Feng Du

COMP3005 Report

**Conceptual Design**

Graphical user interface

Description automatically generated

Diagram

Description automatically generated

The identifying entity of basket is user (denoted by pulse shaped line). Cardinalities are explicitly stated using multiplicities.

**Relational Schema**

book(ISBN**,** author, genre, pages, price, stock, publisher\_ID)

publisher(publisher\_ID, name, email, address, phone, commission\_percent)

bank\_account(bank\_account\_ID, balance, publisher\_ID)

user(account\_ID, name, email, phone\_number)

order(order\_ID, date, tracking\_ID, card\_number, account\_ID)

billing\_info(card\_number, billing\_address, shipping\_address, account\_ID)

in\_cart(ISBN, account\_ID)

order\_contains(ISBN, order­\_ID)

**Functional Dependencies**

ISBN → author, genre, pages, price, stock, publisher\_ID

publisher\_ID → name, email, address, phone, commission\_percent

bank\_account\_ID → balance, publisher\_ID

account\_ID → name, email, phone\_number

order\_ID → date, tracking\_ID, card\_number, account\_ID

card\_number → billing\_address, shipping\_address, account\_ID

**Normalization**

book(ISBN**,** author, genre, pages, price, stock, publisher\_ID) is in BCNF since for every non-trivial FD, LHS is a super key given ISBN → author, genre, pages, price, stock, publisher\_ID.

publisher(publisher\_ID, name, email, address, phone, commission\_percent) is in BCNF since for every non-trivial FD, LHS is a super key given publisher\_ID → name, email, address, phone, commission\_percent.

bank\_account(bank\_account\_ID, balance, publisher\_ID) is in BCNF since for every non-trivial FD, LHS is a super key given bank\_account\_ID → balance, publisher\_ID.

user(account\_ID, name, email, phone\_number) is in BCNF since for every non-trivial FD, LHS is a super key given account\_ID → name, email, phone\_number.

order(order\_ID, date, tracking\_ID, card\_number, account\_ID) is in BCNF since for every non-trivial FD, LHS is a super key given account\_ID → name, email, phone\_number.

billing\_info(card\_number, billing\_address, shipping\_address, account\_ID) is in BCNF since for every non-trivial FD, LHS is a super key given card\_number → billing\_address, shipping\_address, account\_ID.

in\_cart(ISBN, account\_ID) and order\_contains(ISBN, order­\_ID) are both is BCNF as both relations have only trivial FDs.

**Database Schema Design**

Diagram, engineering drawing, schematic

Description automatically generated