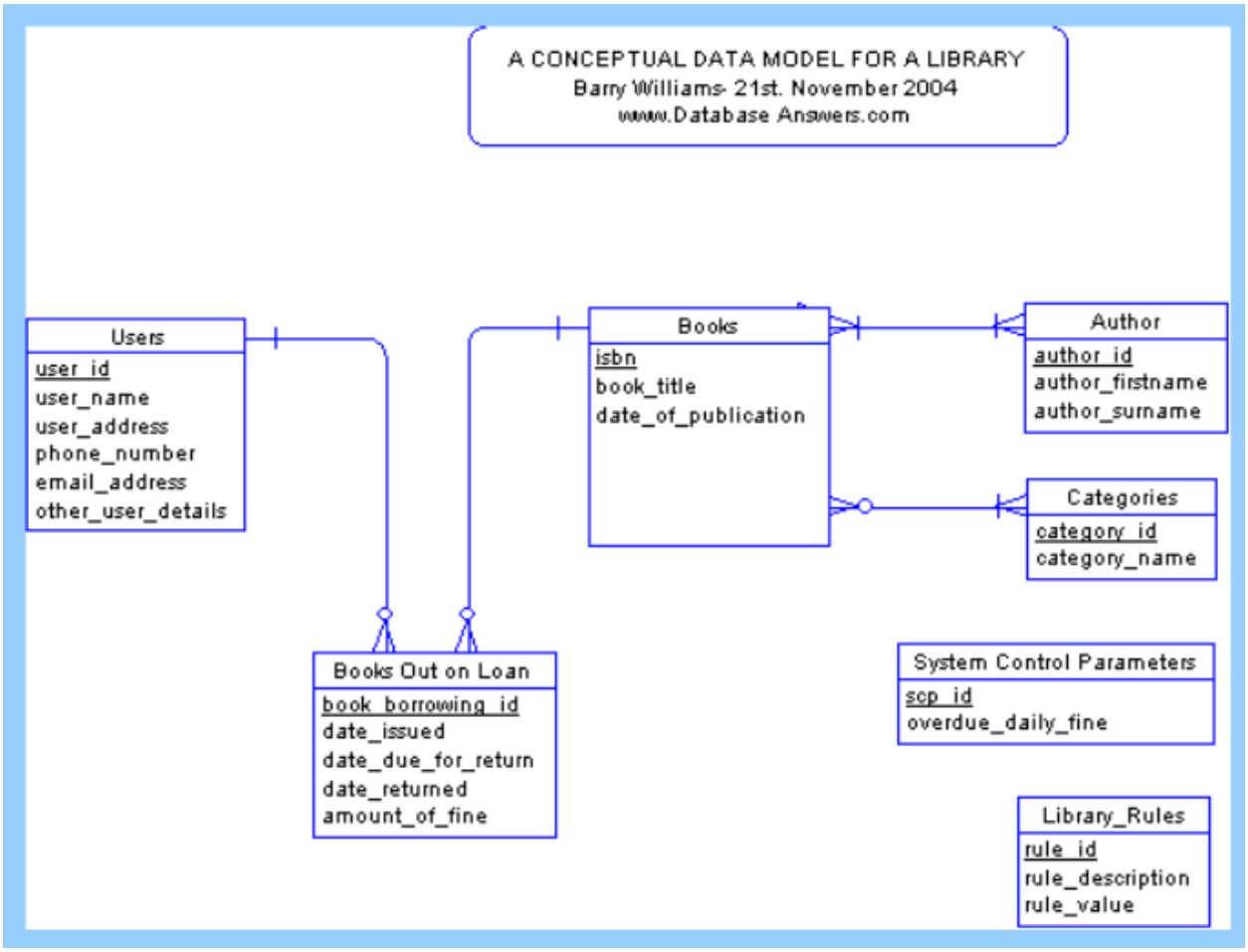
Library Management System - ERD Analysis

Data Model:
https://fordnox.github.io/databaseanswers/data_models/library/index.htm



This is a **Conceptual Data Model** for a Library Management System. The system is designed to manage library operations, including member registration, book management, and tracking loans.

