intro

Team name：Tuesday party

Team members:

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Development Platform : Oracle Apex

Topic:E-Commerce System of Bookstore

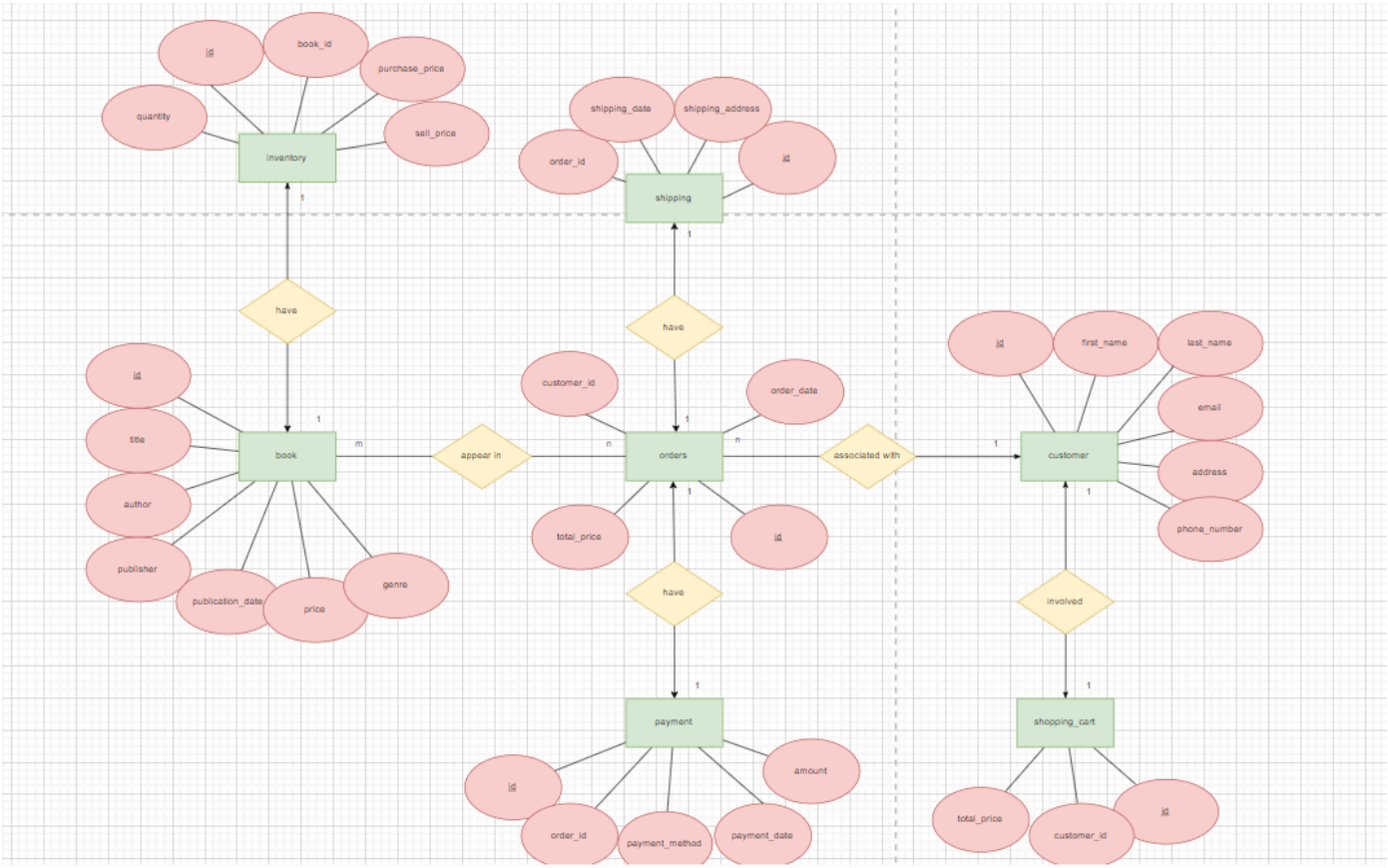
Our project is an e-commerce system for a bookstore, with a primary focus on providing services to customers. The system enables customers to place orders for books and select their preferred payment methods. Customers also have the option to have their orders delivered to their preferred address. Additionally, we have a inventory that tracks inventory levels, providing information on book availability. Customers can add desired items to their shopping carts for later checkout.

E-Commerce System of Bookstore

Entity	Attributes
book	Book ID (PK), Title, Author, Publisher, Publication Date, Price, Genre
order	Order ID (PK), Customer ID (FK), Order Date, Total Price
customer	Customer ID (PK), First Name, Last Name, Email, Address, Phone Number

Entity	Attributes
shopping_cart	Shopping Cart ID (PK), Customer ID (FK), Total Price
payment	Payment ID (PK), Order ID (FK), Payment Method, Payment Date, Amount
shipping	Shipping ID (PK), Order ID (FK), Shipping Date, Shipping Address
inventory	Inventory ID (PK), Book ID (FK),Quantity, Purchase Price, Sell Price

ERD



-relations

- The book entity and order entity have a many-to-many relationship. One order can contain multiple books, and one book can appear in multiple orders.
- The customer entity and order entity have a one-to-many relationship. One customer can place multiple orders, but each order can only be associated with one customer.
- The customer entity and shopping_cart entity have a one-to-one relationship. One customer can have only one shopping cart, and one shopping cart can only be associated with one customer.

