

LIBRARY MANAGEMENT SYSTEM

INTRODUCTION:

Library management system reduces the time and effort of the human by organizing the books via computerization. Generally, in library it consumes more time to arrange the books, and entry the record for each book. Even while borrowing, renewal and return data are also makes complexity for the library staff. Now, by library management system, it becomes more easy and convenient for both admin and user of library.

Library Management System is a system that shows all the available books and their count and also books taken by people, the date on which they took that particular book, expected date of return, late due fees, membership details, and so on. Everything will be crystal clear. There will be no ambiguity. It will be beneficial for librarians and users.

AVAILABLE DATA:

After collection of all the books, before organizing the book by category wise we should enter the details of all the books in the system. Generally, the student will borrow the book and then return it. But we interested on the staff for this project.

The datasets are created within the **lib_mang database schema**, four table are created for maintenance of library management system.

ENTITY RELATIONSHIP DIAGRAM:

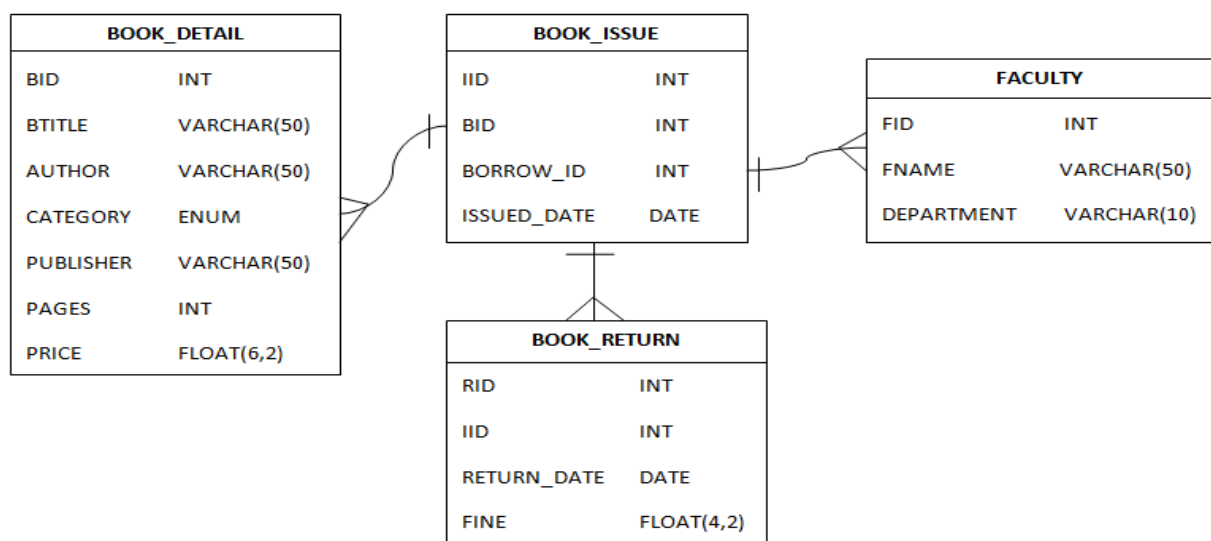


Fig: ER – Diagram for Library Management System

EXAMPLE DATASET

We do the project Library Management System, using **MySQL** database language.

For the dataset we create a database name as 'lib_mang'. In the database, we create 4 dataset that are listed below:

Table 1: BOOK_DETAIL

In the book_detail table, we enter the detail of all the books. If any books are repeated with same name, we refer each by its unique id.

