Database Project Report

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**Introduction:**

**What is your application?**

 The application is a Bookstore.

 A book store owner has noticed that their sales have been declining over the past few months. They want to figure out why this is happening and how they can improve their sales. They decide to create a database and a website to increase the sales and to help them keep track of their inventory, sales, and customer data.

The book store owner starts by creating a spreadsheet with columns for book title, author, publisher, price, and quantity in stock. They also add a column for the date each book was last sold. This will help them keep track of which books are selling well and which ones are not.

Next, the owner decides to track their sales data. They create a table with columns for date, time, customer name, book title, quantity sold, and total sale amount. This will help them see which books are selling the most and at what times of day.

Then he created a website that can make the customers order from his store easily. The website includes Order ID, Customer ID, Date , Time , Email, Address, Phone number, Order History, and Book ID.

Finally, the owner wants to keep track of their customers. They create a table with columns for customer name, email address, phone number, and purchase history. This will help them send targeted marketing emails to customers who have purchased certain types of books in the past.

With this database in place, the book store owner can now analyze their data to make informed decisions about which books to order more of, which ones to discount, and which marketing strategies to use. They can also personalize their customer interactions to  increase loyalty and repeat business.

**Why do you want to choose this application, instead of others, as the course project (motivation)?**

Because of the Availability of Data: Bookstores have a lot of data that can be used for database projects, including inventory, sales, and customer data.

and also a Real-world Experience: Creating a database for a bookstore can provide valuable real-world experience, as it simulates the process of designing and implementing a database for a business.

**Key Components:**

**What are the key components in your project?**

The key components in this project are the Book table, the Customer table, and the Online Order table.

