

COMP3005 Project Report

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Contents

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Contents

1. Problem Statement

2. Project Report

2.1. Conceptual Design

2.2. Reduction to Relation Schema

2.3. Normalization of Relation Schemas

book

publisher

contact_info

Simple cases

2.4. Database Schema Diagram

2.5. Implementation

Tech Stack

Store View

Login

2.7 Github Repository

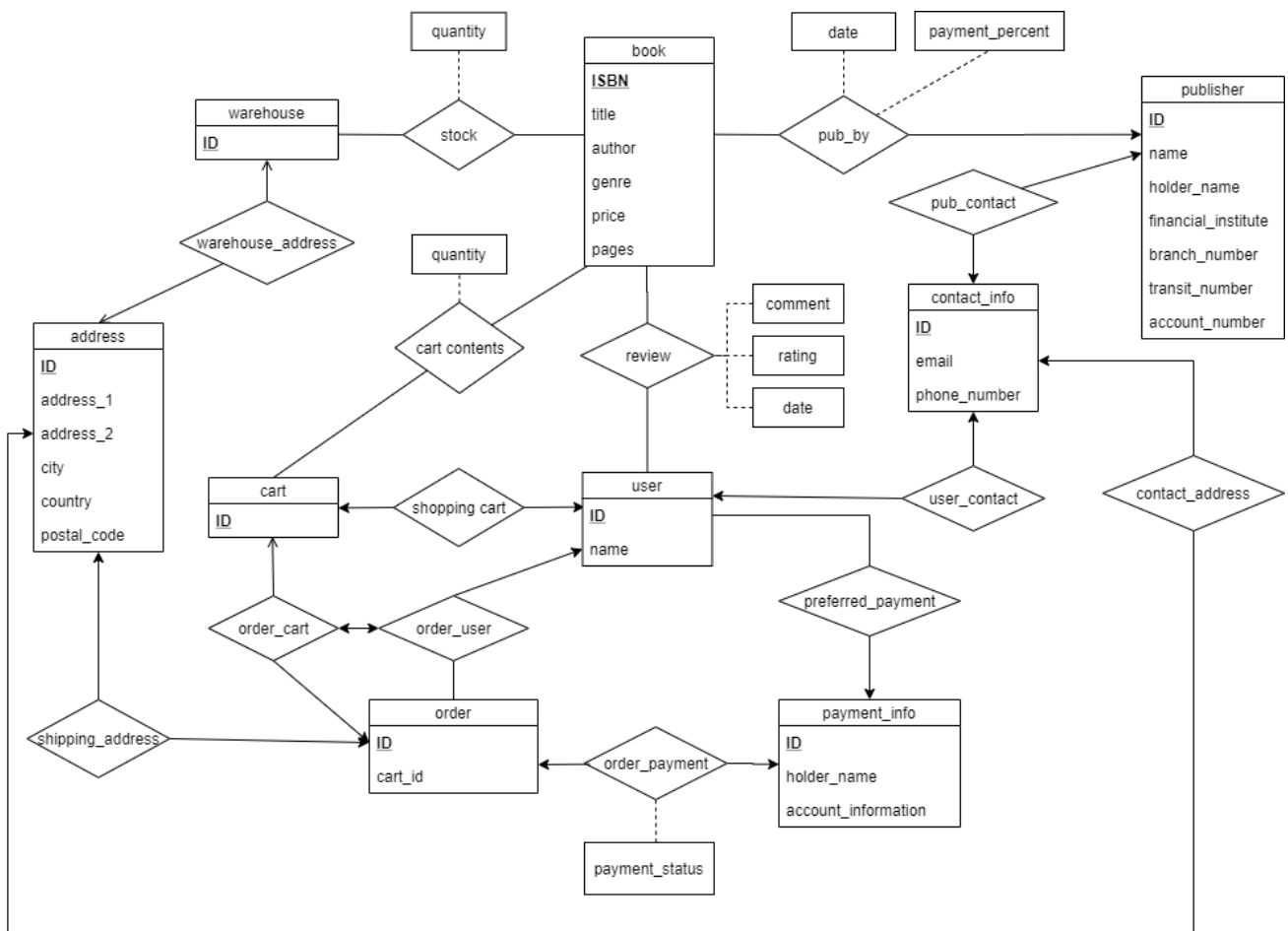
2.8 Appendix I

1. Problem Statement

We are designing a bookstore.

