Live Poets Society

Group 10

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Basic Problem & Goals

Create a social cataloging website for poetry books that allows users to

- Search for books, series, authors etc.
- Maintain their own library
- Answer questions like:
  - "Which poetry books should I read next?"
  - "Which authors are most liked/disliked?"

Dataset

Researchers at UCSD prepared datasets by scraping Goodreads in 2017 (later updated in 2019).

- Poetry Books
- Poetry Reviews
- Goodreads Series
- Goodreads Authors
- Poetry User Library Interactions

Preprocessing

- **Fake user creation**: Username, password, name, email
- **Scraping**: For book cover images
- **Format conversion**: JSON to CSV
- **Subsetting**: Series & Author datasets
- **Projection**: Remove duplicate columns, columns with descriptive statistics etc.
- **String Processing:** Handling quotes/whitespaces, datetime conversions etc.
- **Removing/replacing illogical values**: eg. negative no. of comments for reviews
- **Ensuring foreign key constraints are met**

Schema & ER Diagram

Book (id, title, description, language_code, edition, format, is_ebook, isbn, isbn13, asin, kindle_asin, publisher, publish_date, num_pages, image_url)

Similar_Books (book_id1, book_id2)

Series (id, title, description, numbered)

In_Series (book_id, series_id)

Author (id, name)

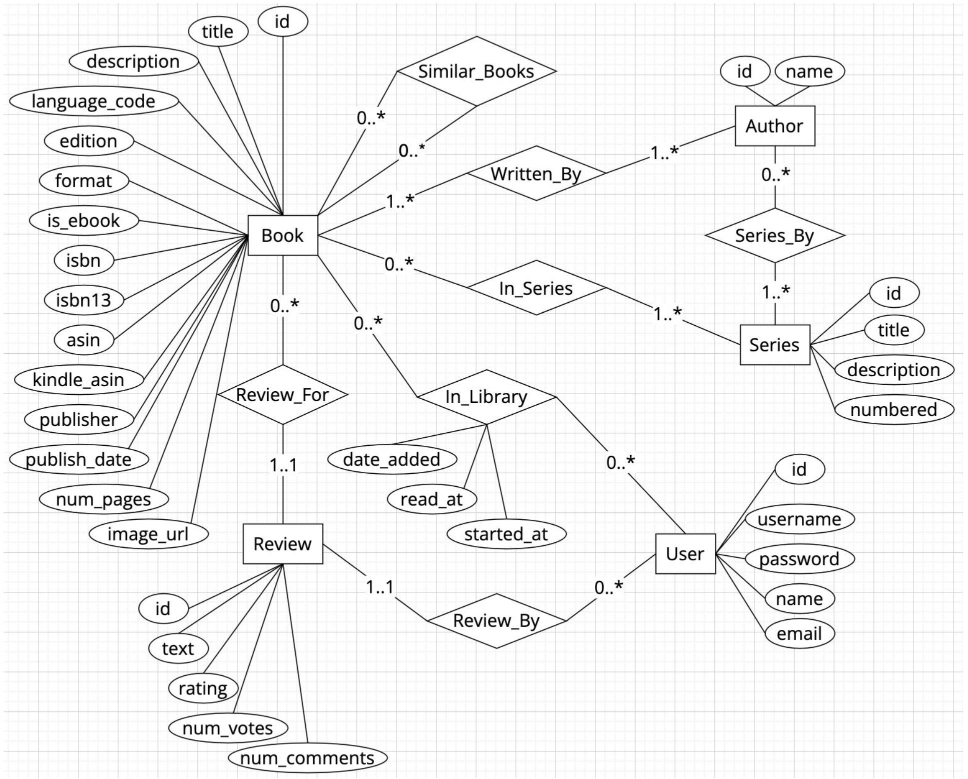
Written_By (book_id, author_id)

Series_By (series_id, author_id)

User (id, username, password, name, email)

In_Library (user_id, book_id, date_added, read_at, started_at)

Review (id, user_id, book_id, text, rating, num_votes, num_comments)



Complex Queries

Book Recommendations

Returns 16 book recommendations that a user hasn't read, based on the tastes of similar users. If there isn't enough user information to recommend 16 books, also recommends most popular books (based on review count).