	BID	BTITLE	AUTHOR	CATEGORY	PUBLISHER	PAGES	PRICE
▶	201	Core Java	Nageswara Rao	subject	dreamtech	720	789.00
	202	C:The Complete Reference	Herbert Schildt	subject	McGraw Hill	832	645.00
	203	Political Science	U.S.Singh	subject	Law Agency	350	298.00
	204	It Ends With US	Hoover	novel	Simon	384	275.00
	205	OTHELLO	William Shakespeare	journal	Simon	330	726.00
	206	RDBMS & ORACLE	G.Pramela	subject	Charulatha	159	160.00
	207	The Monk Who Sold His Ferrai	Robin Sharma	novel	Simon	198	148.00
	208	Data Mining	Vipin Kumar	subject	Pearson	732	850.00
	209	Software Project Management	Bob Hughes	subject	McGraw Hill	395	490.00
	210	You Can	Adams	novel	Fingerprint	232	99.00
	211	Advance in Mathematics	Gian-Caslo Rota	journal	Elsevier	150	120.00
	212	Cloud Computing	James	subject	Wiley	637	350.00
	213	Artificial Intelligence	P.Doherty	journal	Elsevier	90	180.00
	214	Everything The Light Touches	Janice Pariat	novel	Simon	512	519.00
	215	The Microcontroller System	Mckinlay	subject	Pearson	547	690.00
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Table 2: FACULTY

In this table, we enter the details of the faculty

	fid	fname	department
▶	601	Rahul	ECE
	602	Jenny	CSE
	603	Prabhakar	ECE
	604	Stephen	EEE
	605	Rafique	CSE
	606	Shiva Prasad	CSE
	607	Vanitha	ECE
	608	Harish	EEE
	609	Lavanya	CSE
	610	Vinay	ECE
	611	Rohan	CSE
	612	John	ECE
*	NULL	NULL	NULL

Table 3: BOOK_ISSUE

In this table, we maintain the record of who borrowed the book by their id and also what book is issued with its id.

	iid	bid	borrow_id	issued_date
▶	701	201	601	2022-10-02
	702	203	602	2022-10-02
	703	204	601	2022-10-03
	704	207	610	2022-10-03
	705	211	605	2022-10-03
	706	202	609	2022-10-04
	707	205	610	2022-10-05
	708	212	606	2022-10-05
	709	210	610	2022-10-06
	710	215	602	2022-10-06
*	NULL	NULL	NULL	NULL

Table 4: BOOK_RETURN

In this table, we maintain the record that who returned the books. If anybody returns the book lately, the fine is also collected and maintains in table.

	rid	iid	return_date	fine
▶	401	701	2022-10-10	2.00
	402	703	2022-10-15	6.00
	403	704	2022-10-15	6.00
	404	706	2022-10-20	10.00
	405	707	2022-10-16	5.00
	406	708	2022-10-18	7.00
	407	709	2022-10-15	3.00
	408	710	2022-10-12	0.00
*	NULL	NULL	NULL	NULL

INTERACTIVE SQL INSTANCE:

CREATION OF DATABASE:

```
create database lib_mang;
```

```
use lib_mang;
```

a)Table 1: book_detail:

Table Creation:

```
create table book_detail(BID int primary key, BTITLE varchar(50) not null, AUTHOR varchar(50),CATEGORY  
enum('subject','novel','journal'), PUBLISHER varchar(50),PAGES int, PRICE float(6,2));
```

Inserting Data:

```
insert into book_detail values(201,'Core Java','Nageswara Rao','subject','dreamtech',720,789.00),  
(202,'C:The Complete Reference','Herbert Schildt','subject','McGraw Hill',832,645.00),  
(203,'Political Science','U.S.Singh','subject','Law Agency',350,298.00),  
(204,'It Ends With US','Hoover','novel','Simon',384,275.00),  
(205,'OTHELLO','William Shakespeare','journal','Simon',330,726.00),  
(206,'RDBMS & ORACLE','G.Pramela','subject','Charulatha',159,160.00),  
(207,'The Monk Who Sold His Ferrai','Robin Sharma','novel','Simon',198,148.00),  
(208,'Data Mining','Vipin Kumar','subject','Pearson',732,850.00),  
(209,'Software Project Management','Bob Hughes','subject','McGraw Hill',395,490.00),  
(210,'You Can','Adams','novel','Fingerprint',232,99.00),  
(211,'Advance in Mathematics','Gian-Caslo Rota','journal','Elsevier',150,120.00),  
(212,'Cloud Computing','James','subject','Wiley',637,350.00),  
(213,'Artificial Intelligence','P.Doherty','journal','Elsevier',90,180.00),  
(214,'Everything The Light Touches','Janice Pariat','novel','Simon',512,519.00),  
(215,'The Microcontroller System','Mckinlay','subject','Pearson',547,690.00);
```

b) Table 2: faculty

Creation of Table:

```
create table faculty(fid int primary key, fname varchar(50), department varchar(10));
```

