

COMP3005-B

Bookstore Project

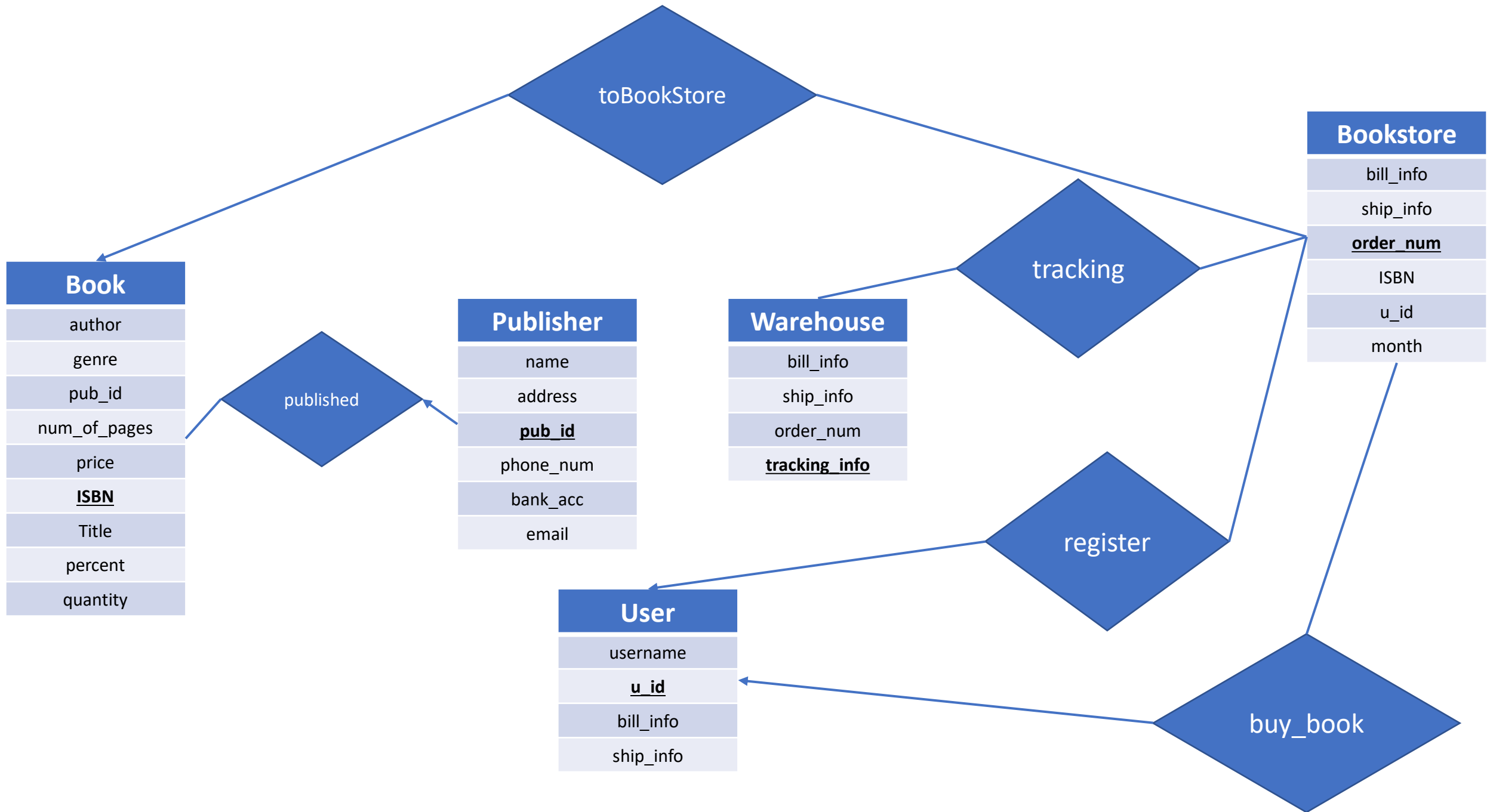
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Section 2.1

Conceptual Design

ER Diagram



Assumptions with Tables

- Bookstore
 - A user can make many purchases and each purchase is recorded with a unique order_num (primary key).
- User
 - Each user only has one account where the (u_id) is unique
 - However we can have repeats of ship_info and bill_info

Assumptions with Relation Set

- Tracking
 - An order can be mapped to many different tracking orders ***when the user can sent them though*** so basically when the user has made the purchase then they can track the info
 - When an order is placed that order will have a unique tracking info
- Register
 - User has the ability to create an account with the database by providing needed information which is bill_info and ship_info
 - Each user must have one account meaning no two users can have the same u_id
 - However two users can have the same bill_info and ship_info

