

Book-Shop Management System

Complete Report on Semester Project

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1. Abstract

This report is dedicated to “Book Bazaar”, a small-sized bookstore in Urdu Bazaar Lahore, and its logistics management. We have conducted an in-depth analysis of the current operational scenario, followed by the formulation of detailed requirements based on user needs. To address these requirements, we present a conceptual database design for a bookshop management system. Additionally, we provide recommendations to enhance the efficiency and functionality of the system.

2. Domain Description

Shop Profile:

The Book Bazaar is a family-owned bookstore, established to cater to the literary interests of its community and avid book readers across the city. It also sells some Stationery items. Operating successfully for several years, it prides itself on its unique selection of books and personalized service.

Operations:

The current state of operations at the shop relies primarily on manual processes, with limited utilization of information technology. The bookstore employs a basic point-of-sale system for tracking sales, but its inventory and customer management are predominantly paper-based. Due to the absence of an integrated system, The Book Bazaar faces challenges related to inventory accuracy, efficient customer service, and precise order fulfillment.

To address these challenges and enhance overall operational efficiency, a comprehensive bookshop management system is proposed, aiming to streamline inventory management, customer relations, and supplier interactions. This system will modernize the bookstore's operations, providing an integrated solution to support its continued success and growth in the competitive book retail market.

3. Requirement Specification

Dividing the logistics of the system into sub parts for simplicity:

Receiving and Inventory Control:

The process of receiving books and stationery from supplier after ordering and billing (payment), is called Receiving within this report.

Storage:

Once books are in the store, they're stored appropriately according to Dewey Decimal Classification, this process is called "Storage".

Selling:

Processing of sale of Books and stationery to Customers, and keep record of customers.

Personnel records:

This refers to the records of employees and Customers.

Functional Requirements:

We are dividing Functional Requirements into

Id	Function	Entity	Priority
Receiving			
1	Insert/ Update/Delete/ View - All the Orders made to a Supplier(s).	Books, Stationery, Supplier Order, Supplier	High
2	Insert/ Update/Delete/ View - All the <i>contents</i> of an Order made to a Supplier(s).	Books, Stationery, Stationery - Supplier Bill, Books-Supplier Bill, Supplier	Normal
3	A list of all Orders and Bills of a Book/ Stationery Item between any Time Period.	Books, Stationery, Supplier Order	Low
Storage			
4	Insert/ Update/Delete/ View - All the Books in the Store.	Books	High
5	Insert/ Update/Delete/ View - All the Stationery in the Store.	Stationery	High
6	View the total Available Quantity of any Book.	Books	High
7	View the total Available Quantity of any Stationery Item.	Stationery	High
8	List of Books/ Stationery at stock level or just below minimum stock level.	Books, Stationery	Low

<i>Selling</i>			
9	Insert/ Update/Delete/ View - All the Customer Bills.	Customers Customer Bill, Stationery- Customer Bill, Books-Customer Bill	High
<i>Personnel records</i>			
10	Insert/ Update/Delete/ View – All the Customers Records.	Customers	High
11	Insert/ Update/Delete/ View – All the Employee Records.	Employees	Normal

Non-Functional Requirements:

- The system should have defined response time objectives for common operations, such as searching for books or processing orders.
- The system should be designed to handle both the current load and potential growth in the future without significant architectural changes.

