

# 3005 - Project

Condition	Draft
Course	3005
Date	@November 30, 2022
Material	<a href="#">Project_COMP_3005_F22.pdf</a> <a href="https://github.com/AminKln/Bookstore">https://github.com/AminKln/Bookstore</a> <a href="https://online.visual-paradigm.com/share.jsp?id=323235303131332d33">https://online.visual-paradigm.com/share.jsp?id=323235303131332d33</a> <a href="https://online.visual-paradigm.com/share.jsp?id=323235303131332d34">https://online.visual-paradigm.com/share.jsp?id=323235303131332d34</a>
Description	

## Repository

### 2.1. Conceptual Design

Participations

Assumptions

### 2.2. Reduction to Relation Schemas

### 2.3. Normalization of Relation Schemas

Functional Dependencies

author(name)

publisher(name, address, email, bank\_account)

publisher\_phone\_number(publisher, phone\_number)

book(isbn, title, n\_of\_pages, publication\_date, language, description, price, count, publisher)

genre(isbn, name)

written\_by(isbn, author, is\_primary)

user(username, password, email, address, is\_admin)

order(id, username, isbn, order\_date, count, updated\_on, status)

cart(username, isbn, count)

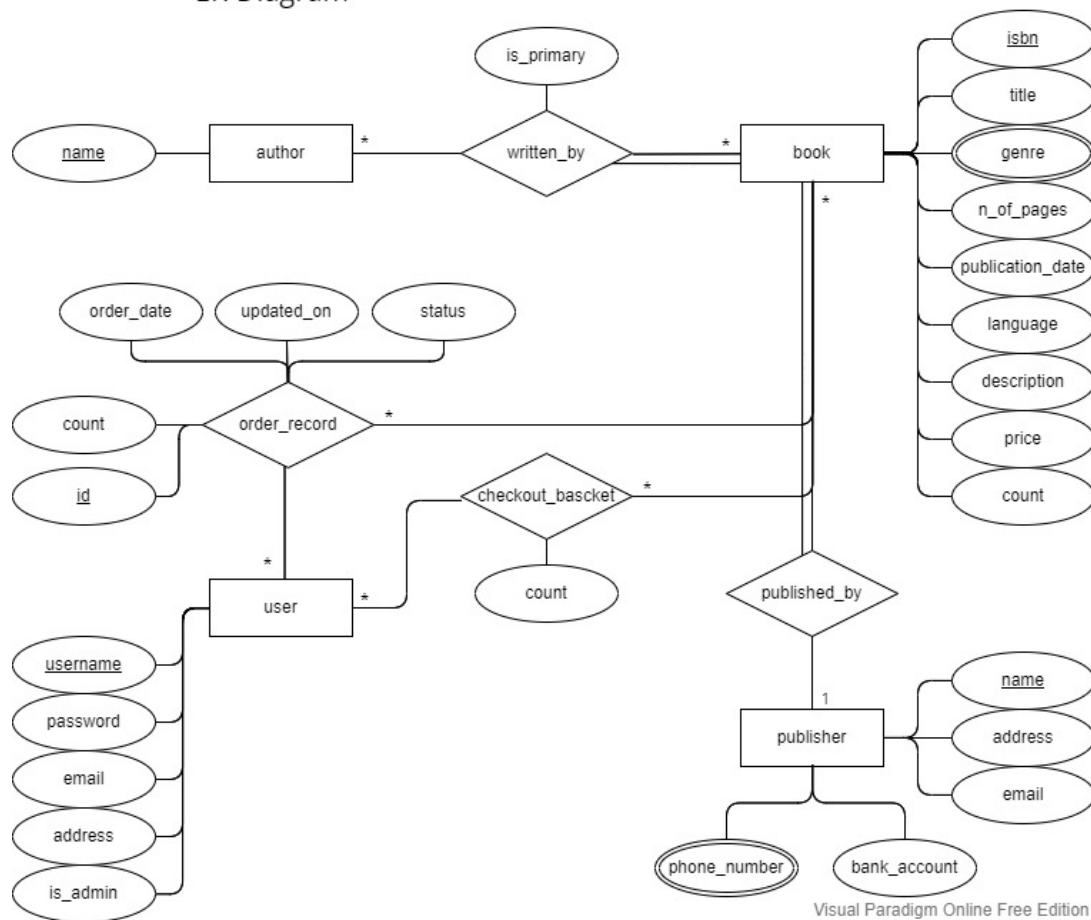
### 2.4. Database Schema Diagram

## Repository

<https://github.com/AminKln/Bookstore>

## 2.1. Conceptual Design

## ER Diagram



- the \* represents a many participation from the side of the relationship that it is next to (e.g. many books - 1 publisher)

## Participations

- a book must be written by an author (total participation) but not every author must have written books (we may have had a book by them but it is now sold out/removed from the bookstore) (partial participation)
- an admin user must be a user (total participation), but not every user is an admin (partial participation).
- every book must be published by a publisher (total participation), but not all publishers must have books published (partial participation)
- the remaining relationships are all partial participation (books do not have to have been ordered or put in a checkout basket. similarly users do not have to have something ordered or in their checkout basket)

## Assumptions

- No 2 authors have the same name
- An author cannot be both a primary and a secondary writer to a book
- The first author to appear in the list of authors is the primary author of the book
- No 2 publishers have the same name

- `isbn` refers to isbn13

## 2.2. Reduction to Relation Schemas

```
--SQLITE3
BEGIN TRANSACTION;

DROP TABLE IF EXISTS "cart";
DROP TABLE IF EXISTS "order_record";
DROP TABLE IF EXISTS "user";
DROP TABLE IF EXISTS "written_by";
DROP TABLE IF EXISTS "genre";
DROP TABLE IF EXISTS "book";
DROP TABLE IF EXISTS "publisher_phone_number";
DROP TABLE IF EXISTS "publisher";
