

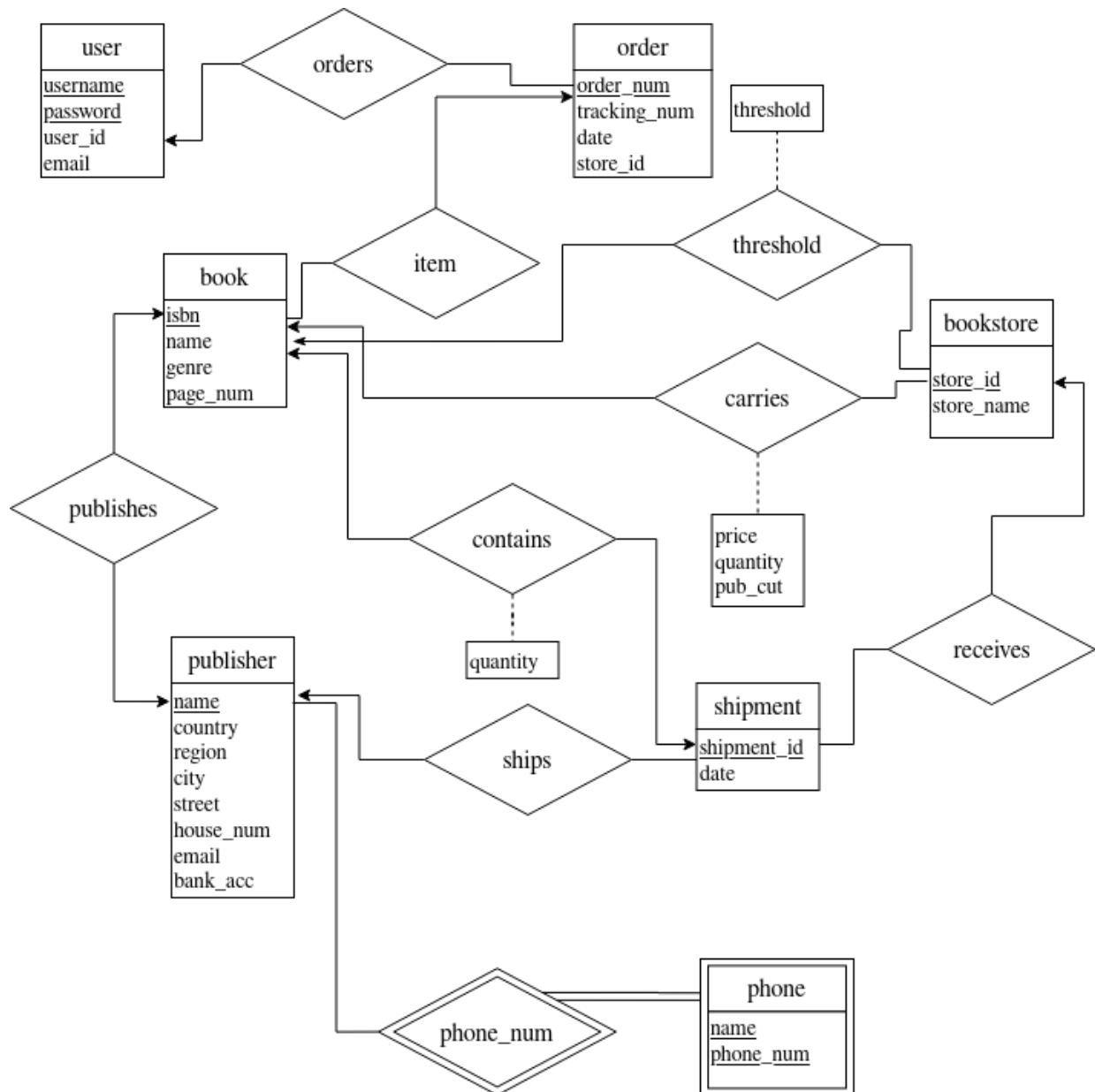
COMP3005B Project

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1 Conceptual Design

1.1 ER Diagram



1.2 Description

- **user**: A user account who's only relation is to their orders. Orders can only be linked to one user, but a user can have many orders.
- **order**: Order details. Order items can only link to one order but an order can have many items. Orders can only have one user
- **book**: A book can only have 1 publisher, but can be in multiple orders, carried by multiple bookstores, and be in multiple restocks.

- publisher: A publisher can publish multiple books, send multiple restock shipments, and have multiple phones.
- phone: phone is a weak entity because it's existence is entirely defined by a publisher. A phone can only tie to one publisher, but a publisher may have multiple phone numbers.
- shipment: A shipment can only be sent from one publisher to one bookstore, but contain multiple books to restock.
- bookstore: A bookstore can carry multiple books and receive multiple restock shipments.

1.3 Notes

- The project description states “When checkingout, the user inserts billing and shipping information (can be different than those used in registration)”. This implies that billing and shipping should be inputted upon registration. I chose not to implement this because it poses an unnecessary security risk for users who have never made an order.

2 Reduction to Relation Schema

- *orders*(user_id, order_num)
- *item*(order_num, isbn)
- *publishes*(isbn, publisher)
- *ships*(pub_name, shipment_id)
- *contains*(isbn, shipment_id, quantity)
- *receives*(store_id, shipment_id)
- *carries*(store_id, isbn, price, quantity, pub_cut)
- *threshold*(store_id, isbn, threshold)

3 Normalization of Relation Schema

The relations in this database have been designed to have minimal functional dependencies. This results in the relations already decomposed. This can be seen by the following.