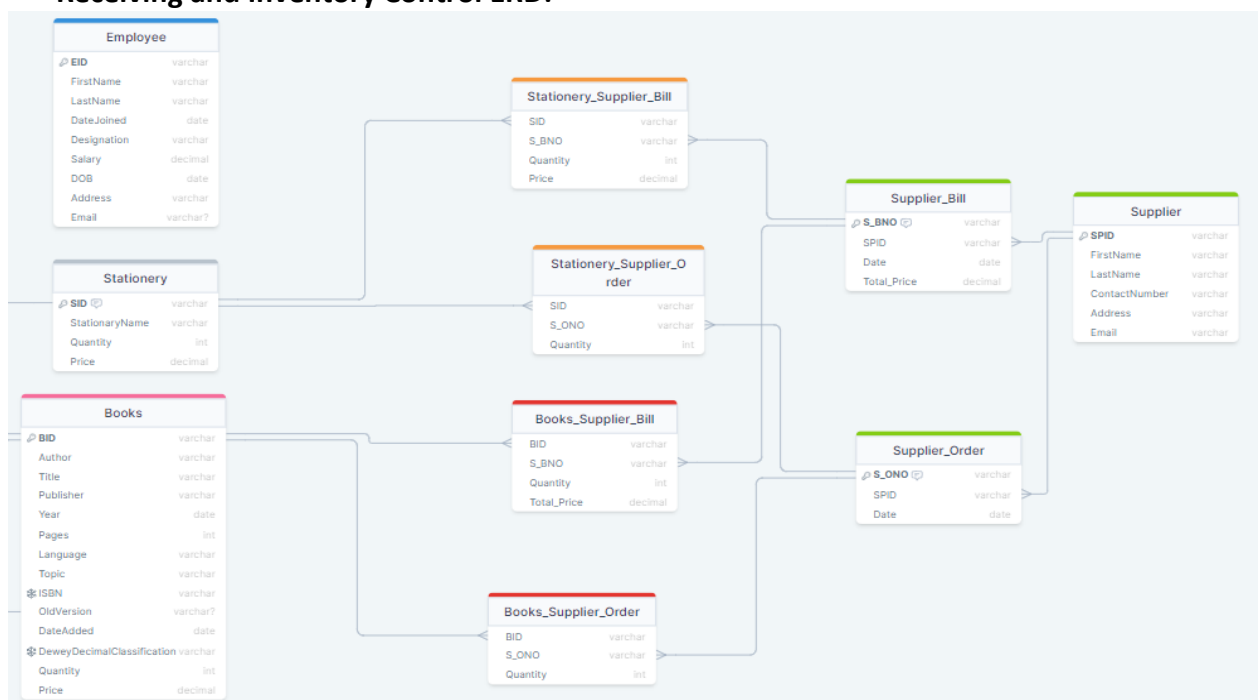
The system should easily scale to accommodate an increasing number of books, customers, and transactions without a significant drop in performance.

4. Assumptions

- The staff will deal with any breakages or problems related to the books/stationary before entering the records into the database.
- The Book shop will follow Dewy Decimal Classification to store Books in relevant shelves. The database does not keep track of which shelf, and it is assumed that it will be known from the DDC number of the book assigned by staff as it is stored upon receiving shipment from supplier.

