

University School of Management Studies



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Assignment on: Database model for online book store.

Post Graduate Diploma

In

Data Analytics

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PGDDA-DBMS

What is data model?

A collection of tools for describing

1. Data
2. Data relationships
3. Data semantics
4. Data constraints

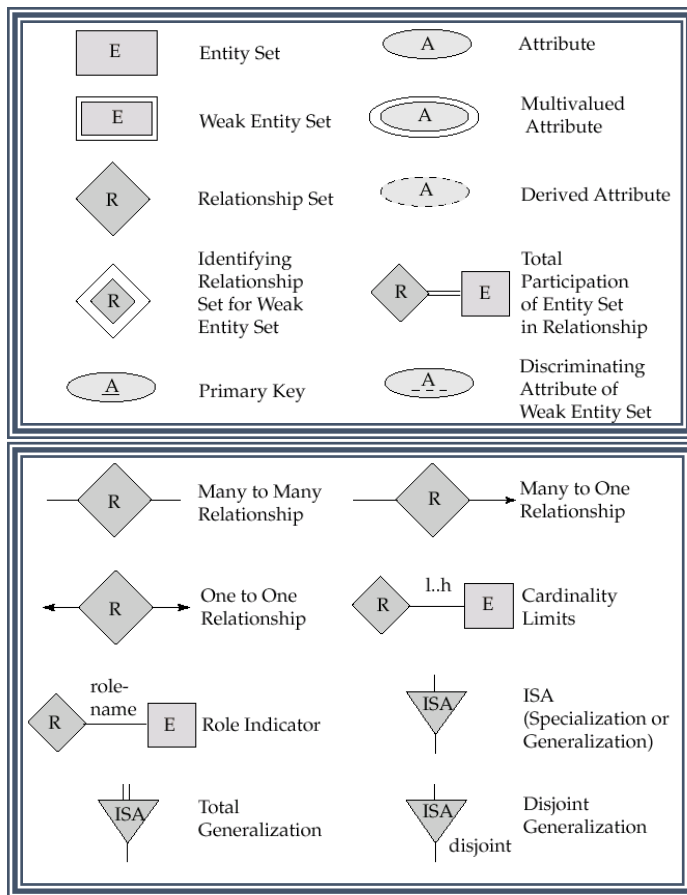
Few example of data models are

1. Entity –Relationship model
2. Relational model
3. Other older models like – network model and hierarchical model.

What is an ER Model?

ER Diagram or ER model is also known as Entity-Relation model. An ER model basically describes the relationship between the entities and their corresponding attributes. It basically shows the blueprint of database that can be later implemented to make the database.

