Experiment 6: MongoDB

1) **Aim:** To study CRUD operations in MongoDB
2) **Problem Statement:**
   A) Create a database, create a collection, insert data, query and manipulate data using various MongoDB operations.

      1. Create a database named "inventory".
      2. Create a collection named "products" with the fields: (ProductID, ProductName, Category, Price, Stock).
      3. Insert 10 documents into the "products" collection.
      4. Display all the documents in the "products" collection.
      5. Display all the products in the "Electronics" category.
      6. Display all the products in ascending order of their names.
      7. Display the details of the first 5 products.
      8. Display the categories of products with a specific name.
      9. Display the number of products in the "Electronics" category.
      10. Display all the products without showing the "_id" field.
      11. Display all the distinct categories of products.
      12. Display products in the "Electronics" category with prices greater than 50 but less than 100.
      13. Change the price of a product.
      14. Delete a particular product entry.

3) **Theory:**
   A. Describe some of the features of MongoDB?

      - **Flexible Schema:** MongoDB is schema-less, meaning it can store documents with different structures in the same collection.
      - **Scalability:** It supports horizontal scaling using sharding.
      - **High Performance:** Efficient for read and write operations.
      - **Replication:** Provides data redundancy and high availability using replica sets.
      - **Indexing:** Supports various types of indexes for efficient query execution.
      - **Aggregation Framework:** Allows powerful data aggregation and transformation.

B. What are Documents and Collections in MongoDB?

- **Document:** A document in MongoDB is a JSON-like data structure called BSON (Binary JSON). It consists of field-value pairs, similar to a row in a relational database.

- **Collection:** A collection is a group of MongoDB documents, equivalent to a table in relational databases. Documents within a collection can have varying structures.

C. When to use MongoDB?

- When dealing with large volumes of unstructured or semi-structured data.

- For applications requiring horizontal scalability.

- When frequent schema changes are expected.

- For real-time analytics and content management systems.

D. What is Sharding in MongoDB?

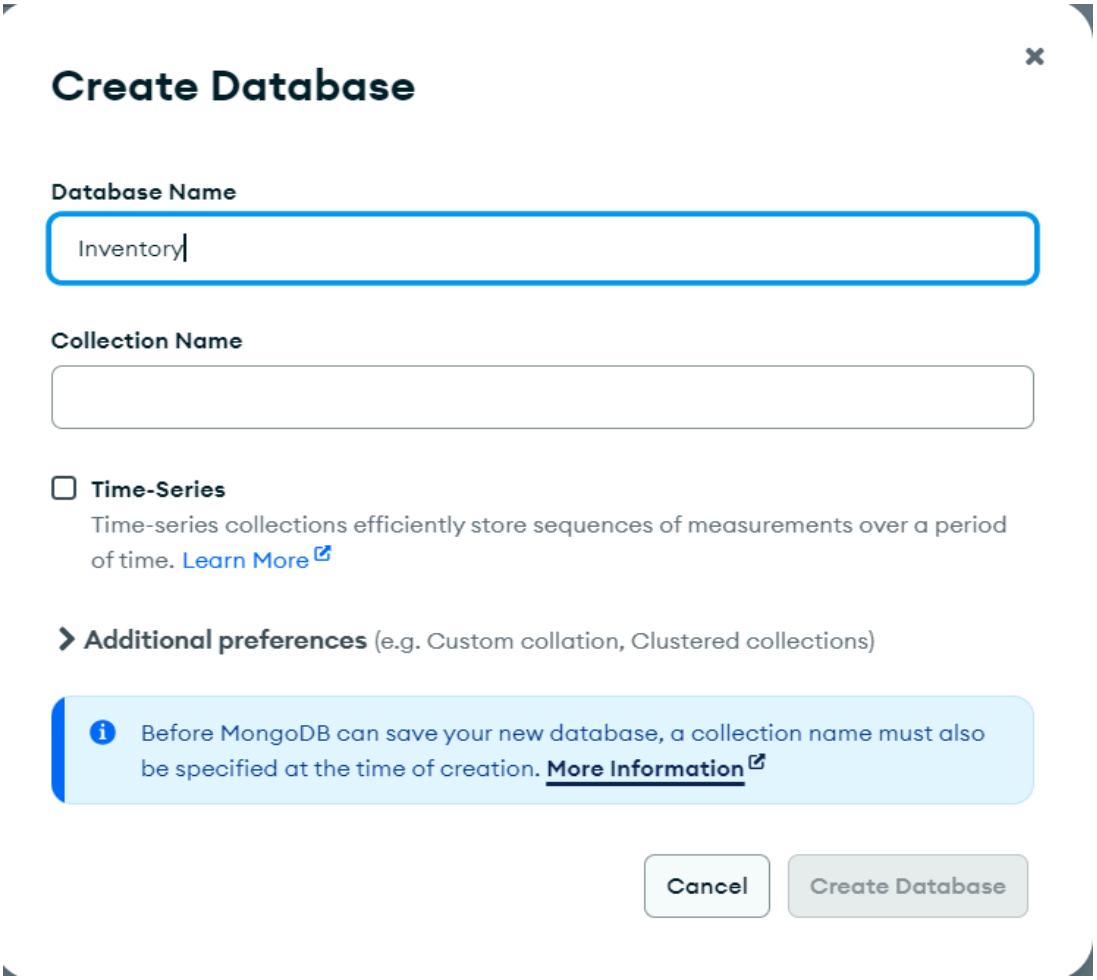
- **Sharding** is a method of horizontally partitioning data across multiple servers to handle large datasets.

