DATABASE MANAGEMENT SYSTEM

PROJECT: LIBRARY MANAGEMENT SYSTEM

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1. INTRODUCTION

PROJECT DELIVERABLE – I

Project Description – Library4You

Library4You is a library management system located across multiple states in the United States, founded in the year 2000. It improved providing the book(s) service to customers from physical store to retail through multiple ways like physical books and e-books. There are multiple ways a library member can search for a book using Genres, Publishers and Authors. In addition to books, there are magazines, newspapers, media, research topics, journals etc. provided to customers. Library Management also helps to manage the library by keeping a track of books rented and purchased.

Books are supplied by multiple vendors that are maintained in the system, who provide different publications of books or materials. Based on the majority of sales for a particular publisher or author, quantity of requirement for those materials from vendors will increase. A librarian is responsible to maintain the library using the online system

The process of placing an order or availing service from Library4You will start with the customer membership. Customers have the following membership options like gold, platinum or regular membership which is valid for 6 months, 18 months and 90 days respectively. Members can either purchase or rent a book or materials through on-line or from the store. A gold member can take up to 5 books per month on rent, platinum up to 12 books per month and a regular member can avail 3 books per month. Order details will be available to members which also includes tracking details of the shipment. Members can provide rating, review for a particular order placed and also the feedback for the services provided by Library4You.

Library Management system allows the company to maintain information about customers, tracking details, inventory details which will improve the efficiency of the company. It can also gather and procure more quantities of books based on the orders placed and based on the trending topics of market. Library4You requires an effective database system to keep track of all the activities which will scale their operations and satisfy customer needs and services across locations.

2. ENTITIES:

1. Store
2. Membership

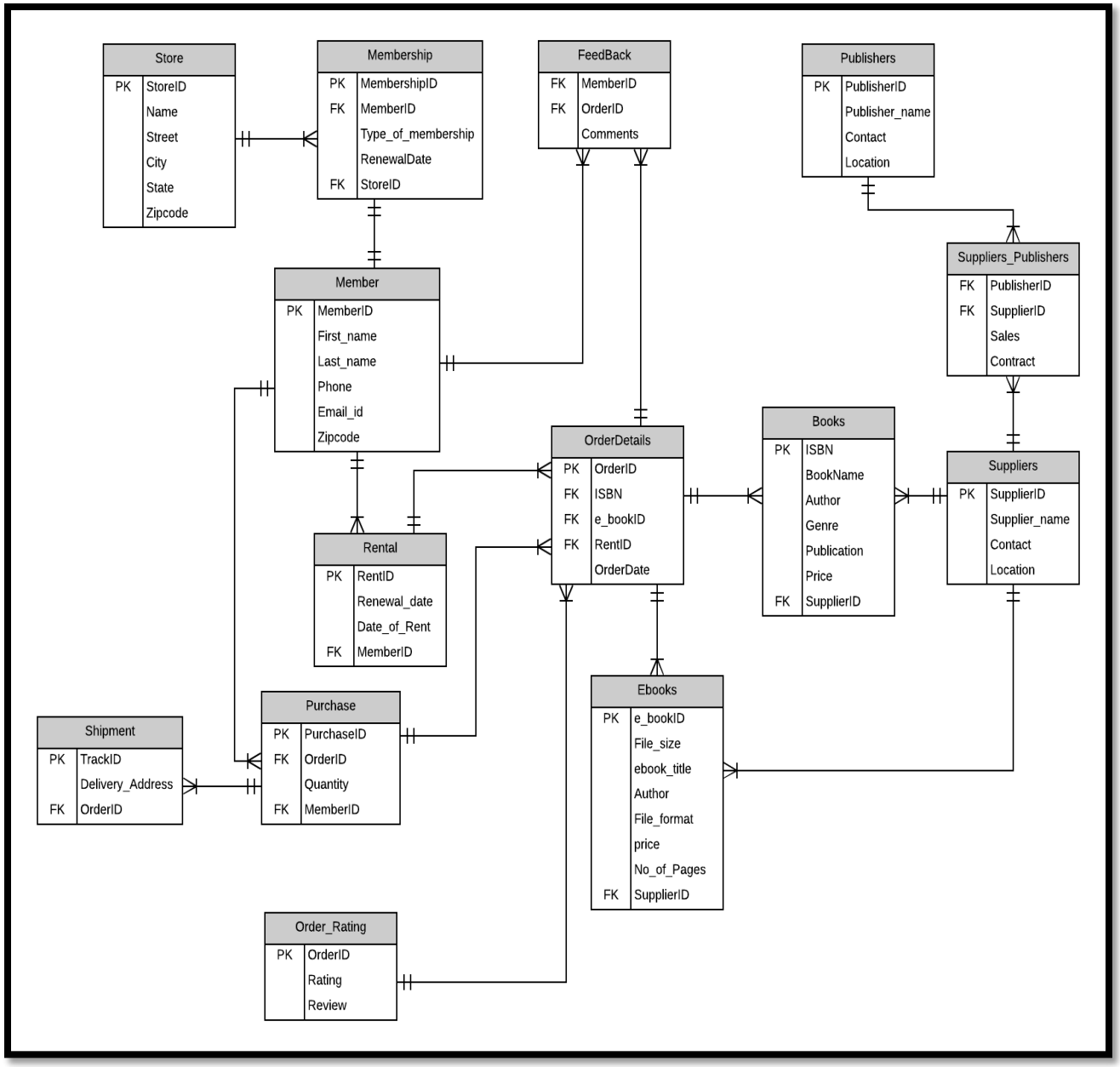
3. Member
4. FeedBack
5. OrderDetails
6. Order_Rating
7. Rental
8. Purchase
9. Shipment
10. Ebooks
11. Books
12. Suppliers
13. Supplier_Publishers
14. Publishers

ASSUMPTIONS:

- Store can give one or many memberships, but membership can be taken in one and only one store.
- Many publishers can be handled by many suppliers and many suppliers can deal many publishers.
- Feedback can be given by one member and member can give many feedbacks.
- Member can take one and only one membership and membership is given to one and only one member.
- Order can have many books/eBooks in it but a book/eBooks can be in one and only one order.
- Feedback is given to one order and order can have many feedbacks.
- Order can have one and only one rental but rental can have different order number at different time.

