

EXPERIMENT 4.3

Aim:

To design and implement a MongoDB data model using nested documents for an e-commerce catalog.

Theory:

MongoDB is a NoSQL document-oriented database that stores data in BSON format. It allows embedding nested documents and arrays within a single collection, making it suitable for real-world applications such as e-commerce catalogs. Instead of managing separate relational tables, MongoDB enables embedding related data, like product variants, directly inside a product document. This makes queries faster and schema design more flexible.

Code:

```
// Create collection and insert
sample products
db.products.insertMany([
  {
    name: "T-
    Shirt", price:
    499,
    category:
    "Clothing",
    variants: [
      { color: "Red", size: "M", stock: 20 },
      { color: "Blue", size: "L", stock: 15 }
    ]
  },
  {
    name:
    "Sneakers",
    price: 1999,
    category:
    "Footwear",
    variants: [
      { color: "Black", size: "8", stock: 10 },
      { color: "White", size: "9", stock: 5 }
    ]
  }
])
```

```

    }
  }
}

// Retrieve all
products
db.products.find(
);

// Filter products by category
db.products.find({ category:
"Clothing" });

// Project specific variant details
db.products.find({}, { name: 1, "variants.color": 1,
"variants.size" : 1 });

```

Expected Output:

The first screenshot shows a GET request to `http://localhost:3000/products/category/Electronics` returning a single product document with the following structure:

```

{
  "_id": "686f63eb90ac2728b3f11082",
  "name": "Smartphone",
  "price": 699,
  "category": "Electronics",
  "__v": 0,
  "variants": []
}

```

The second screenshot shows a GET request to `http://localhost:3000/products` returning a list of product documents. One of the documents is expanded to show its variants:

```

{
  "_id": "686f68ed2bf5384209b236b2",
  "name": "Winter Jacket",
  "price": 200,
  "category": "Apparel",
  "variants": [
    {
      "color": "Black",
      "size": "S",
      "stock": 8,
      "_id": "686f68ed2bf5384209b236b3"
    },
    {
      "color": "Gray",
      "size": "M",
      "stock": 12,
      "_id": "686f68ed2bf5384209b236b4"
    }
  ]
}

```

Learning Outcome:

By completing this task, students will be able to:

- Understand MongoDB nested document design.
- Implement an e-commerce catalog using embedded arrays.
- Perform queries with filtering

and

projections. - Gain practical skills for handling hierarchical data in MongoDB.