

LIBRARY MANAGEMENT SYSTEM

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ADVANCED DATABASE GROUP PROJECT

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Scope of the library management system:

Create distinct product users based on their roles and permissions.

Authenticate users at their login.

Provide the list of books the users can borrow.

Facility to reserve books that are available.

Objective of library management system:

- The primary objective of any library system is to collect, store, organize, retrieve and make available the information sources to the information users.

Existing Problems of the system:

In the modern age, libraries are suffering from many problems including a lack of space, ineffective staff, and improper management. Without a proper system in place, most libraries portray a quite haphazard picture to the readers.

Functional requirements:

The Library Management System database keeps track of readers with the following considerations –

- * The system keeps track of the staff with a single point authentication system comprising login Id and password.
- * Staff maintains the book catalog with its ISBN, Book title, price(in INR), category(novel, general, story), edition, author Number and details.
- * A publisher has publisher Id, Year when the book was published, and name of the book.

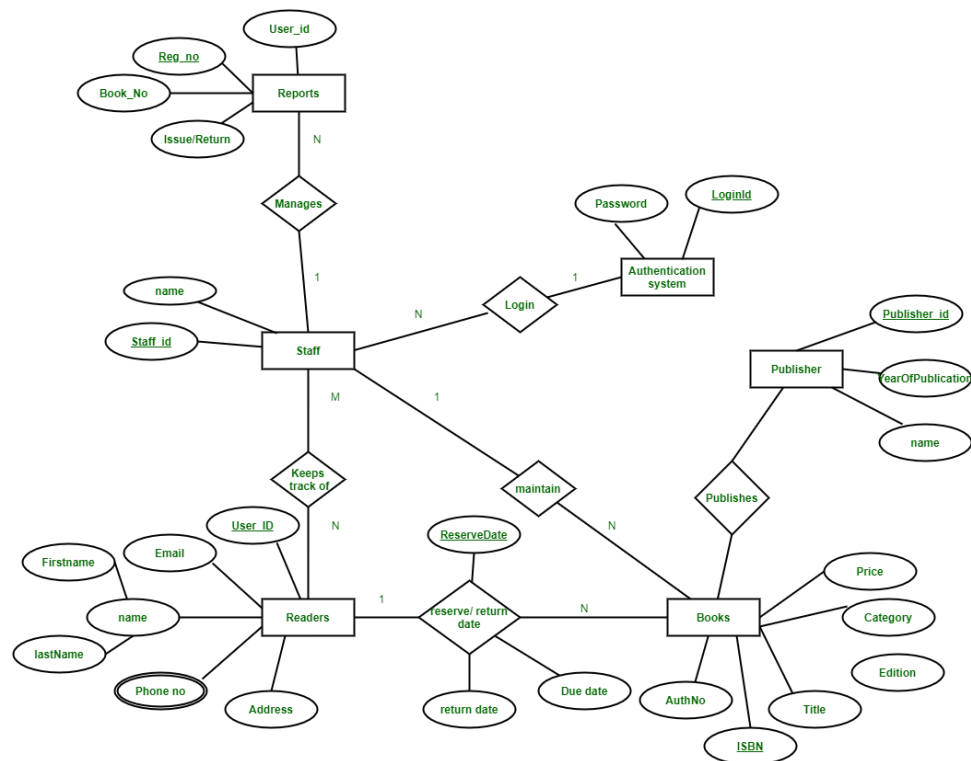
- * Readers are registered with their user_id, email, name (first name, last name), Phone no (multiple entries allowed), communication address. The staff keeps track of readers.
- * Readers can return/reserve books that stamps with issue date and return date. If not returned within the prescribed time period, it may have a due date too.
- * Staff also generate reports that has readers id, registration no of report, book no and return/issue info.

Entities and attributes

- * Book Entity : It has authno, isbn number, title, edition, category, price. ISBN is the Primary Key for Book Entity.
- * Reader Entity : It has UserId, Email, address, phone no, name. Name is composite attribute of firstname and lastname. Phone no is multi valued attribute. UserId is the Primary Key for Readers entity.
- * Publisher Entity : It has PublisherId, Year of publication, name. PublisherID is the Primary Key.
- * Authentication System Entity : It has LoginId and password with LoginID as Primary Key.
- * Reports Entity : It has UserId, Reg_no, Book_no, Issue/Return date. Reg_no is the Primary Key of reports entity.
- * Staff Entity : It has name and staff_id with staff_id as Primary Key.
- * Reserve/Return Relationship Set : It has three attributes: Reserve date, Due date, Return date.