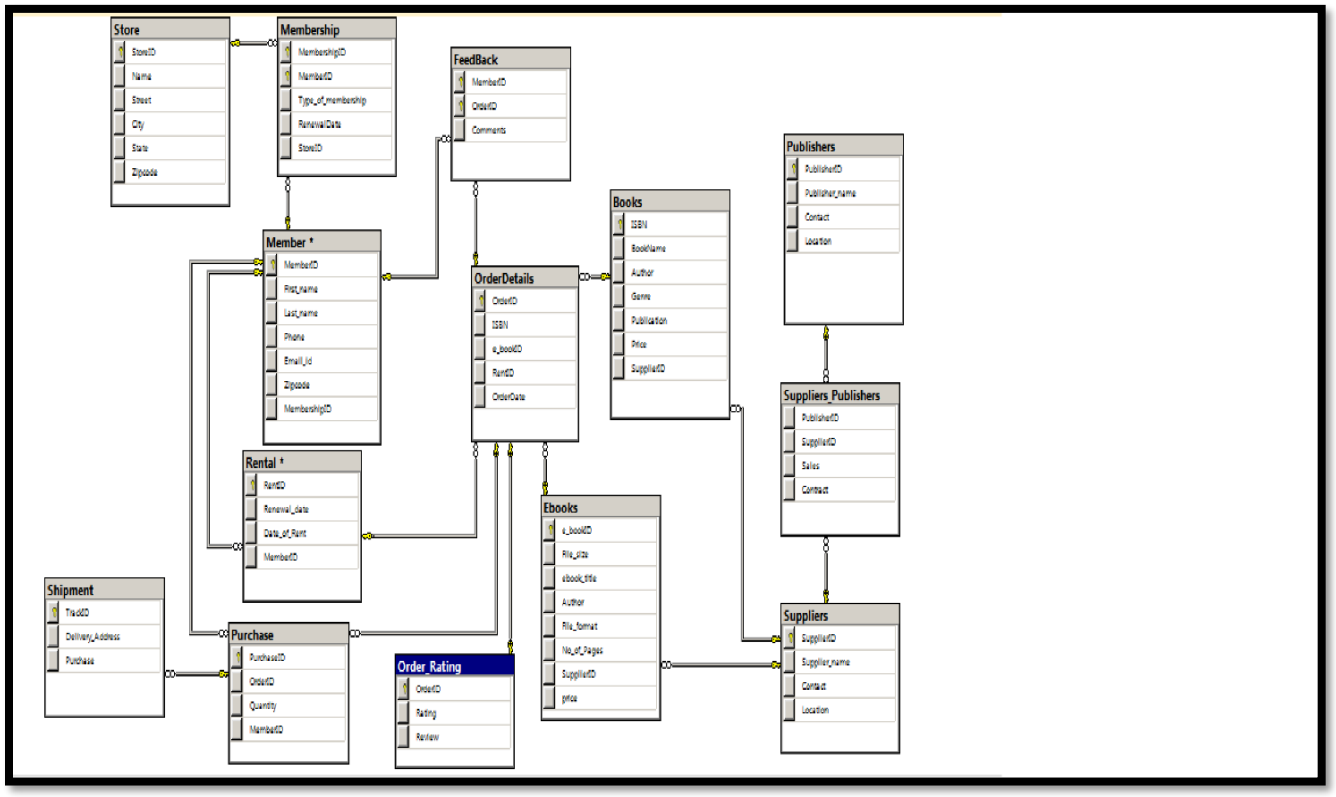
PROJECT DELIVERABLE – II

3. ENTITY RELATIONSHIP DIAGRAM (ERD)



4. DATABASE DIAGRAM

Following is the Database diagram mapping captured from SQL Server Management Studio



PROJECT DELIVERABLE – III

5. TABLES WITH PRIMARY AND FOREIGN KEYS

There is a total of 14 entities including bridging entities which are created in SQL server Management Studio and following are the screenshots of tables where **PK** indicates **Primary Key** and **FK** indicates **Foreign Keys**

I. Books and Ebooks Entities

1) Books Attributes

   i. ISBN – PK

   ii. BookName – Indicates the title of the Book

   iii. Author – Indicates the author of the book

   iv. Genre – Genre of the Book (Eg: History, Biography, Fiction etc.)

v. Publication – Publication of the Book (Eg:
vi. Price (Price of the book in USD)
vii. SupplierID – FK (Foreign key which maps the relation between books and Supplier tables)

Column Name	Data Type	Allow Nulls
ISBN	int	☐
BookName	nvarchar(50)	☐
Author	nvarchar(50)	☐
Genre	nvarchar(50)	☐
Publication	nvarchar(50)	☐
Price	int	☐
SupplierID	int	☐
		☐

2) Ebooks Attributes

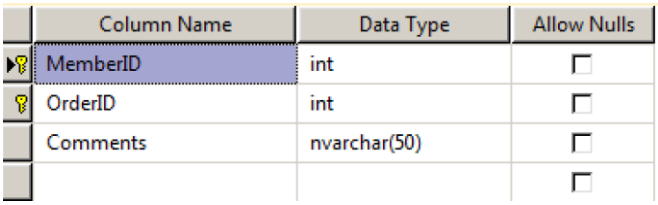
i. e_bookID – PK (Unique key which is used to identify the ebook)
ii. File_size – Indicates the file size of ebook (Eg: 20mb, 10mb etc.)
iii. Ebook_title – Indicates the ebook title
iv. Author – Author of ebook
v. File_format – Indicates the file format of ebook (Eg: pdf, txt etc.)
vi. No_of_Pages – Indicates the number of pages in the ebook
vii. SupplierID – FK (Key which maps the relation between Books and Supplier table)

Column Name	Data Type	Allow Nulls
e_bookID	int	☐
File_size	nvarchar(50)	☐
ebook_title	nvarchar(50)	☐
Author	nvarchar(50)	☐
File_format	nvarchar(50)	☐
No_of_Pages	int	☐
SupplierID	int	☐
price	varchar(10)	☐
		☐

II. FeedBack and Member Entities

3) Feedback Attributes – MemberID, OrderID together forms a composite key

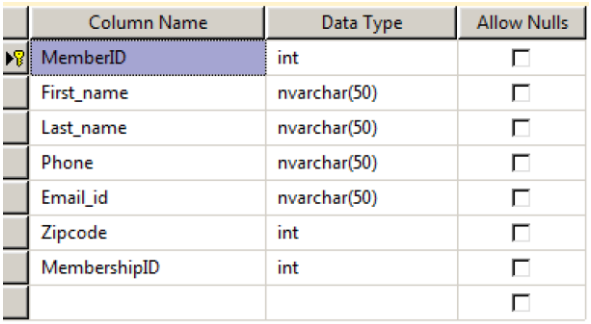
i. MemberID – PK (Key obtained from Member table to map a relation)
ii. OrderID – PK (Kay obtained from OrderDetails table to map a relation)
iii. Comments – Feedback given by the members for the service offered by the system



Column Name	Data Type	Allow Nulls
MemberID	int	☐
OrderID	int	☐
Comments	nvarchar(50)	☐
		☐

4) Member Attributes

i. MemberID – PK (Unique key which identifies the member)
ii. First_name – First name of the member enrolled during their first service
iii. Last_name – Last name of the member
iv. Phone – Contact number of the member
v. Email_id – email of the member to which the communication mails can be sent
vi. Zipcode – Zipcode of the member residence
vii. MembershipID – FK (Indicates the type of membership, a member holds; eg: Gold, premium, regular)



Column Name	Data Type	Allow Nulls
MemberID	int	☐
First_name	nvarchar(50)	☐
Last_name	nvarchar(50)	☐
Phone	nvarchar(50)	☐
Email_id	nvarchar(50)	☐
Zipcode	int	☐
MembershipID	int	☐
		☐

III. Membership and Order Rating Entities

5) Membership Attributes – Below two primary keys form a composite key

i. MembershipID – PK (Indicates which type of membership, a member has registered)
ii. MemberID – PK (ID of a member)
iii. Type_of_membership – Includes the type of membership, a member holds from the available options like gold, premium and regular
iv. RenewalDate – Indicates the date of membership renewal
v. StoreID – FK (Key which maps the relation between Membership and library store tables)

Column Name	Data Type	Allow Nulls
MembershipID	int	☐
MemberID	int	☐
Type_of_membership	nvarchar(50)	☐
RenewalDate	date	☐
StoreID	int	☐
		☐

6) Order_Rating Attributes

i. OrderID – FK (A unique key obtained from OrderDetalils table when a particular order is placed by a member)
ii. Rating – Includes the member rating to the order purchased (Eg: 3.5, 5, 1 etc) where 1being bad and 5 being very satisfied
iii. Review – Indicates the review given by the member for a particular order (Eg: Good, bad, worth the price etc.)

