

# **LIBRARY MANAGEMENT SYSTEM**

A Course Based Project Report submitted in partial fulfillment of the requirements for the award of the degree of

## **BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING -CYBER SECURITY**

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**CERTIFICATE**

This is to certify that **KRISHNA NANDINI -21071A6231, L.BENJAMIN PAUL-21071A6232, L.NIKHIL-21071A6233**, have successfully completed their project work at CSE – CYS, DS and AI&DS Department of VNR VJIET, HYD entitled “LIBRARY MANAGEMENT SYSTEM” in partial fulfilment of the requirements for the award of B. Tech degree during the academic year 2022-2023.

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## DECLARATION

This is to certify that the project work entitles “**LIBRARY MANAGEMENT SYSTEM**” submitted in VNR VJiet in partial fulfilment of requirement for the award of B. Tech in CSE. It is a bonafide report of the work carried out by us under the guidance and supervision of Mrs .N.SUNANDA ( Asst. Professor ), Dept. of CSE – CYS, DS, AI&DS VNR VJiet. To the best of our knowledge, this report has not been submitted in any form to any university or institution for the award of any degree or diploma.

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# ABSTRACT

- ❖ A library management system is software that is designed to manage all the functions of a library.
- ❖ It helps librarian to maintain the database of new books and the books that are borrowed by members along with their due dates.
- ❖ This system completely automates all your library's activities.
- ❖ We will be creating database schemas and write all SQL queries needed.
- ❖ We can enter details into the schema and retrieve them whenever possible.

# 1.INTRODUCTION:

A library is a collection of organized information and resources which is made accessible to a well-defined community for borrowing or reference sake. The collection of the resources and information are provided in digital or physical format in either a building/room or in a virtual space or even both. Library's resources and collections may include newspapers, books, films, prints, maps, CDs, tapes, videotapes, microform, database etc. The main aim of this system is to develop a new programmed system that will conveying ever lasting solution to the manual base operations and to make available a channel through which staff can maintain the record easily and customers can access the information about the library at whatever place they might find themselves.

Library Management System allows the user to store the book details and the customer details. The system is strong enough to withstand regressive yearly operations under conditions where the database is maintained and cleared over a certain time of span. The implementation of the system in the organization will considerably reduce data entry, time and also provide readily calculated reports.

**OBJECTIVE:** - It keeps track of all the information about the books in the library, their cost, status and total number of books available in the Library. The user will find it easy in this automated system rather than using the manual writing system. The system contains a database where all the information will be stored safely.

## **2.DATA REQUIREMENTS**

### **Entities:**

- BRANCH
- EMPLOYEE
- CUSTOMER
- ISSUE STATUS
- RETURN STATUS
- BOOKS

### **Attributes:**

#### ❖ BRANCH

- Manager\_id
- Branch\_id
- Address
  - Contact\_no
  - Branch\_h\_no
  - Street
  - City
  - State
  - Zipcode