Relationships between Entities –Normal forms

- * A reader can reserve N books but one book can be reserved by only one reader. The relationship 1:N.
- * A publisher can publish many books but a book is published by only one publisher. The relationship 1:N.
- * Staff keeps track of readers. The relationship is M:N.
- * Staff maintains multiple reports. The relationship 1:N.
- * Staff maintains multiple Books. The relationship 1:N.
- * Authentication system provides login to multiple staffs. The relation is 1:N.



Instantiating the database(activation)

mysql> use library;

Database changed

Entity creation

Publisher entity:

mysql> create table publisher(

-> publish_id int,

-> yearpb date,

-> publname char(27)

->);

Query OK, 0 rows affected (0.42 sec)

mysql> create table authsyst(loginID varchar(08), passwrld varchar(16));

Query OK, 0 rows affected (0.54 sec)

Reports entity:

```
mysql> create table reports(
```

```
->
```

```
-> userid int,
```

```
-> regno int primary key,
```

```
-> bookno int,
```

```
-> isredate date
```

```
-> );
```

Query OK, 0 rows affected (0.33 sec)

```
mysql> create table staff( empname char(17), staffid int(07) primary key );
```

Query OK, 0 rows affected (0.32 sec)

Reset entity (reserve):

```
mysql> create table resret(
```

```
-> resdate date,
```

```
-> duedate date,
```

```
-> retdate date
```

```
-> );
```

Query OK, 0 rows affected (3.45 sec)

Book Entity

```
mysql> create table book( ISBN int(16) primary key, authno int(07), title varchar(26), edition char(06),  
category char(12), price int(05));
```

Query OK, 0 rows affected (0.32 sec)

READER entity

```
mysql> create table reader( userid int(06) primary key, email varchar(14), phonenum int(10), f_name char (8), l_name char(8) );
```

Query OK, 0 rows affected (0.31 sec)

```
mysql> show tables;
```

```
+-----+
| Tables_in_library |
+-----+
| authsyst          |
| book              |
| publisher         |
| reader            |
| reports           |
| resret            |
| staff             |
+-----+
```

7 rows in set (0.00 sec)

Alter operation on publisher and auth system

```
mysql> alter table publisher add primary key(publish_id);
```

Query OK, 0 rows affected (1.11 sec)

Records: 0 Duplicates: 0 Warnings: 0

```
mysql> alter table authsyst add primary key(loginID);
```

Query OK, 0 rows affected (0.82 sec)

Records: 0 Duplicates: 0 Warnings: 0

Inserting data items:

```
mysql> insert into reader values("001","jima@mail.com","0977262548","james","gatwech");
```

Query OK, 1 row affected (0.06 sec)

```
mysql> insert into reader values("002","mary@mail.com","0977262548","mary","magdalene");
```

Query OK, 1 row affected, 1 warning (0.07 sec)

```
mysql> insert into reader values("003","may@mail.com","0977262548","mary","martha");
```

Query OK, 1 row affected (0.07 sec)

```
mysql> insert into reader values("004","joe@mail.com","0977262548","joe","peter");
```

Query OK, 1 row affected (0.05 sec)

```
mysql> insert into reader values("005","d1v@mail.com","0977262548","dave","simon");
```

Query OK, 1 row affected (0.05 sec)

```
mysql> insert into reader values("006","dan@mail.com","0977262548","dan","stonner");
```

Query OK, 1 row affected (0.56 sec)

```
mysql> insert into reader values("007","dani@mail.com","0977262548","dani","kuja");
```

Query OK, 1 row affected (0.05 sec)

```
mysql> insert into book values("B4e6","099","databasesql","2nd","IT","400");
```

Query OK, 1 row affected, 1 warning (0.08 sec)

```
mysql> insert into staff values("Ben","968");
```

Query OK, 1 row affected (0.18 sec)

```
mysql> insert into staff values("James","328");
```

Query OK, 1 row affected (0.04 sec)

```
mysql> insert into staff values("mike","354");
```

Query OK, 1 row affected (0.05 sec)

```
mysql> insert into staff values("dike","678");
```

Query OK, 1 row affected (0.04 sec)

```
mysql> insert into staff values("dave","038");
```

