Library Management System (LMS)

Library Management System:

Library Management System is a very cost effective and efficient system which is designed to manage all the functions of a library like books availability, their count, borrower's details, fine, memebership details and many more. This project is implemented through SQL using Microsoft SQL Server. This project includes entities and attributes related to library management system and relation between them at appropriate place. All functionalities and and knowledge of SQL that I learned are performed in this project and all the queries are executed successfully.

Functionality required by Students

1. Search Book
2. Issue Book
3. Renew Book
4. Return Book
5. Pay Fine

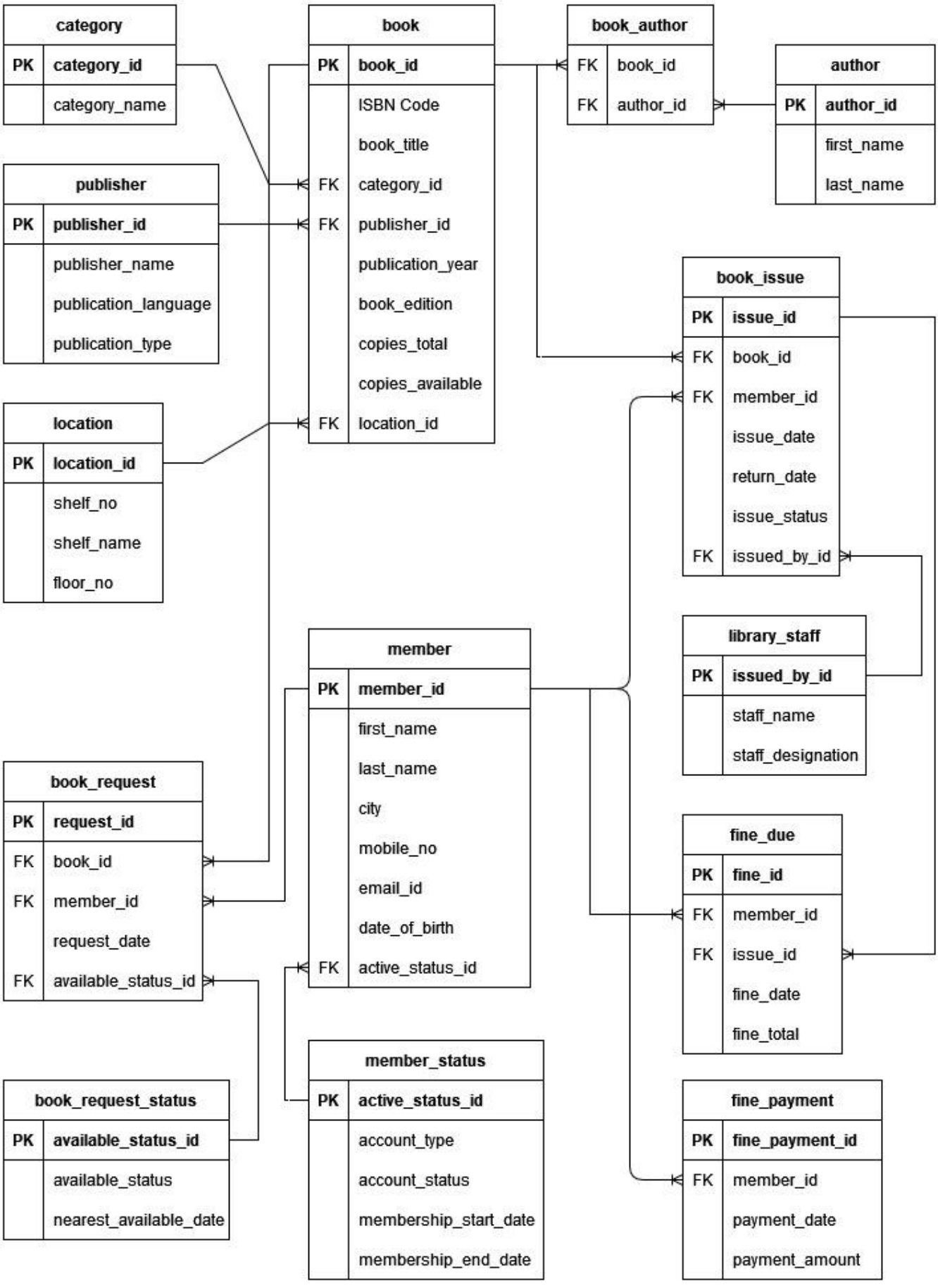
Functionality required by Library Staffs