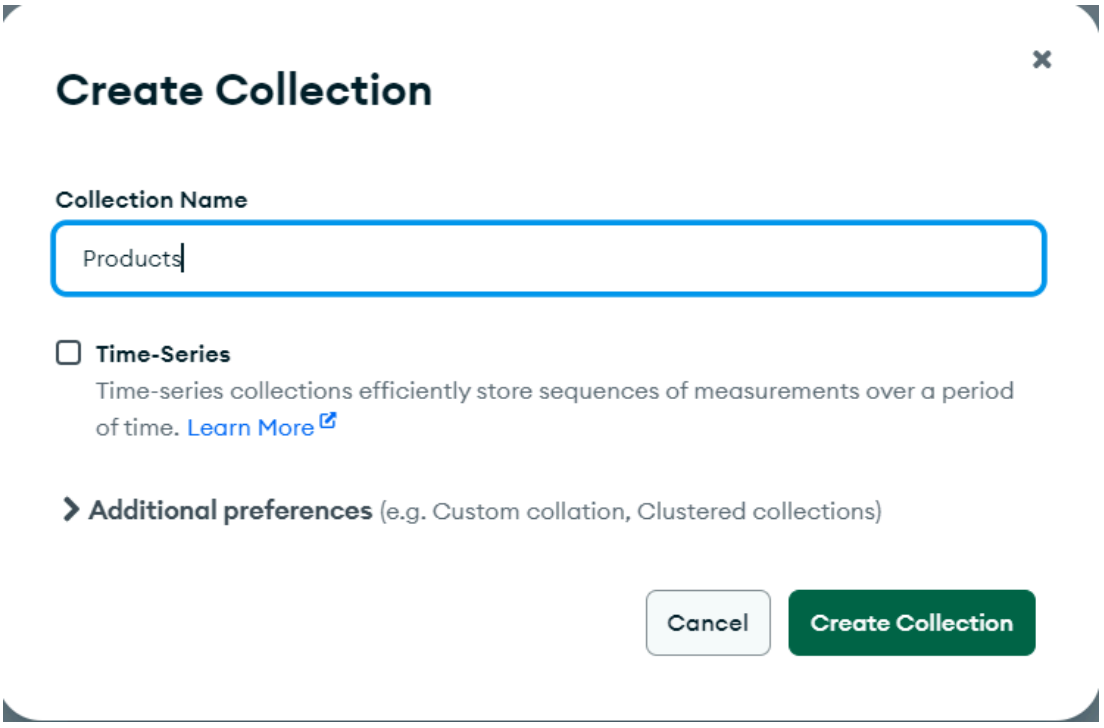
- MongoDB uses **shards** to store subsets of data, ensuring improved read and write performance.

- A **Shard Key** is used to distribute data evenly across shards.