Query OK, 1 row affected (0.06 sec)

```
mysql> insert into staff values("dani","009");
```

Query OK, 1 row affected (0.05 sec)

```
mysql> alter table book modify column ISBN int(11);
```

Query OK, 0 rows affected (0.03 sec)

Records: 0 Duplicates: 0 Warnings: 0

```
mysql> insert into book values("047","968","OOP-Java","6th","IT","800");
```

Query OK, 1 row affected (0.05 sec)

```
mysql> insert into book values("247","855","C-lang","3rd","IT","800");
```

Query OK, 1 row affected (0.06 sec)

```
mysql> insert into book values("213","684","Domains","4th","IT","800");
```

Query OK, 1 row affected (0.06 sec)

```
mysql> insert into book values("694","782","activex","7th","IT","800");
```

Query OK, 1 row affected (0.06 sec)

```
mysql> insert into book values("554","346","authentication","5th","IT","800");
```

Query OK, 1 row affected (0.06 sec)

Select operation:

```
mysql> select * from book;
```

```
+-----+-----+-----+-----+-----+
| ISBN | authno | title      | edition | category | price |
+-----+-----+-----+-----+-----+
| 0    | 99    | databasesql | 2nd     | IT       | 400   |
| 47   | 968   | OOP-Java    | 6th     | IT       | 800   |
| 213  | 684   | Domains     | 4th     | IT       | 800   |
| 247  | 855   | C-lang      | 3rd     | IT       | 800   |
| 554  | 346   | authentication | 5th    | IT       | 800   |
| 694  | 782   | activedir   | 7th     | IT       | 800   |
+-----+-----+-----+-----+-----+
```

6 rows in set (0.01 sec)

Rename operation:

```
mysql> rename table resret to reserve;
```

Query OK, 0 rows affected (0.16 sec)

NB:

My tables are not Union compatible so they don't accept operations like join

```
mysql> rename table resret to reserve;
```

Query OK, 0 rows affected (0.16 sec)

★ my tables are not union compatible so they cannot join

```
mysql> select * from staff;
```

```
+-----+-----+
```



```
| empname | staffid |
```

```
+-----+-----+
```

```
| dani  |    9 |
```

```
| dave  |   38 |
```

```
| James |  328 |
```

```
| mike  |  354 |
```

```
| dike  |  678 |
```

```
| Ben   |  968 |
```

```
+-----+-----+
```

```
mysql> select * from book;
```

```
+-----+-----+-----+-----+-----+
```

```
| ISBN | authno | title      | edition | category | price |
```

```
+-----+-----+-----+-----+-----+
```

```
| 0 | 99 | databasesql | 2nd  | IT  | 400 |
```

```
| 47 | 968 | OOP-Java   | 6th  | IT  | 800 |
```

```
| 213 | 684 | Domains    | 4th  | IT  | 800 |
```

```
| 247 | 855 | C-lang     | 3rd  | IT  | 800 |
```

```
| 554 | 346 | authentication | 5th  | IT  | 800 |
```

```
| 694 | 782 | activedir   | 7th  | IT  | 800 |
```

```
+-----+-----+-----+-----+-----+
```

```
6 rows in set (0.01 sec)
```

```
mysql> select authno, title, edition from book;
```

```
+-----+-----+-----+
```

```
| authno | title      | edition |
```

```
+-----+-----+-----+
```

```
| 99 | databasesql | 2nd  |
```

```
| 968 | OOP-Java   | 6th  |
```

```
| 684 | Domains    | 4th  |
```

	855	C-lang		3rd	
	346	authentication		5th	
	782	activedir		7th	

```
+-----+-----+-----+
```

6 rows in set (0.01 sec)

Projection operation:

◇ the above is a projection operation

viewing schema of reader entity:

```
mysql> desc reader;
```

```
+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| userid | int(6) | NO   | PRI | NULL    |      |
| email  | varchar(14) | YES |     | NULL    |      |
| phonenum | int(10) | YES |     | NULL    |      |
| f_name | char(8) | YES |     | NULL    |      |
| l_name | char(8) | YES |     | NULL    |      |
+-----+-----+-----+-----+-----+
```

5 rows in set (0.00 sec)

Viewing values (data items inserted in reader entity)

```
mysql> select * from reader;
```

```
+-----+-----+-----+-----+-----+
| userid | email      | phonenum | f_name | l_name |
+-----+-----+-----+-----+-----+
| 1 | jima@mail.com | 977262548 | james | gatwech |
| 2 | mary@mail.com | 977262548 | mary  | magdalen |
| 3 | may@mail.com  | 977262548 | mary  | martha  |
```