Inserting Data:

```
insert into faculty values(601,'Rahul','ECE'),  
(602,'Jenny','CSE'),  
(603,'Prabhakar','ECE'),  
(604,'Stephen','EEE'),  
(605,'Rafique','CSE'),  
(606,'Shiva Prasad','CSE'),  
(607,'Vanitha','ECE'),  
(608,'Harish','EEE'),  
(609,'Lavanya','CSE'),  
(610,'Vinay','ECE'),  
(611,'Rohan','CSE'),  
(612,'John','ECE');
```

c) Table 3: book_issue

Creation of Table:

```
create table book_issue(iid int primary key,  
    bid int, foreign key(bid) references book_detail(bid) on delete set null,  
    borrow_id int, foreign key(borrow_id) references faculty(fid) on delete set null,  
    issued_date date);
```

Inserting Data:

```
insert into book_issue values (701,201,601,'2022-10-02');  
insert into book_issue values (702,203,602,'2022-10-02');  
insert into book_issue values (703,204,601,'2022-10-03');  
insert into book_issue values (704,207,610,'2022-10-03');  
insert into book_issue values (705,211,605,'2022-10-03');  
insert into book_issue values (706,202,609,'2022-10-04');  
insert into book_issue values (707,205,610,'2022-10-05');  
insert into book_issue values (708,212,606,'2022-10-05');  
insert into book_issue values (709,210,610,'2022-10-06');  
insert into book_issue values (710,215,602,'2022-10-06');
```

d) Table 4: book_return

Creation of table:

```
create table book_return(rid int primary key,iid int,foreign key(iid) references book_issue(iid) on delete set null,return_date date,fine float(4,2));
```

Inserting Data:

```
insert into book_return values (401,701,'2022-10-10',2.00);  
insert into book_return values (402,703,'2022-10-15',6.00);  
insert into book_return values (403,704,'2022-10-15',6.00);  
insert into book_return values (404,706,'2022-10-20',10.00);  
insert into book_return values (405,707,'2022-10-16',5.00);  
insert into book_return values (406,708,'2022-10-18',7.00);  
insert into book_return values (407,709,'2022-10-15',3.00);  
insert into book_return values (408,710,'2022-10-12',0.00);
```

CASE STUDY QUESTION:

This case study is split into initial data understanding and extends one by one process:

A. BOOK INFORMATION

1. How many books are in the library?
2. What is worth of books in library?
3. Find no. of books on category – wise?
4. Which books is maximum and minimum in price?
5. List all authors and publisher of the book.

B. BOOK ISSUED INFORMATION

1. Find the total number of faculty that books are issued.
2. Find person taken the book in particular period(time).
3. How many books are issued on particular date?
4. Find the book borrower name with corresponding book name.
5. Find the faculty who not borrowed the book from the library.

C. BOOK RETURNED INFORMATION

1. Find the total numbers of books are returned.
2. Find the faculty who are all not returned the books.
3. Find the total cost of fine that is collected.
4. Who paid highest fine amount while returning book?
5. List all the faculty name with their book issued and return date

QUERIES FOR CASE STUDY:

-- A. BOOK INFORMATION

-- 1. How many books are in the library?

```
select count(*) as total_no_books from book_detail;
```

OUTPUT:

	total_no_books
▶	15

-- 2. What is worth of books in library?

```
select sum(price) as Total_Worth from book_detail;
```

OUTPUT:

	Total_Worth
▶	6339.00

-- 3. Find no. of books on category – wise?

```
select category,count(category) from book_detail group by category;
```

OUTPUT:

	category	count(category)
▶	subject	8
	novel	4
	journal	3

-- 4. Which books is maximum and minimum in price?

```
select max(price), min(price) from book_detail;
```

OUTPUT:

	max(price)	min(price)
▶	850.00	99.00

-- 5. List all authors and publisher of the book.

```
select author,publisher from book_detail;
```