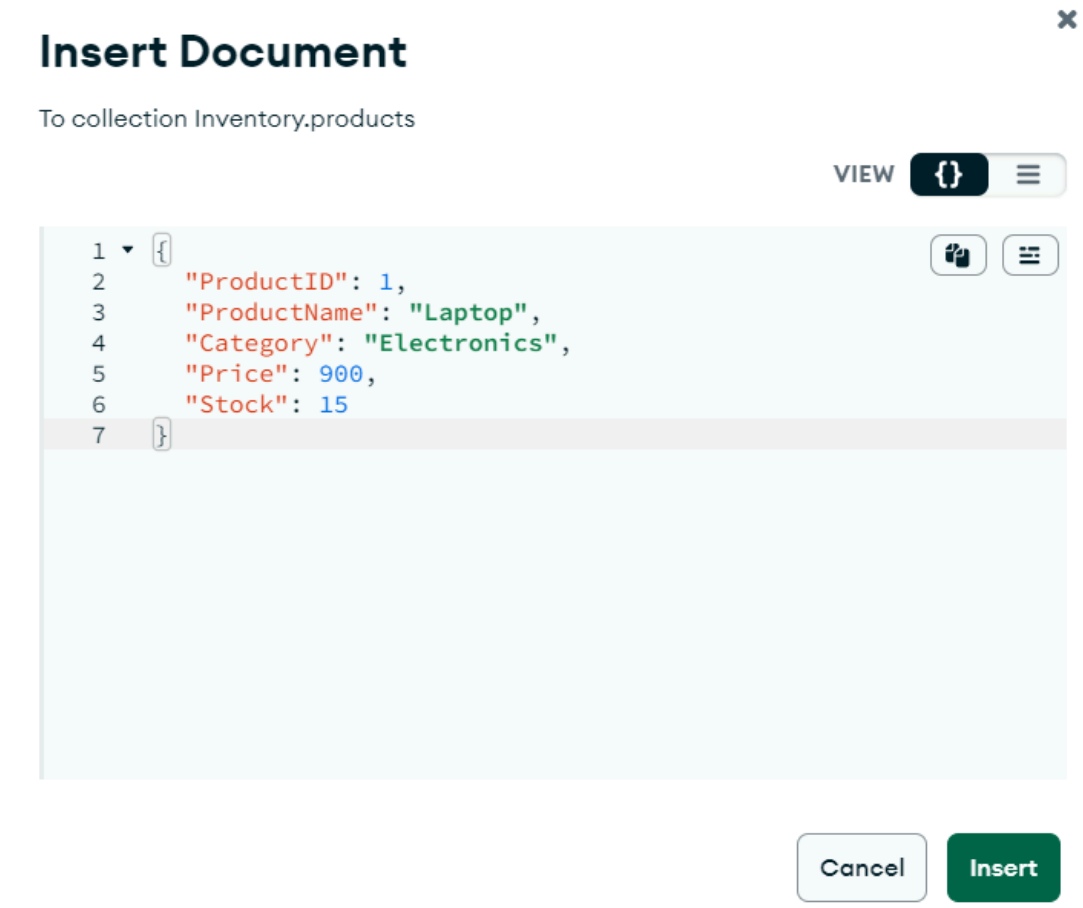
4) **Output:**

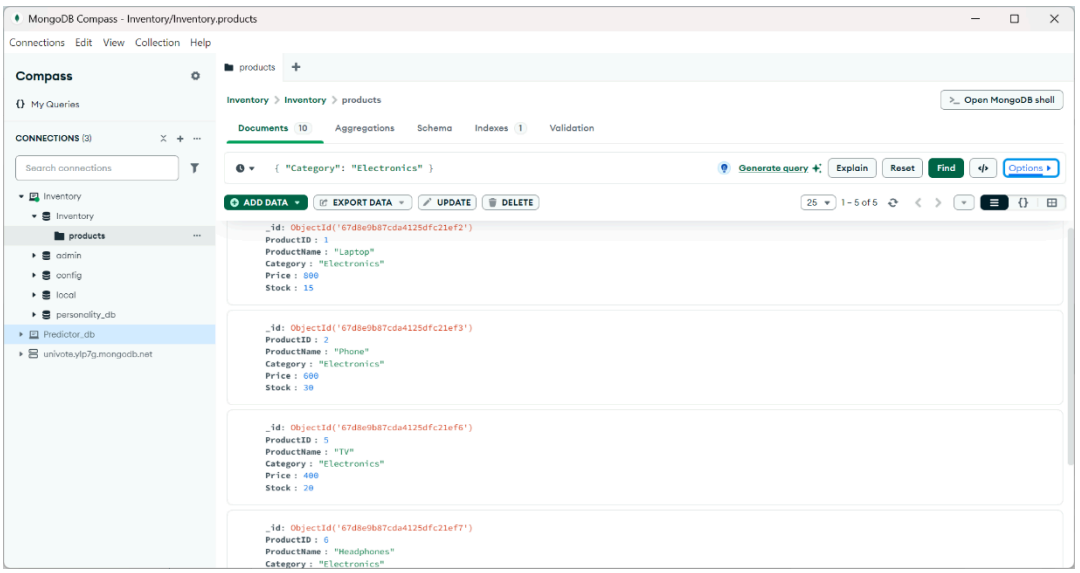
1) Create a database and collection



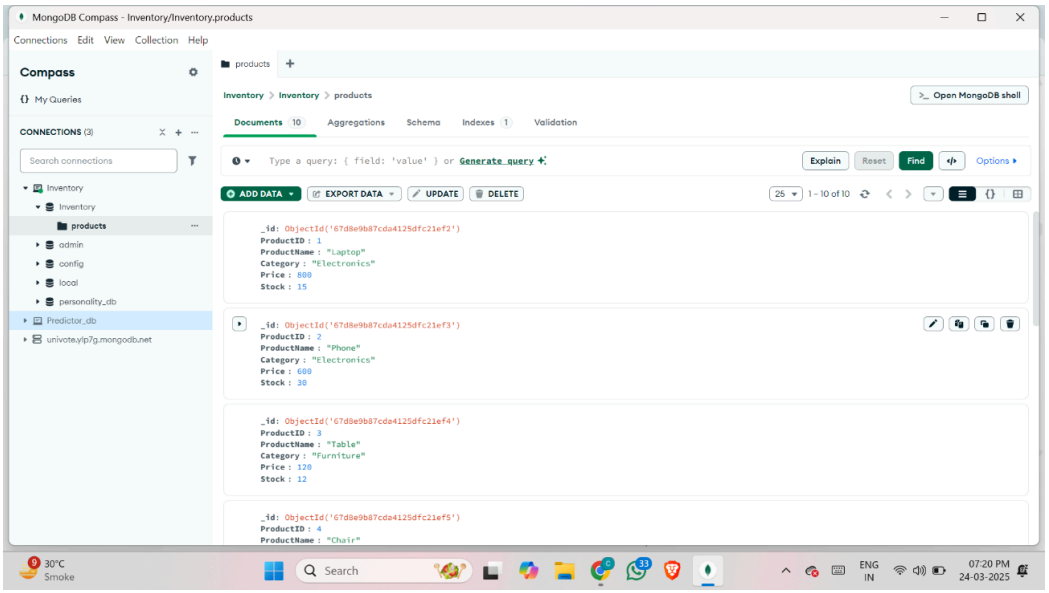


