CSE 3241 Project Checkpoint 01 – Entities and Relationships

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In a **NEATLY TYPED** document, provide the following:

1. Based on the requirements given in the project overview, list the entities to be modeled in this database. For each entity, provide a list of associated attributes.
    a. **Book**
        i. ISBN (Primary Key)
        ii. Title
        iii. Author(s)
        iv. Publisher
        v. Year
        vi. Price
        vii. Category
    b. **Author**
        i. AuthorID (Primary Key)
        ii. Name
    c. **Publisher**
        i. PublisherID (Primary Key)
        ii. Name
        iii. Address
        iv. Contact Info
    d. **Customer**
        i. CustomerID (Primary Key)
        ii. Name
        iii. Address
        iv. Email
        v. Phone Number
    e. **Order**
        i. OrderID (Primary Key)
        ii. CustomerID (Foreign Key)
        iii. Order Date
        iv. Order Total
    f. **OrderItem**
        i. OrderItemID (Primary Key)
        ii. OrderID (Foreign Key)
        iii. ISBN (Foreign Key)
        iv. Quantity
        v. Price
    g. **Category**
        i. CategoryID (Primary Key)

ii. Category Name

h. Inventory

i. ISBN (Foreign Key)

ii. Stock Quantity

2. Based on the requirements given in the project overview, what are the various relationships between entities? (For example, “CUSTOMER entities purchase BOOK entities”).

a. Customer places an order

i. Each Customer can place multiple Orders

ii. Each Order is associated with one Customer

b. Order contains OrderItem

i. Each Order can contain multiple OrderItems

ii. Each OrderItem is associated with one Order

c. OrderItem includes Book

i. Each OrderItem is linked to one Book through ISBN

ii. Each Book can appear in multiple OrderItems

d. Book belongs to Publisher

i. Each Book is published by one Publisher

ii. Each Publisher can publish multiple Books

e. Books are written by Author

i. Each Book can have one or more Authors

ii. Each Author can write multiple Books

f. Book classified into Category

i. Each Book is associated with one or more Categories

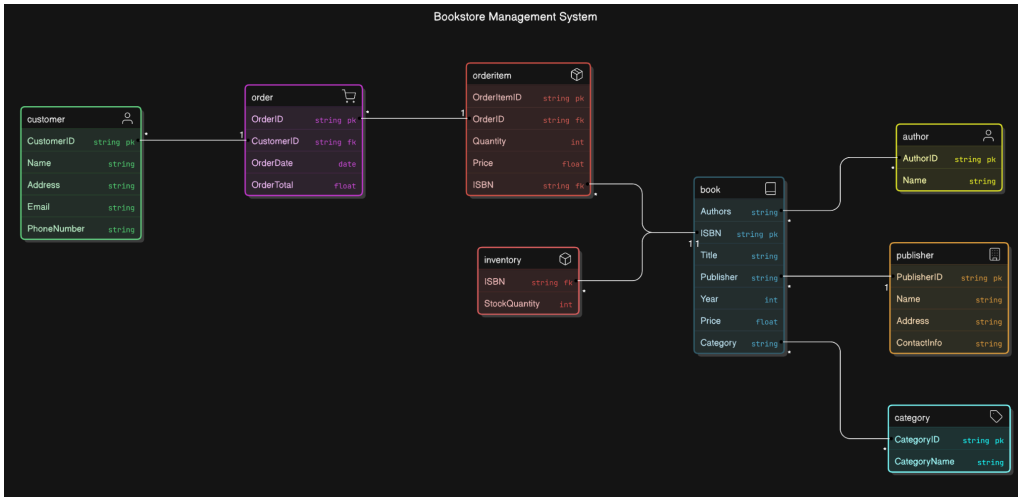
ii. Each Category can have multiple Books

g. Inventory tracks Book stock

i. Each Book is associated with one Inventory Record

ii. Inventory maintains the stock level for each Book

Below is a basic diagram of what the database schema will look like based on the above entities, attributes, and relationships. Our full ER diagram can be found in question 7.



3. Propose at least two additional entities that it would be useful for this database to model beyond the scope of the project requirements. Provide a list of possible attributes for the additional entities and possible relationships they may have with each other and the rest of the entities in the database. Give a brief, one sentence rationale for why adding these entities would be interesting/useful to the stakeholders for this database project.

   Additional Entities:

- BookDemand
  - Attributes:
    - ID, ISBN, popularity
  - Relationship:
    - each book has 1 popularity rating to assist in buying stock
  - Why add?
    - Adding this Attribute would help assure that popular books remain in stock while also helping the store generate as much profit as possible based on the popular demand of books.
- profitMargin
  - Attributes:
    - ID, ISBN, salesTotal, costTotal
  - Relationship:
    - Each book has a profit margin associated with it which can be adjusted to generate more profit with information from book demand.
  - Why add?
    - Adding an easy way to see all profit margins of popular books can help stores adjust prices in order to sell more via cutting prices or make more money based on popular books.

4. Give at least four examples of some informal queries/reports that it might be useful for this database might be used to generate. Include one example for each of the additional entities you proposed in question 3 above.

   1. What did customer A order?
   2. How much stock does book A have currently?
   3. Who published book A?
   4. What category is book A?

   Queries to the additional attributes above:

   5. How popular is book A?
   6. Much is book A making per book?

5. Suppose we want to add a new publisher to the database. How would we do that given the entities and relationships you've outlined above? Given your above description, is it possible to add a new publisher to your database without knowing the title of any books they have published? If not, revise your model to allow for publishers to be added as separate entities.