1. Add Book
2. Delete Book
3. Approve Book
4. See member fine
5. Update for books
6. All the functionalities of students

Requirements for Library Management System project

1. Each book should have a unique ID number.
2. Members of the library can search for books by title, author,category and publication details
3. A book can have mutiple authors.
4. There may be more than one copy of a book owned by the library.
5. Members can borrow books, and the system will store the date that they borrowed the book.
6. Library staff can see who has borrowed a particular book, who has checked out a book in the past , when members have joined, type of memebership and status of member.
7. Members can reserve copies of the books to borrow later, if all of the library's copies are borrowed by other members.
8. Fines can be imposed on members if books are not returned within 15 days of borrowing them. Members can pay the fines that have been added to their account.

ER Diagram Library Management System



SQL Script

```
/* 1. creating new database with the name Lib_mngmt_system*/

create database lib_mngmt_system

use lib_mngmt_system


/*2. Creating new table with name tbl_category consisting of category_id &
category_name*/

create table tbl_category
(
category_id int primary key identity,
category_name varchar(50)
);


/* 3. Creating new table with name tbl_publisher consisting of publisher_id,
pubisher_name, publication_language & publication_type*/

create table tbl_publisher
(
publisher_id int primary key identity,
publisher_name varchar(50),
publication_language varchar(15),
publication_type varchar(20)
);


/* 4. Creating new table with name tbl_location consisting of location_id, shelf_no,
shelf_name & floor_no*/

create table tbl_location
(
location_id int primary key identity,
shelf_no varchar(10),
shelf_name varchar(50),
floor_no int
);


/* 5. Creating new table with name tbl_author consisting of author_id, first_name &
last_name*/

create table tbl_author
(
author_id int primary key identity,
first_name varchar(20),
last_name varchar(20)
);
```

```sql
/* 6. Creating new table with name tbl_book consisting of book_id, isbn_code,
book_title, category_id,publisher_id, publication year, book edition, copies_total,
copies_available & location_id*/

create table tbl_book
(
book_id int primary key identity,
isbn_code varchar(15),
book_title varchar(50),
category_id int,
publisher_id int,
publication_year date,
book_edition int,
copies_total int,
copies_available int,
location_id int,

constraint fk_category_id foreign key (category_id) references
tbl_category(category_id),
constraint fk_publisher_id foreign key (publisher_id) references
tbl_publisher(publisher_id),
constraint fk_location_id foreign key (location_id) references
tbl_location(location_id)
);


/* 7. Creating new table with name tbl_book_author consisting of book_id & author_id*/

create table tbl_book_author
(
book_id int,
author_id int,

constraint fk_book_id foreign key (book_id) references tbl_book(book_id),
constraint fk_author_id foreign key (author_id) references tbl_author(author_id)
);


/* 8. Creating new table with name tbl_member_status consisting of active_status_id,
account_type, account_status, membership_start_date & membership_end_date*/

create table tbl_member_status
(
active_status_id int primary key identity,
account_type varchar(20),
account_status varchar(10),
membership_start_date date,
membership_end_date date
