## Online Bookstore

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# Conceptual Design

Diagram

Description automatically generated Our conceptual design is based entirely on the information provided in the problem statement. The main assumption needed to run the database is that there is only one warehouse, as detailed in the problem statement. Otherwise, the design is solely based on the requirements in the problem statement with no other assumptions added to it.

# Reduction to Relation Schemas

Publisher(publisher\_id, name, address, phone)

Published(published\_id, ISBN)

Author(ISBN, name, address, phone)

Authored(ISBN)

Book(ISBN, name, genre, number\_of\_pages, publisher\_id,price)

Stored(ISBN, warehouse\_ID)

Warehouse(warehouse\_ID, address, phone)

Profile (profile\_id, name, phone, address)

Cart\_of(profile\_id)

Book\_cart(ISBN)

Shopping cart(cart\_id)

# Normalization of Relation Schemas

All the relations are in 3NF because each table has just one F.D therefore there is no extraneous attribute(each attribute is important and non-redundant). Therefore, I just need to check for BCNF

//author

author(ISBN,name, address, phone);

F ={

ISBN -> name, address, phone

}

The relation is in good normal form in BCNF because the author\_id is a superkey.

ISBN is in BCNF because [ISBN]+ = Author\_ID, name, address, phone

//publisher

publisher(publisher\_id,name, address, phone);

F = {

Publisher\_id -> name, address, phone

}

The relation is in good normal form in BCNF because the publisher\_id is a superkey.

Publisher\_ID is in BCNF because [Publisher\_ID]+ = Publisher\_ID, name, address, phone

//Book

book(ISBN, name, genre, number\_of\_pages,publisher\_id, price);

F = {

ISBN -> name, genre, number\_of\_pages,publisher\_id,price

}

The relation is in good normal form in BCNF because the ISBN is a superkey

ISBN is in BCNF because [ISBN]+ = ISBN, name,genre, number\_of\_pages, price

//Warehouse

warehouse(warehouse\_id, address, phone)

F = {

Warehouse\_id -> address, phone

}

The relation is in good normal form in BCNF because the Warehouse\_id is a superkey

Warehouse\_id is in BCNF because [Warehouse\_id]+ = Warehouse\_id, address, phone

//Profile

profile(profile\_id, name, address, phone)

F = {

profile\_id -> name, address, phone

}

The relation is in good normal form in BCNF because the User\_id is a superkey

profile\_id is in BCNF because [profile\_id]+ = profile\_id, name, address, phone

//Authored

Authored(ISBN)

F= {

ISBN -> ISBN

}

The relation is in good normal form in BCNF because it has one functional dependency which is trival. ie. ISBN is a subset of ISBN

//Published

Published(published\_id, ISBN)

F= {

published\_id, ISBN -> ISBN

}

The relation is in good normal form in BCNF because it has one functional dependency which is trival. ie. ISBN is a subset of publisher\_id and ISBN

//stored

stored(ISBN, warehouse\_id)

F = {

ISBN -> warehouse\_id

}

The relation is in good normal form in BCNF because the ISBN is a superkey

ISBN is in BCNF because [ISBN]+ = ISBN, Warehouse\_id

//Book\_Cart

Book\_Cart( ISBN)

F= {

ISBN -> ISBN

}

The relation is in good normal form in BCNF because it has one functional dependency which is trival. ie. ISBN is a subset of ISBN

//Cart\_of

Cart\_of(profile\_id)

F= {

profile\_id -> profile\_id

}

The relation is in good normal form in BCNF because it has one functional dependency which is trival. ie. profile\_id is a subset of profile\_id

//shopping\_cart

shopping\_cart(cart\_id)

F= {

cart\_id -> cart\_id

}

The relation is in good normal form in BCNF because it has one functional dependency which is trival. ie. cart\_id is a subset of cart\_id

Database Schema Diagram

Diagram

Description automatically generated