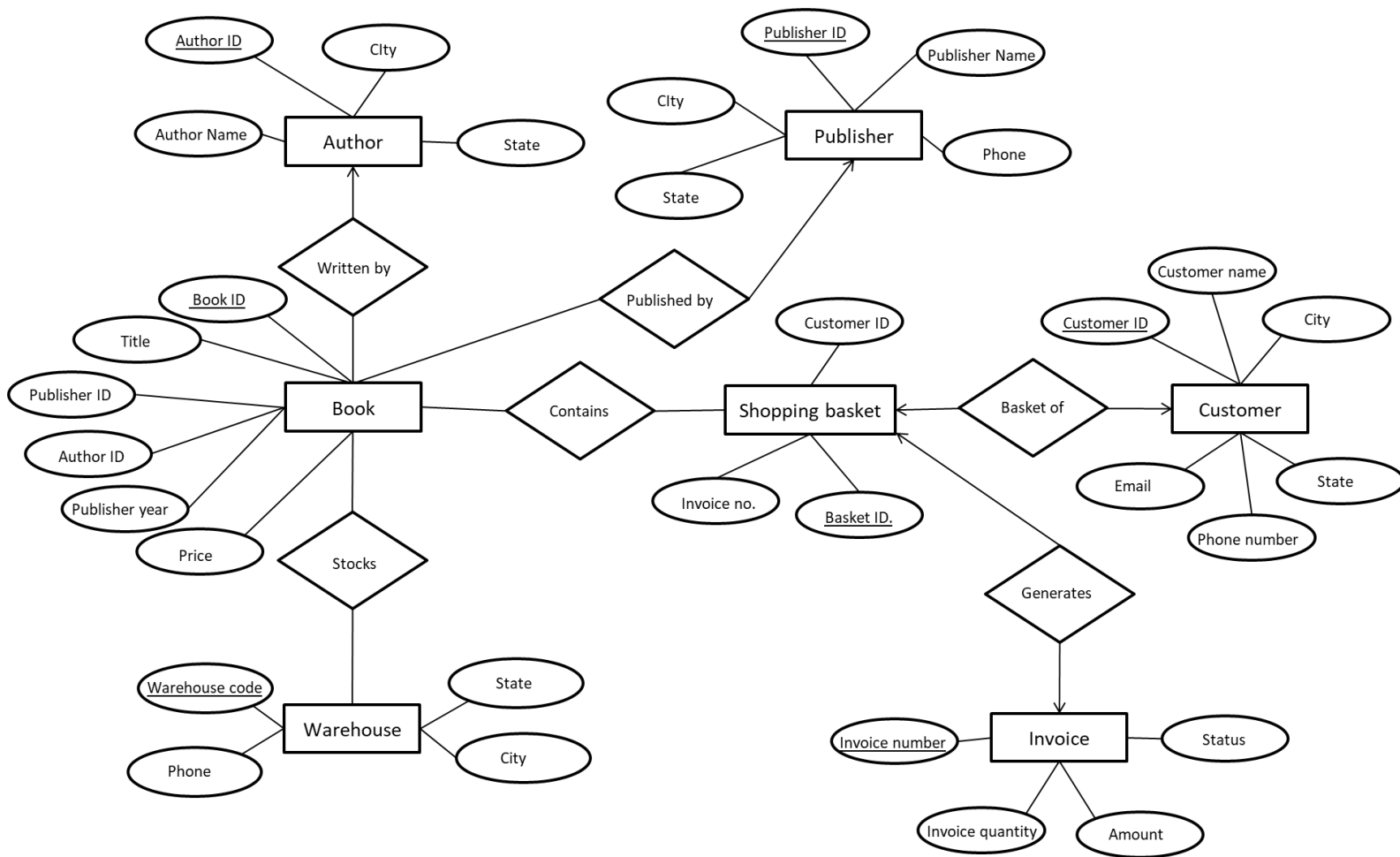
We will be using the following set of symbols to depict our the entities and their relationships



Database model for an online book store.

This database was made based on the requirement of book store. The system can encode customer information. Admin can access the customer information, book status (availability, author details..) etc. They can handle data from author and publisher to customer.

Here is the database design for online bookstore management system with ER diagram. It consist of 7 main tables and their schemas:



Explaining the process.

1. **Book:** In the book table, details of books available in the store is mentioned.
2. **Author:** Author of a book is the person who have written the book. 1 author can write many books but one book is written by one author. So Author and book have a one to many relation.
3. **Publisher:** Publisher is the company where the book written by the author is printed and published. A publication house can publish many books but 1 book is published by 1 publication house only. So, publisher to book have 1 to many relation.
4. **Warehouse:** Warehouse is the location, where different books are stored for delivering to the customer. One warehouse can store many books and one book can also be stored in many warehouses as per requirement. So warehouse and books have many to many relationship.
5. **Shopping Basket:** Shopping basket shows the list of books bought by a customer. One book can be bought by many customer and one customer can buy many book, so Shopping basket and book have many to many relationship.
6. **Customer:** Customer is the table showing the details of the customer (end user) of books. One customer have one shopping basket in which many books can be availed. Also, one shopping basket is related to one customer only. So, shopping basket and customer have one to one relationship.

7. Invoice: Whenever customer makes an purchase of books, invoice is generated for the items available in the shopping basket. Invoice and shopping basket have a one to one relationship.

Database Implementation.

A. Data definition:-

1. Creating author table

SQL WorksheetClearFindActions ▾SaveRun ▶

```
1 create table author
2 (
3   Author_ID number(4) Primary key,
4   Author_Name char(25) Not null,
5   city varchar2(50) not null,
6   state varchar2(50) not null)
```

Table/View Finder ×

Table **AUTHOR**

Column	Type	Length	Precision	Scale	Nullable
AUTHOR_ID	NUMBER	22	4	0	No
AUTHOR_NAME	CHAR	25			No
CITY	VARCHAR2	50			No
STATE	VARCHAR2	50			No