Column Name	Data Type	Allow Nulls
OrderID	int	☐
Rating	nvarchar(50)	☐
Review	nvarchar(50)	☐
		☐

IV. Order Details and Publishers Entities

7) OrderDetails Attributes – This table serves as a bridging entity to Books, ebooks, Purchase and Rental table(s)

i. OrderID – PK (A unique key assigned to a member when they place a order)
ii. ISBN – FK (Key mapped from Books table to Orderdetails table)
iii. e_bookID – FK (Key mapped from ebooks table to Orderdetails table)
iv. RentID – FK (Key mapped from Rental table to Orderdetails table)
v. OrderDate – Indicates the date of order being placed

Column Name	Data Type	Allow Nulls
OrderID	int	☐
ISBN	int	☐
e_bookID	int	☐
RentID	int	☐
OrderDate	nvarchar(50)	☐
		☐

8) Publishers Attributes

i. PublisherID – PK (A unique ID which identifies the publisher details)
ii. Publisher_name – Indicates the name, who published the book
iii. Contact – Contact number of the particular publisher
iv. Location – Place where the publisher resides

Column Name	Data Type	Allow Nulls
PublisherID	int	☐
Publisher_name	nvarchar(50)	☐
Contact	nvarchar(50)	☐
Location	nvarchar(50)	☐
		☐

V. Purchase and Rental Entities

9) Purchase Attributes

i. PurchaseID – PK (A unique key assigned when a member purchases a book)

ii. OrderID – FK (Key obtained from Order table which identifies the order details table)

iii. Quantity – Indicates the count / number of items ordered for a purchase

iv. MemberID – FK (Indicates which member has placed an order, key obtained from Member table for mapping)

Column Name	Data Type	Allow Nulls
PurchaseID	int	☐
OrderID	int	☐
Quantity	nvarchar(50)	☐
MemberID	int	☐
		☐

10) Rental Attributes

i. RentID – PK (A unique key assigned when a member takes a book on rent)

ii. Renewal_date – Indicates the date on which the book has to be renewed

iii. Date_of_Rent – Indicates the date on which a particular book is taken for rent

iv. MemberID – FK (A key obatined from member table, which tells which member has taken the book on rent)

Column Name	Data Type	Allow Nulls
RentID	int	☐
Renewal_date	nvarchar(50)	☐
Date_of_Rent	nvarchar(50)	☐
MemberID	int	☐
		☐

VI. Shipment and Store Entities

11) Shipment Attributes

i. TrackID – PK (A unqiue key generated when the item/order is shipped, used for tracking)
ii. Delivery_Address – Includes the details about the address to which the order has to be delivered
iii. PurchaseID – FK (A key mapped from Purchase table, which gived the details about the particular purchase details)

Column Name	Data Type	Allow Nulls
TrackID	int	☐
Delivery_Address	nvarchar(50)	☐
PurchaseID	int	☐
		☐

12) Store Attributes

i. StoreID – PK (A unique key assigned to every physical library store)
ii. Name – Indicates the store name
iii. Street – Indicates the street of the store
iv. City – Indicates in which city is the store located
v. State – Indicates the state where the city of the store is located
vi. Zipcode – Indicates the zipcode of the store

Column Name	Data Type	Allow Nulls
StoreID	int	☐
Name	nvarchar(50)	☐
Street	nvarchar(50)	☐
City	nvarchar(50)	☐
State	nvarchar(50)	☐
Zipcode	int	☐
		☐

VII. Suppliers and Suppliers_Publishers (Bridging entity) Entity

13) Suppliers Attributes

i. SupplierID – PK (A unique key assigned for every supplier who supplies books)

ii. Supplier_name – Indicates the name of the supplier

iii. Contact – Indicates the mobile/contact number of the supplier

iv. Location – Indicates the location of the supplier

Column Name	Data Type	Allow Nulls
SupplierID	int	☐
Supplier_name	nvarchar(50)	☐
Contact	nvarchar(50)	☐
Location	nvarchar(50)	☐
		☐

14) Suppliers_Publishers – This table serves as a bridging entity for Suppliers and Publishers tables

i. PublisherID – FK (A key obatined from Publisher table which maps the relation between supplier_pubilsher and pubihser table)

ii. SupplierID – FK A key obatined from Supplier table which maps the relation between supplier_pubilsher and supplier table)

iii. Sales – Indicates the percentage of sales rate (Eg: 50, 70, 20)

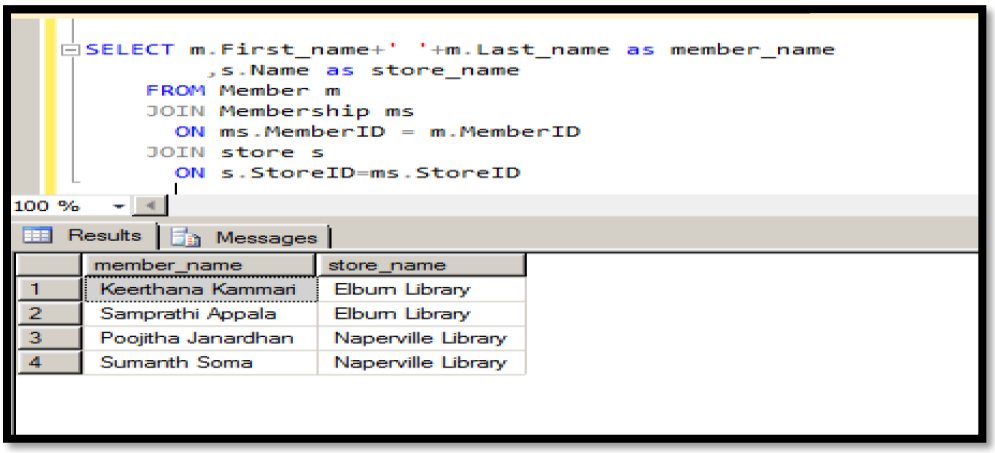
iv. Contract – Indicates the type of contract (Eg: temporary, permanent)

Column Name	Data Type	Allow Nulls
PublisherID	int	☐
SupplierID	int	☐
Sales	nvarchar(50)	☐
Contract	nvarchar(50)	☐
		☐

6. 20 QUERIES:

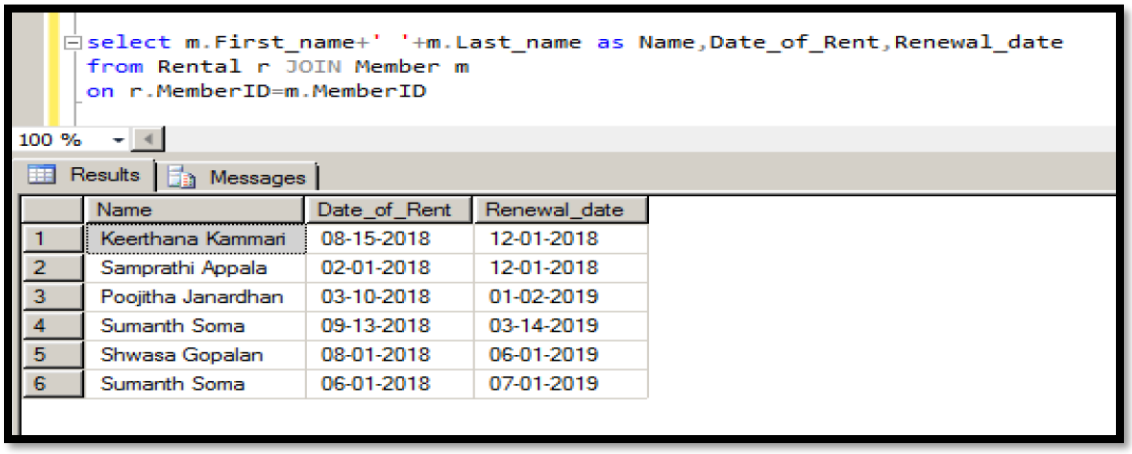
1.Write a query to display the store in which customer has taken the membership from?