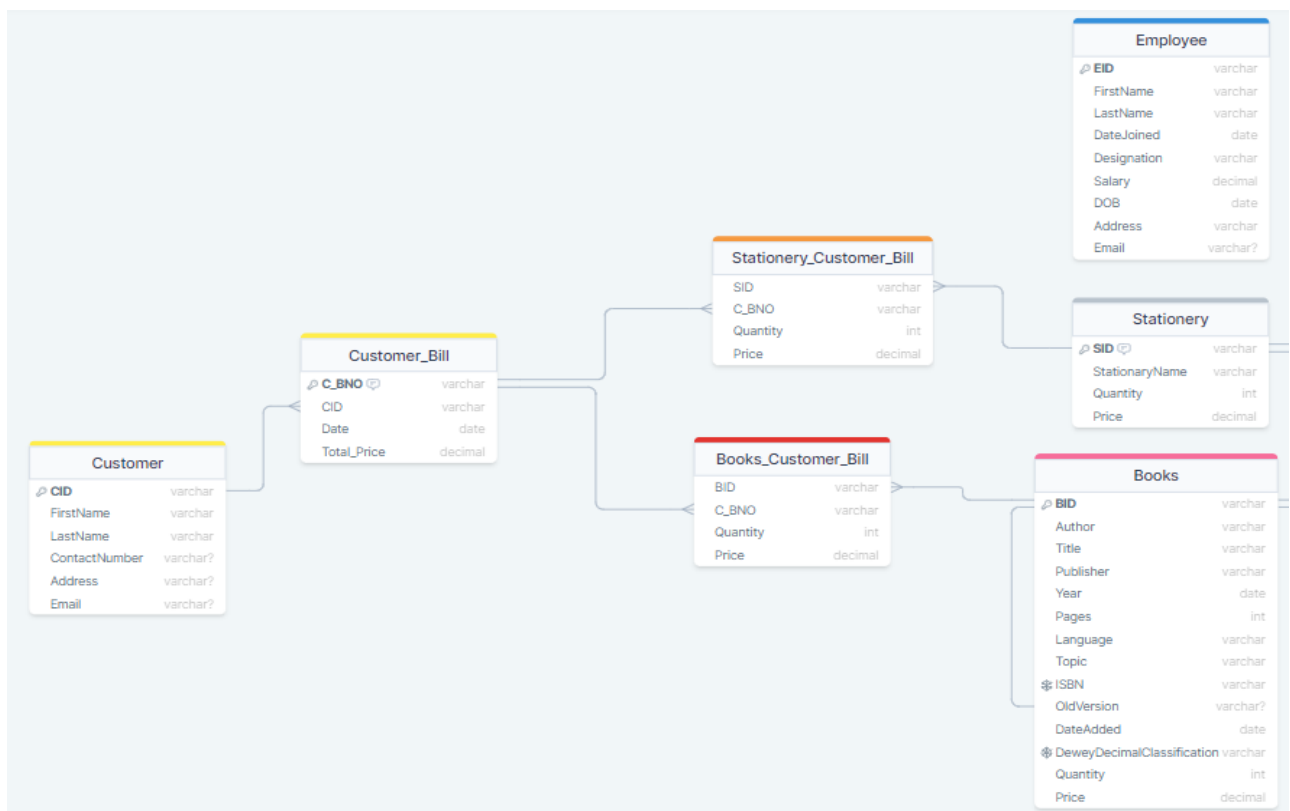
5. Entity Relationship Diagram

Receiving and Inventory Control ERD:



Right Side Of Entity Relationship Diagram

Selling and Personnel records ERD:



Left Side of Entity Relationship Diagram

(ERD was drawn using Drawsql.app. This can be viewed online at:

<https://drawsql.app/teams/team-1-165/diagrams/book-shop-management-system>)

5.1. Entities & Attributes

For Purpose of simplicity, we are only listing the Main Entities and their Attributes, rest are visible from the ERD which can be viewed on mentioned [Link](#).

Books

<u>BID</u>	Varchar(255)
Authors	Varchar(255)
Title	Varchar(255)
Publisher	Varchar(255)
Year	Date
Pages	Int
Language	Varchar(255)
Topic	Varchar(255)
ISBN	Varchar(255)
<u>Old Version (FK)</u>	Varchar(255) NULL
Date Added	Date
Dewey Decimal Classification	Varchar(255)
Quantity	int

Old Version (FK) References Book ID in the same table.

Stationery

<u>SID</u>	Varchar(255)
Stationery Name	Varchar(255)
Quantity	int

Employees

<u>EID</u>	Varchar(255)
First name	Varchar(255)
Last name	Varchar(255)
Date joined	Date
Designation	Varchar(255)
Salary	Decimal
DOB	Date
Address	Varchar(255)
Email	Varchar(255) NULL

Customers

<u>CID</u>	Varchar(255)
First Name	Varchar(255)
Last Name	Varchar(255)
Contact Number	Varchar(255)
Address	Varchar(255)
Email	Varchar(255)

Supplier

<u>SPID</u>	Varchar(255)
First Name	Varchar(255)
Last Name	Varchar(255)
Contact Number	Varchar(255)
Address	Varchar(255)
Email	Varchar(255)

5.2. Relationships & Labels

Receiving and Inventory control:

- A Book can **have many** Books-Supplier Orders.
- A Books-Supplier Order **must belong to** a Book.
- A Books-Supplier Order is a **part of** Supplier Order.
- A Book can **have many** Books-Supplier Bills.
- A Books-Supplier Bill **must belong to** a Book.
- A Books-Supplier Bill is a **part of** Supplier Bill.

- A Stationery can **have many** Stationery-Supplier Orders.
- A Stationery-Supplier Order **must belong to** a Stationery.
- A Stationery-Supplier Order is a **part of** Supplier Order.
- A Stationery can **have many** Stationery-Supplier Bills.
- A Stationery-Supplier Bill **must belong to** a Stationery.
- A Stationery-Supplier Bill is a **part of** Supplier Bill.
- A Supplier can **have many** Supplier Orders.
- A Supplier Order **must belong to** a Supplier.
- A Supplier can **have many** Supplier Bills.
- A Supplier Bill **must belong to** a Supplier.

Storage:

- A Book can **have one** Old Version.
- An Old Version **may belong to** a Book.