< All ObjectsQuery >

2. Creating Publisher table

SQL Worksheet

Clear

Find

Actions

Save

Run

```
1 create table publisher
2 (Publisher_ID number(6) primary key,
3 Publisher_Name char(80) unique not null,
4 Phone number(10) not null unique,
5 city varchar2(50) not null,
6 state varchar2(50) not null)
```

Table/View Finder

×

Table PUBLISHER

Column	Type	Length	Precision	Scale	Nullable
PUBLISHER_ID	NUMBER	22	6	0	No
PUBLISHER_NAME	CHAR	80			No
PHONE	NUMBER	22	10	0	No
CITY	VARCHAR2	50			No
STATE	VARCHAR2	50			No

< All Objects

Query >

3. Creating books table

SQL Worksheet

ClearFindActionsSaveRun

```
1 Create table books
2 (Book_ID number(4) Primary key,
3 Title varchar2(60) unique not null,
4 Year_of_publication number(4) not null,
5 Price number(6,2) not null,
6 Author_ID references author(Author_ID),
7 Publisher_ID references publisher(Publisher_ID))
```

Table/View Finder

×

Table **BOOKS**

Column	Type	Length	Precision	Scale	Nullable
BOOK_ID	NUMBER	22	4	0	No
TITLE	VARCHAR2	60			No
YEAR_OF_PUBLICATION	NUMBER	22	4	0	No
PRICE	NUMBER	22	6	2	No
AUTHOR_ID	NUMBER	22	4	0	Yes
PUBLISHER_ID	NUMBER	22	6	0	Yes

< All Objects

Query >

4. Creating customer table

SQL Worksheet

ClearFindActionsSaveRun

```
1 create table customer
2 (Customer_ID number(6) Primary key,
3 Customer_Name char(25) not null,
4 City char(40) not null,
5 State char(40) not null,
6 Phone number(10) unique not null,
7 Email varchar2(100) not null)
```

Table/View Finder

Table CUSTOMER

Column	Type	Length	Precision	Scale	Nullable
CUSTOMER_ID	NUMBER	22	6	0	No
CUSTOMER_NAME	CHAR	25			No
CITY	CHAR	40			No
STATE	CHAR	40			No
PHONE	NUMBER	22	10	0	No
EMAIL	VARCHAR2	100			No

< All ObjectsQuery >

5. Creating Invoice table.

SQL Worksheet

ClearFindActionsSaveRun

```
1 create table payment(Status char(10) primary key)
2
3 create table invoice
4 (Invoice_No number(10) Primary key,
5 Invoice_Qty number(2) not null,
6 Amount number(6,2) not null,
7 Status references payment(status))
```

Table/View Finder

×

Table INVOICE

Column	Type	Length	Precision	Scale	Nullable
INVOICE_NO	NUMBER	22	10	0	No
INVOICE_QTY	NUMBER	22	2	0	No
AMOUNT	NUMBER	22	6	2	No
STATUS	CHAR	10			Yes

< All Objects

Query >

6. Creating shopping basket table

SQL Worksheet

Clear Find Actions Save Run

```
1 create table shopping_basket(  
2 Basket_ID number(5) primary key,  
3 Customer_ID references customer(Customer_ID),  
4 Invoice_No references invoice(Invoice_No))
```

Table/View Finder

Table **SHOPPING_BASKET**

Column	Type	Length	Precision	Scale	Nullable
BASKET_ID	NUMBER	22	5	0	No
CUSTOMER_ID	NUMBER	22	6	0	Yes
INVOICE_NO	NUMBER	22	10	0	Yes

< All Objects Query >

Interlinking Books table and shopping basket with many to many relationship.

```
1 create table book_basket(  
2 basket_ID references shopping_basket(Basket_ID),  
3 book_ID references books(Book_ID),  
4 primary key(Basket_ID, Book_ID))
```

Table/View Finder

Table **BOOK_BASKET**

Column	Type	Length	Precision	Scale	Nullable
BASKET_ID	NUMBER	22	5	0	No
BOOK_ID	NUMBER	22	4	0	No

< All Objects Query >

7. Creating warehouse table.

SQL Worksheet

Clear Find Actions Save Run

```
1 create table warehouse(  
2 Warehouse_code varchar2(5) primary key,  
3 Phone number(10) not null unique,  
4 City char(25) not null,  
5 State Char(25) not null)
```

Table/View Finder

Table **WAREHOUSE**

Column	Type	Length	Precision	Scale	Nullable
WAREHOUSE_CODE	VARCHAR2	5			No
PHONE	NUMBER	22	10	0	No
CITY	CHAR	25			No
STATE	CHAR	25			No