- The order entity and payment entity have a one-to-one relationship. One order can only have one payment record, and one payment record can only be associated with one order.
- The order entity and shipping entity have a one-to-one relationship. One order can only have one shipping record, and one shipping record can only be associated with one order.
- The inventory entity and book entity have a one-to-many relationship. One inventory corresponds to one book, but one book can have multiple inventory records.

NF

1.Book

Attributes: {Book ID (PK), Title, Author, Publisher, Publication Date, Price, Genre}

Functional Dependencies: {Book ID -> Title, Author, Publisher, Publication Date, Price, Genre}

Superkey: {Book ID}, {Book ID, Title, Author, Publisher, Publication Date, Price, Genre}

Candidate Key: {Book ID}

Primary key: {Book ID}

State: BCNF

Reason:

- No multi-valued attributes. Each column and row intersection has only one value.
- No partial dependencies. There is one unique attribute, Book ID, that identifies each tuple, and no non-key attributes depend only on a part of the primary key.
- No transitive dependencies. No non-primary-key attribute is transitively dependent on the primary key.
- No partial or transitive dependencies of primary attributes on candidate keys.

2.Order

Attributes: {Order ID (PK), Customer ID (FK), Order Date, Total Price}

Functional Dependencies: {Order ID -> Customer ID, Order Date, Total Price}

Superkey: {Order ID}, {Order ID, Customer ID}

Candidate Key: {Order ID}

Primary Key: {Order ID}

State: BCNF

Explanation:

- No multi-valued attributes. Each row and column intersection has only one value.
- No partial dependencies. Each non-primary key attribute is fully dependent on the primary key.
- No transitive dependencies. No non-primary key attribute is transitively dependent on the primary key.
- No partial or transitive dependencies of primary attributes on candidate keys.

3.Customer

Attributes: {Customer ID (PK), First Name, Last Name, Email, Address, Phone Number}

Functional Dependencies: {Customer ID -> First Name, Last Name, Email, Address, Phone Number}

Superkey: {Customer ID}, {Email}

Candidate Key: {Customer ID}

Primary Key: {Customer ID}

State: BCNF

Explanation:

No multi-valued attributes. Each row and column intersection has only one value. No partial dependencies. Each non-primary key attribute is fully dependent on the primary key. No transitive dependencies. No non-primary key attribute is transitively dependent on the primary key. No partial or transitive dependencies of primary attributes on candidate keys.

4.Shopping_cart

Attributes: {Shopping Cart ID (PK), Customer ID (FK), Total Price}

Functional Dependencies: {Shopping Cart ID -> Customer ID, Total Price}, {Customer ID -> Shopping Cart ID}

Superkey: {Shopping Cart ID}, {Customer ID, Shopping Cart ID}

Candidate Key: {Shopping Cart ID}

Primary Key: {Shopping Cart ID}

State: BCNF

Explanation:

No multi-valued attributes. Each row and column intersection has only one value. No partial dependencies. Each non-primary key attribute is fully dependent on the primary key. No transitive dependencies. No non-primary key attribute is transitively dependent on the primary key. No partial or transitive dependencies of primary attributes on candidate keys.

5.Payment

Attributes: {Payment ID (PK), Order ID (FK), Payment Method, Payment Date, Amount}

Functional Dependencies: {Payment ID -> Order ID, Payment Method, Payment Date, Amount}

Superkey: {Payment ID}, {Payment ID, Order ID}

Candidate Key: {Payment ID}

Primary Key: {Payment ID}

State: BCNF

Explanation:

No multi-valued attributes. Each row and column intersection has only one value. No partial dependencies. Each non-primary key attribute is fully dependent on the primary key. No transitive dependencies. No non-primary key attribute is transitively dependent on the primary key. No partial or transitive dependencies of primary attributes on candidate keys.

6.Shipping

Attributes: {Shipping ID (PK), Order ID (FK), Shipping Date, Shipping Address}

Functional Dependencies: {Shipping ID -> Order ID, Shipping Date, Shipping Address}

Superkey: {Shipping ID}, {Shipping ID, Order ID}

Candidate Key: {Shipping ID}

Primary Key: {Shipping ID}

State: BCNF

Explanation:

No multi-valued attributes. Each row and column intersection has only one value. No partial dependencies. Each non-primary key attribute is fully dependent on the primary key. No transitive dependencies. No non-primary key attribute is transitively dependent on the primary key. No partial or transitive dependencies of primary attributes on candidate keys.

7.Inventory

Attributes: {Inventory ID (PK), Book ID (FK), Quantity, Purchase Price, Sell Price}

Functional Dependencies: {Inventory ID -> Book ID, Quantity, Purchase Price, Sell Price}

Superkey: {Inventory ID}, {Inventory ID, Book ID}

Candidate Key: {Inventory ID}

Primary Key: {Inventory ID}

State: BCNF

Explanation:

No multi-valued attributes. Each row and column intersection has only one value. No partial dependencies. Each non-primary key attribute is fully dependent on the primary key. No transitive dependencies. No non-primary key attribute is transitively dependent on the primary key. No partial or transitive dependencies of primary attributes on candidate keys.