);


/* 9. Creating new table with name tbl_member consisting of member_id, first_name,
last_name, city, mobile_no, email_id, date_of_birth & active_status_id*/

create table tbl_member
(
member_id int primary key identity,
first_name varchar(20),
last_name varchar(20),
```

```
city varchar(20),
mobile_no varchar(10),
email_id varchar(50),
date_of_birth date,
active_status_id int,

constraint fk_active_status_id foreign key (active_status_id) references
tbl_member_status
);


/* 10. Creating new table with name tbl_library_staff consisting of issue_by_id,
staff_name & staff_designation*/

create table tbl_library_staff
(
issue_by_id int primary key identity,
staff_name varchar(50),
staff_designation varchar(20)
);


/* 11. Creating new table with name tbl_book_issue consisting of issue_id, book_id,
member_id, issue_date, return_date, issue_status & issued_by_id*/

create table tbl_book_issue
(
issue_id int primary key identity,
book_id int,
member_id int,
issue_date date,
return_date date,
issue_status varchar(20),
issued_by_id int,

constraint fk_issue_book_id foreign key(book_id) references tbl_book,
constraint fk_issue_member_id foreign key(member_id) references tbl_member,
constraint fk_issue_issued_by_id foreign key(issued_by_id) references
tbl_library_staff
);


/* 12. Creating new table with name tbl_fine_due consisting of fine_id, member_id,
issue_id, fine_date & fine_total*/

create table tbl_fine_due
(
fine_id int primary key identity,
member_id int,
issue_id int,
fine_date date,
fine_total int,

constraint fk_member_id foreign key(member_id) references tbl_member,
constraint fk_issue_id foreign key(issue_id) references tbl_book_issue
);
```

```sql
/* 13. Creating new table with name tbl_fine_payment consisting of fine_payment_id,
member_id, payment_date & payment_amount*/

create table tbl_fine_payment
(
fine_payment_id int primary key identity,
member_id int,
payment_date date,
payment_amount int,

constraint fk_payment_member_id foreign key(member_id) references tbl_member
);

/* 14. Creating new table with name tbl_book_request_status consisting of
available_status_id, available_status & nearest_available_date*/

create table tbl_book_request_status
(
available_status_id int primary key identity,
available_status varchar(10),
nearest_available_date date
);

/* 15. Creating new table with name tbl_book_request consisting of request_id,
book_id, member_id, request_date & available_status_id*/

create table tbl_book_request
(
request_id int primary key identity,
book_id int,
member_id int,
request_date date,
available_status_id int,

constraint fk_request_book_id foreign key(book_id) references tbl_book,
constraint fk_request_member_id foreign key(member_id) references tbl_member,
constraint fk_request_available_status_id foreign key(available_status_id) references
tbl_book_request_status
);


/* 16. Insert data into table tbl_author */

select * from tbl_author

insert into tbl_author
values('PK', 'Nag'), ('JP', 'Holman'), ('APJ', 'Kalam'), ('E', 'Sreedharan'),('RL',
'Norton'),
('Amrita', 'Pritam'), ('Mahadevi', 'Verma'), ('Sudha', 'Murthy'), ('Ruskin', 'Bond'),
('Robert', 'Frost'),
('Rabindranath', 'Tagore'), ('Jack', 'Canfield'), ('Dale', 'Carnegie'), ('Swami',
'Vivekanand'), ('Munshi', 'Premchand'),
('Stephen', 'Covey'), ('F', 'Beer'), ('R', 'Johnston'), ('Amish', 'Tripathi'),
('Stephen', 'Timoshenko'),
('Anton', 'Chekhov'), ('Leo', 'Tolstoy'), ('Mahatma', 'Gandhi'), ('JL',