SELECT m.First_name+' '+m.Last_name as member_name,
s.Name as store_name
FROM Member m
JOIN Membership ms
ON ms.MemberID = m.MemberID
JOIN store s
ON s.StoreID=ms.StoreID



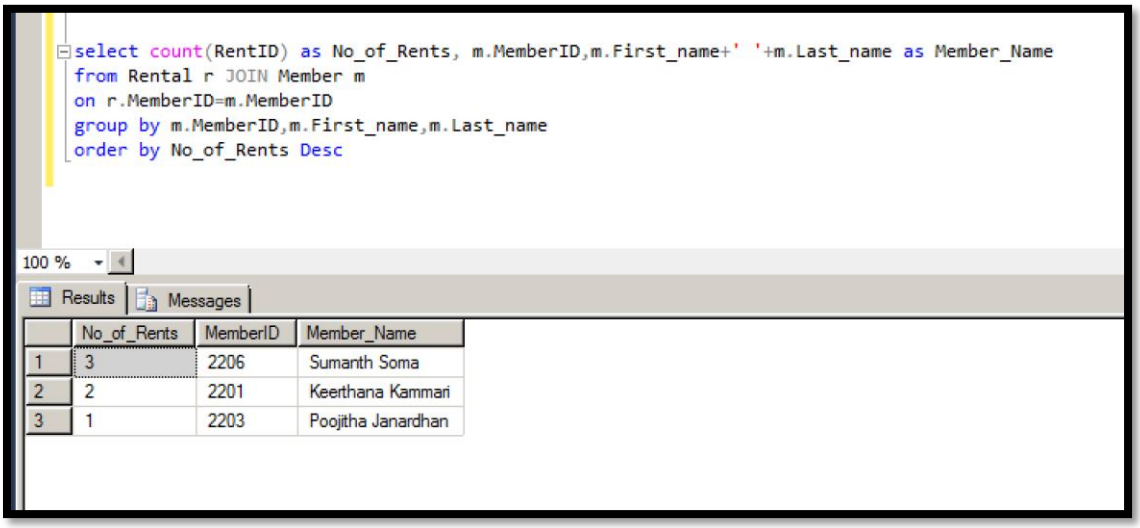
2.Write a query to display customer details which includes the rental and renewal date of the book

A.select m.First_name+' '+m.Last_name as Name,
Date_of_Rent,Renewal_date
from Rental r JOIN Member m
on r.MemberID=m.MemberID



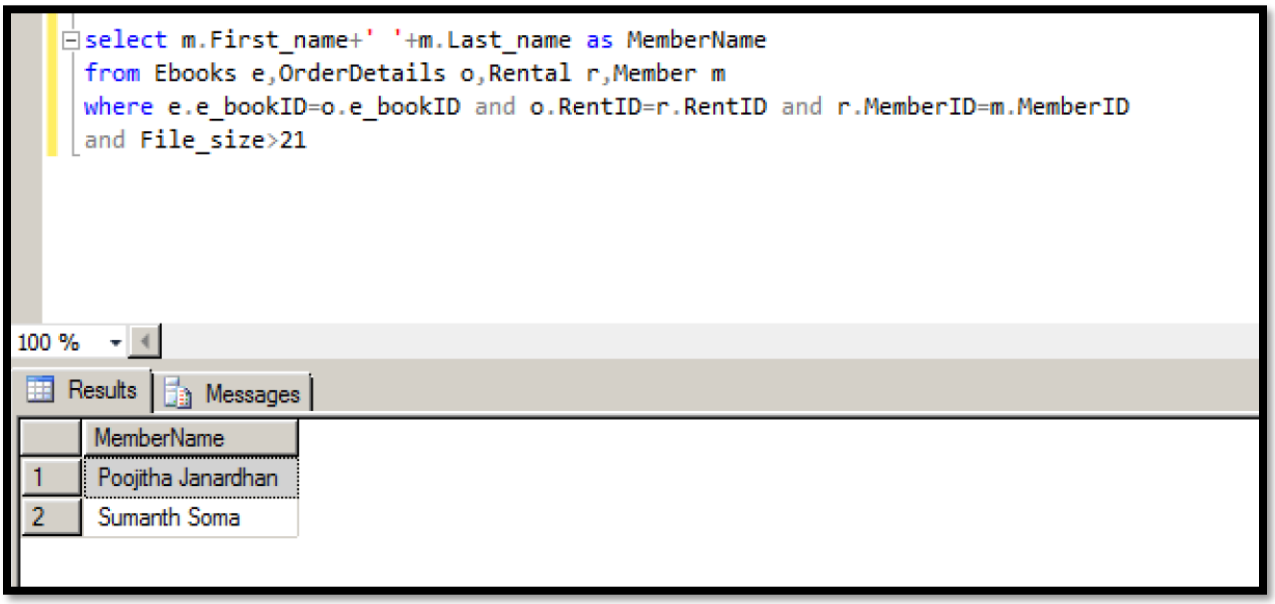
3.Write a query to display member details with the total number of books rented

Select count(RentID) as No_of_Rents, m.MemberID,m.First_name+' '+m.Last_name as Member_Name
from Rental r JOIN Member m
on r.MemberID=m.MemberID
group by m.MemberID,m.First_name,m.Last_name
order by No_of_Rents Desc



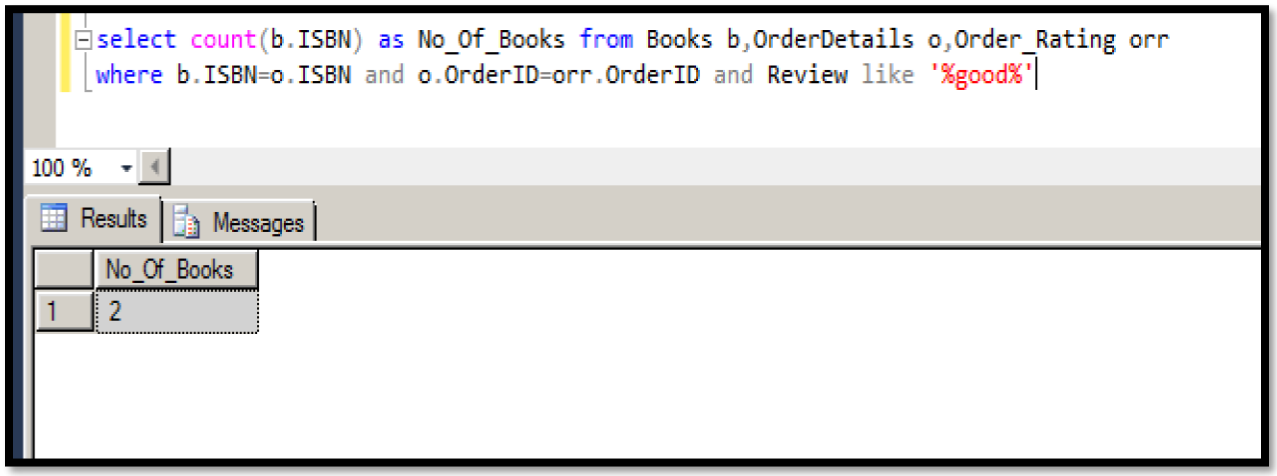
4.Write a query to display customer who rented ebooks having file size greater than 21

select m.First_name+' '+m.Last_name as MemberName
from Ebooks e,OrderDetails o,Rental r,Member m
where e.e_bookID=o.e_bookID and o.RentID=r.RentID and r.MemberID=m.MemberID
and File_size>21