Selling:

- A Book can **have many** Books-Customer Bills.
- A Books-Customer Bill **must belong to** a Book.
- A Books-Customer Bill is a **part of** Customer Bill.
- A Stationery can **have many** Stationery-Customer Bills.
- A Stationery-Customer Bill **must belong to** a Stationery.
- A Stationery-Customer Bill is a **part of** Customer Bill.
- A Customer can **have many** Customer Bills.
- A Customer Bill **must belong to** a Customer.

5.3. Validation

In accordance with the user requirements, it is evident from the above description of entities and their relationships that the model effectively captures all the essential information relevant to the bookshop's operations. Therefore, the completeness of the conceptual model can be verified against the established user requirements.

5.4. Description

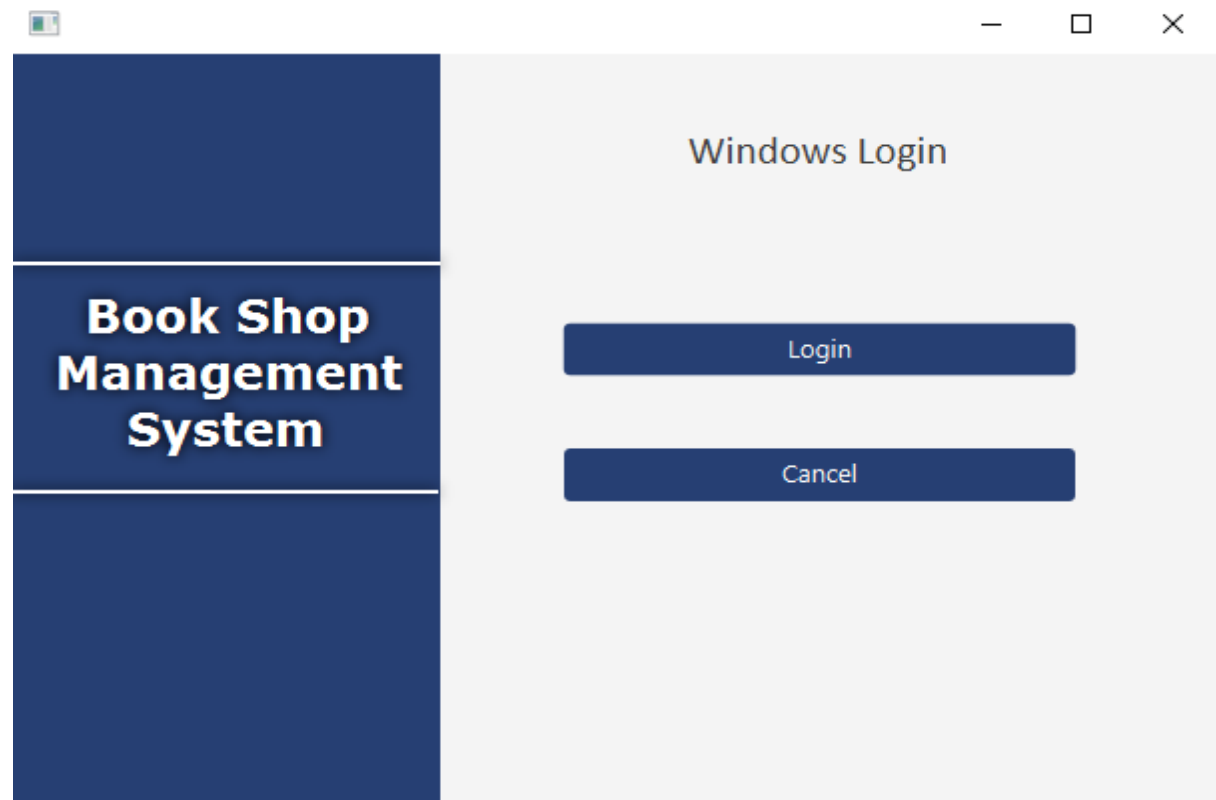
The ERD describes the logistic functioning the Book Bazaar Data management system. It can be observed that the main functions are receiving the stock (Books, stationery) and selling them to the Customers.

Since Supplier Order consists of both Books and Suppliers, Stationery-Supplier Orders and Books-Supplier Orders are stored in a separate entity. Same goes for Supplier Bill which stores the total price of the particular Order, while prices and quantities of individual books and stationery are stored in Books-Supplier Bill and Stationery-Supplier Bill, respectively.

