

# Database Applications Assignment

# Library Management System

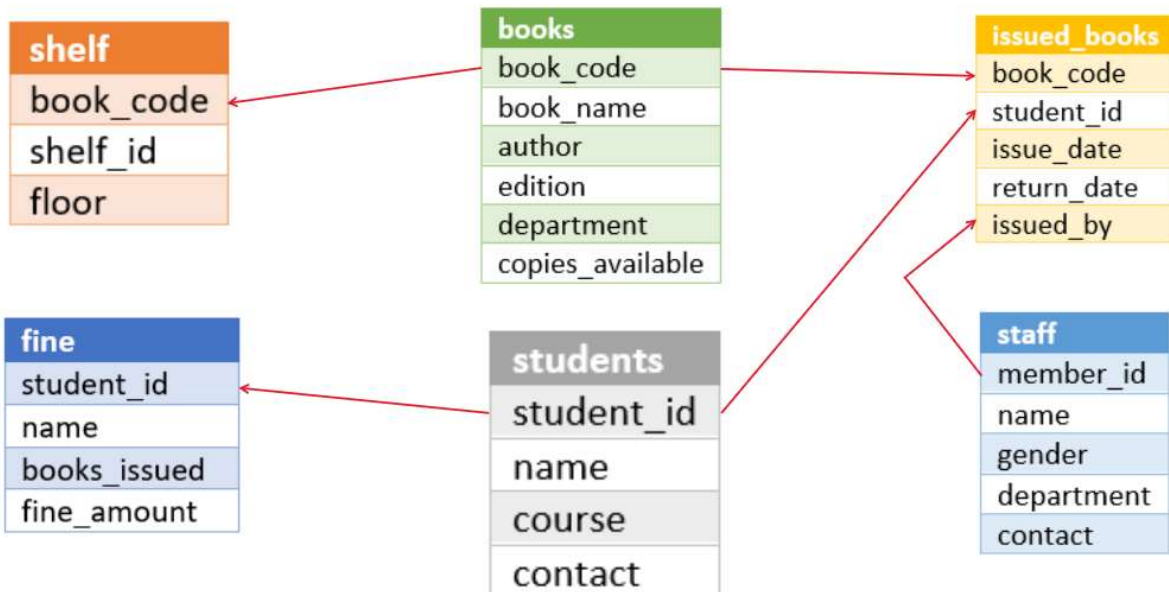
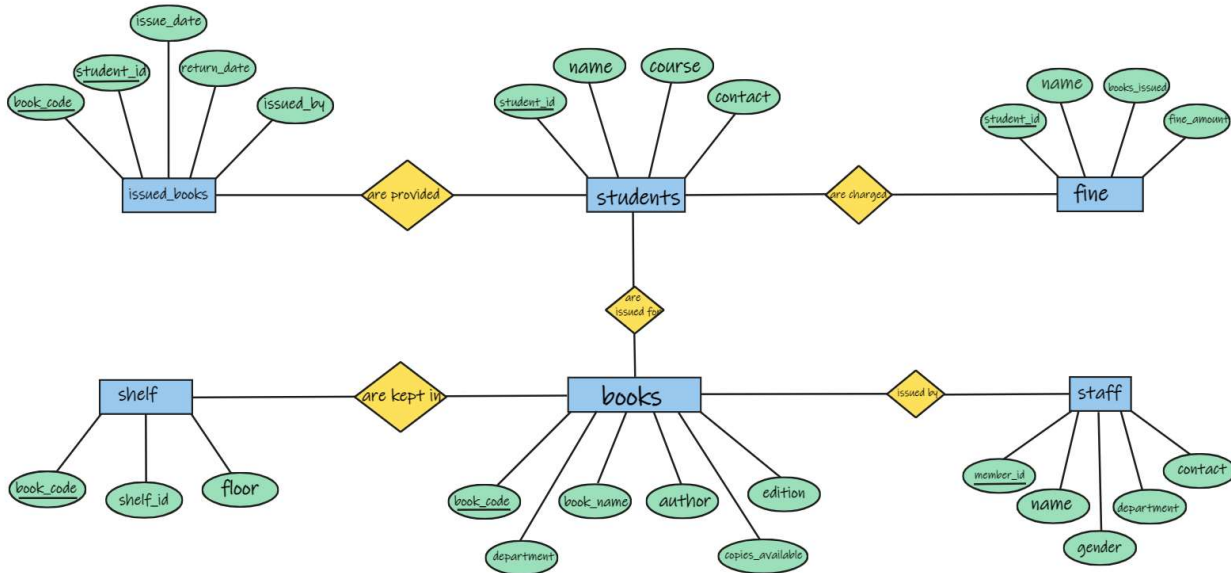
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Submitted by:

Arzoo Jangra

MCS 06

## E-R Diagram:



## Tables:

### 1. books

This is the master table for all the books that are available in the Library. This table contains the complete list of books that are available in the library.