DROP TABLE IF EXISTS "author";

CREATE TABLE "author" (
    "name" TEXT NOT NULL,
    PRIMARY KEY ("name")
);

CREATE TABLE "publisher" (
    "name" TEXT NOT NULL,
    "address" TEXT NOT NULL,
    "email" TEXT NOT NULL,
    "bank_account" INTEGER NOT NULL CHECK ("bank_account" >= 1000000000000000 AND "bank_account" <= 9999999999999999), --16 digits
    PRIMARY KEY ("name")
);

CREATE TABLE "publisher_phone_number" (
    "publisher" TEXT NOT NULL,
    "phone_number" INTEGER NOT NULL CHECK ("phone_number" >= 1000000000 AND "phone_number" <= 9999999999), --10 digits
    FOREIGN KEY ("publisher") REFERENCES "publisher" ("name"),
    PRIMARY KEY ("publisher", "phone_number")
);

CREATE TABLE "book" (
    "isbn" INTEGER, --CHECK ("isbn" >= 1000000000 AND "isbn" <= 9999999999999999), -- between 10-13 digits
    "title" TEXT NOT NULL,
    "n_of_pages" INTEGER NOT NULL,
    "publication_date" DATETIME NOT NULL, --first ever publish date
    "language" TEXT NOT NULL, --CHECK ("language" IN ('English', 'French', 'German', 'Italian', 'Spanish', 'Russian')),
    "description" TEXT,
    "price" DECIMAL(6,2) NOT NULL,
    "publisher_fees" DECIMAL(6,2) NOT NULL,
    "count" INTEGER NOT NULL,
    "publisher" TEXT NOT NULL,
    FOREIGN KEY ("publisher") REFERENCES "publisher" ("name"),
    PRIMARY KEY ("isbn")
);

CREATE TABLE "genre" (
    "isbn" INTEGER,
    "name" TEXT,
    FOREIGN KEY ("isbn") REFERENCES "book" ("isbn"),
    PRIMARY KEY ("isbn", "name")
);

CREATE TABLE "written_by" (
    "isbn" INTEGER,
    "author" TEXT,
    "is_primary" INTEGER NOT NULL CHECK ("is_primary" IN (0, 1)),
    FOREIGN KEY ("isbn") REFERENCES "book" ("isbn"),
    FOREIGN KEY ("author") REFERENCES "author" ("name"),
    PRIMARY KEY ("isbn", "author")
);

CREATE TABLE "user" (
    "username" TEXT,
    "password" TEXT NOT NULL,
```

```

"email" TEXT NOT NULL,
"address" TEXT,
"is_admin" INTEGER NOT NULL CHECK ("is_admin" IN (0, 1)),
PRIMARY KEY ("username")
);

CREATE TABLE "order_record" (
  "id" INTEGER PRIMARY KEY AUTOINCREMENT,
  "username" TEXT NOT NULL,
  "isbn" INTEGER NOT NULL,
  "order_date" DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
  "count" INTEGER NOT NULL,
  "updated_on" DATETIME NOT NULL DEFAULT CURRENT_TIMESTAMP,
  "status" TEXT NOT NULL CHECK ("status" IN ('pending', 'shipped', 'delivered', 'cancelled')),
  FOREIGN KEY ("username") REFERENCES "user" ("username"),
  FOREIGN KEY ("isbn") REFERENCES "book" ("isbn")
);

CREATE TABLE "cart" (
  "username" TEXT NOT NULL,
  "isbn" INTEGER NOT NULL,
  "count" INTEGER NOT NULL,
  FOREIGN KEY ("username") REFERENCES "user" ("username"),
  FOREIGN KEY ("isbn") REFERENCES "book" ("isbn"),
  PRIMARY KEY ("username", "isbn")
);

END TRANSACTION;