#### ❖ CUSTOMER

- Customer\_id
- Books\_issued
- Name
- Address
- Registration\_date

#### ❖ ISSUE STATUS

- Issue\_book\_name
- Issue\_id
- Issue\_date
- ISBN
- Customer\_id

#### ❖ RETURN STATUS

- Return\_id
- Return\_date
- Customer\_id



- Return\_book\_name

- ISBN

❖ BOOKS

- ISBN

- Title

- Category

- Rental\_price

- Author

- Publisher

- Status

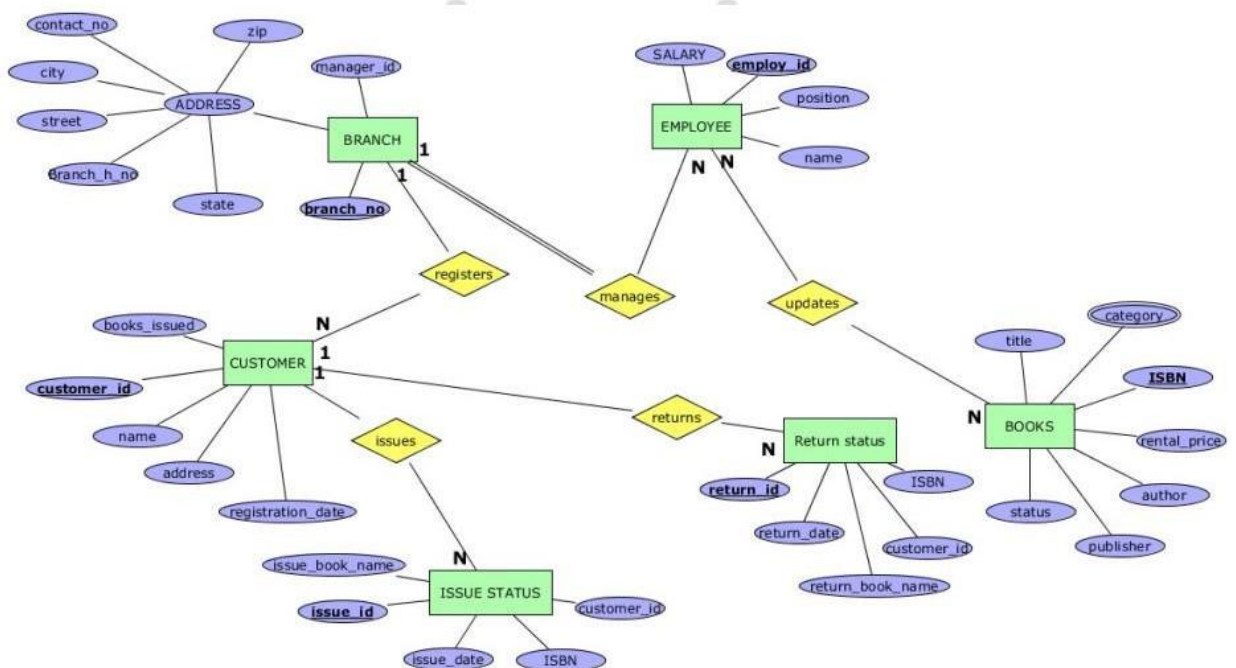
**RELATIONSHIPS - CARDINALITY**

- MANAGER manages the BRANCH (1 - N)
- CUSTOMER registers in the respective BRANCH ( N - 1 )
- CUSTOMER issues BOOKS (1 – N)
- CUSTOMER returns BOOKS (N – 1)
- EMPLOYEE updates BOOKS (N – N)

### 3.ER -DIAGRAM

Entity Relationship Diagram is used in modern database software engineering to illustrate logical structure of database. It is a relational schema database modelling method used to Model a system and approach. This approach commonly used in database design. The diagram created using this method is called ER-diagram.

The ER-diagram depicts the various relationships among entities, considering each object as entity. Entity is represented as rectangle shape and relationship represented as diamond shape. It depicts the relationship between data object. The ER-diagram is the notation that is used to conduct the data modelling activity.