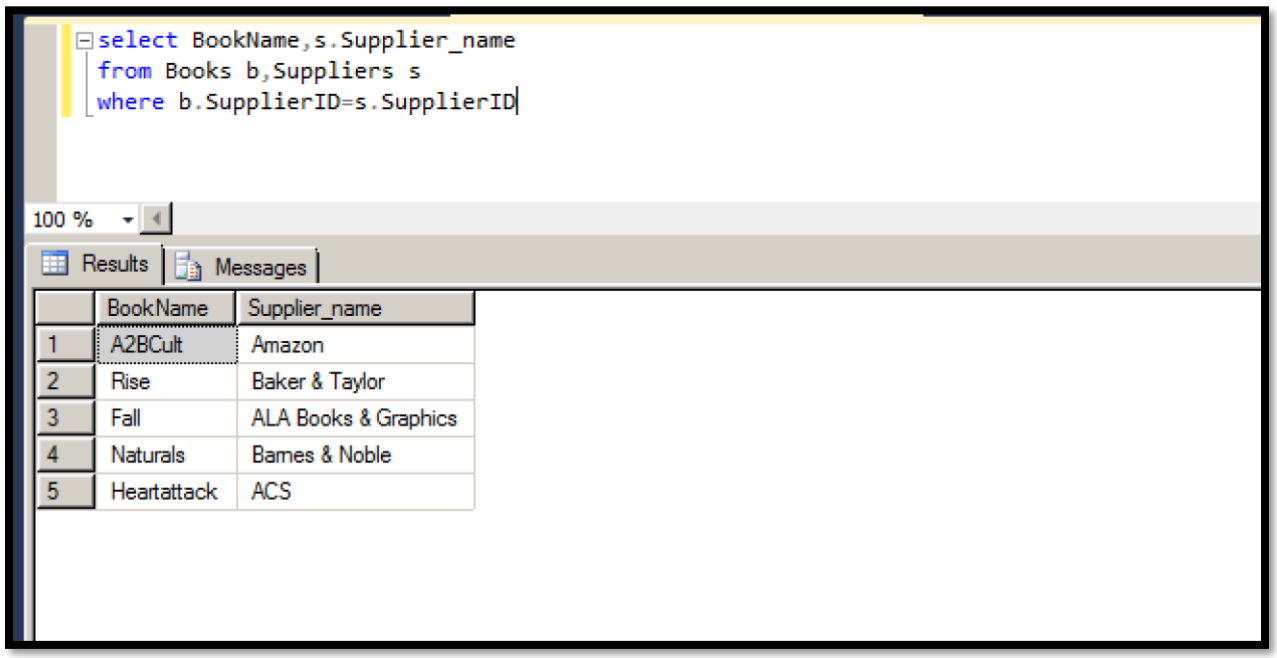


5.write a query to display the total count of book with good review

select count(b.ISBN) as No_Of_Books from Books b,OrderDetails o,Order_Rating orr
where b.ISBN=o.ISBN and o.OrderID=orr.OrderID and Review like '%good%'

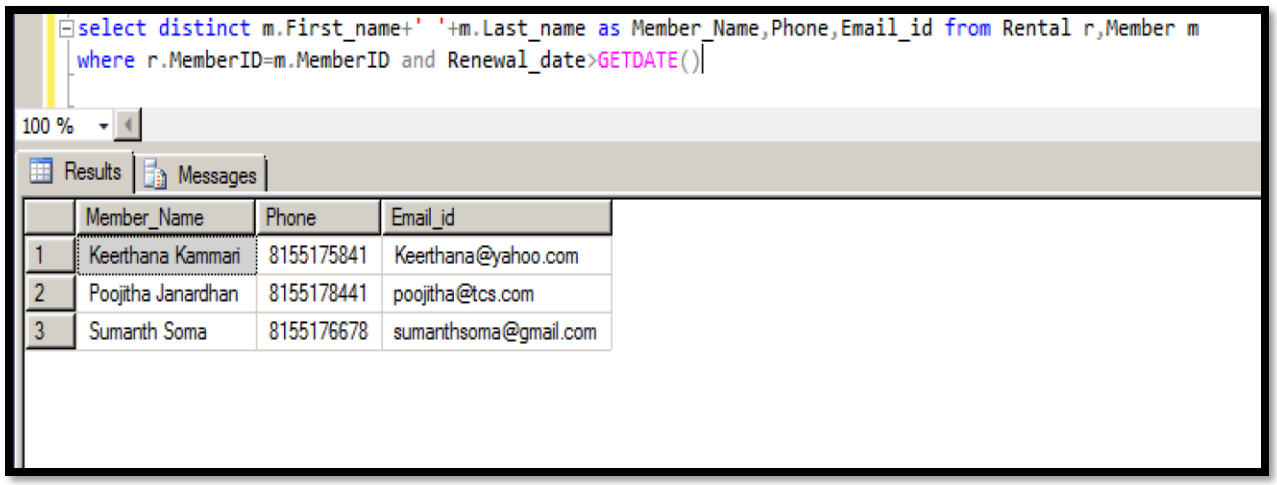


6.Write a query to display the list of suppliers for all the books available
select BookName,s.Supplier_name
from Books b,Suppliers s
where b.SupplierID=s.SupplierID



7.Write a query to display Contact details of Members whose book renewal date is greater than today's date(2nd dec 2018)

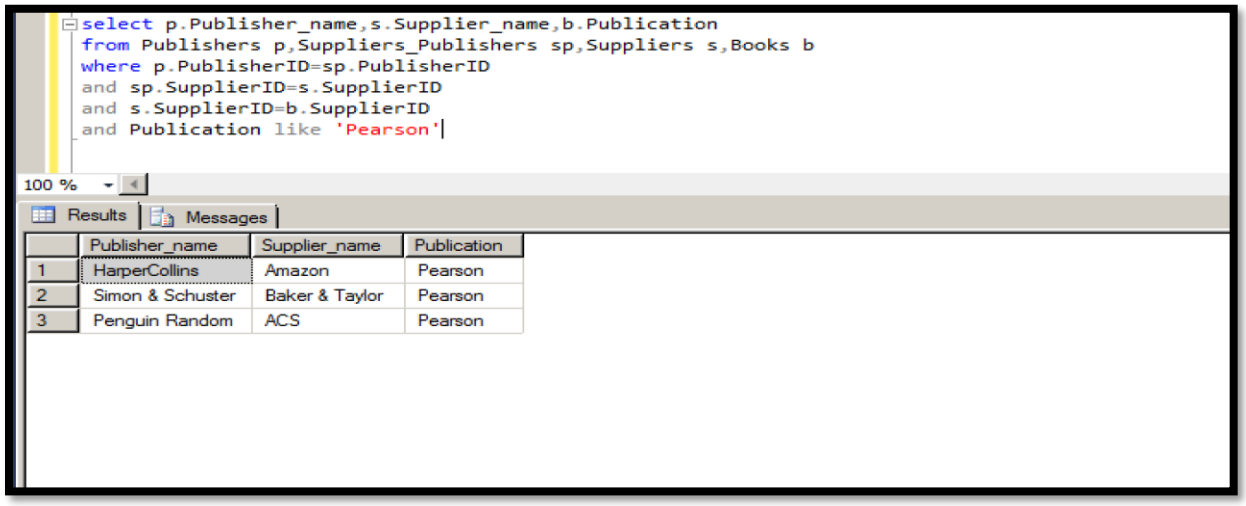
select distinct m.First_name+' '+m.Last_name as Member_Name,Phone,Email_id from Rental r,Member m
where r.MemberID=m.MemberID and Renewal_date>GETDATE()



	Member_Name	Phone	Email_id
1	Keerthana Kammari	8155175841	Keerthana@yahoo.com
2	Poojitha Janardhan	8155178441	poojitha@tcs.com
3	Sumanth Soma	8155176678	sumanthsoma@gmail.com

8.Write a query to display publishers and Suppliers with publication details whose publication is Pearson

select p.Publisher_name,s.Supplier_name,b.Publication
from Publishers p,Suppliers_Publishers sp,Suppliers s,Books b
where p.PublisherID=sp.PublisherID
and sp.SupplierID=s.SupplierID
and s.SupplierID=b.SupplierID
and Publication like 'Pearson'



	Publisher_name	Supplier_name	Publication
1	HarperCollins	Amazon	Pearson
2	Simon & Schuster	Baker & Taylor	Pearson
3	Penguin Random	ACS	Pearson

9. Write a query to display stores where stores are in same location as members

select Name from Store
where zipcode like
(select zipcode from Member
intersect
select Zipcode from Store)

```
select Name from Store
where zipcode like
(select zipcode from Member
intersect
select Zipcode from Store)
```

100 %

Results | Messages

	Name
1	Dekalb Library
2	Sycamore Library

10. Write a query to display membership of the customer

SELECT mb.MembershipID,mm.First_name,Type_of_membership
FROM Member mm
JOIN Membership mb
ON mm.MemberID = mb.MemberID

```
SELECT mb.MembershipID
      ,mm.First_name
      ,Type_of_membership
  FROM Member mm
  JOIN Membership mb
    ON mm.MemberID = mb.MemberID
```