#### Columns:

- **book\_code** : This is a unique ID given to every book. Since there may be a large no. of books with the same TITLE, thus book\_code will help us to distinguish between books of the same title.
- **book\_name** : Provides the name of the book.
- **author** : Provides the name of the author of the book.
- **edition** : Contains the edition of the book.
- **department** : Stores the department of each book.
- **copies\_available** : Provides the number of copies of the book available in the library.

book_code	book_name	author	edition	department	copies_available
SL0110	How to lie with maps	Mark Monmonier	6	Geography	3
SL0115	Machine Learning	Andriy Burkov	5	CS	5
SL0129	Unix OS	Maurice J. Bach	7	CS	15
SL0134	Guns, Germs, and Steel	Jared Diamond	11	Geography	13
SL0157	Algorithms	Thomas H. Cormen	8	CS	12
SL0190	1776	David McCullough	7	History	6
SL0287	History of Modern India	Bipan Chandra	5	History	9
SL0432	Physical Geography	Savindra Singh	5	Geography	5
SL0672	Chordate Zoology	P.S. Verma	8	Zoology	10

## 2. students

This table contains the information of the students that have enrolled for issuing the books from the library.

### Columns :

- **student\_id** : This is a unique ID given to every student. Every student can issue any book from the library using this ID.
- **name** : Provides the name of each student.
- **course** : Stores the name of the course of each student.
- **contact** : Stores the contact number of each student.

student_id	name	course	contact
ST0123	Bhavya Gupta	Zoology	8937462890
ST0286	Gourav	CS	9836278178
ST0397	Aman Yadav	Geography	9835672897
ST0487	Charu Verma	Zoology	9372892783
ST0567	Divya Singh	History	9356278902
ST0621	Aisha Singh	CS	8392018476
ST0734	Akansha Goyal	History	9362781903
ST0836	Kashish Sharma	Geography	9637289123

## 3. issued\_books

This table contains all the information about issuing the book.

Columns:

- **book\_code** : This is a unique ID given to every issued book.
- **student\_id** : Contains the ID of the student to which the book was issued.
- **issue\_date** : Contains the date on which the book was issued.
- **return\_date** : Stores the date on which the book is to be returned.
- **issued\_by** : Contains the ID of the librarian who issued the book.

book_code	student_id	issue_date	return_date	issued_by
SL0110	ST0123	2022-02-02	2022-02-17	LM04512
SL0110	ST0487	2022-06-01	2022-06-16	LM04512
SL0115	ST0123	2022-04-06	2022-04-21	LM01456
SL0115	ST0734	2022-06-14	2022-06-29	LM01456
SL0129	ST0286	2022-03-03	2022-03-18	LM01456
SL0134	ST0397	2022-04-17	2022-05-02	LM04512
SL0134	ST0734	2022-04-04	2022-04-19	LM04512
SL0134	ST0836	2022-06-12	2022-06-27	LM04512
SL0157	ST0286	2022-04-13	2022-04-28	LM01456
SL0190	ST0286	2022-04-04	2022-04-19	LM03428
SL0190	ST0567	2022-06-10	2022-06-25	LM03428
SL0190	ST0734	2022-05-15	2022-05-30	LM03428
SL0287	ST0487	2022-05-11	2022-05-26	LM03428
SL0287	ST0567	2022-06-08	2022-06-23	LM03428

## 4. shelf

This table contains the information about the book like in which shelf the book is placed in the library.

### Columns:

- **book\_code** : This is a unique ID given to every book.
- **shelf\_id** : Contains the id for each shelf in the library.
- **floor** : Contains the floor number on which the shelf is in the library.

book_code	shelf_id	floor
SL0110	SH-12	1
SL0115	SH-3	3
SL0129	SH-3	3
SL0134	SH-12	1
SL0157	SH-4	3
SL0190	SH-8	2
SL0287	SH-9	2
SL0432	SH-13	1
SL0672	SH-2	4

## 5. staff

This table contains information about the library staff.