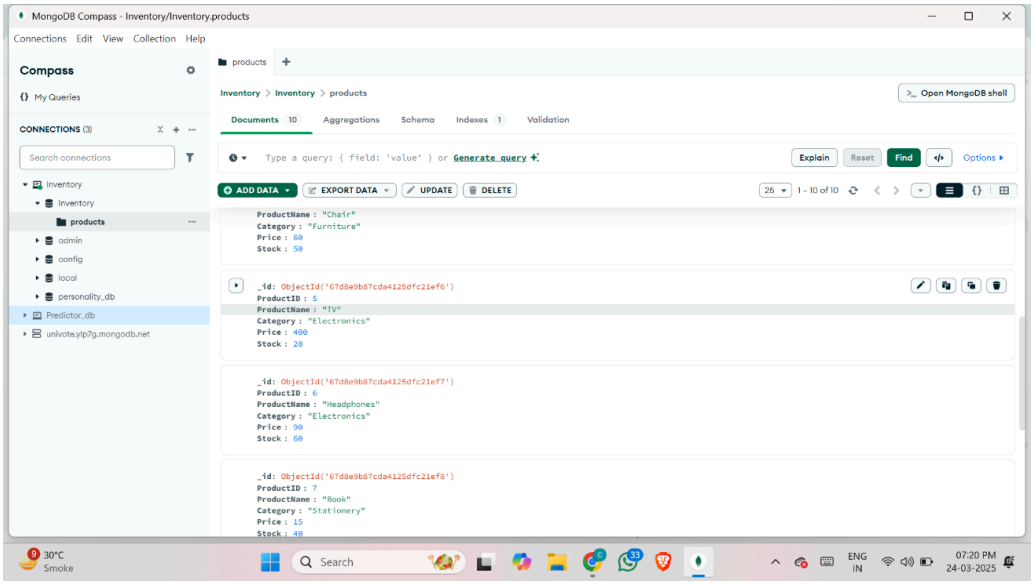
2) Insert Data

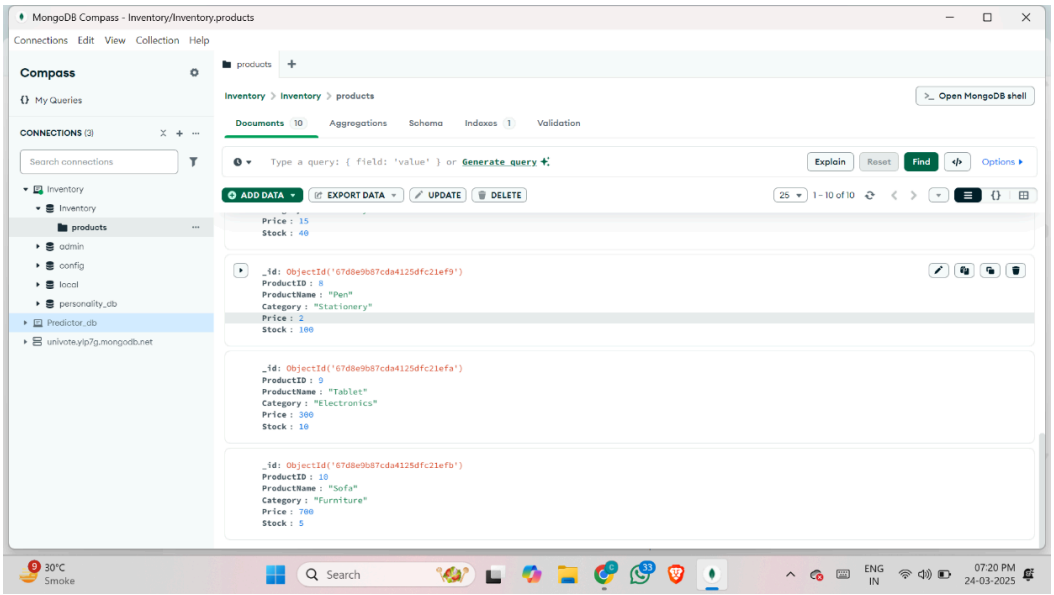




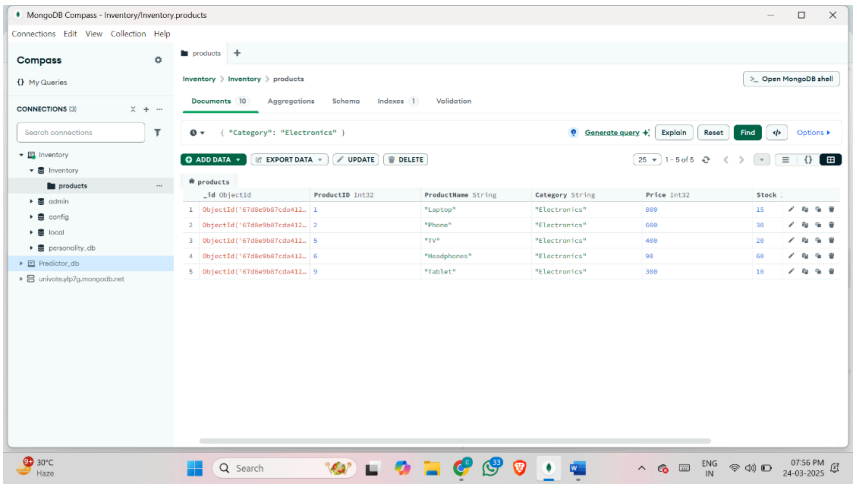