'Nehru'),('Nelson', 'Mandela')
```

```sql
/* 17. Insert data into table tbl_category */

select * from tbl_category

insert into tbl_category
values('Engineering&Technology'), ('Spritualism'), ('Self_Development'),
('Literature'), ('History'),
('Crime'), ('Comedy'), ('Romantic'), ('Folk_Tales'), ('Fiction'),
('Non_Fiction'), ('Poetry'), ('Drama'), ('Adventure'), ('Mythology')


/* 18. Insert data into table tbl_publisher */

select * from tbl_publisher

insert into tbl_publisher
values('ABC','English','Journals'), ('ABC','Hindi','Journals'),
('CBS','English','Handbooks'), ('CBS','Hindi','Handbooks'),
('XYZ','English','Research_Reports'), ('XYZ','Hindi','Research_Reports'),
('XYZ','English','Books'), ('XYZ','Hindi','Books'),
('ZAB','English','Magzines'),('ZAB','Hindi','Magzines')


/* 19. Insert data into table tbl_location */

select * from tbl_location

insert into tbl_location
values('10001', 'Engineering_Mechanical',1), ('10001', 'Engineering_Mechanical',2),
('10001', 'Engineering_Mechanical',3),
('10002', 'Engineering_Electrical',1), ('10002', 'Engineering_Electrical',2),
('10002', 'Engineering_Electrical',3),
('10003', 'Engineering_Computers',1), ('10003', 'Engineering_Computers',2), ('10003',
'Engineering_Computers',3),
('20001', 'Philosophy',1), ('20001', 'Philosophy',2),('20001', 'Philosophy',3),
('20001', 'Philosophy',4),
('20002', 'Spritualism',1), ('20002', 'Spritualism',2), ('20002', 'Spritualism',3),
('20002', 'Spritualism',4),
('30001', 'Self_Development',1), ('30001', 'Self_Development',2), ('30001',
'Self_Development',3),
('30002', 'Competitions',1), ('30002', 'Competitions',2), ('30002', 'Competitions',3),
('30003', 'Literature',1), ('30003', 'Literature',2), ('30003',
'Literature',3),('30003', 'Literature',4),
('40001', 'Journals',1), ('40001', 'Journals',2), ('40001', 'Journals',3)


/* 20. Insert data into table tbl_book */

select * from tbl_book

insert into tbl_book
values('9876543210001', 'Thermodynamics', 1, 7, '2016',3,15,10,1)
('9876543210002', 'Heat & Mass Transfer', 1, 7, '2014',2,5,2,2),
('9876543210003', 'Wings of Fire', 11, 7, '1999',1,10,5,18),
('9876543210004', 'Kinematics of Machines', 1, 7, '2012',3,5,5,3),
('9876543210005', 'Khaton ka Safarnama', 8, 8, '1985',1,3,3,24),
('9876543210006', 'Black Rose', 8, 7, '1970',1,1,1,24),
('9876543210007', 'Kagaz Te Kanvas', 8, 8, '1980',1,5,3,25),
('9876543210008', 'Gillu', 4, 8, '1960',1,2,2,26),
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```
('9876543210009', 'How I taught my grandmother to read', 4, 7, '1990',1,5,5,26),
('9876543210010', 'Three Thousand Stitches', 4, 7, '2010',1,5,5,27),
('9876543210011', 'Wise and Otherwise', 4, 7, '2012',1,5,5,26),
('9876543210012', 'The Room on the Roof', 4, 7, '1970',1,5,5,27),
('9876543210013', 'Happy Birthday, World', 11, 7, '2000',1,1,1,27),
('9876543210014', 'The Road Not Taken', 12, 7, '1920',1,1,1,24),
('9876543210015', 'Geetanjali', 12, 7, '1920',3,1,1,25),
('9876543210016', 'The 25 Success Principles', 3, 7, '1980',6,10,5,18)
('9976543210002', 'How to stop worrying and start living', 3, 7, '2005',10,10,2,19),
('9976543210003', 'Karma Yoga', 11, 7, '1980',5,2,2,11),
('9976543210004', 'Godan', 10, 8, '2012',10,2,2,24),
('9976543210005', 'Premashram', 10, 8, '2010',10,2,2,24),
('9976543210006', 'The Seven Habits of Highly Effective People', 3, 7,
'2000',15,10,2,20),
('9876543210007', 'Mechanics', 1, 8, '2000',3,3,3,3),
('9876543210008', 'The Immortals of Meluha', 15, 8, '2012',1,3,3,27),