Author Perceptions

For each author, returns the no. of users that like, are neutral towards, and dislike the author

Author Statistics

For each author, returns general statistics about the author, such as the no. of books they have written, no. of reviews/ratings, average rating etc.

Top Reviewers

Returns information about users with the highest no. of reviews, such as their username, no. of books in their library, no. of their ratings/reviews, average rating etc.

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As the complex queries are huge, we link them here

Performance & Optimization (Part 1)

Observation: Three complex queries have a (common) costly setup

Book Recommendations

```
WITH users_authors AS (
    SELECT U.id AS u_id,
        U.name as user_name,
        A.id as a_id,
        A.name as author_name,
        AVG(rating) AS rating
    FROM Author A
    JOIN Written_By WB ON A.id = WB.author_id
    JOIN Review R ON WB.book_id = R.book_id
    JOIN User U on U.id = R.user_id
    GROUP BY A.id, A.name, U.id, U.name
    ORDER BY U.name ASC, rating DESC),
  top_authors AS (
    SELECT a_id FROM users_authors
    …
```

Author Perceptions

```
WITH users_authors AS (
  SELECT U.id AS u_id,
      U.name as user_name,
      A.id as a_id,
      A.name as author_name,
      AVG(rating) AS rating
  FROM Author A
  JOIN Written_By WB ON A.id = WB.author_id
  JOIN Review R ON WB.book_id = R.book_id
  JOIN User U on U.id = R.user_id
  GROUP BY A.id, A.name, U.id, U.name
  ORDER BY U.name ASC, rating DESC),
dislikes AS (
  SELECT a_id, author_name, COUNT(DISTINCT
u_id) AS num_dislikes
  FROM users_authors
  WHERE rating < 2.0
  …
```

Author Statistics

```
WITH
author_reviews AS (
  SELECT Written_By.book_id, author_id, name,
rating FROM Written_By
  JOIN Review ON Written_By.book_id =
Review.book_id
  JOIN Author ON author_id = Author.id
),
author_rating_stats AS (
  SELECT DISTINCT author_id, name,
     AVG(rating) OVER (PARTITION BY author_id)
AS AVG_Rating,
   …
```

Performance & Optimization (Part 1)

Observation: Three complex queries have a (common) costly setup

Solution: "Simulate" a materialized view for the setup and adapt queries to use the view

View

```
CREATE TABLE ABRU_View(
    SELECT A.id author_id,
           A.name author_name,
           R.book_id book_id,
           R.id review_id,
           R.user_id user_id,
           R.rating rating
    FROM Author A
         JOIN Written_By WB on A.id = WB.author_id
         JOIN Review R on WB.book_id = R.book_id);
```

Index

```
CREATE INDEX AU_Index
ON ABRU_View(author_id, user_id);

CREATE INDEX Rating_Index
ON ABRU_View(rating);
```

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Performance & Optimization (Part 1)

Query	Before ABRU_View	After ABRU_View		
		Before AU_Index	After AU_Index	After Rating_Index
Recommendation	20.34	2.45	1.53	1.51
Author Perceptions	12.18	3.36	2.16	2.20
Author Statistics	96.42	1.21*	0.3*	0.31*

* After adapting query to use ABRU_View

All the time recordings were averages of 10 runs (in seconds)

Performance & Optimization (Part 2)

Observation: Split a complex query into reusable components

Query	**Unoptimized**	**Optimized**
Top Reviewers	22.19	2.32

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All the time recordings were averages of 10 runs (in seconds)

Technical Challenges

- **Dataset**: Finding a dataset large enough to be challenging but still feasible to work with
- **Preprocessing**: Scraping, fake user creation
- **Complex queries**: Creating complex queries that meaningfully contribute to the application
- **Query optimization**:
  - MySQL deprecated query caching
  - No materialized views

Thank you!