

Query:

1) Showing book name, author name, publisher name :

```
select book.title,author.name as 'author name',publisher.name as 'publisher' from book
join book_author on book_author.book_id=book.book_id
join book_publisher on book_author.book_id=book_publisher.book_id
join author on author.author_id=book_author.author_id
join publisher on publisher.publisher_id=book_publisher.publisher_id
```

	title	author name	publisher
1	Intoduction to Computers	Peter Norton	McGraw-Hill
2	Fundamental of Computers	Balagurusamy	PublisherMc Graw Hill India
3	Principle of Electronics	VK Mehta	S.Chand
4	Hand Book of Electronics	Gupta	Pragati Prakashan
5	Hand Book of Electronics	Kumer	Pragati Prakashan
6	Programming in ANSI C	Balagurusamy	PublisherMc Graw Hill India

2) Showing book title and number of available book :

```
select sub.title,count(title) as 'available copy' from(select title from item
join book on book.book_id=item.book_id where item.stat='available') as sub
group by sub.title;
```

	title	available copy
1	Fundamental of Computers	6
2	Hand Book of Electronics	6
3	Intoduction to Computers	6
4	Principle of Electronics	6
5	Programming in ANSI C	6

2)

3) Showing all available copy of "Hand Book of Electronics" and their location:

```
select book.title,item.copy_no,shelf.shelf_no,shelf.row_no,shelf.col_no from item
join book on book.book_id=item.book_id
join shelf on item.cell_id=shelf.cell_id where title='Hand Book of Electronics';
```

	title	copy_no	shelf_no	row_no	col_no
1	Hand Book of Electronics	C01	02	2	1
2	Hand Book of Electronics	C02	02	2	1
3	Hand Book of Electronics	C03	02	2	1
4	Hand Book of Electronics	C04	02	2	2
5	Hand Book of Electronics	C05	02	2	2
6	Hand Book of Electronics	C06	02	2	2

In case 2 and 3 all books in database are in available status. Cause no book has been borrowed yet

4) Showing member_id of member, number of book borrowed and other details:

```
select * from member;
```

	member_id	member_type	loan_count	stat	membership_date
1	fac_1	teacher	0	active	2024-10-30
2	fac_2	teacher	0	active	2024-10-30
3	fac_3	teacher	0	active	2024-10-30
4	fac_4	teacher	0	active	2024-10-30
5	fac_5	teacher	0	active	2024-10-30
6	fac_6	teacher	0	active	2024-10-30
7	fac_7	teacher	0	active	2024-10-30
8	fac_8	teacher	0	active	2024-10-30
9	fac_9	teacher	0	active	2024-10-30
10	stu_1	student	0	active	2024-10-30
11	stu_10	student	0	active	2024-10-30

Currently all member are in active status and they haven't borrowed any book yet;

5) Suppose member with member_id "fac_1" want to borrow 3 book. It is shown below:

We have to execute loan_request procedure with member_id and item id

```
exec loan_request 'fac_1','it_1';
exec loan_request 'fac_1','it_22';
exec loan_request 'fac_1','it_10';
```

Now will check how many book member "fac_1" borrowed.

```
select * from member where member_id='fac_1';
```

	member_id	member_type	loan_count	stat	membership_date
1	fac_1	teacher	2	active	2024-10-30

we can see only two book borrowed inspite of requesting 3. Cause a member can only borrow 2 books at a max.

In this case first two book will be borrowed.

Lets see the status of borrowed book:

```
select * from item where item_id in('it_1','it_22');
```

	id	item_id	copy_no	stat	book_id	cell_id
1	1	it_1	C01	borrowed	bk_1	loc_1
2	22	it_22	C04	borrowed	bk_4	loc_10

We can see that stat of item that was borrowed by 'fac_1' changed to "borrowed".

6) Now we will examine the loan table:

```
select * from loan;
```

	id	loan_id	item_id	stat	issue_date	member_id
1	1	ln_1	it_1	active	2024-10-30	fac_1
2	2	ln_2	it_22	active	2024-10-30	fac_1

We can see two loan table registered in loan table

7)Now we will show member_id, name, title of the book borrowed, copy no, loan issue date:

```
go
create proc member_title_borrow @member_id varchar(10) as
begin
declare @member_type varchar(10);
select @member_type=member_type from member where member.member_id=@member_id
if @member_type='student'
begin
select student_member.member_id,student.first_name +' '+student.last_name as
'name',book.title,item.copy_no,book.edition,loan.issue_date from loan
join student_member on loan.member_id=student_member.member_id
join student on student_member.roll=student.roll
join item on loan.item_id=item.item_id
join book on item.book_id=book.book_id;
end
else
begin
select teacher_member.member_id,teacher.first_name +' '+teacher.last_name as
'name',book.title,item.copy_no,book.edition,loan.issue_date from loan
join teacher_member on loan.member_id=teacher_member.member_id
join teacher on teacher_member.teacher_id=teacher.teacher_id
join item on loan.item_id=item.item_id
join book on item.book_id=book.book_id;
end
end
go
exec member_title_borrow 'fac_1';
```

	member_id	name	title	copy_no	edition	issue_date
1	fac_1	Md. Anwar Hossain	Intoduction to Computers	C01	3	2024-10-30
2	fac_1	Md. Anwar Hossain	Hand Book of Electronics	C04	1	2024-10-30

Now lets again see book title and count of available book:

```
select sub.title,count(title) as 'available copy' from(select title from item
join book on book.book_id=item.book_id where item.stat='available') as sub
group by sub.title ;
```

	title	available copy
1	Fundamental of Computers	6
2	Hand Book of Electronics	5
3	Intoduction to Computers	5
4	Principle of Electronics	6
5	Programming in ANSI C	6

We can see available_copy number decreased by 1 for “Intoduction to Computers”

and “Hand Book of Electronics”. Cause 1 copy of each book borrowed by “fac_1”

6)Now lets check if there fine for any loan:

First as admin I will apply fine today.

```
insert into fine (loan_id,reason,amount,fine_date) select loan_id,'late return',20,'0000-00-00' from
loan where datediff(day,cast(getdate() as date),issue_date)>=30 and stat='active';
select * from fine;
```

fine_id	loan_id	fine_date	reason	amount
---------	---------	-----------	--------	--------

You can see no fine registered because 'fac_1' borrowed book on 2024-10-30 and admin applied loan on on 2024-10-30. A member can keep book 30 days. So the fine is not applicable for 'fac_1'.