('9876543210009', 'Strengh of Materials', 1, 8, '2000',6,2,2,2),
('9876543210010', 'The Seagull', 13, 8, '1960',1,1,1,27),
('9876543210011', 'War and Peace', 13, 8, '1970',21,1,1,26),
('9876543210012', 'Harijan', 11, 1, '1932',1,1,1,29),
('9876543210013', 'The Story of my experiments with Truth', 11, 8, '1925',1,1,1,26),
('9876543210014', 'The Discovery of India', 5, 8, '1945',1,3,3,24),
('9876543210015', 'Long walk to freedom', 5, 8, '1999',1,2,2,25),
('9876543210016', 'Beyond Religion', 2, 8, '2010',1,2,2,15),
('9876543210017', 'Ikigai', 2, 8, '2010',1,2,0,15),
('9976443210004', 'Gaban', 10, 8, '2012',10,2,0,24),
('9976549210004', 'Idgah', 10, 8, '2012',10,2,0,24)


/* 21. Insert data into table tbl_member_status */

select * from tbl_member_status

insert into tbl_member_status
values('student','active','2018','2020')
('student','active','2019','2021'),
('student','inactive','2016','2017'),
('student','inactive','2015','2016'),
('professional','active','2020','2022'),
('professional','active','2018','2022'),
('professional','inactive','2015','2018'),
('professional','inactive','2016','2016'),
('staff','active','2020','2022'),
('staff','active','2020','2022'),
('staff','inactive','2015','2016')


/* 22. Insert data into table tbl_member*/

select * from tbl_member

insert into tbl_member
values('A','Kumar','Delhi','9999999999','a@xyz.com','1996',1),
('B','Kumar','Delhi','9999999999','b@xyz.com','1990',5),
('C','Kumar','Noida','9999999999','c@xyz.com','2000',3),
('A','Singh','Noida','9999999999','as@xyz.com','2002',2),
('B','Singh','Noida','9999999999','bs@xyz.com','1985',4),
('B','Singh','Noida','9999999999','bs@xyz.com','1985',6),
('C','Singh','Delhi','9999999999','cs@xyz.com','1990',7),
```

```
('X','Patel','Delhi','9999999999','x@xyz.com','1990',9),
('Y','Arora','Delhi','9999999999','y@xyz.com','1985',10),
('Z','Khanna','Delhi','9999999999','z@xyz.com','1970',11)


/* 23. Insert data into table tbl_library_staff*/

select * from tbl_library_staff

insert into tbl_library_staff
values('X Patel', 'Librarian'),
('Y Arora', 'Librarian'),
('R Tiwari', 'Head Librarian')


/* 24. Insert data into table tbl_book_issue*/

select * from tbl_book_issue


insert into tbl_book_issue
values(7, 1, '2022', '2022', 'overdue', 1),
(8, 1, '2022-11-01', '2022-11-15', 'underdue', 1),
(1, 2, '2022-11-10', '2022-11-25', 'underdue', 1),
(10, 2, '2022-11-12', '2022-11-27', 'underdue', 2),
(18, 2, '2022-11-12', '2022-11-27', 'underdue', 2),
(2, 4, '2022-10-10', '2022-10-25', 'overrdue', 1),
(15, 5, '2022-10-10', '2022-10-25', 'overdue', 2)


/* 25. Insert data into table tbl_fine_due*/

select * from tbl_fine_due

insert into tbl_fine_due
values(5,12,'2022-11-20',25),
(4,11,'2022-11-20',25),
(1,6,'2022-11-20',150)


/* 26. Insert data into table tbl_fine_payment*/

select * from tbl_fine_payment

insert into tbl_fine_payment
values(5,'2022-11-20',25),
(4,'2022-11-20',25),
(1,'2022-11-20',150)


/* 27. Insert data into table tbl_book_request_status*/

select * from tbl_book_request_status

insert into tbl_book_request_status
values('not_avail','2022-11-22'),
('not_avail','2022-11-30'),
('not_avail','2022-11-25'),
('available','2022-11-16')
```

```sql
/* 28. Insert data into table tbl_book_request*/

select * from tbl_book_request

insert into tbl_book_request
values(33,1,'2022-11-15',3),
(34,1,'2022-11-15',4),
(33,2,'2022-11-15',4),
(32,4,'2022-11-15',5),
(25,5,'2022-11-15',6)
```