3) Display all Documents



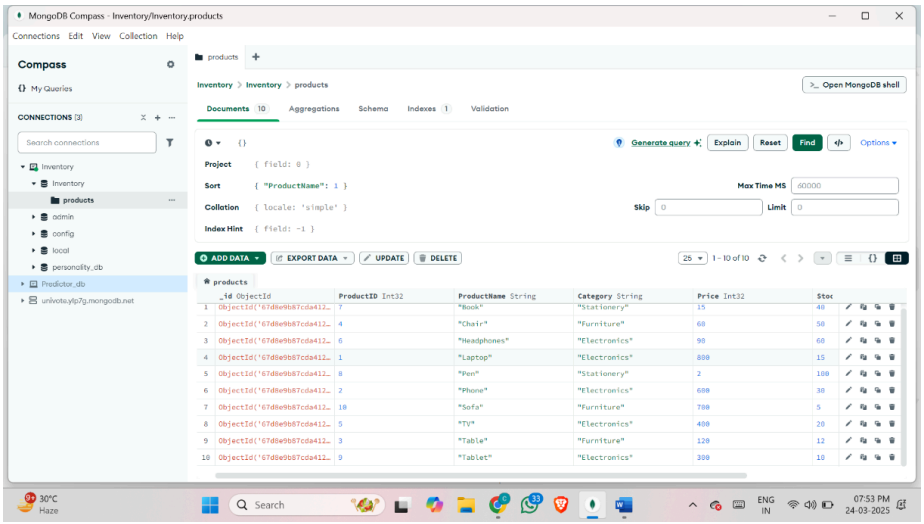




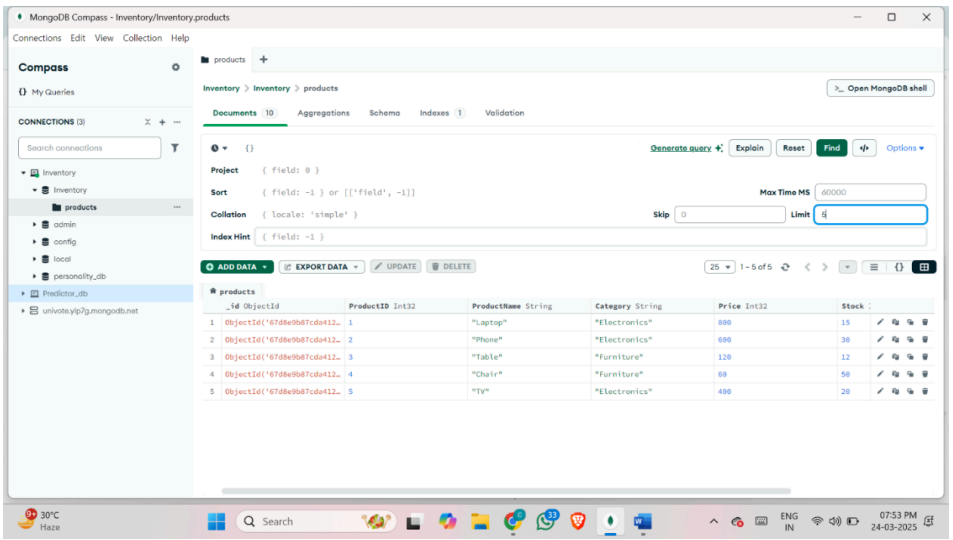
4) Display all Products in the Electronics Category