**Database Design:**

**How do you design the database?**

The database is designed to accommodate the functional dependencies by ensuring that each table has a primary key and that all other attributes are dependent on that primary key.

```
MariaDB [(none)]> USE BookNook;
Database changed
MariaDB [BookNook]> CREATE TABLE Book(
    ->
    -> ;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syntax to use near
'' at line 1
MariaDB [BookNook]> CREATE TABLE Book(
    -> BookID VARCHAR(10),
    -> Book_Title VARCHAR(45),
    -> Author VARCHAR(30),
    -> Publisher VARCHAR(45),
    -> Price decimal,
    -> Quantity int,
    -> PRIMARY KEY(BookID));
Query OK, 0 rows affected (0.066 sec)

MariaDB [BookNook]> CREATE TABLE Customer(
    -> CustomerID VARCHAR(10),
    -> Name VARCHAR(35),
    -> Email VARCHAR(50),
    -> Purchase_History int,
    -> PRIMARY KEY (CustomerID));
Query OK, 0 rows affected (0.025 sec)

MariaDB [BookNook]> CREATE TABLE Online_Orders(
    -> OrderID VARCHAR(10),
    -> CustomerID VARCHAR(10),
    -> Email VARCHAR(50),
    -> Phone_Number VARCHAR(10),
    -> Address VARCHAR(50),
    -> Date date,
    -> Time VARCHAR(10),
    -> Order_History int,
    -> PRIMARY KEY(OrderID),
    -> FOREIGN KEY(CustomerID) REFERENCES Customer(CustomerID));
Query OK, 0 rows affected (0.071 sec)
```

```
MariaDB [BookNook]> INSERT INTO Book VALUES('B1','The little prince','Antoine Saint','Readers press',20,4);
Query OK, 1 row affected (0.205 sec)

MariaDB [BookNook]> INSERT INTO Book VALUES('B2','Good vibes, Good life','Will Smith','Book prize',17,1);
Query OK, 1 row affected (0.032 sec)

MariaDB [BookNook]> INSERT INTO Book VALUES('B3','It ends with us','Tamara ireland','Christian Science Monitor',35,5);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Book VALUES('B4','Harry potter','J.W.rowling','Readers press',26,11);
Query OK, 1 row affected (0.006 sec)

MariaDB [BookNook]> INSERT INTO Book VALUES('B5','Gone Girl','Fix king','Book prize',39,8);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Book VALUES('B6','No longer human','Jane Eyre','Readers press',15,20);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Book VALUES('B7','Every last word','John Stone','Book prize',25,3);
Query OK, 1 row affected (0.004 sec)

MariaDB [BookNook]> INSERT INTO Customer VALUES('C1','Israa','israa@gmail.com',1);
Query OK, 1 row affected (0.020 sec)

MariaDB [BookNook]> INSERT INTO Customer VALUES('C2','Amani','amani@gmail.com',4);
Query OK, 1 row affected (0.008 sec)

MariaDB [BookNook]> INSERT INTO Customer VALUES('C3','Amalya','amalya@gmail.com',1);
Query OK, 1 row affected (0.006 sec)

MariaDB [BookNook]> INSERT INTO Customer VALUES('C4','Raghad','raghad@gmail.com',5);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Customer VALUES('C5','Sarah','sarah@gmail.com',2);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Customer VALUES('C6','Shahad','shahad@gmail.com',3);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Customer VALUES('C7','Jana','jana@gmail.com',1);
Query OK, 1 row affected (0.011 sec)
```

```
MariaDB [BookNook]> desc Book;
+------------+---------------+------+-----+---------+-------+
| Field      | Type          | Null | Key | Default | Extra |
+------------+---------------+------+-----+---------+-------+
