Library Database Management System

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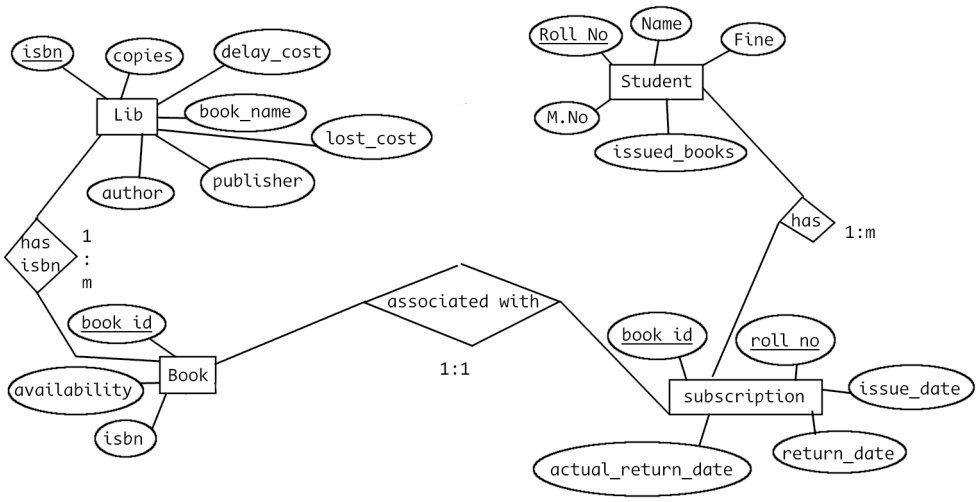
Problem Statement

Library Management System is an application designed to keep record of the data used by the library (specifically Library of a University). It is used by librarian to manage the library using a computerized system where he/she can add new books, students, issue books etc. Books and student maintenance modules are also included in this system which would keep track of the students using the library and also a detailed description about the books a library contains. With this computerized system there will be no loss of book record or member record which generally happens when a non computerized system is used. All these modules are able to help librarian to manage the library with more convenience and in a more efficient way as compared to library systems which are not computerized.

ER diagram



Tables

Lib	
ISBN (PK)	NUMBER
Copies	NUMBER
Delay_cost	NUMBER
Lost_cost	NUMBER
Book_Name	VARCHAR(50)
Author	VARCHAR(40)
Publisher	VARCHAR(50)

Student	
Roll No (PK)	NUMBER
Name	VARCHAR(50)
M_No	VARCHAR(10)
Issued_books	NUMBER
Fine	Number

Book	
Book_Id (PK)	NUMBER
Availability	VARCHAR(1)
ISBN (FK)	NUMBER

Subscription	
Book_Id (PK) (FK)	NUMBER
Roll_No (PK) (FK)	NUMBER
Issue_Date	DATE
Return_Date	DATE
Actual_Return_Date	DATE

Normalization

Table: Lib

- **1st Normal Form:** There is no multi-valued attribute in the table, so it is in 1st Normal form.
- **2nd Normal Form:** There is no partial dependency in the table as all the fields are dependent only on ISBN number. Hence, the table is in 2nd Normal form.
- **3rd Normal Form:** Since there is no transitive dependency in the table (all fields are dependent only the primary key), the table is in 3rd Normal Form.
- **Boyce-Codd Normal Form:** Since every field of the table is dependent only on primary key, it is in BCNF.
- **4th Normal Form:** The table is in BCNF and has no multi-valued dependency, so it is in 4th Normal form.
- **5th Normal Form:** The table cannot be decomposed into smaller tables, so it is in 5th Normal form.

Table: Student

- **1st Normal Form:** There is no multi-valued attribute in the table (in this project, we are considering only one mobile number per student), so it is in 1st Normal form.
- **2nd Normal Form:** There is no partial dependency in the table as all the fields are dependent only on Roll No of student. Hence, the table is in 2nd Normal form.
- **3rd Normal Form:** Since there is no transitive dependency in the table (all fields are dependent only the primary key), the table is in 3rd Normal Form.
- **Boyce-Codd Normal Form:** Since every field of the table is dependent only on primary key, it is in BCNF.
- **4th Normal Form:** The table is in BCNF and has no multi-valued dependency, so it is in 4th Normal form.

- **5th Normal Form:** The table cannot be decomposed into smaller tables, so it is in 5th Normal form.

Table: Book

- **1st Normal Form:** There is no multi-valued attribute in the table, so it is in 1st Normal form.
- **2nd Normal Form:** There is no partial dependency in the table as all the fields are dependent only on Book ID of a book. Hence, the table is in 2nd Normal form.
- **3rd Normal Form:** Since there is no transitive dependency in the table (all fields are dependent only the primary key), the table is in 3rd Normal Form.
- **Boyce-Codd Normal Form:** Since every field of the table is dependent only on primary key, it is in BCNF.
- **4th Normal Form:** The table is in BCNF and has no multi-valued dependency, so it is in 4th Normal form.
- **5th Normal Form:** The table cannot be decomposed into smaller tables, so it is in 5th Normal form.

Table: Subscription

- **1st Normal Form:** There is no multi-valued attribute in the table, so it is in 1st Normal form.
- **2nd Normal Form:** There is no partial dependency in the table as all the fields are dependent on the Book ID (A single book as a single subscription associated with it). Hence, the table is in 2nd Normal form.
- **3rd Normal Form:** Since there is no transitive dependency in the table (all fields are dependent only the primary key), the table is in 3rd Normal Form.
- **Boyce-Codd Normal Form:** Since every field of the table is dependent only on primary key, it is in BCNF.

- **4th Normal Form:** The table is in BCNF and has no multi-valued dependency, so it is in 4th Normal form.
- **5th Normal Form:** The table cannot be decomposed into smaller tables, so it is in 5th Normal form.

PL-SQL statements

Repository Link: https://www.github.com/hitesh-aggarwal/dbms