SQL Query Handling

```sql
/*Problem # 1:
Write a query to display all the member id, member name, city, account_type,
account_status, membership start and end date.*/

select m.member_id, m.first_name, m.last_name, m.city, ms.account_type,
ms.account_status,
ms.membership_start_date, ms.membership_end_date
from tbl_member m
join tbl_member_status ms on m.active_status_id=ms.active_status_id

/*Problem # 2:
Write a query to display the member details whose account is inactive.*/

select m.member_id, m.first_name, m.last_name, m.city, ms.account_type,
ms.account_status,
ms.membership_start_date, ms.membership_end_date
from tbl_member m
join tbl_member_status ms on m.active_status_id=ms.active_status_id
where account_status='inactive'

/*Problem # 3:
Write a query to display the member details whose account type is student.*/

select m.member_id, m.first_name, m.last_name, m.city, ms.account_type,
ms.account_status,
ms.membership_start_date, ms.membership_end_date
from tbl_member m
join tbl_member_status ms on m.active_status_id=ms.active_status_id
where account_type='student'

/*Problem # 4:
Write a query to display the member details whose account type is student and account
is  inactive.*/

select m.member_id, m.first_name, m.last_name, m.city, ms.account_type,
ms.account_status,
ms.membership_start_date, ms.membership_end_date
from tbl_member m
join tbl_member_status ms on m.active_status_id=ms.active_status_id
where account_type='student' and account_status='inactive'

/*Problem # 5:
Write a query to display the member details who have fine due.*/

select m.member_id, m.first_name, m.last_name, m.city, f.fine_date, f.fine_total,
ms.account_type, ms.account_status,
ms.membership_start_date, ms.membership_end_date
from tbl_member m
join tbl_fine_due f on m.member_id=f.member_id
join tbl_member_status ms on m.active_status_id=ms.active_status_id

/*Problem- # 6:
Write a query to display the member details who have fine due and account is
inactive.*/

select m.member_id, m.first_name, m.last_name, m.city, f.fine_date, f.fine_total,
```

```
ms.account_type, ms.account_status,
ms.membership_start_date, ms.membership_end_date
from tbl_member m
join tbl_fine_due f on m.member_id=f.member_id
join tbl_member_status ms on m.active_status_id=ms.active_status_id
where account_status='inactive'

/*Problem- # 7:
Write a query to display total number of active membership and inactive membership.*/
select count(*) as total_active_members
from tbl_member m
join tbl_member_status ms on m.active_status_id=ms.active_status_id
where account_status='active'
go
select count(*) as total_inactive_members
from tbl_member m
join tbl_member_status ms on m.active_status_id=ms.active_status_id
where account_status='inactive'

/*Problem- # 8:
Write a query to display how many books this library owns.*/

select sum(copies_total) as total_books from tbl_book

/*Problem- # 9:
Write a query to display how many books are available for borrowing.*/

select sum(copies_available) as books_available_for_borrowing from tbl_book

/*Problem- # 10:
Write a query to display categorywise book count*/

select  c.category_name, b.copies_total
from tbl_category c
join tbl_book b on b.category_id=c.category_id
order by b.copies_total desc

/*Problem- # 11:
Write a query to display total engineering & technology books*/

select sum(copies_total) as total_engineering_technology_books
from tbl_category c
join tbl_book b on b.category_id=c.category_id
where category_name='Engineering&Technology'

/*Problem- # 12:
Write a query to search a book with name 'Three Thousand Stitches'. Is it available
for borrowing?*/

select * from tbl_book where book_title='Three Thousand Stitches'

--There are total 5 copies and all 5 copies are available for borrowing

/*Problem- # 13:
Write a query to issue book with book_id=10 to a member  with member_id=4*/

insert into tbl_book_issue
values(10,4,'2022-11-20','2022-12-05','underdue',1)
go
```

```sql
update tbl_book set copies_available=copies_available-1
where book_id=10

/*Problem- # 14:
Write a query to return book with book_id=10 to a member  with member_id=4*/

update tbl_book_issue set issue_status='returned'
where book_id=10 and  member_id=4
go
update tbl_book set copies_available=copies_available+1
where book_id=10

/*Problem- # 15:
Write a query to show fine details of member with member name='A Kumar'*/

select m.member_id, m.first_name, m.last_name, m.city, f.fine_date, f.fine_total,
ms.account_type, ms.account_status,
ms.membership_start_date, ms.membership_end_date
from tbl_member m
join tbl_fine_due f on m.member_id=f.member_id
join tbl_member_status ms on m.active_status_id=ms.active_status_id
where m.first_name='A' and m.last_name='Kumar'
```

*All the SQL query executed successfully.