Now we will change the condition a bit. Lets imagine a member can keep book 0 days. Its shown below:

```
insert into fine (loan_id, reason, amount, fine_date) select loan_id, 'late return', 20, '0000-00-00' from
loan where datediff(day, cast(getdate() as date), issue_date)>=0 and stat='active';
select * from fine;
```

	fine_id	loan_id	fine_date	reason	amount
1	1	ln_1	2024-10-30	late return	20.00
2	2	ln_2	2024-10-30	late return	20.00

You can see a fine issued.

Now will see on whom the fine issued:

```
select teacher.teacher_id, teacher.first_name + ' ' + teacher.last_name as 'borrower', book.title, case
when datediff(day, cast(getdate() as date), cast(sub.fine_date as date))*3+amount >500
then 500
else datediff(day, cast(getdate() as date), cast(sub.fine_date as date))*3+amount
end as amount
from
(select member.member_id, loan.item_id, fine.fine_date, fine.amount from member
join loan on member.member_id=loan.member_id
join fine on loan.loan_id=fine.loan_id
where member.member_id='fac_1') as sub
join teacher_member on sub.member_id=teacher_member.member_id
join teacher on teacher_member.teacher_id=teacher.teacher_id
join item on sub.item_id=item.item_id
join book on item.book_id=book.book_id
```

	teacher_id	borrower	title	amount
1	1002	Md. Anwar Hossain	Intoduction to Computers	20.00
2	1002	Md. Anwar Hossain	Hand Book of Electronics	20.00

7)Now we will happen if a member want to see his fine. In data base only the fine applied in this case 20 will be stored.

But when a user want to see his fine, the fine will be shown as

showed fine =applied fine+ 3*abs(today - fin issue date)

For this we will execute the following prcedure:

```
go
create proc show_fine_teacher @member_id varchar(10) as
begin
select teacher.teacher_id, book.title, case
when datediff(day, cast(getdate() as date), cast(sub.fine_date as date))*3+amount >500
then 500
else datediff(day, cast(getdate() as date), cast(sub.fine_date as date))*3+amount
end as amount
from
(select member.member_id, loan.item_id, fine.fine_date, fine.amount from member
```

```

join loan on member.member_id=loan.member_id
join fine on loan.loan_id=fine.loan_id
where member.member_id=@member_id) as sub
join teacher_member on sub.member_id=teacher_member.member_id
join teacher on teacher_member.teacher_id=teacher.teacher_id
join item on sub.item_id=item.item_id
join book on item.book_id=book.book_id
end
go

```

```
exec show_fine_teacher 'fac_1';
```

	teacher_id	title	amount
1	1002	Intoduction to Computers	20.00
2	1002	Hand Book of Electronics	20.00

We can see fine is same. Because we executed the procedure show_fine_teacher on the date fine issued.

So we will modify the procedure and set

```
abs(today - fin issue date)=30
```

It will produce following:

```

create proc show_fine_stu @member_id varchar(10) as
begin
select student.roll,book.title, case
when datediff(day,cast(getdate() as date),cast(sub.fine_date as date))*3+amount >500
then 500
else datediff(day,cast(getdate() as date),cast(sub.fine_date as date))*3+amount
end as amount
from
(select member.member_id,loan.item_id,fine.fine_date,fine.amount from member
join loan on member.member_id=loan.member_id
join fine on loan.loan_id=fine.loan_id
where member.member_id=@member_id) as sub
join student_member on sub.member_id=student_member.member_id
join student on student_member.roll=student.roll
join item on sub.item_id=item.item_id
join book on item.book_id=book.book_id
end
go

```

```
exec show_fine_teacher 'fac_1';
```

	teacher_id	title	amount
1	1002	Intoduction to Computers	110.00
2	1002	Hand Book of Electronics	110.00

We can see fine increased. For keeping the book 30 days after fine issued $3*30=90$ taka extra fine add.

Now lets consider what if the user keep the book 1000 day after fine issued.

```

go
create proc show_fine_teacher @member_id varchar(10) as
begin
select teacher.teacher_id,book.title, case
when 1000*3+amount >500

```

```

then 500
else 1000*3+amount
end as amount
from
(select member.member_id,loan.item_id,fine.fine_date,fine.amount from member
join loan on member.member_id=loan.member_id
join fine on loan.loan_id=fine.loan_id
where member.member_id=@member_id) as sub
join teacher_member on sub.member_id=teacher_member.member_id
join teacher on teacher_member.teacher_id=teacher.teacher_id
join item on sub.item_id=item.item_id
join book on item.book_id=book.book_id
end
go

exec show_fine_teacher 'fac_1';

```

	teacher_id	title	amount
1	1002	Introduction to Computers	500.00
2	1002	Hand Book of Electronics	500.00

We can see that instead of $3*1000=3000$ extra fine only 480 extra fine applied. Beacuse we allowed fine+extra fine at max 500