Logical Model for Income & Expense Management System

Entities & Attributes Overview

1. **Users**

   o **Purpose**: Manage system access via roles like Admin, Accountant.

   o **Key Attributes**: user_id (PK), username (UQ, NOT NULL), password, role, email (UQ), created_at.

2. **Categories**

   o **Purpose**: Classify transactions (e.g., Salary, Rent).

   o **Key Attributes**: category_id (PK), category_name, category_type (Income/Expense), description.

3. **Transactions**

   o **Purpose**: Record income and expense entries.

   o **Key Attributes**: transaction_id (PK), user_id (FK), category_id (FK), amount, transaction_date, description, transaction_type.

4. **Budgets**

   o **Purpose**: Set and monitor financial limits.

   o **Key Attributes**: budget_id (PK), user_id (FK), category_id (FK), budget_amount, start_date, end_date.

5. **Reports**

   o **Purpose**: Provide summaries and analytics.

   o **Key Attributes**: report_id (PK), user_id (FK), generated_at, report_type, report_data.

6. **Holidays**

   o **Purpose**: Restrict updates on specific dates (auditing logic).

   o **Key Attributes**: holiday_id (PK), holiday_date, holiday_name.

Entity Relationships

- **Users ↔ Transactions**: 1:N (One user can make many transactions)

- **Users ↔ Budgets**: 1:N (One user can set multiple budgets)

- **Users ↔ Reports**: 1:N (One user can generate many reports)

- **Categories ↔ Transactions**: 1:N (One category applies to many transactions)

- **Categories ↔ Budgets**: 1:N (One category budgeted multiple times)

Constraints

- **NOT NULL**: Enforced on critical fields (e.g., username, password, amount).

- **UNIQUE**: Enforced on username and email in Users.

- **PK / FK**: Ensures uniqueness and referential integrity.

- **CHECK (Implied)**: category_type, transaction_type (must be "Income"/"Expense"), budget_amount > 0, end_date > start_date.

MIS Functions Support

- **Operational Efficiency**: Reduces redundancy; speeds up data processing.

- **Decision Support**: Reports assist in strategic planning and financial oversight.

- **Control & Security**: Budgets restrict overspending; Holidays restrict edits on critical days.

Organizational Benefits

- **Budget Discipline**: Prevents overspending with enforced budget limits.

- **Real-Time Insights**: Prompt reporting supports timely decisions.

- **Scalability**: Supports multi-user, multi-category growth.

- **Data Security**: Role-based access and operational restrictions ensure data protection.