```

## 2.3. Normalization of Relation Schemas

### Functional Dependencies

#### **author(name)**

$\text{name} \rightarrow \text{name}$

- All functional dependencies are trivial so this relation is in 3NF

#### **publisher(name, address, email, bank\_account)**

$\text{name} \rightarrow \text{address, email, bank\_account}$

- $\alpha$  is the primary key (therefore also a superkey) so this relation is in 3NF.

#### **publisher\_phone\_number(publisher, phone\_number)**

$\text{publisher, phone\_number} \rightarrow \text{publisher, phone\_number}$

- All functional dependencies are trivial so this relation is in 3NF

#### **book(isbn, title, n\_of\_pages, publication\_date, language, description, price, count, publisher)**

$\text{isbn} \rightarrow \text{title, n\_of\_pages, publish\_date, language, description, price, count, publisher}$

- $\alpha$  is the primary key (therefore also a superkey) so this relation is in 3NF.

#### **genre(isbn, name)**

$\text{isbn, name} \rightarrow \text{isbn, name}$

- All functional dependencies are trivial so this relation is in 3NF

**written\_by(isbn, author, is\_primary)**

$\text{isbn, author} \rightarrow \text{is\_primary}$

- $\alpha$  is the primary key (therefore also a superkey) so this relation is in 3NF.

**user(username, password, email, address, is\_admin)**

$\text{username} \rightarrow \text{password, email, address, is\_admin}$

- $\alpha$  is the primary key (therefore also a superkey) so this relation is in 3NF.

**order(id, username, isbn, order\_date, count, updated\_on, status)**

$\text{id} \rightarrow \text{username, isbn, order\_date, count, updated\_on, status}$

- $\alpha$  is the primary key (therefore also a superkey) so this relation is in 3NF.

**cart(username, isbn, count)**

$\text{username, isbn} \rightarrow \text{count}$

- $\alpha$  is the primary key (therefore also a superkey) so this relation is in 3NF.

## 2.4. Database Schema Diagram