   You could add another publisher to the database by creating a new entry in the Publisher table, with the Publisher Name, Address and contact info, where the ID is automatically generated. In the case that the ID is not automatically generated, the ID would need to be unique, ideally the next unused integer.

6. Determine at least three other informal update operations and describe what entities would need to have attributes altered and how they would need to be changed given your above descriptions. Include one example for each of the additional entities you proposed in question 3 above.

    a. BookDemand

        i. To add another book demand entry, you would need a Book ID that is not currently represented in the list, as well as a popularity score, and an auto generated id, or an id that is the next unused integer. If there is not an unused book id, then you would need another Book which requires its own ISBN, and then data for Author, Publisher, Title, Year, Price and Category.

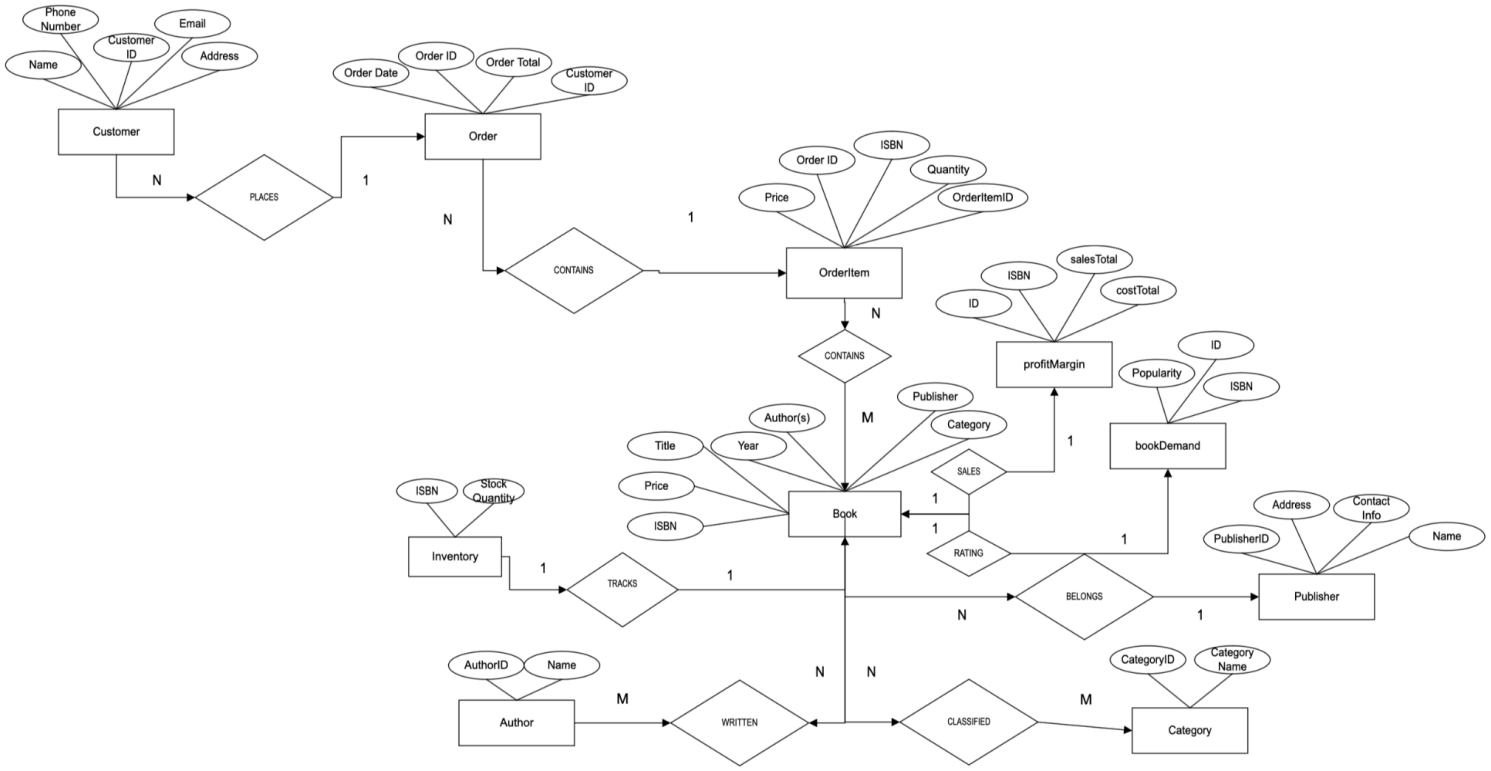
    b. profitMargin

        i. To add another profitMargin entry, you would need a Book ID that is not currently represented in the list, total cost, total sales, and an auto generated id, or an id that is the next unused integer. If there is not an unused book id, then you would need another Book which requires its own ISBN, and then data for Author, Publisher, Title, Year, Price and Category.

    c. Order

        i. To add another Order, you would need a new Order ID, ideally the next unused integer, and then an existing Customer ID, as well as the current date, and the total cost of the order. In the case that there are no Customers to fill that role, you would need a new Customer which requires a unique customer ID, then a name, address, email and phone number. Also, when making an order, you would have to append to the profitMargin table any books that were in the order, if they weren't already in the table, and modify their salesTotal attribute.

7. Provide an ER diagram for your database. Make sure you include all of the entities and relationships you determined in the questions above ***INCLUDING the entities for question 3 above***, and remember that ***EVERY*** entity in your model needs to connect to another entity in the model via some kind of relationship.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