Original Scope & Key Components:

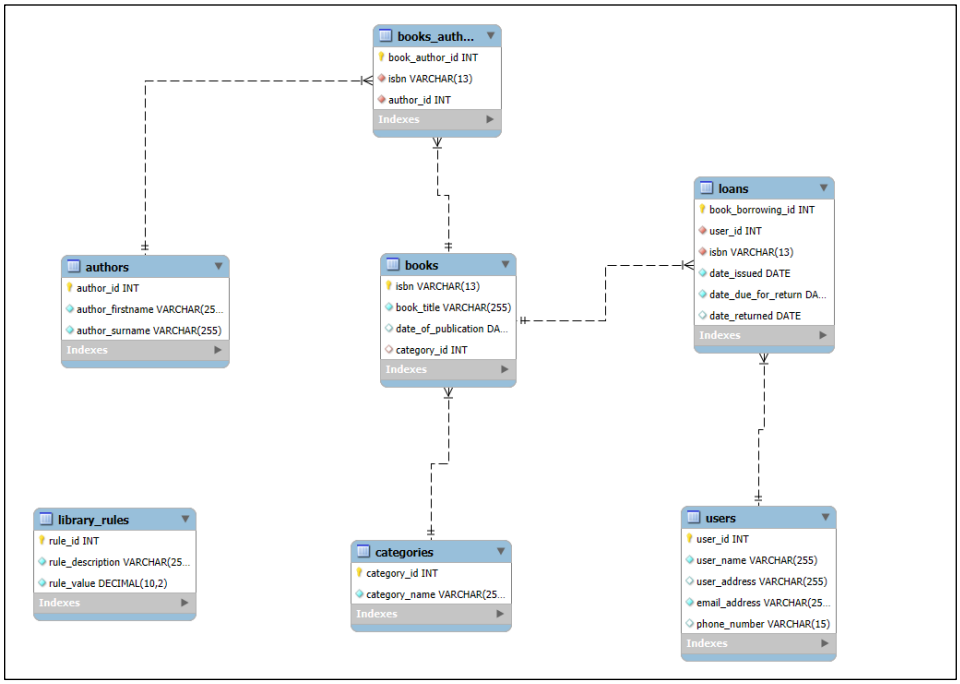
The original system includes the following features:

1. **Users Management**:
    - Store user details (e.g., name, address, email).
    - Allow tracking of who borrows books.
2. **Book Management**:
    - Store book information (e.g., title, ISBN, authors, categories).
    - Categorize books by genres.
    - Track which books are currently on loan.
3. **Loan Management**:
    - Record loans with details like issue date, due date, and return status.
    - Track overdue books and calculate fines.
4. **Library Rules**:
    - Define and enforce borrowing rules (e.g., daily overdue fines).
5. **System Parameters**:
    - Oversee system-wide settings, such as overdue fine rates.

Original System Features:

- 5+ interconnected tables.
- Support for managing books, authors, and categories.
- Full loan tracking, including overdue fine calculations.
- Detailed user information and borrowing history.

Minimized Scope – Essential Features Only:



To simplify the system while retaining core functionality, the scope is reduced to the following **4–6 key tables**:

1. **Users**:
    - Tracks library members and their contact details.
    - Simplified Fields:
        - user_id (Primary Key)
        - user_name
        - user_address
        - email_address
        - phone_number
2. **Books**:
    - Holds book information, including categories and authors.
    - Simplified Fields:
        - isbn (Primary Key)
        - book_title
        - date_of_publication

3. **Authors**:
    - Connects books to their respective authors.
    - Simplified Fields:
        - author_id (Primary Key)
        - author_firstname
        - author_surname
4. **Loans (Books Out on Loan)**:
    - Tracks the borrowing and returning of books by users.
    - Simplified Fields:
        - book_borrowing_id (Primary Key)
        - user_id (Foreign Key)
        - isbn (Foreign Key)
        - date_issued
        - date_due_for_return
        - date_returned
5. **Categories**:
    - Organizes books into categories/genres.
    - Simplified Fields:
        - category_id (Primary Key)
        - category_name
6. **Library Rules** (Optional):
    - Defines borrowing rules like overdue fines.
    - Simplified Fields:
        - rule_id (Primary Key)
        - rule_description
        - rule_value

Simplified System Design:

- Focuses on **core functionalities**:
    - Member management.
    - Book inventory and categorization.
    - Loan tracking.
- Reduces complexity by excluding advanced features like:
    - Detailed system controls.
    - Multi-layered category hierarchies.

Example User Stories:

As a Library Member:

1. "I want to borrow books and know when they are due."
2. "I want to return books and check if I have overdue fines."

As a Librarian:

1. "I want to manage member registrations."
2. "I want to track borrowed books and overdue returns."
3. "I want to update book details like title or publication date."

As a System Administrator:

1. "I want to enforce library rules, such as calculating overdue fines."
2. "I want to categorize books by genre for easier discovery."