### Columns:

- **member\_id** : Stores the unique ID of each staff member.
- **name** : Stores the name of each staff member.

- **gender** : Contains the gender of each staff member.
- **department** : Contains the department of the books in which the staff member is appointed.
- **contact** : Stores the contact information of each staff member.

member_id	name	gender	department	contact
LM01456	Vikas Kumar	M	CS	9467839204
LM02316	Amardeep Singh	M	Zoology	9647836457
LM03428	Anita Yadav	F	History	8356472874
LM04512	Harshita Mehta	F	Geography	7263547890

## 6. fine

This table stores the information about the fines and dues of the student.

### Columns:

- **student\_id** : Stores the student ID of the student to which the book was issued.
- **name** : Stores the name of the student to which the book was issued.
- **books\_issued** : Stores the total number of books issued to the student.
- **fine\_amount** : Contains the amount of fine due on the student.

student_id	name	books_issued	fine_amount
ST0123	Bhavya Gupta	2	25
ST0286	Gourav	3	0
ST0397	Aman Yadav	1	40
ST0487	Charu Verma	4	15
ST0567	Divya Singh	2	0
ST0621	Aisha Singh	1	10
ST0734	Akansha Goyal	4	5
ST0836	Kashish Sharma	3	30



## Creating Database For Library Management System

```
17 CREATE TABLE staff
18 ( member_id varchar(15) NOT NULL,
19   name varchar(50) NOT NULL,
20   gender char DEFAULT NULL,
21   department varchar(20) DEFAULT NULL,
22   contact int(11) DEFAULT NULL,
23   PRIMARY KEY (member_id));
24
25 CREATE TABLE book_issue
26 ( book_code varchar(15) NOT NULL,
27   student_id varchar(15) NOT NULL,
28   issue_date date DEFAULT NULL,
29   return_date date DEFAULT NULL,
30   issued_by varchar(15) DEFAULT NULL,
31   PRIMARY KEY (book_code, student_id),
32   FOREIGN KEY (book_code) REFERENCES books (book_code),
33   FOREIGN KEY (student_id) REFERENCES student (student_id),
34   FOREIGN KEY (issued_by) REFERENCES staff (member_id));
35
36 CREATE TABLE shelf_details
37 ( book_code varchar(15) NOT NULL,
38   shelf_id varchar(20) DEFAULT NULL,
39   floor int DEFAULT NULL,
40   PRIMARY KEY (book_code),
41   FOREIGN KEY (book_code) REFERENCES books (book_code));
42
43 CREATE TABLE fine_issued
44 ( student_id varchar(15) NOT NULL,
45   name varchar(50) NOT NULL,
46   books_issued int DEFAULT NULL,
47   fine_amount float DEFAULT NULL,
48   PRIMARY KEY (student_id));
```





Later on 3 changes were made to the database:

```
1 ALTER TABLE student
2 RENAME TO students;
3 ALTER TABLE fine_issued
4 RENAME TO fine;
5 ALTER TABLE shelf_details
6 RENAME TO shelf;
```

## Queries:

1. List the names of the students with the number of books issued by them:

```
SELECT name, books_issued FROM fine;
```

2. List the names of all the books with number of copies available in the library:

```
SELECT book_name, copies_available FROM books;
```

3. List the book names and the shelves in which they are placed:

```
SELECT book_name, shelf_id FROM books AS b, shelf AS s WHERE b.book_code = s.book_code;
```

4. List the number of students of each course:

```
SELECT course, COUNT(name) FROM `students` GROUP BY course;
```

5. List the number of books issued by each staff member:

```
SELECT name, COUNT(issued_by) FROM issued_books AS i, staff AS s WHERE s.member_id=i.issued_by GROUP BY name;
```

6. Give the book written by author whose name's initials are J and D:

```
SELECT book_name, author FROM books WHERE author like "J%D%";
```

7. List the names of books and their issued dates:

```
SELECT book_name, issue_date FROM books AS b, issued_books AS i WHERE b.book_code = i.book_code;
```

8. List book name and their author:

```
SELECT concat(book_name," by ",author) as 'book and their writer' FROM books;
```

9. Name the student who has maximum fine amount:

```
SELECT name, MAX(fine_amount) FROM fine;
```

10. Count the number of books issued by a student whose name starts with A:

```
SELECT name, books_issued FROM fine WHERE name LIKE "A%";
```