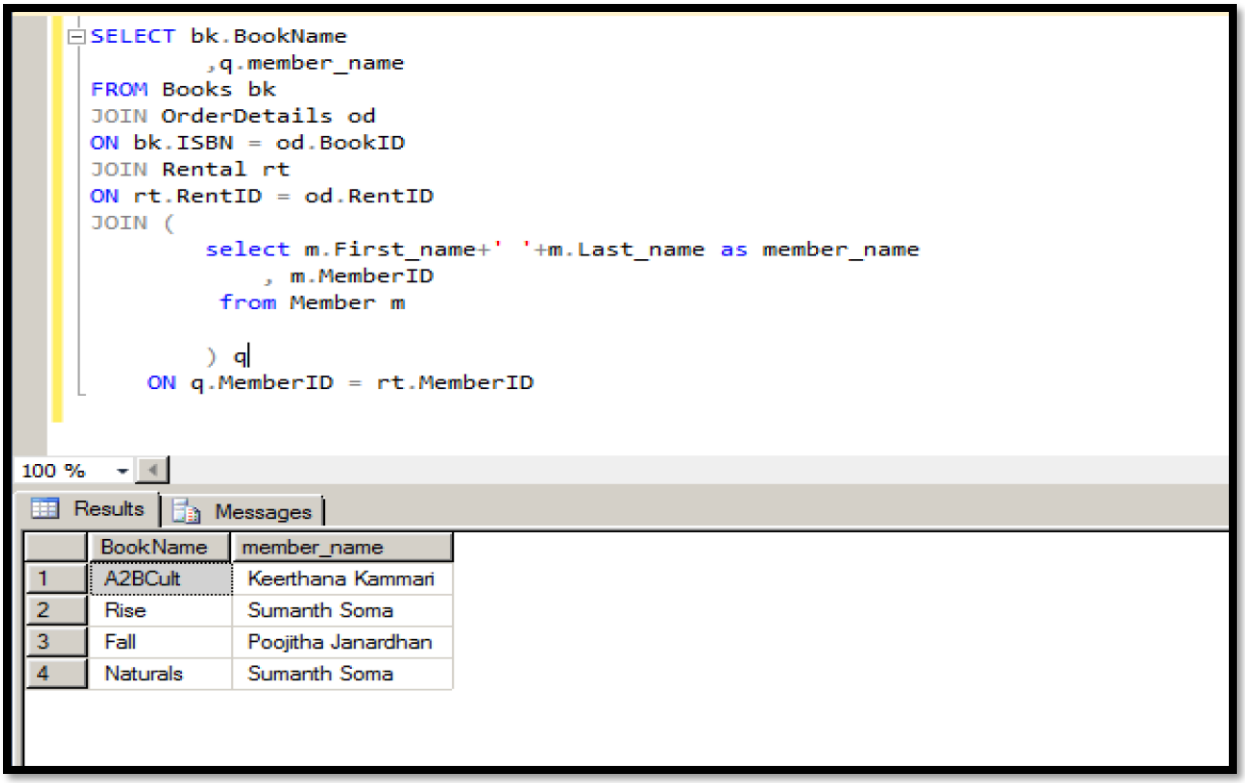
100 %

Results | Messages

	MembershipID	First_name	Type_of_membership
1	2001	Keerthana	gold
2	2002	Samprathi	platinum
3	2003	Poojitha	regular
4	2003	Sumanth	gold

11.write a query to display the books that the members have rented

```
SELECT bk.BookName,q.member_name
FROM Books bk
JOIN OrderDetails od
ON bk.ISBN = od.BookID
JOIN Rental rt
ON rt.RentID = od.RentID
JOIN (select m.First_name+' '+m.Last_name as member_name, m.MemberID
from Member m) q
ON q.MemberID = rt.MemberID
```



12. write a query to display books by the publisher ‘Bloomsbury’

```
SELECT bk.BookName, bk.Author
FROM Books bk
JOIN Suppliers sp
ON bk.SupplierID = sp.SupplierID
JOIN Suppliers_Publishers sb
ON sb.SupplierID = sp.SupplierID
WHERE sb.PublisherID IN
(select pb.PublisherID
from Publishers pb
where pb.Publisher_name = 'Bloomsbury')
```

```
SELECT bk.BookName, bk.Author
FROM Books bk
    JOIN Suppliers sp
        ON bk.SupplierID = sp.SupplierID
    JOIN Suppliers_Publishers sb
        ON sb.SupplierID = sp.SupplierID
            WHERE sb.PublisherID IN
                (select pb.PublisherID
                from Publishers pb
                where pb.Publisher_name = 'Bloomsbury')
```

100 %

Results | Messages

	BookName	Author
1	The Harry Potter Series	J.K. Rowling

13. write a query to display publisher Name of the book named **"The Castle"**

SELECT pb.Publisher_name
FROM Publishers pb JOIN Suppliers_Publishers sb
ON pb.PublisherID = sb.PublisherID JOIN Suppliers sp
ON sp.SupplierID = sb.SupplierID
WHERE sb.SupplierID IN (select b.SupplierID
from Books b
where b.BookName = 'The Castle')

```
SELECT pb.Publisher_name
FROM Publishers pb
    JOIN Suppliers_Publishers sb
        ON pb.PublisherID = sb.PublisherID
            JOIN Suppliers sp
            ON sp.SupplierID = sb.SupplierID
            WHERE sb.SupplierID IN
                (select b.SupplierID
                from Books b
                where b.BookName = 'The Castle')
```

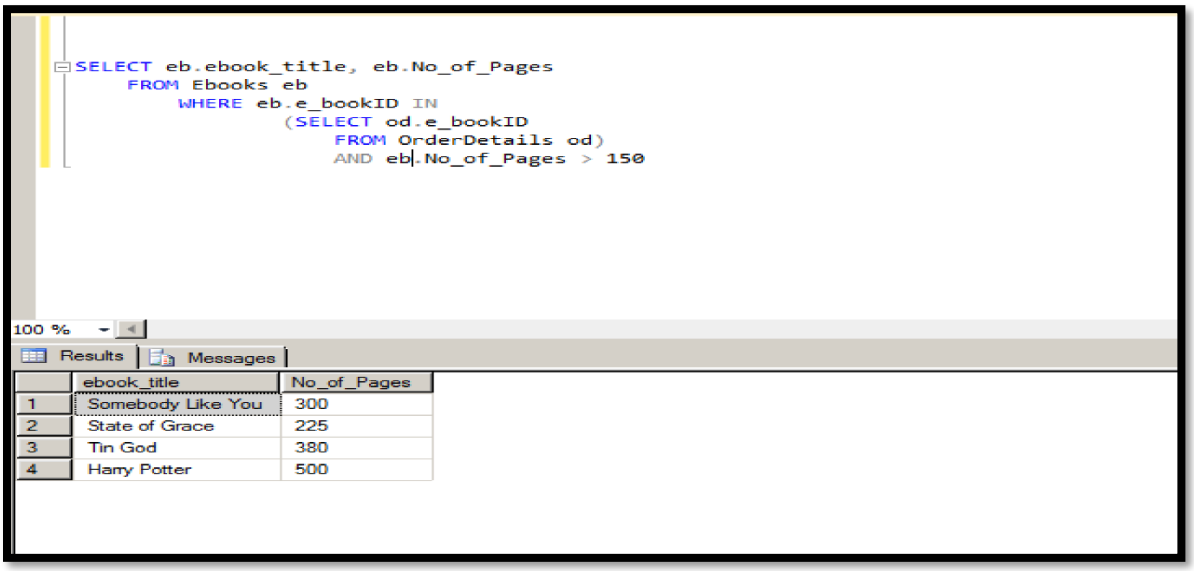
100 %

Results | Messages

	Publisher_name
1	HarperCollins

14.Write a query to display ebook Names with the total number of pages.