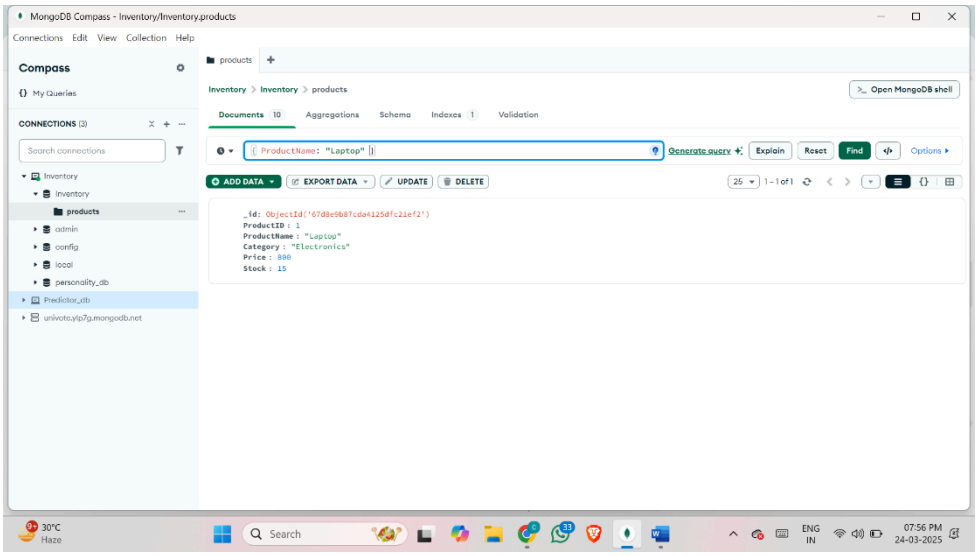
5) Display Products in Ascending Order of Names