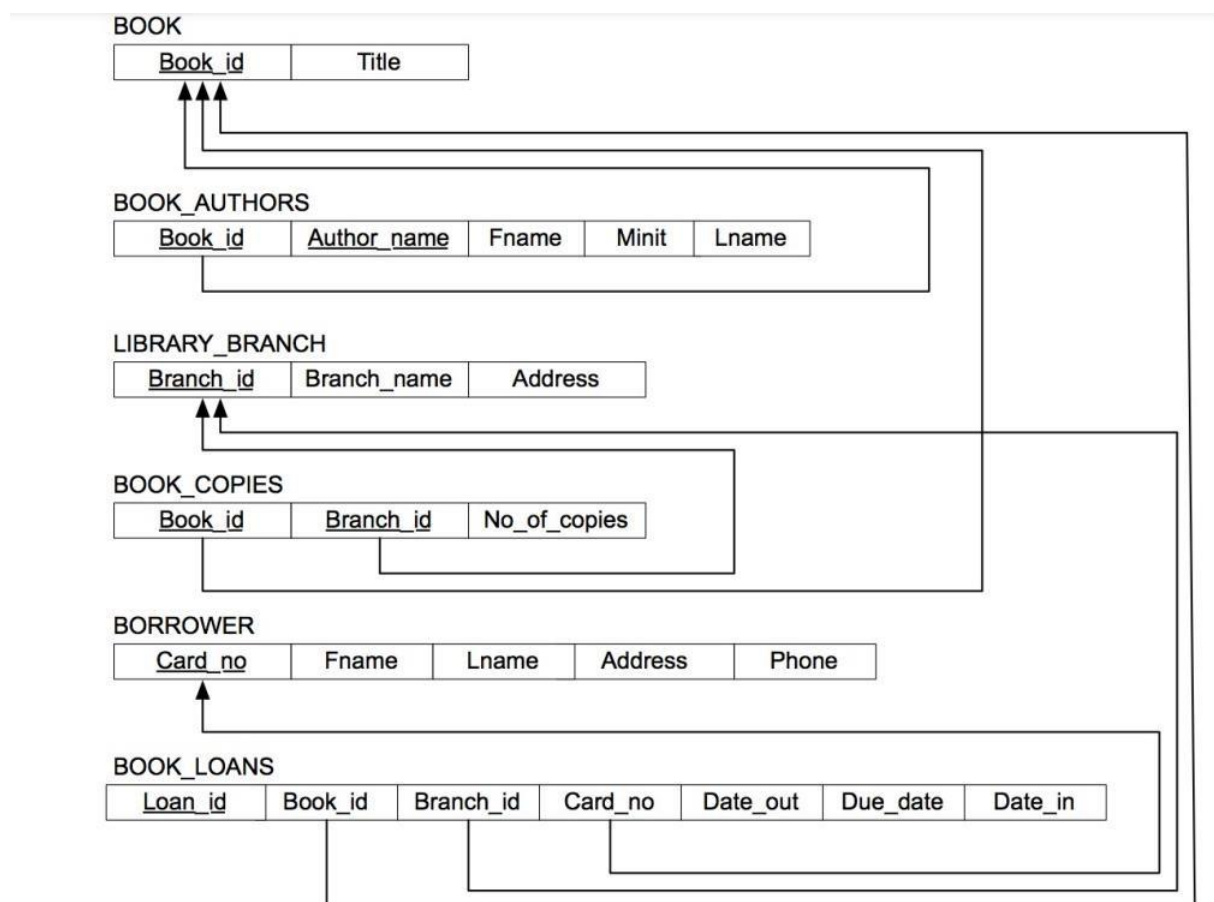


## 4.SCHEMA DIAGRAM

A schema is the structure behind data organization. It is a visual representation of how different table relationships enable the schema's underlying mission business rules for which the database is created. Database schema defines its entities and the relationship among them.

It contains a descriptive detail of the database, which can be depicted by means of schema diagrams. It's the database designers who design the schema to help programmers understand the database and make it useful.

Schema diagrams have an important function because they force database developers to transpose ideas to paper. This provides an overview of the entire database, while facilitating future database administrator work.



## **5.SQL IMPLEMENTATION**

```
mysql> create database libproject;
```

```
mysql> use libproject;
```

Database changed

```
mysql> CREATE TABLE BOOKS(ISBN int(100) not null,book_title varchar(50) not null,category varchar(50) not null,rental_price int(10) not null,status varchar(50),author varchar(50) not null,publisher varchar(50) not null,primary key(ISBN)) ;
```

Query OK, 0 rows affected (1.44 sec)

```
mysql> CREATE TABLE EMPLOYEE(employ_id int(10) not null,employ_name varchar(50) not null,position varchar(30) not null,salary int(10) not null,primary key(employ_id));
```

Query OK, 0 rows affected (0.35 sec)

```
mysql> create table customer(customer_id int(10) not null,customer_name varchar(50),customer_address varchar(100) not null,registration_date date not null,primary key(customer_id));
```

Query OK, 0 rows affected (0.38 sec)

```
mysql> create table brach(branch_no int(10) not null,manager_id int(10) not null,branch_address varchar(100) not null,contact_no int(10) not null,primary key(branch_no));
```

Query OK, 0 rows affected (0.49 sec)

```
mysql> create table issue_status(issue_id int(10) not null,issued_cust int(10) not null,issued_book_name varchar(50) not null,issue_date date not null,isbn_book int(10) not null,primary key(issue_id),constraint foreign key(isbn_book) references BOOKS(ISBN),constraint foreign key(issued_cust) references customer(customer_id));
```

Query OK, 0 rows affected (0.66 sec)

```
mysql> alter table brach rename branch;
```

Query OK, 0 rows affected (0.50 sec)

```
mysql> create table return_status(return_id int(10) not null,return_cust int(10)
not null,returned_book_name varchar(50) not null,return_date date not
null,isbn_book2 int(10) not null,primary key(return_id),constraint foreign
key(isbn_book2) references BOOKS(ISBN),constraint foreign key(return_cust)
references issue_status(issued_cust));
```

