NSQ1 S22 Course Assignment 2

Question 1 – Set up database

Set up the database with a sharded cluster with at least two shards. At least one of the shards should be a replica set containing at least 3 nodes.

See https://docs.mongodb.com/manual/tutorial/deploy-shard-cluster/.

Question 2 – Model database

Design a MongoDB model for the bookstore model from the 1st course assignment. Make note of the choices you make and why. You can document the model using example documents.

Design the model to be used with the queries from the 1st course assignment.

Question 3 – Create schemas

Design and create schemas for the collections in your model.

Question 4 – Work with data

Answer the following questions in MongoDB using your model from question 1.

Modifying data

Use MongoDB CRUD methods to execute the following scenarios. Use transactions where necessary.

If nothing else is stated, assume you know the object ids of the objects involved.

1. Sell a book to a customer.
2. Change the address of a customer.
3. Add an existing author to a book.
4. Retire the "Space Opera" category and assign all books from that category to the parent category. Don't assume you know the id of the parent category.
5. Sell 3 copies of one book and 2 of another in a single order

Querying data

Write find() or aggregate() statements to return the following data

1. All books by an author
2. Total price of an order
3. Total sales (in £) to a customer

4. Books that are categorized as neither fiction nor non-fiction
5. Average page count by genre
6. Categories that have no sub-categories
7. ISBN numbers of books with more than one author
8. ISBN numbers of books that sold at least X copies (you decide the value for X)
9. Number of copies of each book sold – unsold books should show as 0 sold copies.
10. Best-selling books: The top 10 selling books ordered in descending order by number of sales.
11. Best-selling genres: The top 3 selling genres ordered in descending order by number of sales.
12. All science fiction books. Note: Books in science fiction subcategories like cyberpunk also count as science fiction. Don't use your knowledge of the concrete category structure. (Hint: $graphLookup)
13. Characters used in science fiction books. Not from (12) applies here as well.
14. Number of books in each category including books in subcategories.

Question 5 – Report

Write a report on the experience gained by completing Question 1 and 2 above. The report should contain answers to the questions

- What were the decisions taken in the modelling?
- Why were these decisions taken?
- What were the consequences of these decisions?
- What were the difficult and easy parts of the exercise?
- How does that compare to relational databases?
- What are the advantages and disadvantages of MongoDB over relational databases for this exercise?

Rules

- Make the exercise in groups of 2 – 4
- Hand in to itslearning no later than 27 March