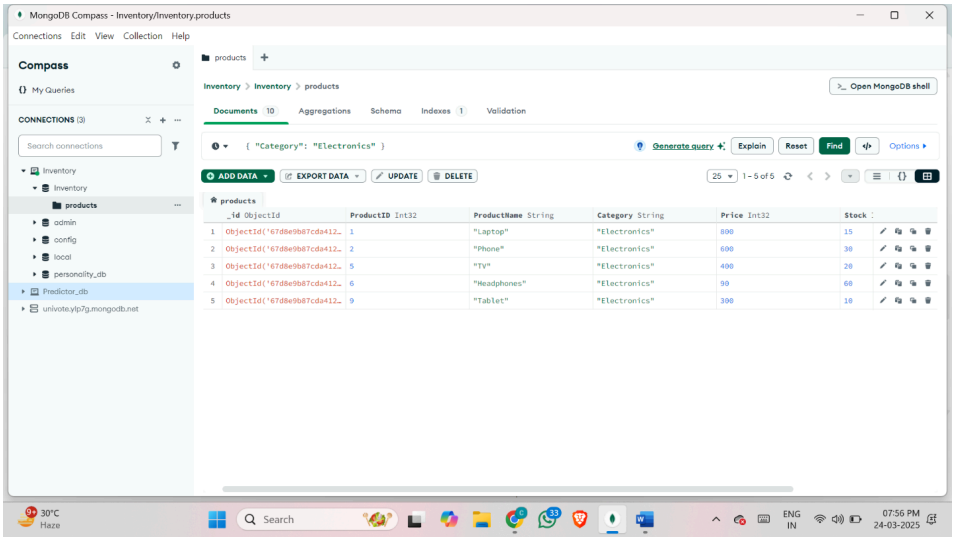
6) Display First 5 Products



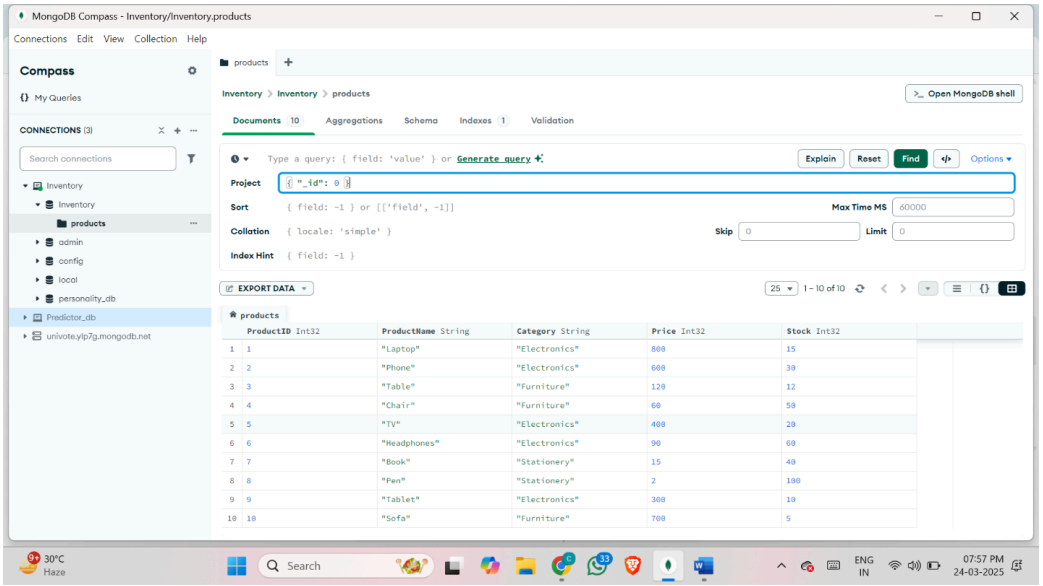
7) Display Products with a Specific Name



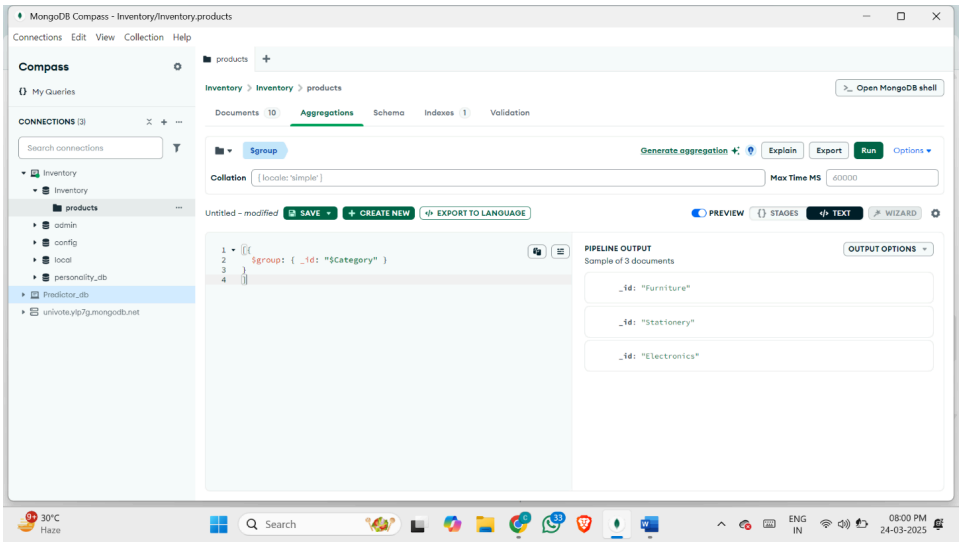
8) Count Products in Electronics Category