Query OK, 0 rows affected (0.39 sec)

```
mysql> show tables;
+-----+
| Tables_in_libproject |
+-----+
| books                 |
| branch               |
| customer              |
| employee              |
| issue_status          |
| return_status         |
+-----+
6 rows in set (0.00 sec)
```

```
mysql> describe books;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ISBN           | int(100)      | NO   | PRI | NULL    |       |
| book_title     | varchar(50)   | NO   |     | NULL    |       |
| category       | varchar(50)   | NO   |     | NULL    |       |
| rental_price   | int(10)       | NO   |     | NULL    |       |
| status         | varchar(50)   | YES  |     | NULL    |       |
| author         | varchar(50)   | NO   |     | NULL    |       |
| publisher      | varchar(50)   | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.07 sec)
```

```
mysql> describe branch;
```

Field	Type	Null	Key	Default	Extra
branch_no	int(10)	NO	PRI	NULL	
manager_id	int(10)	NO		NULL	
branch_address	varchar(100)	NO		NULL	
contact_no	int(10)	NO		NULL	

4 rows in set (0.00 sec)

```
mysql> describe customer;
```

Field	Type	Null	Key	Default	Extra
customer_id	int(10)	NO	PRI	NULL	
customer_name	varchar(50)	YES		NULL	
customer_address	varchar(100)	NO		NULL	
registration_date	date	NO		NULL	

4 rows in set (0.00 sec)

```
mysql> describe employee;
```

Field	Type	Null	Key	Default	Extra
employ_id	int(10)	NO	PRI	NULL	
employ_name	varchar(50)	NO		NULL	
position	varchar(30)	NO		NULL	
salary	int(10)	NO		NULL	

4 rows in set (0.00 sec)

```
mysql> describe issue_status;
```

Field	Type	Null	Key	Default	Extra
issue_id	int(10)	NO	PRI	NULL	
issued_cust	int(10)	NO	MUL	NULL	
issued_book_name	varchar(50)	NO		NULL	
issue_date	date	NO		NULL	
isbn_book	int(10)	NO	MUL	NULL	

5 rows in set (0.00 sec)

```
mysql> describe return_status;
```

Field	Type	Null	Key	Default	Extra
return_id	int(10)	NO	PRI	NULL	
return_cust	int(10)	NO	MUL	NULL	
returned_book_name	varchar(50)	NO		NULL	
return_date	date	NO		NULL	
isbn_book2	int(10)	NO	MUL	NULL	

```
5 rows in set (0.00 sec)
```

```
mysql> insert into books
```

```
values(1000,'book1','comedy',5,'available','author1','pub1');
```

Query OK, 1 row affected (0.18 sec)

```
mysql> insert into books
```

```
values(1001,'book2','scifi',3,'available','author2','pub2');
```

Query OK, 1 row affected (0.08 sec)

```
mysql> insert into books
```

```
values(1003,'book3','romance',1,'unavailable','author3','pub3');
```

Query OK, 1 row affected (0.06 sec)

```
mysql> insert into books
```

```
values(1004,'book4','thriller',7,'available','author4','pub4');
```

Query OK, 1 row affected (0.07 sec)

```
mysql> select * from books;
```

ISBN	book_title	category	rental_price	status	author	publisher
1000	book1	comedy	5	available	author1	pub1
1001	book2	scifi	3	available	author2	pub2
1003	book3	romance	1	un-available	author3	pub3
1004	book4	thriller	7	available	author4	pub4

```
4 rows in set (0.06 sec)
```

```
mysql> alter table branch add constraint foreign key(manager_id) references
employee(employ_id);
```

Query OK, 0 rows affected (1.20 sec)



Records: 0 Duplicates: 0 Warnings: 0

```
mysql> insert into employee values(991,'emp1','manager',30000);
```

Query OK, 1 row affected (0.06 sec)

```
mysql> insert into employee values(992,'emp2','worker',10000);
```

Query OK, 1 row affected (0.07 sec)

```
mysql> insert into employee values(993,'emp3','worker',10000);
```

Query OK, 1 row affected (0.05 sec) mysql>

```
insert into employee values(994,'emp4','reader',20000);
```

Query OK, 1 row affected (0.07 sec)

```
mysql> insert into employee values(995,'emp5','assist',20000);
```

Query OK, 1 row affected (0.07 sec)

```
mysql> select * from employee;
```

employ_id	employ_name	position	salary
991	emp1	manager	30000
992	emp2	worker	10000
993	emp3	worker	10000
994	emp4	reader	20000
995	emp5	assist	20000

5 rows in set (0.00 sec)

```
mysql> insert into branchvalues(1,991,'branch_addr1',987654321);
```