	4	joe@mail.com	977262548	joe	peter	
	5	d1v@mail.com	977262548	dave	simon	
	6	dan@mail.com	977262548	dan	stonner	
	7	dani@mail.com	977262548	dani	kuja	

```
+-----+-----+-----+-----+-----+
```

7 rows in set (2.76 sec)

Creating a view readers from reader entity:

mysql> create view readers as

-> select f_name, l_name, userid

-> from reader;

Query OK, 0 rows affected (0.05 sec)

Having a look at the elements in the view:

this is the view we created we are viewing it

Viewing items in readers VIEW that we created: note readers is different from reader (the entity we derived it from)

mysql> select * from readers;

	f_name		l_name		userid	
	james		gatwech		1	
	mary		magdalen		2	
	mary		martha		3	
	joe		peter		4	
	dave		simon		5	
	dan		stonner		6	
	dani		kuja		7	

7 rows in set (0.00 sec)

Deleting from book using authno:

```
mysql> delete from book where authno = 684;
```

Query OK, 1 row affected (0.07 sec)

Looking at the missing element: the one we deleted

```
mysql> select * from book;
```

ISBN	authno	title	edition	category	price
0	99	databasesql	2nd	IT	400
47	968	OOP-Java	6th	IT	800
247	855	C-lang	3rd	IT	800
554	346	authentication	5th	IT	800
694	782	activedir	7th	IT	800

5 rows in set (0.00 sec)

Deleting all elements from staff table without changing its schema and constraints: truncate operation

```
mysql> truncate table staff;
```

Query OK, 0 rows affected (0.24 sec)

Looking at the values within the erased table:

```
mysql> select * from staff;
```

Empty set (0.00 sec)

Creating index:

```
mysql> create index ISBN on book(ISBN);
```

Query OK, 0 rows affected (0.68 sec)

Records: 0 Duplicates: 0 Warnings: 0

```
mysql> select * from reserve;
```

resdate	duedate	retdate
2023-07-05	2023-07-06	2023-07-09
2023-07-06	2023-07-11	2023-07-12
2023-07-13	2023-07-17	2023-07-19
2023-07-20	2023-07-21	2023-07-23

4 rows in set (0.00 sec)

Sql Date function:

datedifference function:

```
mysql> select datediff("2023-07-19","2023-07-13");
```

datediff("2023-07-19","2023-07-13")
6

1 row in set (0.02 sec)

Data Control Language:

viewing current users in the sql server connection:

We realised that we don't need to create a table for the user login since its prebuilt in mysql

```
mysql> select session_user();
```

session_user()

```

+-----+
| root@localhost |
+-----+
1 row in set (0.00 sec)

```

Adding users and privileges:

```

mysql> create user john@localhost identified by 'James46!8n';
Query OK, 0 rows affected (0.00 sec)

```

```

mysql> create user suhayeb@localhost identified by 'Kabd1r.M0h@mm3d';
Query OK, 0 rows affected (0.00 sec)

```

```

mysql> grant all privileges on library.readers to suhayeb@localhost;
Query OK, 0 rows affected (0.00 sec)

```

```

mysql> grant select, update, insert on library.book to john@localhost;
Query OK, 0 rows affected (0.00 sec)

```

```

mysql> show grants for john@localhost;

```

```

+-----+
| Grants for john@localhost |
+-----+
| GRANT USAGE ON *.* TO 'john'@'localhost' IDENTIFIED BY PASSWORD
'*AE54F15898E0711F630375790A498A35DCC26FB2' |
| GRANT SELECT, INSERT, UPDATE ON `library`.`book` TO 'john'@'localhost' |
+-----+

```

```

2 rows in set (0.00 sec)

```

```

mysql> desc publisher;

```

```

+-----+-----+-----+-----+-----+

```

Field	Type	Null	Key	Default	Extra
publish_id	int(11)	NO	PRI	0	
yearpb	date	YES		NULL	
publname	char(27)	YES		NULL	

3 rows in set (0.00 sec)

mysql> select * from publisher;

Empty set (1.05 sec)

SQL Drop operation(deleting a table):

mysql> drop table publisher;

Query OK, 0 rows affected (3.04 sec)