COMP3005-B Bookstore Project

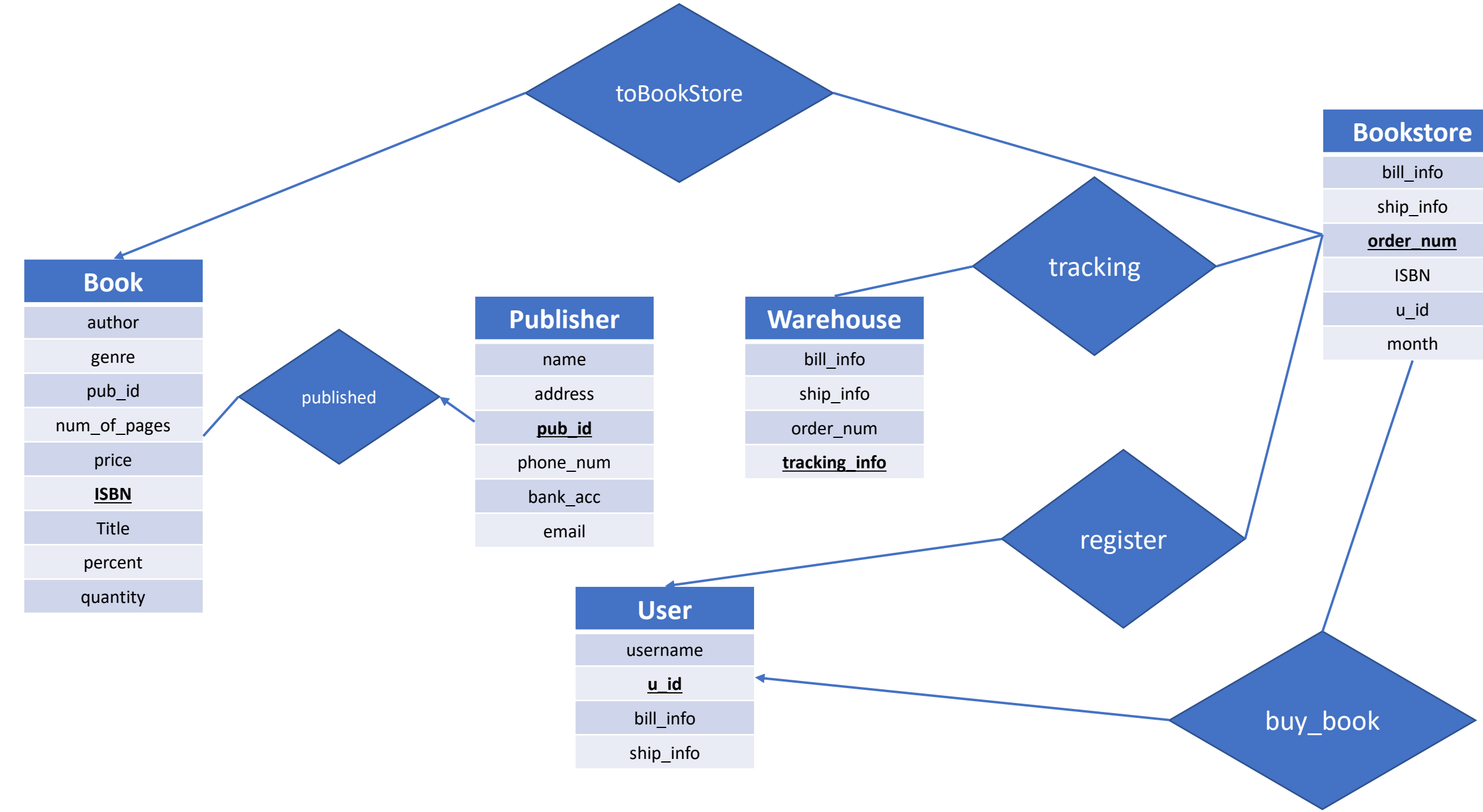
Amrhe Minott

101107093

Section 2.1

Conceptual Design

ER Diagram


toBookStore
Book
author
genre
pub_id
num_of_pages
price
ISBN
Title
percent
quantity
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Publisher
name
address
pub_id
phone_num
bank_acc
email
Warehouse
bill_info
ship_info
order_num
tracking_info
tracking
Bookstore
bill_info
ship_info
order_num
ISBN
u_id
month
register
User
username
u_id
bill_info
ship_info
buy_book

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

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

- ~~order_num → ISBN, u_id (**BOOKSTORE**)~~

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

order_num → ISBN, u_id, t_id, tracking_info

tracking_info, ISBN are extraneous

Conical Covers cont’d

- order_num → u_id, t_id,
- ~~order_num, u_id → b_id (**BUY_BOOK**)~~

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

order_num → b_id

order_num → b_id UNION order_num → u_id, t_id,

- order_num → u_id, t_id, b_id

}

Conical Covers Final

F_C = {

- ISBN → num_of_pages, price, author, genre, author, quantity , pub_name (**BOOK**)
- pub_id → address, bank_acc, phone_num, name, email, percent (**PUBLISHER**) (**BOOK**)
- tracking_info → order_num, ship_info, bill_info (**WAREHOUSE**)
- order_num → 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