< All Objects Query >

Interlinking warehouse table and books table with many to many relationship

```
1 create table book_warehouse  
2 (Book_ID references books(Book_ID),  
3 Warehouse_Code references warehouse(Warehouse_Code),  
4 primary key(Book_ID, Warehouse_Code))
```

Table/View Finder

Table **BOOK_WAREHOUSE**

Column	Type	Length	Precision	Scale	Nullable
BOOK_ID	NUMBER	22	4	0	No
WAREHOUSE_CODE	VARCHAR2	5			No

< All Objects Query >

B. Data Manipulation:

1. Inserting values into author table

Insert into author values (1111,'Author1','Varanasi','Uttar Pradesh')

Insert into author values (1112,'Author2','Patna','Bihar')

Insert into author values (1113,'Author3','Rohtak','Haryana')

Insert into author Values (1114,'Author4','Vithalapur','Gujarat')

Insert into author values (1115, 'Author5', 'Indore', 'Madhya Pradesh')

Insert into author values (1116, 'Author6','Mumbai','Maharashtra')

Insert into author values (1117,'Author7','Bangalore','Karnataka')

AUTHOR_ID	AUTHOR_NAME	CITY	STATE
1114	Author4	Vithalapur	Gujarat
1112	Author2	Patna	Bihar
1117	Author7	Bangalore	Karnataka
1115	Author5	Indore	Madhya Pradesh
1111	Author1	Varanasi	Utter Pradesh
1113	Author3	Rohtak	Haryana
1116	Author6	Mumbai	Maharashtra

2. Inserting values into publisher table

Insert into publisher values (202201,'Publisher1',9999999999,'Gurugram','Haryana')

Insert into publisher values (202202,'Publisher2',8888888888,'Lucknow','Uttar Pradesh')

Insert into publisher values (202203,'Publisher3',7777777777,'Ahmedabad','Gujarat')

Insert into publisher values (202204,'Publisher4',6666666666,'Pune','Maharashtra')

Insert into publisher values (202205,'Publisher5',5555555555,'Chennai','Tamil Nadu')

PUBLISHER_ID	PUBLISHER_NAME	PHONE	CITY	STATE
202202	Publisher2	8888888888	Lucknow	Uttar Pradesh
202204	Publisher4	6666666666	Pune	Maharashtra
202201	Publisher1	9999999999	Gurugram	Haryana
202203	Publisher3	7777777777	Ahmedabad	Gujarat
202205	Publisher5	5555555555	Chennai	Tamil Nadu

3. Inserting values into books table

Insert into books values (2201,'Book1', 2016, 851.67, 1114, 202203)

Insert into books values (2202,'Book2', 2020, 1700, 1112, 202202)

Insert into books values (2203,'Book3', 2012, 1100.50, 1111, 202202)

Insert into books values (2204, 'Book4', 2021, 350.45, 1113, 202201)

Insert into books values (2205,'Book5', 2018, 2400, 1115, 202204)

Insert into books values (2206,'Book6', 2015, 1150.50, 1116, 202204)

Insert into books values (2207,'Book7', 2020, 1000.00, 1117, 202205)

Insert into books values (2208,'Book8', 2019, 1770, 1113, 202201)

Insert into books values (2209,'Book9', 2016,550, 1111, 202201)

BOOK_ID	TITLE	YEAR_OF_PUBLICATION	PRICE	AUTHOR_ID	PUBLISHER_ID
2203	Book3	2012	1100.5	1111	202202
2206	Book6	2015	1150.5	1116	202204
2201	Book1	2016	851.67	1114	202203
2202	Book2	2020	1700	1112	202202
2204	Book4	2021	350.45	1113	202201
2205	Book5	2018	2400	1115	202204
2207	Book7	2020	1000	1117	202205
2208	Book8	2019	1770	1113	202201
2209	Book9	2016	550	1111	202201

4. Inserting values into customer table

insert into customer values(122111,'Customer1','Dwarka','Delhi',9999000011,'xyz111@gmail.com')

insert into customer

values(122112,'Customer2','Chandigarh','Punjab',9999000022,'xyz112@gmail.com')

insert into customer values(122113,'Customer3','Gorakhpur','Uttar Pradesh',9999000033,'xyz113@gmail.com')

insert into customer

values(122114,'Customer4','Pune','Maharashtra',9999000044,'xyz114@gmail.com')

insert into customer

values(122115,'Customer5','Hyderabad','Telangana',9999000055,'xyz115@gmail.com')