Section 2.2

Reduction to Relation Schemas

Items in bold are Foreign Keys

Tables and Relation Sets

Tables

- Book(author, genre, **pub_id**, num_of_pages, price, ISBN, title, percent, pub_name, quantity)
- Publisher(name, address, email, phone_num, bank_acc, pub_id)
- Warehouse(bill_info, ship_info, order_num, tracking_info)
- User(username, u_id, bill_info, ship_info)
- Bookstore(bill_info, ship_info, order_num, ISBN, **u_id**)

Relation Sets

- ~~Buy_Book(u_id, **order_num**, b_id)~~
- Tracking(t_id, **tracking_info**, **order_num**)

Section 2.3

Normalization of Relation Schemas

Functional Dependencies

F={

- ISBN \rightarrow author, pub_name (**BOOK**)
 - pub_ib \rightarrow percent (**BOOK**)
 - ISBN, pub_id, pub_name \rightarrow num_of_pages, price, author, genre, quantity (**BOOK**)
 - pub_id \rightarrow address, bank_acc, phone_num, name, email (**PUBLISHER**)
 - tracking_info \rightarrow order_num, ship_info, bill_info (**WAREHOUSE**)
 - u_id \rightarrow bill_info, ship_info (**USER**)
 - order_num \rightarrow t_id, tracking_info (**TRACKING**)
 - order_num \rightarrow ship_info, bill_info, ISBN, u_id (**BOOKSTORE**)
 - u_id, order_num \rightarrow b_id (**BUY_BOOK**)
- }

Conical Covers

F={

• ~~ISBN → author, pub_name (**BOOK**)~~

• ~~pub_ib → percent (**BOOK**)~~

• ~~ISBN, pub_id, pub_name → num_of_pages, price, author, genre, quantity (**BOOK**)~~

pub_id, pub_name in ISBN, pub_id, pub_name → num_of_pages, price, author, quantity, genre (**BOOK**) is extraneous

Remove pub_id & pub_name L.H.S.

• ~~ISBN → num_of_pages, price, author, genre (**BOOK**)~~

ISBN → num_of_pages, price, author, genre, quantity (**BOOK**) UNION ISBN → author, pub_name (**BOOK**)

• ISBN → num_of_pages, price, author, genre, author, pub_name, quantity (**BOOK**)

• pub_id → address, bank_acc, phone_num, name, email (**PUBLISHER**)

pub_ib → percent (**BOOK**) UNION with pub_id → address, bank_acc, phone_num, name, email (**PUBLISHER**)

• pub_id → address, bank_acc, phone_num, name, email, percent (**PUBLISHER**)
(**BOOK**)

Conical Covers cont'd

- tracking_info \rightarrow order_num, ship_info, bill_info (**WAREHOUSE**)

- ~~• u_id \rightarrow bill_info, ship_info (**USER**)~~

- order_num \rightarrow t_id, tracking_info (**TRACKING**)

- ~~• order_num \rightarrow ship_info, bill_info, ISBN, u_id (**BOOKSTORE**)~~

ship_info & bill_info are extraneous so Remove from R.H.S.

- ~~• order_num \rightarrow ISBN, u_id (**BOOKSTORE**)~~

order_num \rightarrow ISBN, u_id (**BOOKSTORE**) UNION order_num \rightarrow t_id, tracking_info (**TRACKING**)

order_num \rightarrow ISBN, u_id, t_id, tracking_info

tracking_info, ISBN are extraneous

Conical Covers cont'd

- $\text{order_num} \rightarrow \text{u_id}, \text{t_id},$
- ~~$\text{order_num}, \text{u_id} \rightarrow \text{b_id}$ (**BUY_BOOK**)~~

u_id is extraneous so remove from L.H.S.

$\text{order_num} \rightarrow \text{b_id}$

$\text{order_num} \rightarrow \text{b_id} \text{ UNION } \text{order_num} \rightarrow \text{u_id}, \text{t_id},$

- $\text{order_num} \rightarrow \text{u_id}, \text{t_id}, \text{b_id}$
- }

Conical Covers Final

$F_C = \{$

- ISBN \rightarrow num_of_pages, price, author, genre, author, quantity ,
pub_name (**BOOK**)
- pub_id \rightarrow address, bank_acc, phone_num, name, email, percent
(**PUBLISHER**) (**BOOK**)
- tracking_info \rightarrow order_num, ship_info, bill_info (**WAREHOUSE**)
- order_num \rightarrow u_id, t_id, b_id (**TRACKING**) (**BOOKSTORE**)
(**BUY_BOOK**)

$\}$

3NF

First Loop generate the following schemas suing the Conical Covers from slide 12

- (ISBN, num_of_pages, price, author, genre, author, pub_name, quantity)
- (pub_id, address, bank_acc, phone_num, name, email, percent)
- (tracking_info, order_num, ship_info, bill_info)
- (order_num, u_id, t_id)

3NF Final

Notice no schema is a subset of any of the other subsets

- (ISBN, num_of_pages, price, author, genre, author, pub_name, quantity)
- (pub_id, address, bank_acc, phone_num, name, email, percent)
- (tracking_info, order_num, ship_info, bill_info)
- (order_num, u_id, t_id)