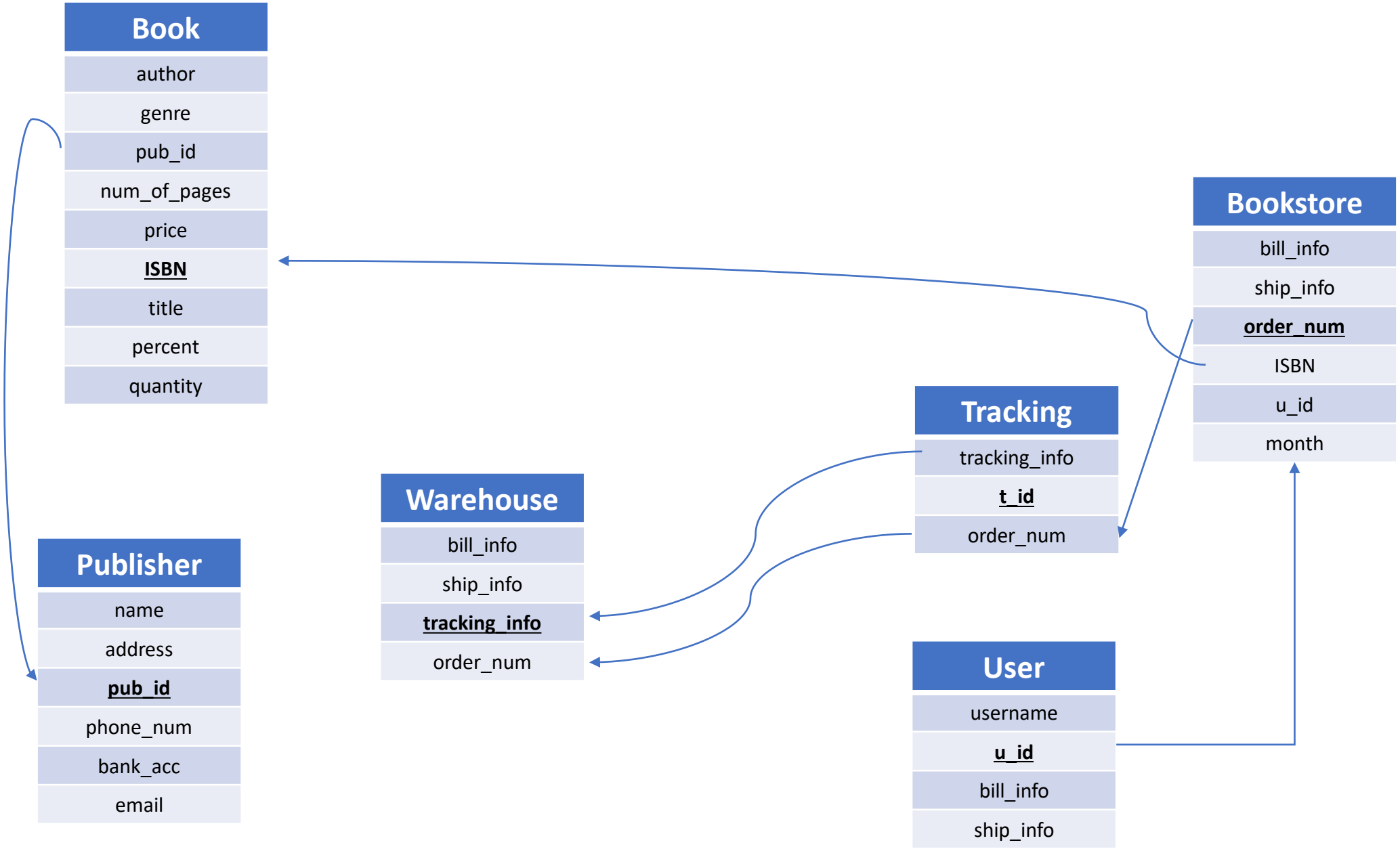
Notice no schema is a subset of any of the other subsets

- (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
ISBN
title
percent
quantity
Bookstore
bill_info
ship_info
order_num
ISBN
u_id
month
Tracking
tracking_info
t_id
order_num
Warehouse
bill_info
ship_info
tracking_info
order_num
Publisher
name
address
pub_id
phone_num
bank_acc
email
User
username
u_id
bill_info
ship_info

Section 2.5

Implementation

Code is Available as a Web Application on Github

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

Section 2.7

GitHub Repository