

Names: Wally Yang, Tina Liang, Wei Zong, Chuwen Sun, Xingyu Yan
Date: Jan 31, 2020

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.
 - BOOK (Isbn, Title, Author(s), Year, Price, Category)
 - PUBLISHER (Name, Phone, Address)
 - CUSTOMER (Id, Email, Name, Address, Phone)
 - INVENTORY (Location, Quantity)
 - SALE_RECORD (Transaction_Id, Date, Card_Type)
2. Based on the requirements given in the project overview, what are the various relationships between entities? (For example, "CUSTOMER entities purchase BOOK entities").
 - PUBLISHER entities publish BOOK entities
 - CUSTOMER entities purchase BOOK entities, create SALE_RECORD entities (ternary relation)
 - BOOK entities stores at INVENTORY entities
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.
 - DISCOUNT (Percentage, Buy_Limit)
Additional Relationships: DISCOUNT entities applies on BOOK entities
Applying a DISCOUNT entities to BOOK entities, the final cost of that BOOK entities could be calculated automatically.
 - ACCOUNT (weak) (Acct_No, Reward_Point, Recommendation_List, membership)
Additional Relationships: CUSTOMER entities may have ACCOUNT entities
Enabling CUSTOMER entities to have their unique account could help the stakeholders to check information of a customer quicker when the customer is trying to make a purchase.
 - GIFT (weak) (Type)
Additional Relationships: BOOKSTORE entities reward GIFT entities to CUSTOMER entities
By applying GIFT entities, customers get rewarded once they spend a certain amount at the bookstore, which will maintain a good customer service.

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.

- Report all current inventory
- Report sales summary
- List all current accounts with membership
- Show all discounted books
- List all books from certain category
- List all books by certain author
- List all gifts that are rewarded to customer

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.

Create PUBLISHER entities with attributes "Name", "Phone" and "Address", and have a relationship with BOOK entities which is PUBLISHER entities publish BOOK entities.

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.

- Change the price of a BOOK
- Update the INVENTORY of a BOOK
- Add Reward_Point for a MEMBER
- Change the Percentage of a DISCOUNT
- Change the Type of GIFT
- Customers update their personal information (Email, Name, Address, Phone)
- Account's recommendation list can be altered according to changes in purchasing history

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.