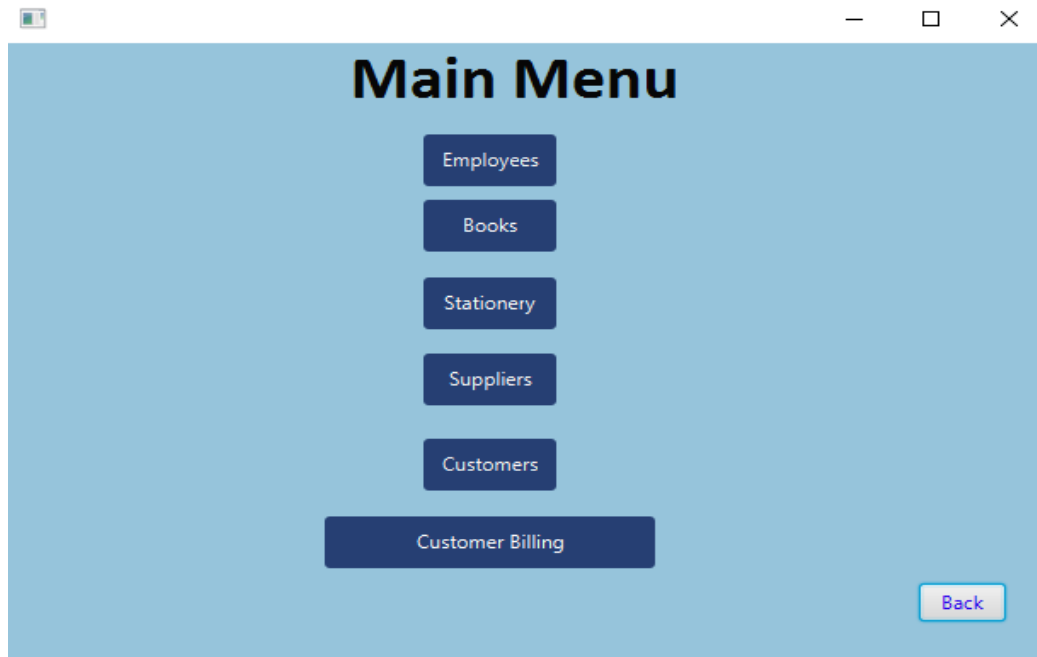
Same logic is applied to selling side, where individual prices and quantities of books and stationery are stored in Books-Customer Bill and Stationery-Customer Bill, respectively. Their collective price is stored in Customer Bills.

6. Screen Shots of the developed frontend / GUI

FrontEnd:



Main Menu:



7. Screen Shots of the developed reports

Employee:

Customer:

[illegible]

Customer Billing:

Customer Billing

[Back](#)

Add Books Bill Here

BID:
C_BNO:
Quantity:
Price:

Add Stationery Bill Here

SID:
C_BNO:
Quantity:
Price:

Total Customer Bill/Receipt

C_BNO:
CID:
Date:
Total Price:

Result Console

BID C_BNO New Quantity

BID	C_BNO	Quantity	Price
No content in table			

SID C_BNO New Quantity

SID	C_BNO	Quantity	Price
No content in table			

C_BNO CID Date Total Price

1			0.0

8. Normalization

Normalizing the logical design of the Book-shop management system:

We start with a table of containing Multi-valued Attributes, hence its not in any 1st normal form:

Customer ID	Customer Name	Customer Address	<u>Book ID</u>	Author	Title	<u>Bill ID</u>	Quantity	Unit Price
C001	Hamza	Lahore	B009	James Clear	Atomic Habits	2031	1	1200
			B010	Thomas Sowell	Basic Economics		1	1500
C002	Ahmed	Lahore	B111	The Precipice	Toby Ord	2032	1	900
			B201	Lord of Flies	William Golding		1	1400

