceRecord` is the base data model.
- `CalculatedField` operates on `FinanceRecord`.
- `DashboardView` visualizes outputs from `CalculatedField`.

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3. Data Structure Overview

Field Name	Type	Description

Date	Date	Transaction date
Amount	Decimal	Transaction amount
Category	String	Spending/income category
Type	Enum	‘Income’ or ‘Expense’

Calculated Fields (Tableau):

- `MonthlyIncome`: SUM([Amount]) WHERE [Type]=’Income’ GROUP BY MONTH([Date])
- `MonthlyExpense`: SUM([Amount]) WHERE [Type]=’Expense’ GROUP BY MONTH([Date])
- `MonthlySavings`: [MonthlyIncome] - [MonthlyExpense]
- `TopSpendingCategory`: MAX(SUM([Amount])) BY [Category]

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4. Algorithms/Logic

Monthly Trend Calculation (Pseudocode):

```
FOR each month IN data:
    income = SUM(amount WHERE type == 'Income' AND month(date) == month)
    expense = SUM(amount WHERE type == 'Expense' AND month(date) == month)
    savings = income - expense
    highlight_category = category WITH MAX(expense)
```

Dashboard Flow:

1. Connect to data source.
2. Apply calculated fields for trends.
3. Render dashboard views (line charts, bar charts, highlights).

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5. Error Handling

Scenario	Handling Approach
Data source unavailable	Show error message, prompt to reconnect
Invalid/missing data fields	Skip record, log warning
Calculation errors (e.g., divide by zero)	Display ‘N/A’ or zero in dashboard
Data refresh failure	Notify user, retain last successful data

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