3.1 orders

a is *user_id*, *b* is *order_num*

ab is a superkey for orders,

a does not imply *b*, *b* does not imply *a*, therefore orders is fully decomposed

3.2 item

a is *order_num*, *b* is *isbn*

ab is a superkey for item,

a does not imply *b*, *b* does not imply *a*, therefore item is fully decomposed

3.3 publishes

a is *isbn*, *b* is *publisher*

ab is a superkey for publishes

a does not imply *b*, *b* does not imply *a*, therefore publishes is fully decomposed

3.4 ships

a is *pub_name*, b is *shipment_id*,

ab is a superkey for ships,

a does not imply b , b does not imply a , therefore ships is fully decomposed

3.5 contains

a is *isbn*, b is *shipment_id*, c is *quantity*,

ab is a superkey, $ab \rightarrow c$, therefore receives is fully decomposed

3.6 receives

a is *store_id*, b is *shipment_id*,

ab is a superkey for receives,

a does not imply b , b does not imply a , therefore receives is fully decomposed

3.7 carries

a is *store_id*, b is *isbn*, c is *price*, d is *quantity*, e is *pub_cut*,

ab is a superkey for carries,

$ab \rightarrow c$, $ab \rightarrow d$, $ab \rightarrow e$. Due to the uniqueness and required population of c , d , and e , this system should not be decomposed.

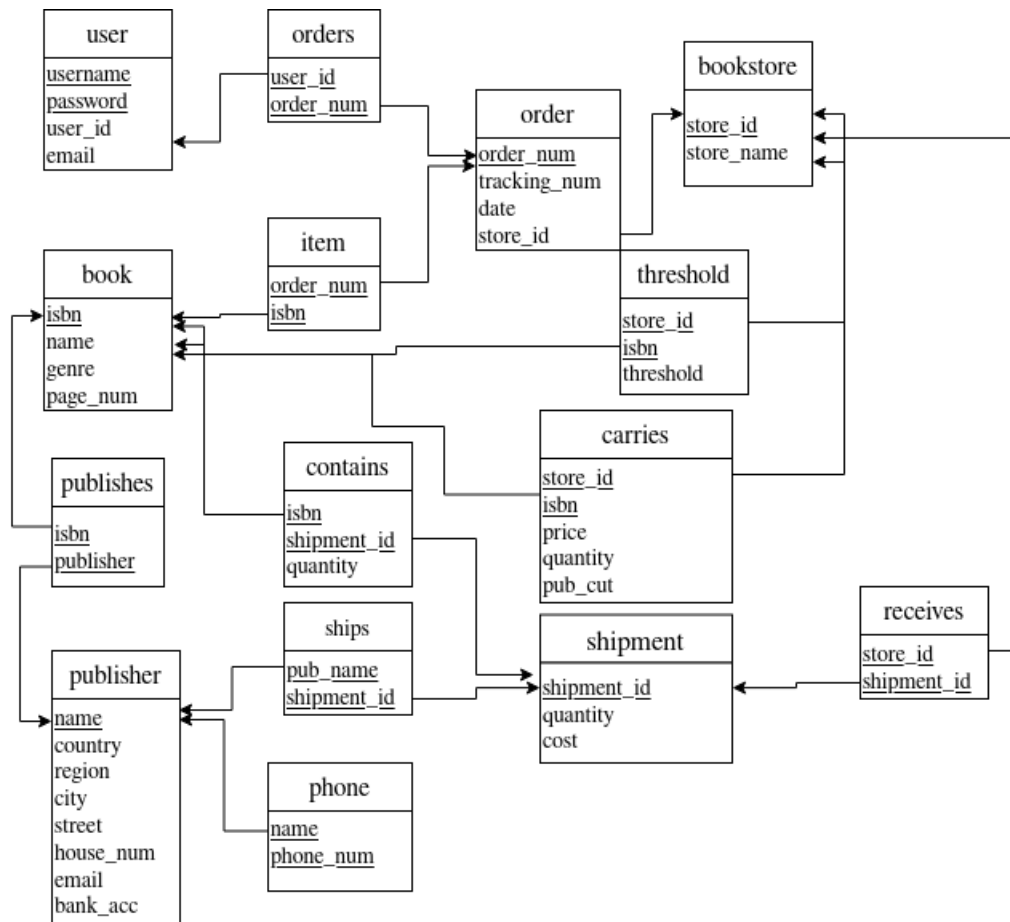
3.8 threshold

a is *store_id*, b is *isbn*, c is *price*,

ab is a superkey for threshold,

ab implies c , therefore threshold is fully decomposed. Previously this was a part of carries, but, due to the potential NULL state of threshold, it was decomposed out.

4 Database Schema Diagram



5 Implementation

Implementation is currently incomplete

6 Bonus Features

6.1 Implemented Features

Currently no bonus features are implemented.

6.2 Planned Features

- Password hashing
- HTTPS support
- Improved searching

7 GitHub Repo

Repository will be made public April 15.

https://github.com/AdamPayzant/COMP3005_Project