Query OK, 1 row affected (0.07 sec)

```
mysql> insert into branchvalues(3,993,'branch_addr3',987654323);
```

Query OK, 1 row affected (0.09 sec)



```
mysql> select * from branch;
```

branch_no	manager_id	branch_address	contact_no
1	991	branch_addr1	987654321
2	992	branch_addr2	987654321
3	993	branch_addr3	987654323

3 rows in set (0.00 sec)

```
mysql> insert into customer values(11,'cus1','hom1','2008:10:10');
```

Query OK, 1 row affected (0.07 sec)

```
mysql> insert into customer values(12,'cus2','hom2','2008:03:03');
```

Query OK, 1 row affected (0.09 sec)

```
mysql> insert into customer values(13,'cus3','hom3','2009:03:03');
```

Query OK, 1 row affected (0.07 sec)

```
mysql> insert into customer values(14,'cus4','hom4','2009:04:04');
```

Query OK, 1 row affected (0.06 sec)

```
mysql> select * from customer;
```

customer_id	customer_name	customer_address	registration_date
11	cus1	hom1	2008-10-10
12	cus2	hom2	2008-03-03
13	cus3	hom3	2009-03-03
14	cus4	hom4	2009-04-04

4 rows in set (0.00 sec)

```
mysql> insert into issue_status values(51,12,'book1','2010:01:01',1001);
```

Query OK, 1 row affected (0.08 sec)

```
mysql> insert into issue_status values(52,14,'book4','2010:01:01',1004);
```

Query OK, 1 row affected (0.06 sec)

```
mysql> select * from issue_status;
```

issue_id	issued_cust	issued_book_name	issue_date	isbn_book
51	12	book1	2010-01-01	1001
52	14	book4	2010-01-01	1004

```
2 rows in set (0.00 sec)
```

```
mysql> insert into return_status values(61,12,'book1','2010:10:01',1001);
```

Query OK, 1 row affected (0.08 sec)

```
mysql> select * from return_status;
```

return_id	return_cust	returned_book_name	return_date	isbn_book2
61	12	book1	2010-10-01	1001

```
1 row in set (0.00 sec)
```

## 5. TESTING

1. Display the customer name who took the book of type comedy.

Mysql>select customer\_name from customer where book\_type='comedy';

```
+-----+
| customer_name |
+-----+
| cus5         |
+-----+
1 row in set (0.00 sec)
```

2. Display issue id ,issued customer name whose isbn book number is 1004.

Mysql>select issue\_id , issued\_cust from issue\_status where isbn\_book=1004;

```
+-----+-----+
| issue_id | issued_cust |
+-----+-----+
|      52 |          14 |
+-----+-----+
1 row in set (0.00 sec)
```

3. Display all contents in issue status table where isbn book of issue table and return table are equal.

Mysql>select p.\* from issue\_status p, return\_status r where p.isbn\_book=r.isbn\_book2;

```
mysql> select p.* from issue_status p, return_status r where p.isbn_book=r.isbn_book2;
+-----+-----+-----+-----+-----+
| issue_id | issued_cust | issued_book_name | issue_date | isbn_book |
+-----+-----+-----+-----+-----+
|      51 |          12 | book1            | 2010-01-01 |      1001 |
+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

4. Add a column called book type in customer table.

Mysql>alter table customer add book\_type varchar(10) not null;

Query ok,4 rows affected(0.37sec)

Records:4 Duplicates:0 Warnings:0

Mysql>describe customer;

mysql > describe customer ;

Field	Type	Null	Key	Default	Extra
customer_id	int(11)	NO	PRI	NULL	
customer_name	varchar(50)	YES		NULL	
customer_address	varchar(100)	YES		NULL	
registration_date	date	YES		NULL	
book_type	varchar(10)	YES		NULL	

5 rows in set (0.25 sec)

## **7.CONCLUSION**

- SQL database management application which is very well used in the modern world in organising and manipulating a database.
- Though SQL doesn't have the GUI interface like Microsoft access is having and they all manage the database comfortable.
- Depending on the user or users, if an organisation has multiple users then they should go for SQL server based application.
- This project shows how to create tables in SQL and how to create simple data manipulation language and data definition language with how to execute them.
- It also shows how relationships are established with the concepts of primary and foreign key within a table.
- Lastly, the project shows how queries are created in SQL server, queries like the create command, view, update, alter etc.

## REFERENCES

[www.google.com](http://www.google.com)

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