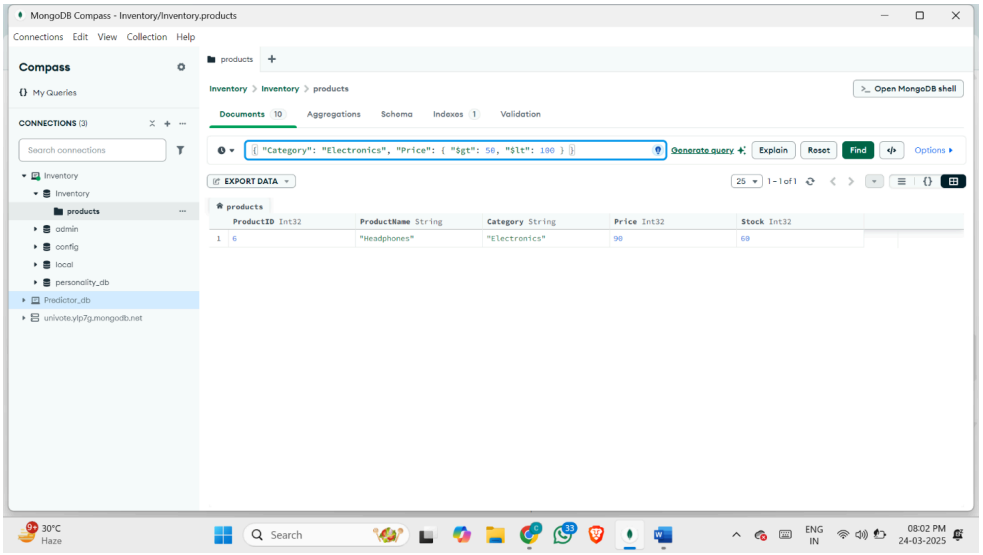
9) Hide the "_id" Field



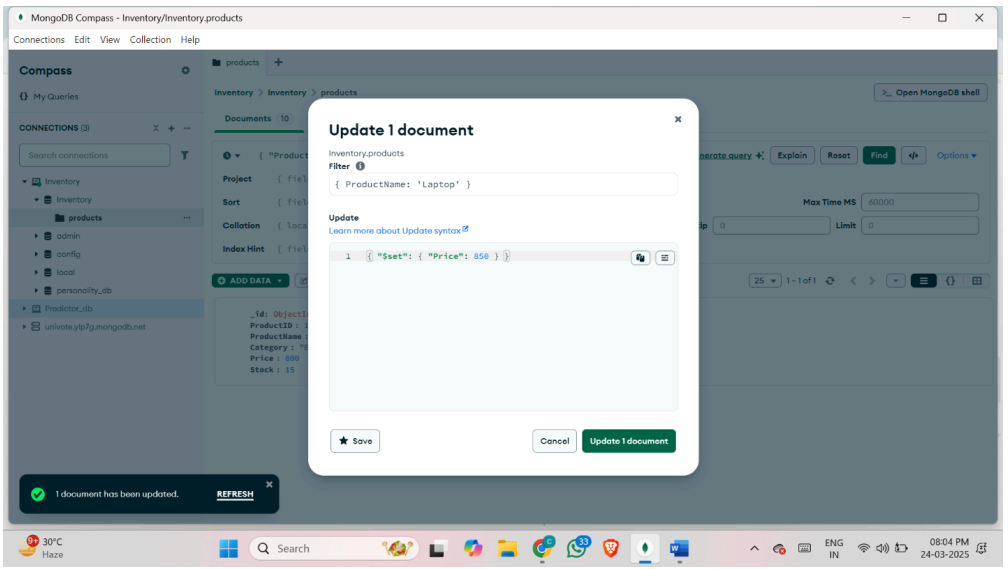
10) Display Distinct Categories

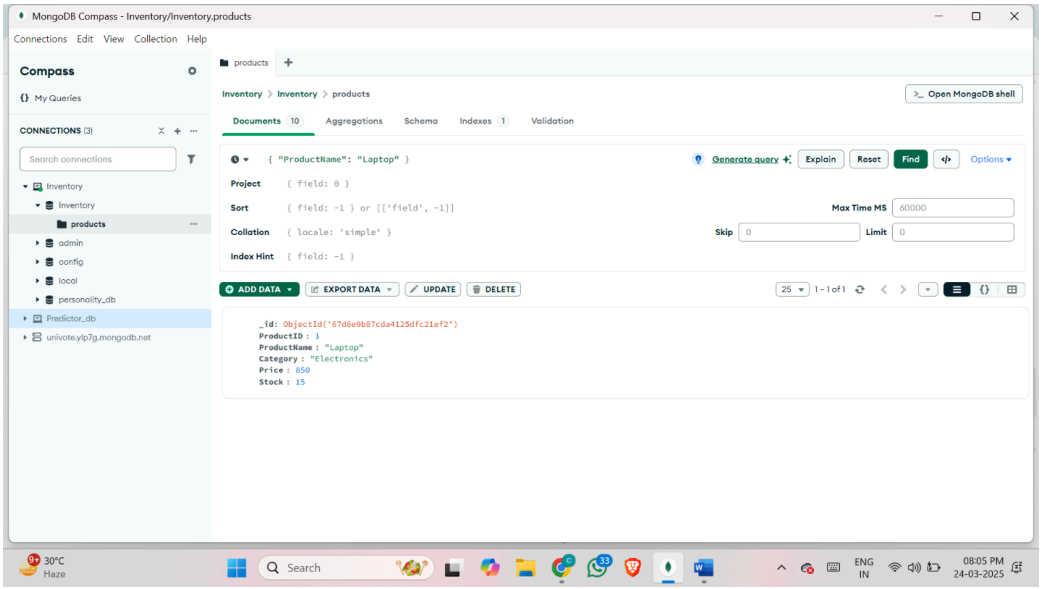


11) Display Products in Electronics Category with Price > 50 and < 100



12) Change the Price of a Product





13) Delete a Product