SELECT eb.ebook_title, eb.No_of_Pages
FROM Ebooks eb
WHERE eb.e_ebookID IN
(SELECT od.e_bookID
FROM OrderDetails od
AND eb.No_of_Pages>150



	ebook_title	No_of_Pages
1	Somebody Like You	300
2	State of Grace	225
3	Tin God	380
4	Harry Potter	500

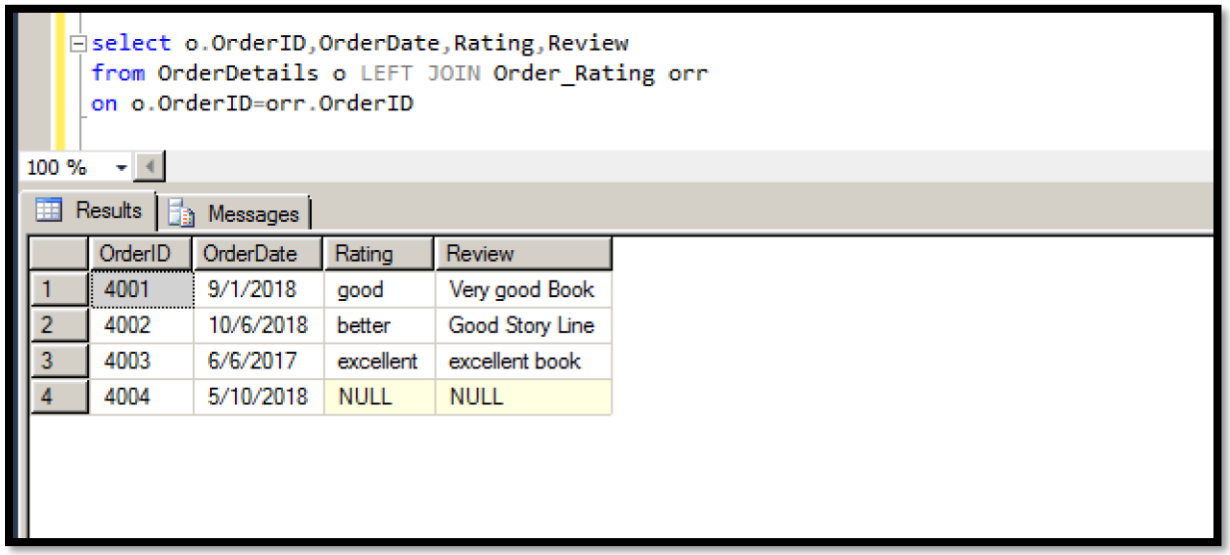
15. Write a query to display all the Authors of Books and EBooks?

SELECT Distinct Author FROM Books
UNION ALL
SELECT Distinct Author FROM Ebooks

	Author
1	Franz Kalka
2	Gunnar Myrdal
3	Indira Gandhi
4	J.K. Rowling
5	Jean Paul
6	Amish Tripati
7	Amitv Ghosh
8	Elizabeth Davies
9	Gregory David
10	Heatherly Bell
11	J.K.Rowling
12	Sally Bemeathy
13	Savi Sharma
14	Stacy Green
15	Tom Barber

16. Write a query to display Order Details with rating and review information

```
select o.OrderID,OrderDate,Rating,Review
from OrderDetails o LEFT JOIN Order_Rating orr
on o.OrderID=orr.OrderID
```



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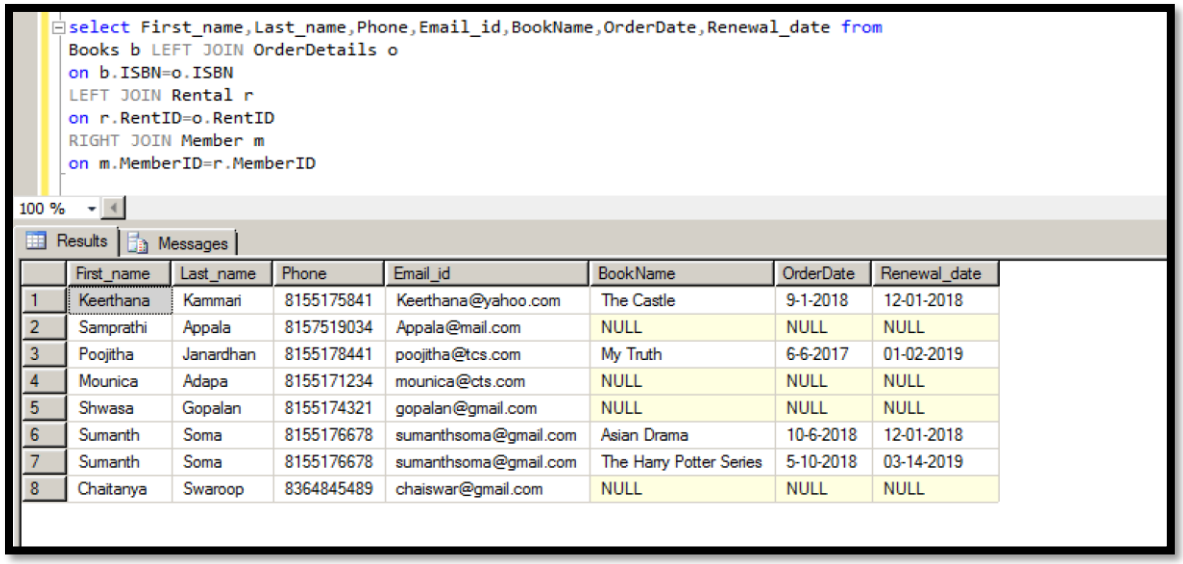
Results | Messages

	OrderID	OrderDate	Rating	Review
1	4001	9/1/2018	good	Very good Book
2	4002	10/6/2018	better	Good Story Line
3	4003	6/6/2017	excellent	excellent book
4	4004	5/10/2018	NULL	NULL

17.write a query to display the contact details of members who took the book on Rented and their renewal date?

```
select First_name,Last_name,Phone,Email_id,BookName,OrderDate,Renewal_date from
Books b LEFT JOIN OrderDetails o
on b.ISBN=o.ISBN LEFT JOIN Rental r
on r.RentID=o.RentID RIGHT JOIN Member m
on m.MemberID=r.MemberID
```



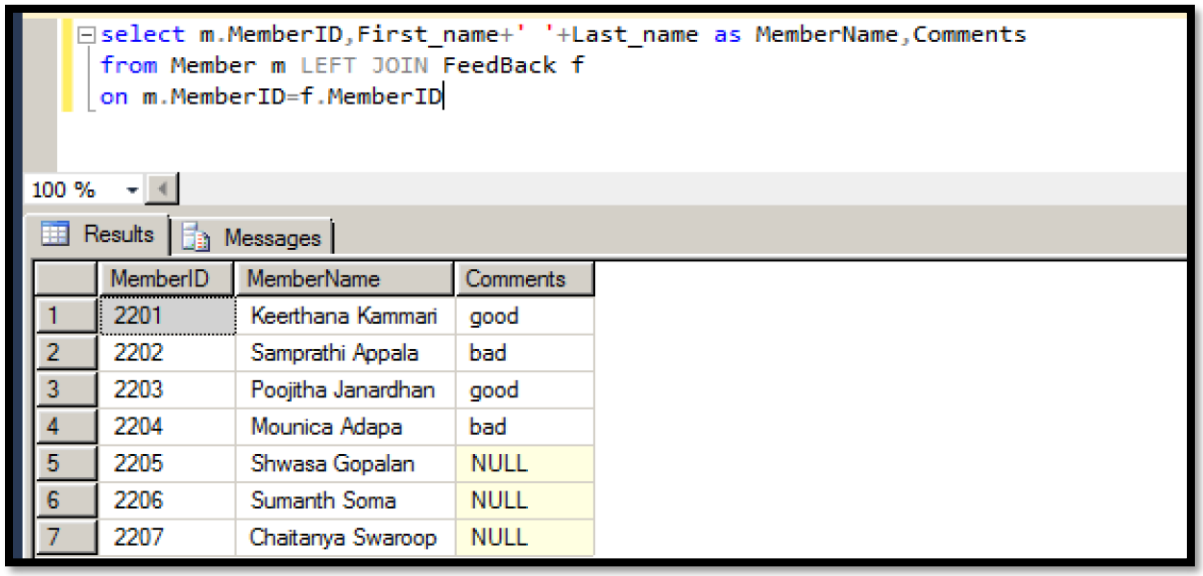
100 %

Results | Messages

	First_name	Last_name	Phone	Email_id	BookName	OrderDate	Renewal_date
1	Keerthana	Kammari	8155175841	Keerthana@yahoo.com	The Castle	9-1-2018	12-01-2018
2	Samprathi	Appala	8157519034	Appala@mail.com	NULL	NULL	NULL
3	Poojitha	Janardhan	8155178441	poojitha@tcs.com	My Truth	6-6-2017	01-02-2019
4	Mounica	Adapa	8155171234	mounica@cts.com	NULL	NULL	NULL
5	Shwasa	Gopalan	8155174321	gopalan@gmail.com	NULL	NULL	NULL
6	Sumanth	Soma	8155176678	sumanthsoma@gmail.com	Asian Drama	10-6-2018	12-01-2018
7	Sumanth	Soma	8155176678	sumanthsoma@gmail.com	The Harry Potter Series	5-10-2018	03-14-2019
8	Chaitanya	Swaroop	8364845489	chaiswar@gmail.com	NULL	NULL	NULL