So No Change

Section 2.4

Database Schema Diagram

Book
author
genre
pub_id
num_of_pages
price
<u>ISBN</u>
title
percent
quantity

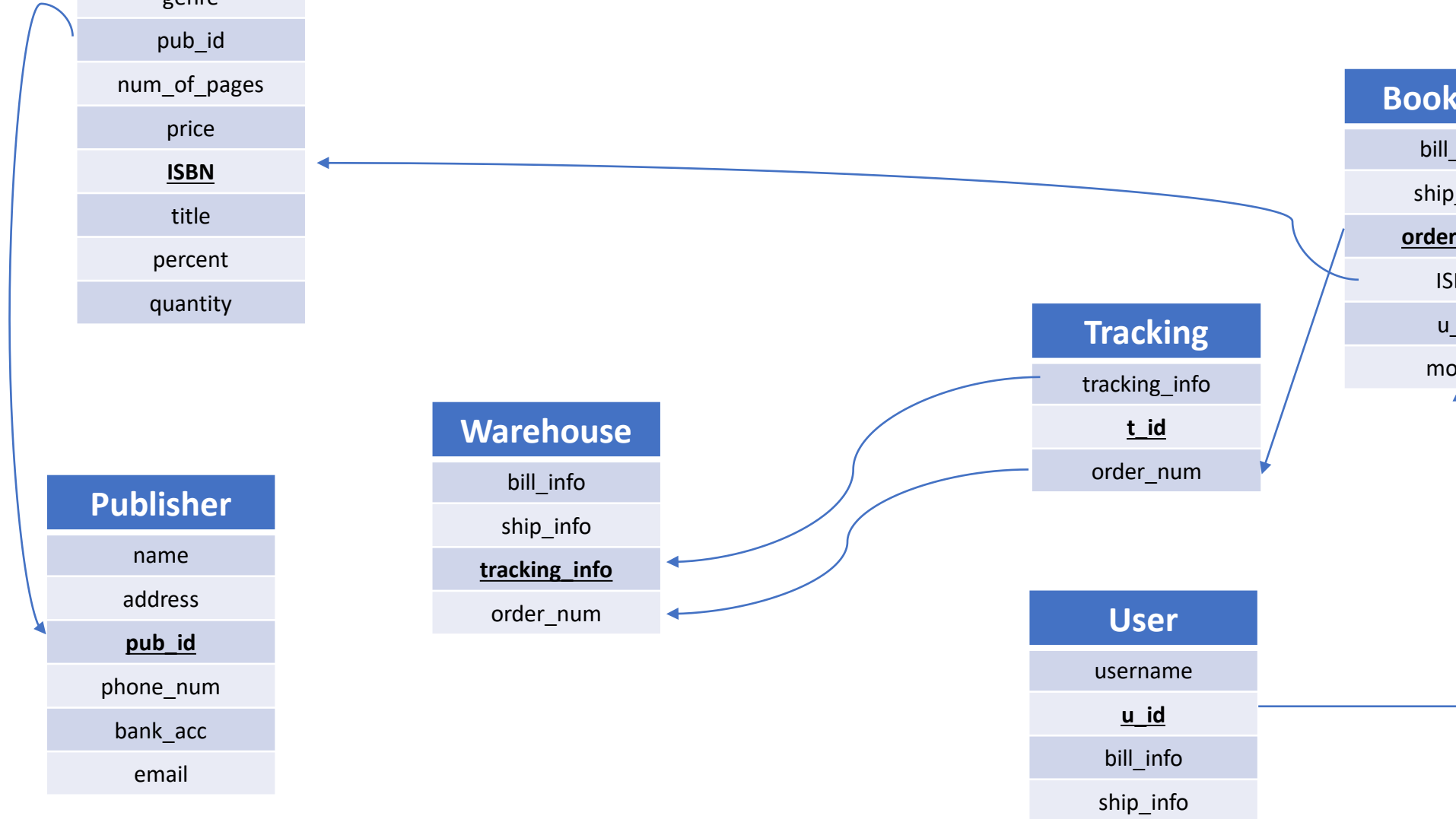
Publisher
name
address
<u>pub_id</u>
phone_num
bank_acc
email

Warehouse
bill_info
ship_info
<u>tracking_info</u>
order_num

Tracking
tracking_info
<u>t_id</u>
order_num

User
username
<u>u_id</u>
bill_info
ship_info

Bookstore
bill_info
ship_info
<u>order_num</u>
ISBN
u_id
month



Section 2.5

Implementation

Section 2.7

GitHub Repository

Code is Available as a Web Application on Github

- GitHub account link
 - https://github.com/AmrheMinott/COMP_3005_SQL_Project

Section 2.8

Appendix

Time Available

- Thursday April 16 any time
- Friday April 17 any time
- Saturday April 18 any time
- Sunday April 19 any time
- Monday April 20 any time
- Tuesday April 21 any time