| BookID     | varchar(10)   | NO   | PRI | NULL    |       |
| Book_Title | varchar(45)   | YES  |     | NULL    |       |
| Author     | varchar(30)   | YES  |     | NULL    |       |
| Publisher  | varchar(45)   | YES  |     | NULL    |       |
| Price      | decimal(10,0) | YES  |     | NULL    |       |
| Quantity   | int(11)       | YES  |     | NULL    |       |
+------------+---------------+------+-----+---------+-------+
6 rows in set (0.060 sec)

MariaDB [BookNook]> desc Customer;
+------------------+-------------+------+-----+---------+-------+
| Field            | Type        | Null | Key | Default | Extra |
+------------------+-------------+------+-----+---------+-------+
| CustomerID       | varchar(10) | NO   | PRI | NULL    |       |
| Name             | varchar(35) | YES  |     | NULL    |       |
| Email            | varchar(50) | YES  |     | NULL    |       |
| Purchase_History | int(11)     | YES  |     | NULL    |       |
+------------------+-------------+------+-----+---------+-------+
4 rows in set (0.016 sec)

MariaDB [BookNook]> desc Online_Orders;
+---------------+-------------+------+-----+---------+-------+
| Field         | Type        | Null | Key | Default | Extra |
+---------------+-------------+------+-----+---------+-------+
| OrderID       | varchar(10) | NO   | PRI | NULL    |       |
| CustomerID    | varchar(10) | YES  | MUL | NULL    |       |
| Email         | varchar(50) | YES  |     | NULL    |       |
| Phone_Number  | varchar(10) | YES  |     | NULL    |       |
| Address       | varchar(50) | YES  |     | NULL    |       |
| Date          | date        | YES  |     | NULL    |       |
| Time          | varchar(10) | YES  |     | NULL    |       |
| Order_History | int(11)     | YES  |     | NULL    |       |
+---------------+-------------+------+-----+---------+-------+
8 rows in set (0.016 sec)
```

```
MariaDB [BookNook]> INSERT INTO Online_Orders VALUES('O2','C2','amani@gmail.com',051234,'Waha','2018-05-02','10:59',1);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Online_Orders VALUES('O3','C3','amalya@gmail.com',052344,'Rehab','2022-01-05','3:26',1);
Query OK, 1 row affected (0.012 sec)

MariaDB [BookNook]> INSERT INTO Online_Orders VALUES('O4','C4','raghad@gmail.com',052347,'Safa','2022-01-05','3:27',2);
Query OK, 1 row affected (0.004 sec)

MariaDB [BookNook]> INSERT INTO Online_Orders VALUES('O5','C5','sarah@gmail.com',058789,'Sohman','2023-07-08','20:56',2);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Online_Orders VALUES('O6','C6','shahad@gmail.com',051233,'Rawda','2023-04-13','6:17',3);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> INSERT INTO Online_Orders VALUES('O7','C7','jana@gmail.com',052347,'Zahraa','2023-01-05','3:20',1);
Query OK, 1 row affected (0.005 sec)

MariaDB [BookNook]> SELECT * FROM Book;
+--------+----------------------+----------------+--------------------------+-------+----------+
| BookID | Book_Title           | Author         | Publisher                | Price | Quantity |
+--------+----------------------+----------------+--------------------------+-------+----------+
| B1     | The little prince    | Antoine Saint  | Readers press            |    20 |        4 |
| B2     | Good vibes, Good life | Will Smith    | Book prize               |    17 |        1 |