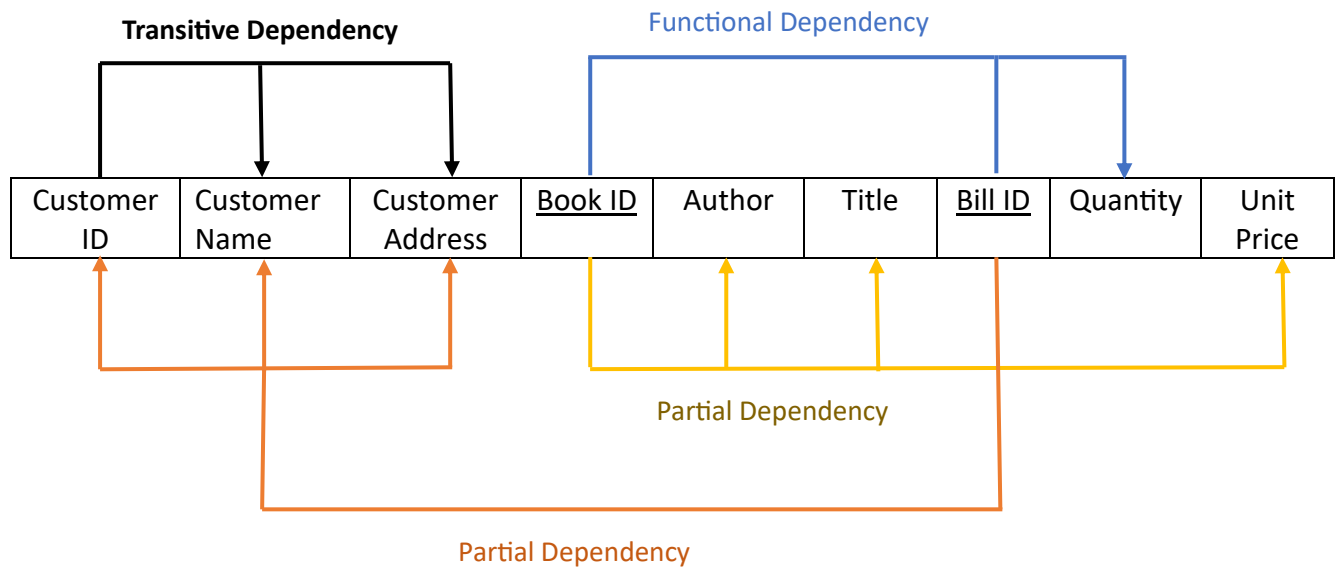
1. Getting to First Normal Form by Removing Multivalued Attributes:

Customer ID	Customer Name	Customer Address	<u>Book ID</u>	Author	Title	<u>Bill ID</u>	Quantity	Unit Price
C001	Hamza	Lahore	B009	James Clear	Atomic Habits	2031	1	1200
C001	Hamza	Lahore	B010	Thomas Sowell	Basic Economics	2031	1	1500
C002	Ahmed	Lahore	B111	The Precipice	Toby Ord	2032	1	900
C002	Ahmed	Lahore	B201	Lord of Flies	William Golding	2032	1	1400

2. Second Normal Form:

We get to the second normal form by removing partial dependencies. For that we

need to identify all the dependencies in the table.



<u>Bill ID</u>	Book ID	Quantity
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<u>Book ID</u>	Author	Title	Unit Price
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<u>Bill ID</u>	Customer ID	Customer Name	Customer Address
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3. Third Normal Form:

The Customer_Bill Table (last table in the 2NF section) has transitive dependencies we need to remove to reach 3rd Normal Form.

(Customer ID is Foreign Key in Customer_Bill Table)

<u>Bill ID</u>	Bill Date	Customer ID
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(Added Bill Date Field)

<u>Customer ID</u>	Customer Name	Customer Address
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9. Elaborate on any Denormalization opportunities in your

design.

We can Denormalize

- Stationery_Customer_Bill and Books_Customer_Bill into Customer_Bill Table.
- Stationery_Supplier_Order and Books_Supplier_order into Supplier_Order Table.
- Stationery_Supplier_Bill and Books_Supplier_Bill into Supplier_Bill Table.

10. Conclusion

The entity model presented here is designed to capture the data needed for the system, focusing specifically on the perspective of the Bookshop Management System. When all views are integrated into the complete system, there may be a need to adjust certain entities and relationships to align with the requirements of other subsystems or modules.

11. Recommendations

Based on the user requirements and give location of the shop and future scalability in mind, the database should be an offline application, however it can be turned into a web-application when another branch is opened and a centralized database should be placed at the main shop.

Given the seamless access to information facilitated by the automated system, it is strongly advisable to establish a robust security policy to restrict system access exclusively to authorized staff. This prudent measure is expected to yield substantial benefits, including heightened efficiency in information retrieval, enhanced data accuracy, and the facilitation of cost-effective transactions. Consequently, these enhancements are poised to elevate the overall efficiency and effectiveness of the bookshop's operational processes.