CUSTOMER_ID	CUSTOMER_NAME	CITY	STATE	PHONE	EMAIL
122113	Customer3	Gorakhpur	Uttar Pradesh	9999000033	xyz113@gmail.com
122115	Customer5	Hyderabad	Telangana	9999000055	xyz115@gmail.com
122111	Customer1	Dwarka	Delhi	9999000011	xyz111@gmail.com
122112	Customer2	Chandigarh	Punjab	9999000022	xyz112@gmail.com
122114	Customer4	Pune	Maharashtra	9999000044	xyz114@gmail.com

5. Inserting values in Invoice table

i. Making payment table

Insert into payment values('Paid')

Insert into payment values('COD')

STATUS
COD
Paid

Insert into invoice values (2022111101,2,2621.67,'Paid')

Insert into invoice values (2022111102,2,1450.95,'Paid')

Insert into invoice values (2022111103,3,5100,'COD')

Insert into invoice values (2022111104,3,2552.17,'Paid')

Insert into invoice values (2022111105,2,1500.95,'Paid')

INVOICE_NO	INVOICE_QTY	AMOUNT	STATUS
2022111103	3	5100	COD
2022111105	2	1500.95	Paid
2022111101	2	2621.67	Paid
2022111102	2	1450.95	Paid
2022111104	3	2552.17	Paid

6. Inserting values in Shopping basket

Insert into shopping_basket values (12201, 122111, 2022111101)

Insert into shopping_basket values (12202, 122112, 2022111102)

Insert into shopping_basket values (12203, 122113, 2022111103)

Insert into shopping_basket values (12204, 122114, 2022111104)

Insert into shopping_basket values (12205, 122115, 2022111105)

BASKET_ID	CUSTOMER_ID	INVOICE_NO
12202	122112	2022111102
12204	122114	2022111104
12205	122115	2022111105
12203	122113	2022111103
12201	122111	2022111101

Linking shopping basket and books using book_basket table

insert into book_basket values (12201, 2201)

insert into book_basket values (12201, 2208)

insert into book_basket values (12202, 2203)

insert into book_basket values (12202, 2204)

insert into book_basket values (12203, 2202)

insert into book_basket values (12203, 2205)

insert into book_basket values (12203, 2207)

insert into book_basket values (12204, 2201)

insert into book_basket values (12204, 2206)

insert into book_basket values (12204, 2209)

insert into book_basket values (12205, 2206)

insert into book_basket values (12205, 2204)

BASKET_ID	BOOK_ID
12201	2201
12204	2201
12204	2209
12205	2206
12205	2204
12202	2203
12202	2204
12204	2206
12201	2208
12203	2202
12203	2205
12203	2207

7. Inserting values in warehouse.

insert into warehouse values ('War01',9900001111, 'Manesar', 'Haryana')

insert into warehouse values ('War02',9900002222, 'Indore', 'Madhya Pradesh')

Insert into warehouse values ('War03',9900003333, 'Bangalore', 'Karnataka')

WAREHOUSE_CODE	PHONE	CITY	STATE
War01	9900001111	Manesar	Haryana
War02	9900002222	Indore	Madhya Pradesh
War03	9900003333	Bangalore	Karnataka

Interlinking Books and warehouse using book_warehouse table

insert into book_warehouse values (2201,'War01')

insert into book_warehouse values (2202,'War01')

insert into book_warehouse values (2203,'War01')

insert into book_warehouse values (2204,'War01')

insert into book_warehouse values (2205,'War01')

insert into book_warehouse values (2206,'War01')

insert into book_warehouse values (2207,'War01')

insert into book_warehouse values (2208,'War01')

insert into book_warehouse values (2209,'War01')

insert into book_warehouse values (2201,'War02')

insert into book_warehouse values (2202,'War02')


```

insert into book_warehouse values (2203,'War02')
insert into book_warehouse values (2204,'War02')
insert into book_warehouse values (2205,'War02')
insert into book_warehouse values (2206,'War02')
insert into book_warehouse values (2207,'War02')
insert into book_warehouse values (2208,'War02')
insert into book_warehouse values (2209,'War02')
insert into book_warehouse values (2201,'War03')
insert into book_warehouse values (2202,'War03')
insert into book_warehouse values (2203,'War03')
insert into book_warehouse values (2204,'War03')
insert into book_warehouse values (2205,'War03')
insert into book_warehouse values (2206,'War03')
insert into book_warehouse values (2207,'War03')
insert into book_warehouse values (2208,'War03')
insert into book_warehouse values (2209,'War03')