| B3     | It ends with us      | Tamara ireland | Christian Science Monitor |   35 |        5 |
| B4     | Harry potter         | J.K.rowling    | Readers press            |    26 |       11 |
| B5     | Gone Girl            | Fix king       | Book prize               |    39 |        8 |
| B6     | No longer human      | Jane Eyre      | Readers press            |    15 |       20 |
| B7     | Every last word      | John Stone     | Book prize               |    25 |        3 |
+--------+----------------------+----------------+--------------------------+-------+----------+
7 rows in set (0.006 sec)
```

```
MariaDB [BookNook]> SELECT * FROM Customer;
+------------+--------+-------------------+------------------+
| CustomerID | Name   | Email             | Purchase_History |
+------------+--------+-------------------+------------------+
| C1         | Israa  | israa@gmail.com   |                1 |
| C2         | Amani  | amani@gmail.com   |                4 |
| C3         | Amalya | amalya@gmail.com  |                1 |
| C4         | Raghad | raghad@gmail.com  |                5 |
| C5         | Sarah  | sarah@gmail.com   |                2 |
| C6         | Shahad | shahad@gmail.com  |                3 |
| C7         | Jana   | jana@gmail.com    |                1 |
+------------+--------+-------------------+------------------+
7 rows in set (0.000 sec)

MariaDB [BookNook]> SELECT * FROM Online_Orders;
+---------+------------+------------------+--------------+---------+------------+-------+---------------+
| OrderID | CustomerID | Email            | Phone_Number | Address | Date       | Time  | Order_History |
+---------+------------+------------------+--------------+---------+------------+-------+---------------+
| O1      | C1         | israa@gmail.com  | 58765        | Rehab   | 2021-05-05 | 12:34 |             1 |
| O2      | C2         | amani@gmail.com  | 51234        | Waha    | 2018-05-02 | 10:59 |             1 |
| O3      | C3         | amalya@gmail.com | 52344        | Rehab   | 2022-01-05 | 3:26  |             1 |
| O4      | C4         | raghad@gmail.com | 52347        | Safa    | 2022-01-05 | 3:27  |             2 |
| O5      | C5         | sarah@gmail.com  | 58789        | Sohman  | 2023-07-08 | 20:56 |             2 |
| O6      | C6         | shahad@gmail.com | 51233        | Rawda   | 2023-04-13 | 6:17  |             3 |
| O7      | C7         | jana@gmail.com   | 52347        | Zahraa  | 2023-01-05 | 3:20  |             1 |
+---------+------------+------------------+--------------+---------+------------+-------+---------------+
7 rows in set (0.001 sec)
```

```
MariaDB [BookNook]> UPDATE Online_Orders
    -> SET Address = 'Rehab'
    -> WHERE CustomerID ;
Query OK, 0 rows affected, 7 warnings (0.027 sec)
Rows matched: 0  Changed: 0  Warnings: 7

MariaDB [BookNook]> UPDATE Online_Orders
    -> SET Address = 'Naseem'
    -> WHERE CustomerID ='C1';
Query OK, 1 row affected (0.026 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [BookNook]> SELECT * FROM Online_Orders;
+---------+------------+--------+------------------+--------------+---------+------------+-------+---------------+
| OrderID | CustomerID | BookID | Email            | Phone_Number | Address | Date       | Time  | Order_History |