OUTPUT:

	author	publisher
▶	Nageswara Rao	dreamtech
	Herbert Schildt	McGraw Hill
	U.S.Singh	Law Agency
	Hoover	Simon
	William Shakespeare	Simon
	G.Pramela	Charulatha
	Robin Sharma	Simon
	Vipin Kumar	Pearson
	Bob Hughes	McGraw Hill
	Adams	Fingerprint
	Gian-Caslo Rota	Elsevier
	James	Wiley
	P.Doherty	Elsevier
	Janice Pariat	Simon
	Mckinlay	Pearson

-- B. BOOK ISSUED INFORMATION

-- 1. Find the total number of faculty that books are issued.

```
select count(*) as total_faculty_issue from book_issue;
```

OUTPUT:

	total_faculty_issue
▶	10

-- 2. Find person taken the book in particular period(time).

```
select f.fname from faculty f inner join book_issue b on f.fid = b.borrow_id  
where issued_date between '2022-10-02' and '2022-10-03';
```

OUTPUT:

	fname
▶	Rahul
	Jenny
	Rahul
	Vinay
	Rafique

-- 3. How many books are issued on particular date?

```
select count(*) from book_issue where issued_date = '2022-10-06';
```

OUTPUT:

	count(*)
▶	2

-- 4. Find the book borrower name with corresponding book name.

```
select f.fname, bd.btitle from (book_issue b inner join faculty f on  
b.borrow_id=f.fid) inner join book_detail bd on b.bid=bd.bid;
```

OUTPUT:

	fname	btitle
▶	Rahul	Core Java
	Jenny	Political Science
	Rahul	It Ends With US
	Vinay	The Monk Who Sold His Ferrai
	Rafique	Advance in Mathematics
	Lavanya	C:The Complete Reference
	Vinay	OTHELLO
	Shiva Prasad	Cloud Computing
	Vinay	You Can
	Jenny	The Microcontroller System

-- 5. Find the faculty who not borrowed the book from the library.

```
select f.fname from book_issue b right join faculty f on b.borrow_id = f.fid  
where b.borrow_id is NULL;
```

OUTPUT:

	fname
▶	Prabhakar
	Stephen
	Vaniitha
	Harish
	Rohan
	John

--

C. BOOK RETURNED INFORMATION

-- 1. Find the total numbers of books are returned.

```
select count(*) from book_return;
```

OUTPUT:

	count(*)
▶	8

-- 2. Find the faculty who are all not returned the books.

```
select f.fname from faculty f inner join book_issue bi where bi.borrow_id=f.fid and  
bi.iid not in(select bi.iid from book_issue bi inner join book_return br on br.iid =  
bi.iid);
```

OUTPUT:

	fname
▶	Jenny
	Rafique

-- 3. Find the total cost of fine that is collected.

```
select sum(fine) as total_fine from book_return;
```

OUTPUT:

	total_fine
▶	39.00

-- 4. Who paid highest fine amount while returning book.

```
select fname from faculty where fid =(select borrow_id from book_issue  
where iid =( select iid from book_return where fine=(select max(fine) from  
book_return)));
```

OUTPUT:

	fname
▶	Lavanya

-- 5. List all the faculty name with their book issued and return date including fine.

```
select f.fname,bi.issued_date,br.return_date,br.fine from (faculty f inner join
book_issue bi on f.fid=bi.borrow_id) inner join book_return br on bi.iid=br.iid;
```

OUTPUT:

	fname	issued_date	return_date	fine
►	Rahul	2022-10-02	2022-10-10	2.00
	Rahul	2022-10-03	2022-10-15	6.00
	Vinay	2022-10-03	2022-10-15	6.00
	Lavanya	2022-10-04	2022-10-20	10.00
	Vinay	2022-10-05	2022-10-16	5.00
	Shiva Prasad	2022-10-05	2022-10-18	7.00
	Vinay	2022-10-06	2022-10-15	3.00
	Jenny	2022-10-06	2022-10-12	0.00

CONCLUSION:

The Library Management System is useful for colleges, schools and many more places for these days. It reduces a lot of work which are done by manual. It also avoid the any mistakes done by the admin like wrong data of issued date, miscalculation of fine amount and even helpful for missing books. It is also cost-effective and efficient because of computer-managed system.