2. Project Report

2.1. Conceptual Design



2.2. Reduction to Relation Schema


```

let  $A = ISBN$ 
let  $B = title$ 
let  $C = author$ 
let  $D = genre$ 
let  $E = price$ 
let  $F = pages$ 

```

$$R = (A, B, C, D, E, F, E, F)$$

$$F = \{$$

$$A \rightarrow B, A \rightarrow C, A \rightarrow D,$$

$$A \rightarrow E, A \rightarrow F$$

$$\}$$
 $result = A$
 $A \rightarrow B$
 $A \rightarrow C$
 $A \rightarrow D$
 $A \rightarrow E$
 $A \rightarrow F$
 $result = AB$
 $result = ABC$
 $result = ABCD$
 $result = ABCDE$
 $result = ABCDEF$

Therefore ISBN is a superkey and this relation is in 3NF form

publisher

```

let  $A = ID$ 
let  $B = name$ 
let  $C = holder\_name$ 
let  $D = financial\_institute$ 
let  $E = branch\_number$ 
let  $F = transit\_number$ 
let  $G = account\_number$ 

```

$$R = (A, B, C, D, E, F, E, F, G)$$

$$F = \{$$

$$A \rightarrow B, A \rightarrow C, A \rightarrow D,$$

$$A \rightarrow E, A \rightarrow F, A \rightarrow G$$

$$\}$$
 $result = A$
 $A \rightarrow B$
 $A \rightarrow C$
 $A \rightarrow D$
 $A \rightarrow E$
 $A \rightarrow F$
 $A \rightarrow G$
 $result = AB$
 $result = ABC$
 $result = ABCD$
 $result = ABCDE$
 $result = ABCDEF$
 $result = ABCDEFG$

Therefore ID is a superkey and this relation is in 3NF form

contact_info

let $A = ID$
let $B = address_id$
let $C = email$
let $D = phone_number$

$$R = (A, B, C, D)$$

$$F = \{ \\ A \rightarrow B, A \rightarrow C, A \rightarrow D \\ \}$$

$$result = A$$

$$A \rightarrow B \\ A \rightarrow C \\ A \rightarrow D$$

$$result = AB \\ result = ABC \\ result = ABCD$$

Therefore ID is a superkey and this relation is in 3NF form

Simple cases

1. The following relations have only two attributes and one functional dependency connecting them, giving a clear primary key showing that they are in 3NF form

They can be tested with the following form

$$R = AB \\ F = \{A \rightarrow B\}$$

$$A \rightarrow B \quad \begin{array}{l} result = A \\ result = AB \end{array}$$

\therefore for every functional dependency $\alpha \rightarrow \beta$ in F_c , α is a superkey

- user
- user_contact
- order_cart
- user_order
- pub_contact
- contact_address
- preferred_payment
- warehouse_address
- shipping_address
- stock