+---------+------------+--------+------------------+--------------+---------+------------+-------+---------------+
| O1      | C1         | B1     | israa@gmail.com  | 058765       | Naseem  | 2021-05-05 | 12:34 |             1 |
| O2      | C2         | B2     | amani@gmail.com  | 051234       | Waha    | 2018-02-05 | 10:59 |             1 |
| O3      | C3         | B3     | amalya@gmail.com | 052344       | Rehab   | 2022-01-05 | 3:26  |             1 |
| O4      | C4         | B4     | raghad@gmail.com | 052347       | Safa    | 2022-01-05 | 3:27  |             2 |
| O5      | C5         | B5     | sarah@gmail.com  | 058789       | Sohman  | 2023-08-07 | 20:56 |             2 |
| O6      | C6         | B6     | shahad@gmail.com | 051233       | Rawda   | 2023-04-13 | 6:17  |             3 |
| O7      | C7         | B7     | jana@gmail.com   | 052347       | Zahraa  | 2022-01-05 | 3:20  |             1 |
+---------+------------+--------+------------------+--------------+---------+------------+-------+---------------+
7 rows in set (0.002 sec)
```

```
MariaDB [BookNook]> SELECT CustomerID, Email,Address, BookID, Book_Title
    -> FROM Online_Orders, Book
    -> WHERE Book_Title = 'Harry Potter';
ERROR 1052 (23000): Column 'BookID' in field list is ambiguous
MariaDB [BookNook]> SELECT BookID, Author, Price, Quantity
    -> FROM Book
    -> WHERE Book_Title = 'Harry potter';
+--------+------------+-------+----------+
| BookID | Author     | Price | Quantity |
+--------+------------+-------+----------+
| B4     | J.K.rowling |   26 |       11 |
+--------+------------+-------+----------+
1 row in set (0.013 sec)
```

```
MariaDB [BookNook]> SELECT BookID, Order_History
    -> FROM Online_Orders
    -> WHERE BookID = 'B6';
+--------+---------------+
| BookID | Order_History |
+--------+---------------+
| B6     |             3 |
+--------+---------------+
1 row in set (0.060 sec)
```

```
MariaDB [BookNook]> SELECT BookID, COUNT(Quantity)
    -> FROM Book
    -> ;
+--------+-----------------+
| BookID | COUNT(Quantity) |
+--------+-----------------+
| B1     |               7 |
+--------+-----------------+
1 row in set (0.008 sec)
```

```
MariaDB [BookNook]> SELECT Online_Orders.OrderID, Online_Orders.date, Customer.name,Customer.Email
    -> from Online_Orders INNER JOIN CUSTOMER ON ONLINE_ORDERS.customerid = customer.cUstOmerID;
+---------+------------+--------+------------------+
| OrderID | date       | name   | Email            |
+---------+------------+--------+------------------+
| O1      | 2021-05-05 | Israa  | israa@gmail.com  |
| O2      | 2018-02-05 | Amani  | amani@gmail.com  |
| O3      | 2022-01-05 | Amalya | amalya@gmail.com |
| O4      | 2022-01-05 | Raghad | raghad@gmail.com |
| O5      | 2023-08-07 | Sarah  | sarah@gmail.com  |
| O6      | 2023-04-13 | Shahad | shahad@gmail.com |
| O7      | 2022-01-05 | Jana   | jana@gmail.com   |
+---------+------------+--------+------------------+
7 rows in set (0.006 sec)
```
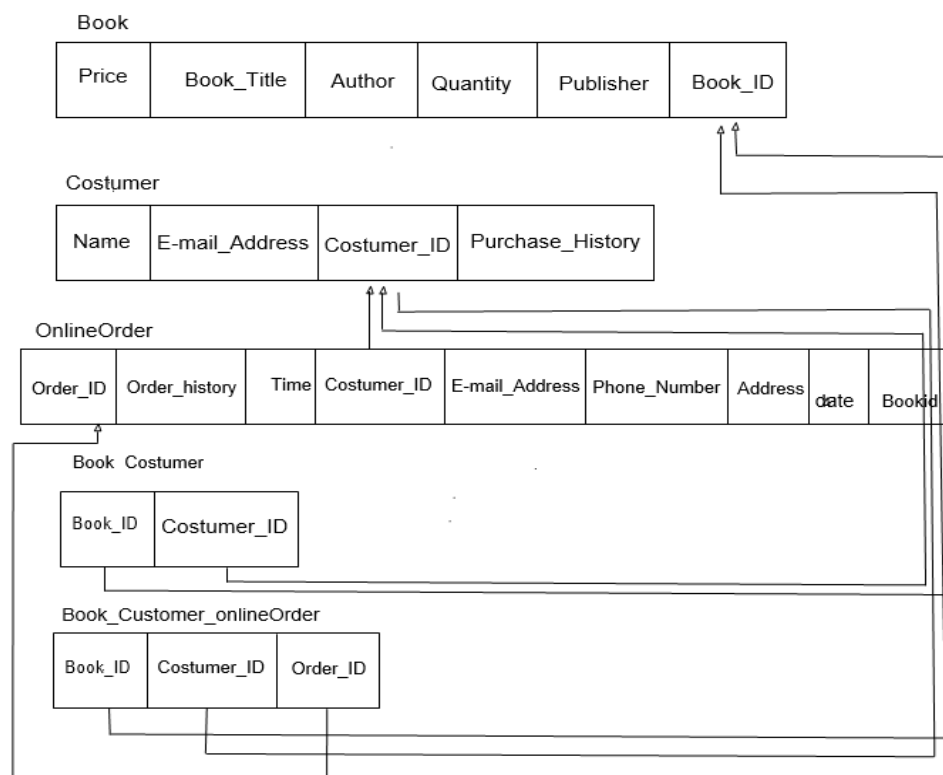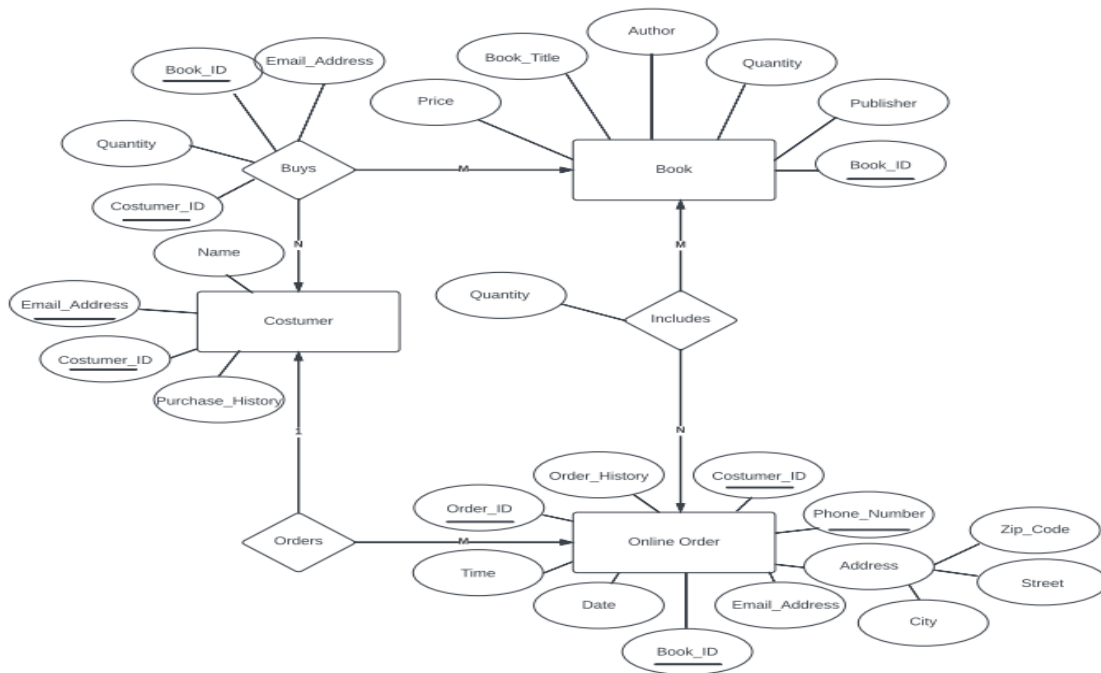
```
MariaDB [BookNook]> SELECT Book_TITLE , Quantity FROM BOOK
    -> WHERE QUANTITY > 10;
+----------------+----------+
| Book_TITLE     | Quantity |
+----------------+----------+
| Harry potter   |       11 |
| No longer human |      20 |
+----------------+----------+
2 rows in set (0.003 sec)
```