```

BOOK_ID	WAREHOUSE_CODE	BOOK_ID	WAREHOUSE_CODE	BOOK_ID	WAREHOUSE_CODE
2201	War02	2201	War01	2201	War03
2202	War02	2202	War01	2202	War03
2203	War02	2203	War01	2203	War03
2204	War02	2204	War01	2204	War03
2205	War02	2205	War01	2205	War03
2206	War02	2206	War01	2206	War03
2207	War02	2207	War01	2207	War03
2208	War02	2208	War01	2208	War03
2209	War02	2209	War01	2209	War03

Query – 1 Display the book titles written by author 1 and author 2.

```
1 select Author_Name ,title from books,author
2 where books.author_ID = author.author_ID and author_name in('Author1','Author2')
```

AUTHOR_NAME	TITLE
Author2	Book2
Author1	Book3
Author1	Book9

Query – 2 Display the numbers of books published by different publication houses.

```
1 select Publisher_ID, count(book_ID) from books group by Publisher_ID
```

PUBLISHER_ID	COUNT(BOOK_ID)
202205	1
202203	1
202201	3
202204	2
202202	2

Query – 3 Display all the books published in the year 2020 and 2015.

```
1 select year_of_publication, title from books where year_of_publication in (2020,2015)
```

YEAR_OF_PUBLICATION	TITLE
2020	Book2
2015	Book6
2020	Book7

Query – 4 Display the amount spent by each customer for purchasing the books.

```
1 select customer_name, amount from invoice, customer, shopping Basket
2 where (shopping_basket.invoice_no = invoice.invoice_no
3 and shopping_basket.customer_ID = customer.customer_ID)
```

CUSTOMER_NAME	AMOUNT
Customer1	2621.67
Customer2	1450.95
Customer3	5100
Customer4	2552.17
Customer5	1500.95

Query – 5 Display the name of customer who had opted for COD.

```
1 select customer_name, status from invoice, customer, shopping Basket
2 where (shopping_basket.invoice_no = invoice.invoice_no
3 and shopping_basket.customer_ID = customer.customer_ID) and status = 'COD'
```

CUSTOMER_NAME	STATUS
Customer3	COD

Query – 6 Display the number of books bought by each customer.

```
1 select customer_name, count(Book_ID) from book_basket, customer, shopping Basket
2 where (shopping_basket.basket_ID = book_basket.basket_ID
3 and shopping_basket.customer_ID = customer.customer_ID) group by customer_name
```

CUSTOMER_NAME	COUNT(BOOK_ID)
Customer1	2
Customer2	2
Customer4	3
Customer3	3
Customer5	2

Query – 7 Display the titles of the books bought by customer3.

```
1 select customer_name, title from book_basket, customer, shopping_basket, books
2 where (shopping_basket.basket_ID = book_basket.basket_ID
3 and shopping_basket.customer_ID = customer.customer_ID and
4 book_basket.book_ID = books.book_ID) and customer_name = 'Customer3'
```

CUSTOMER_NAME	TITLE
Customer3	Book2
Customer3	Book5
Customer3	Book7

Query – 8 Display total number of books available in Warehouse code War01.

```
1 select count(Book_ID) from book_warehouse where warehouse_code = 'War01'
```

COUNT(BOOK_ID)
9

Query – 9 Display all the books available in manesar warehouse.

```
3 select Book_ID, city, state from warehouse, book_warehouse
4 where book_warehouse.warehouse_code = warehouse.warehouse_code and city = 'Manesar'
```

BOOK_ID	CITY	STATE
2201	Manesar	Haryana
2202	Manesar	Haryana
2203	Manesar	Haryana
2204	Manesar	Haryana
2205	Manesar	Haryana
2206	Manesar	Haryana
2207	Manesar	Haryana
2208	Manesar	Haryana
2209	Manesar	Haryana

Query – 10: Display details of most expensive book in the store

```
1 select book_ID,title, Price from books where price in (select max(price) from books)
```

BOOK_ID	TITLE	PRICE
2205	Book5	2400