2.1 ER diagram

图示

描述已自动生成

Both owner and customer are the user off our application, they can buy books form the bookstore, however, the owners have more right that can modify the books collection in the bookstore and read the report of bookstore in a period. When user finishing checkout, an order will be automatically generated in the user\_order entity to record order information. And each book will have a publisher that published them.

2.2 Reduction to the schema

Owner (user\_name, password, email, payment, billing\_address, shipping\_address)

customer (user\_name, password, email, payment, billing\_address, shipping\_address)

Report (date, genre, author\_name, sales, expenditures)

Book (Id, book\_name, author\_name, publisher\_name, genre, ISBN, prices, cost, sales\_percentage, in\_stock)

User\_order (order\_id, user\_name, Id, quantity, order\_date, expected\_date, current\_location)

Publisher (publisher\_name, address, email, phone\_number, bank\_account)

Access (user\_name, date, genre, author\_name)

Manage (user\_name, Id)

2.3 Normalization

Owner (user\_name, password, email, payment, billing\_address, shipping\_address)

Functional dependencies for owner:

User\_name is a super key. therefore, it is in BCNF.

customer (user\_name, password, email, payment, billing\_address, shipping\_address,)

Functional dependencies for customer:

User\_name is a super key. therefore, it is in BCNF.

Report (date, genre, author\_name, sales, expenditures)

Functional dependencies for report:

{date, genre, author\_name} is a super key. therefore, it is in BCNF.

Book (Id, book\_name, author\_name, publisher\_name, genre, ISBN, prices, cost, sales\_percentage, in\_stock)

Functional dependencies for book:

{id}, {book\_name, author\_name} are super keys. therefore, it is in BCNF.

User\_order (order\_id, user\_name, Id, order\_date, quantity, expected\_date, current\_location)

Functional dependencies for user\_order:

Order\_id is a super key. therefore, it is in BCNF.

Publisher (publisher\_name, address, email, phone\_number, bank\_account)

FD for publisher:

publisher\_name is a super key. therefore, it is in BCNF.

Access (user\_name, date, genre, author\_name)

Functional dependencies for access:

It’s trivial. therefore, it is in BCNF.

Manage (user\_name, Id)

Functional dependencies for manage:

It’s trivial. therefore, it is in BCNF.

2.4 Schema Diagram

图示

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