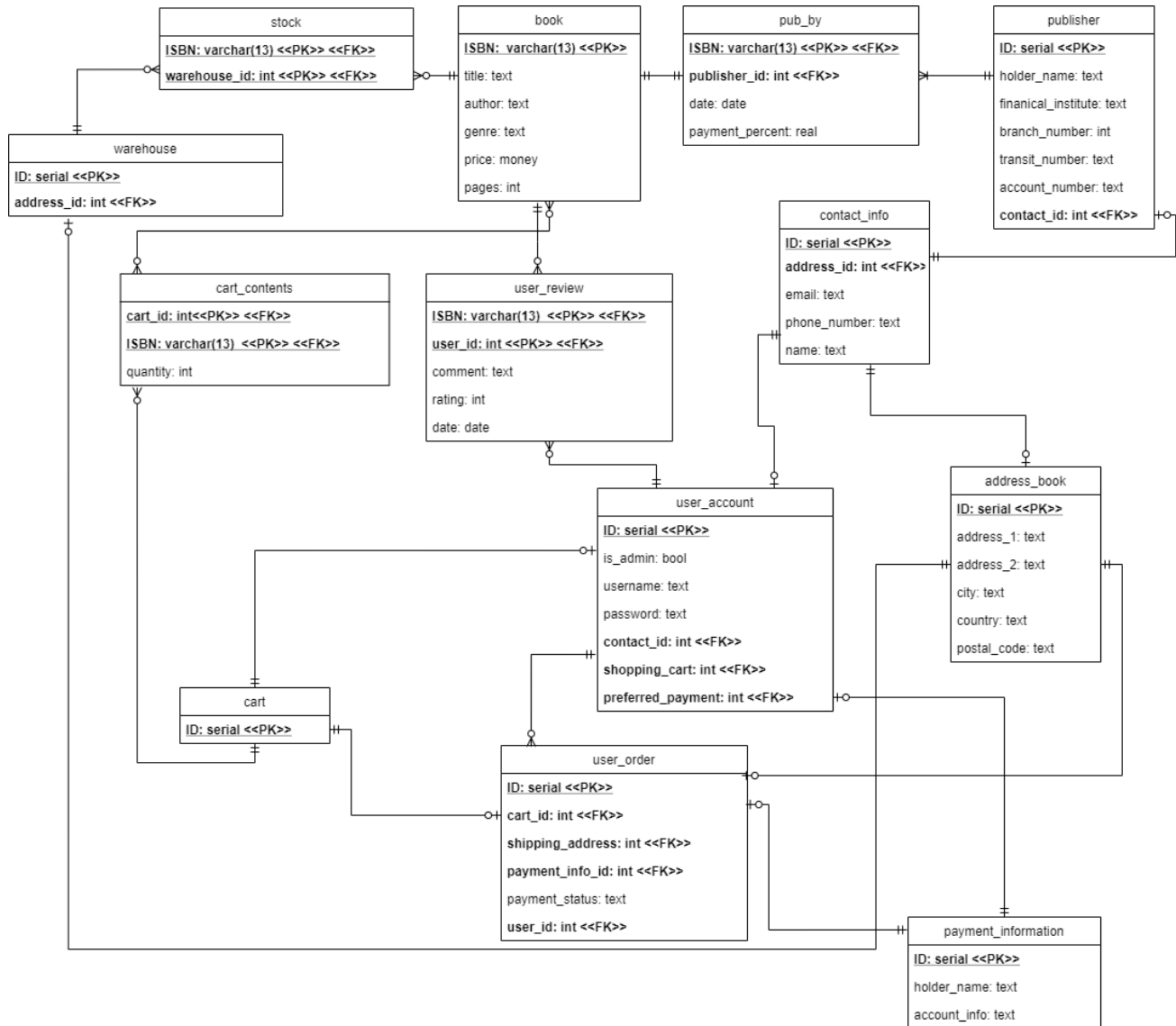
2. Another simple case are entities with one attribute

- cart
- warehouse

...

2.4. Database Schema Diagram

I collapsed some of the 1-1 relations into the stronger entity (whichever one seemed like it would be used more)



2.5. Implementation

Tech Stack

- Docker Compose: used to create database and server instances
 - Postgres Image: the main database
 - Redis: used for storing temporary sessions
 - Flask (Python): The backend framework
 - React: The frontend framework
 - Nginx

Store View

Store

Title	Author	Pages	Publisher	Price
Lord of the Rings: The hobbit	JRR Tolken	453		\$20.99
Lord of the Rings: The Last King	JRR Tolken	622		\$23.99

Login

Login

Username



Password



I have the structure for creating APIs, user authentication (as well as permissions) that are working well with some simple session logic. Queries are fetched, data is sent. The basic pieces are there, unfortunately the higher level parts of the project are noticeably absent, I ran out of time.

- honestly I don't think I could've done better unless I had a group, it's been crazy and I'm so burnt out. Setting up the environment was a ton of work on its own.

2.7 Github Repository

GitHub Repository: <https://github.com/altear/comp3005-project>

2.8 Appendix I

I filled out the poll, but anytime works. It should be a short presentation.