**What is your E-R model and relational model?**

The ER model for the database have entities for Book, Customer, and Online Order, with relationships between them.

The relational model have tables for Book, Customer, and Online Order, with primary keys and foreign keys to establish relationships between them.

**Book**

| Price | Book_Title | Author | Quantity | Publisher | Book_ID |
|-------|-----------|--------|----------|-----------|---------|

**Costumer**

| Name | E-mail_Address | Costumer_ID | Purchase_History |
|------|----------------|-------------|------------------|

**OnlineOrder**

| Order_ID | Order_history | Time | Costumer_ID | E-mail_Address | Phone_Number | Address | date | Bookid |
|----------|---------------|------|-------------|----------------|--------------|---------|------|--------|

**Book Costumer**

| Book_ID | Costumer_ID |
|---------|-------------|

**Book_Customer_onlineOrder**

| Book_ID | Costumer_ID | Order_ID |
|---------|-------------|----------|

**What are the tables you include in the database?**

Tables:

The tables included in the database are the Book table, the Customer table, and the Online Order table.

The Book table includes columns for book id, book title, author, publisher, price, and quantity in stock.

The Customer table includes columns for customer name, customer id, email address, phone number, and purchase history.

The Online Order table includes columns for order ID, date, time, address, customer id, book id, order history.

**How do you design you database to accommodate functional dependencies?**

The tables in the database are designed to accommodate functional dependencies by ensuring that each table has a primary key and that all other attributes are dependent on that primary key. For example, in the Book table, the book title is dependent on the primary key (ISBN or book ID) and the price is dependent on the book title.

**Are your tables in BCNF or 3NF?**

The database is designed to be in 3NF, which means that there are no atomic attributes, no partial dependency, and no transitive dependency. This ensures that the data is organized and stored efficiently, and that there is no redundancy.

**How about other constraints**

Other constraints that could be included in the database design are data validation rules, such as ensuring that only valid email addresses and phone numbers are entered into the Customer table, or that the quantity in stock in the Book table is always greater than or equal to zero.

**Functionality:**

**What are the basic functions and advanced functions in your database and how do you implement them?**

The basic functions of the database would include adding new books to the Book table, adding new customers to the Customer table, and recording new online orders in the Online Order table.

Advanced functions could include generating reports to analyze sales data, creating marketing campaigns based on customer purchase history, and updating inventory levels based on online orders. These functions could be implemented using queries, forms, and reports in the database management system.

**Implementation details:**

**What languages and platform you've chosen to do the implementation?**

We used SQL.

**Experiences:**

Through this project, we learned how to design and implement a database for a specific application, in this case, a bookstore.

also we learned how to model data, identify functional dependencies, and normalize data to reduce redundancy and improve efficiency.

Additionally, we gained experience in data entry, data retrieval, and data analysis, as well as in troubleshooting problems with the database.

**Problem-solving:**

we did not face any complex problems, most of our problems was solved by searching in the internet.

**Extending the Project:**

To extend the project to more advanced, mature systems in the future, we might consider incorporating additional tables and entities, such as suppliers, distributors, or employees, to support more complex business processes.