18. Write a query to display Member details which must include their comments

```
select m.MemberID,First_name+' '+Last_name as MemberName,Comments
from Member m LEFT JOIN FeedBack f
on m.MemberID=f.MemberID
```



```
select m.MemberID,First_name+' '+Last_name as MemberName,Comments
from Member m LEFT JOIN FeedBack f
on m.MemberID=f.MemberID
```

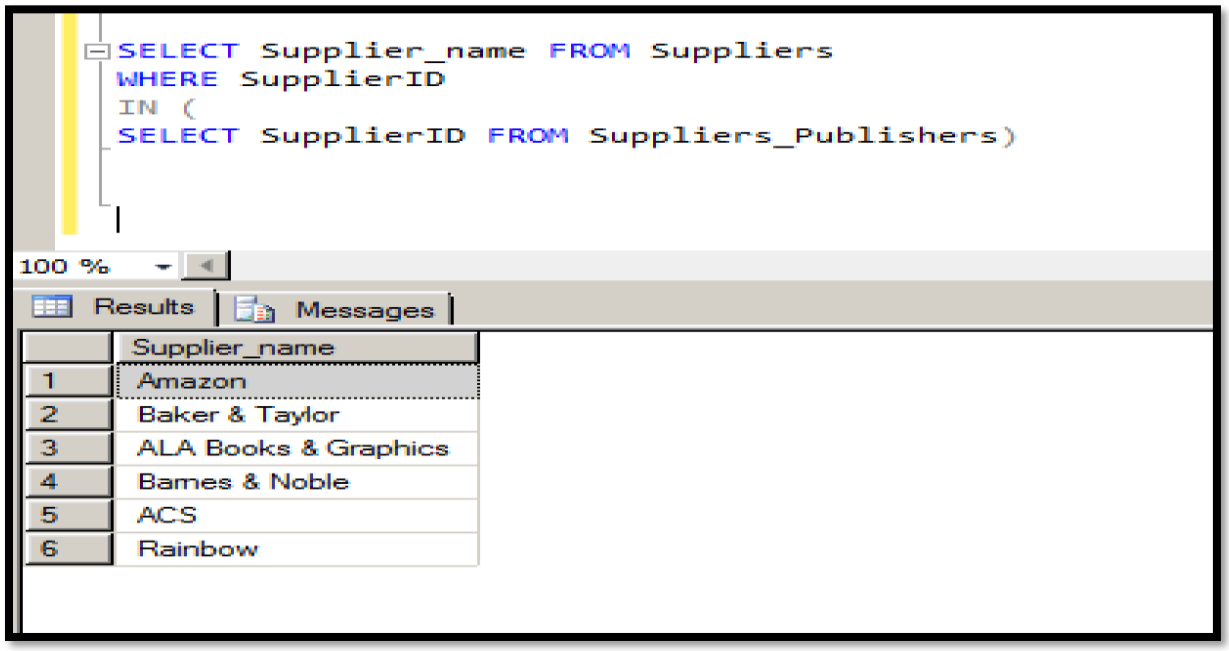
100 %

Results | Messages

	MemberID	MemberName	Comments
1	2201	Keerthana Kammari	good
2	2202	Samprathi Appala	bad
3	2203	Poojitha Janardhan	good
4	2204	Mounica Adapa	bad
5	2205	Shwasa Gopalan	NULL
6	2206	Sumanth Soma	NULL
7	2207	Chaitanya Swaroop	NULL

19. Write a query to display list of all the Suppliers who supply books to the library?

```
SELECT Supplier_name FROM Suppliers
WHERE SupplierID
IN (
SELECT SupplierID FROM Suppliers_Publishers)
```



```
SELECT Supplier_name FROM Suppliers
WHERE SupplierID
IN (
SELECT SupplierID FROM Suppliers_Publishers)
```

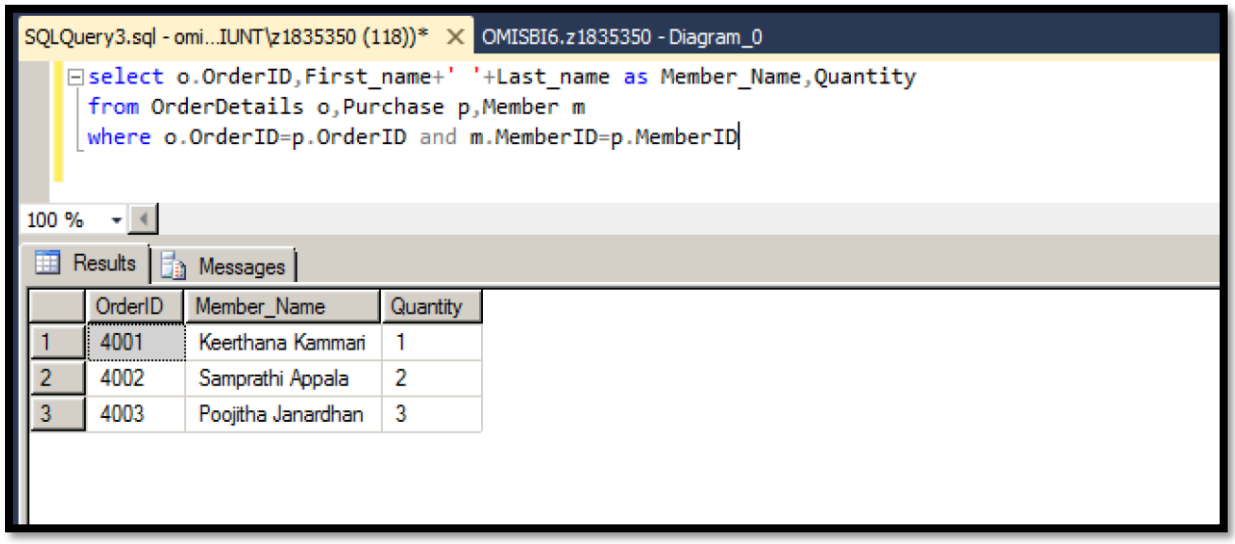
100 %

Results | Messages

	Supplier_name
1	Amazon
2	Baker & Taylor
3	ALA Books & Graphics
4	Barnes & Noble
5	ACS
6	Rainbow

20.write a query to display quantity of the order with the members details who placed orders?

```
select o.OrderID,First_name+' '+Last_name as Member_Name,Quantity
from OrderDetails o,Purchase p,Member m
where o.OrderID=p.OrderID and m.MemberID=p.MemberID
```



7.CONCLUSION

Library4You, a Library Management System keeps tracks of the customers enrollment, their membership, order details. It also has a records of Suppliers and publishers from where the books are obtained to the system. When the sale of a particular books increases, then demand increases and system keeps checking the inventory and will procure more quantities of those materials from supplies and publishers. Every member will have their membership details available once they login to the system and an alert notification will be sent to the member when the renewal date of either book or membership approaches. Members has several options of collecting books from the library either by rent or purchase. When a member provides a feedback to any type of service availed from Library4You, it helps the system improve better and satisfy the member needs. A database management helps to keep a system alert without the need of human intervention by checking, tracking, updating and providing notifications as in when required which makes the system work efficient.

8.REFERENCES

- Lucid Chart is used to Draw ER Diagram.
    - Link :: https://www.lucidchart.com
- SQL Server Management Studio 2014 is used to write Queries.