# Week – 7 MongoDB Assignment

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## To perform:

**Store and Query JSON Data in MongoDB**

**Goal:**

Explore NoSQL by storing and querying semi-structured sales data in MongoDB.

**Tasks:**

Store order data as nested JSON documents (customer, product, region).

**Run queries to:**

Retrieve all orders in a given date range.

Group sales by region or category using the aggregation pipeline.

Compare flexibility vs. relational SQL model.

**Tech:** MongoDB, Python (PyMongo)

**Deliverables:** .ipynb or .py with CRUD + aggregation examples + screenshots (Mongo shell/Compass query outputs)

Link to github: https://github.com/friedcheesee/blendweek7allstar

## Compare flexibility vs. relational SQL model

**MongoDB and relational SQL databases differ fundamentally in how they model, store, and query data.**

MongoDB: MongoDB uses a document-oriented data model with no fixed schema, allowing related data - such as customer, product, and region information - to be nested within a single document.

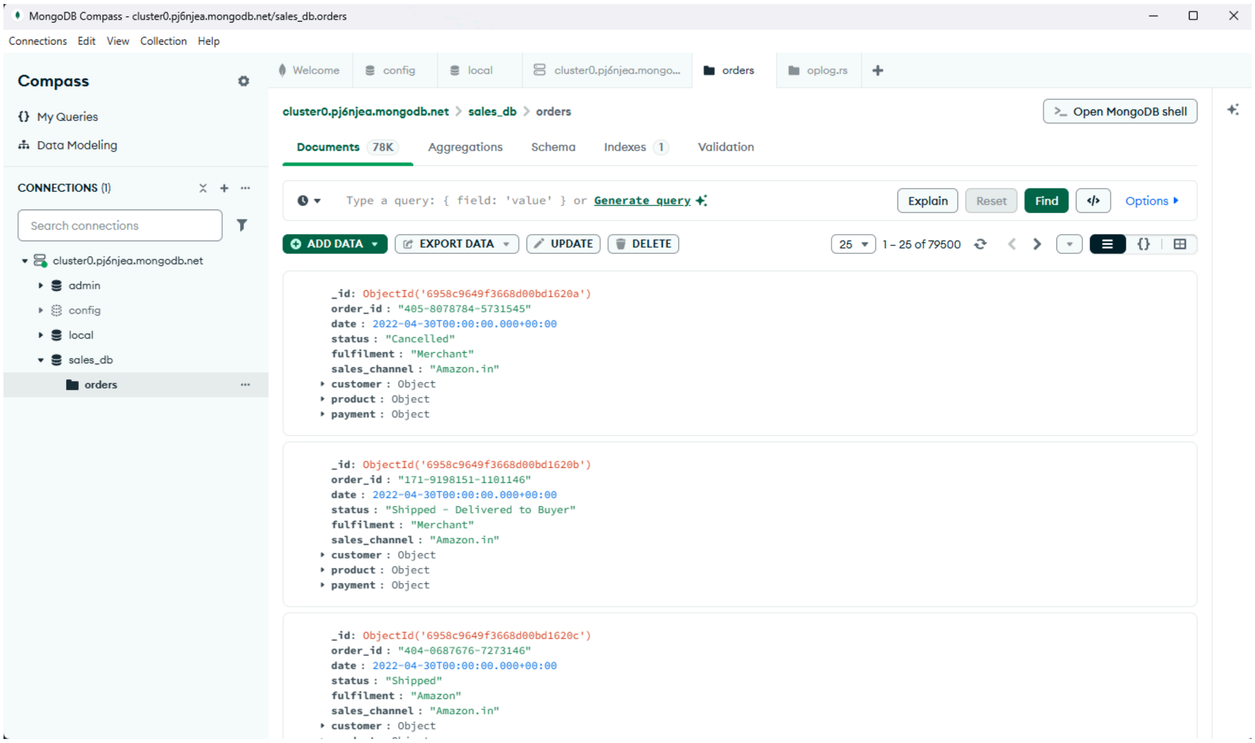
Fields are optional in mongodb, so csv imports and and streaming data can contain missing fields or attributes, and still get inserted successfully. Hence, mongoDB is well suited for semi-structured or evolving datasets.

Relational SQL: Relational databases require data to be normalized across multiple tables (e.g., orders, customers, products, regions). While this enforces strong consistency, it increases schema complexity.

Schema changes - such as adding new attributes or restructuring relationships- can be expensive, and will require major updates/ downtime to change the schema. Queries typically rely on JOIN operations across multiple tables. As data volume grows, these joins can become performance bottlenecks and increase query complexity.

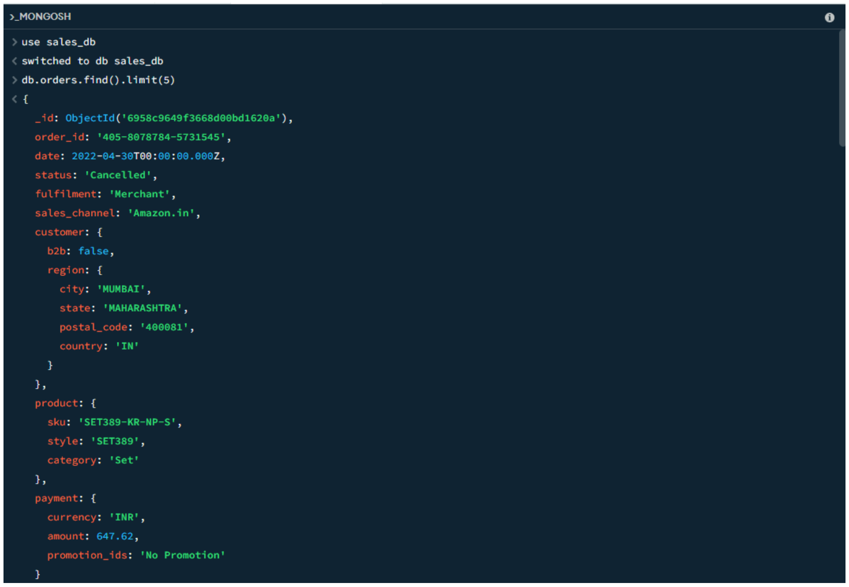
| Property | MongoDB | SQL |
|---|---|---|
| Data model | Document based (JSON like) | Table based (rows and columns) |
| Schema | Schema-less | Fixed |
| Handling missing fields | Allowed without errors | Must be defined |
| Data relationships | Nested docs | Normalized across tables |
| Schema evolution | Low cost | Expensive |
| Analytics | Aggregation pipeline | JOIN- heavy SQL queries |
| Best suited for | Semi-structured data, evolving data. | Highly structured, transactional data |

## Inserted documents (Compass):



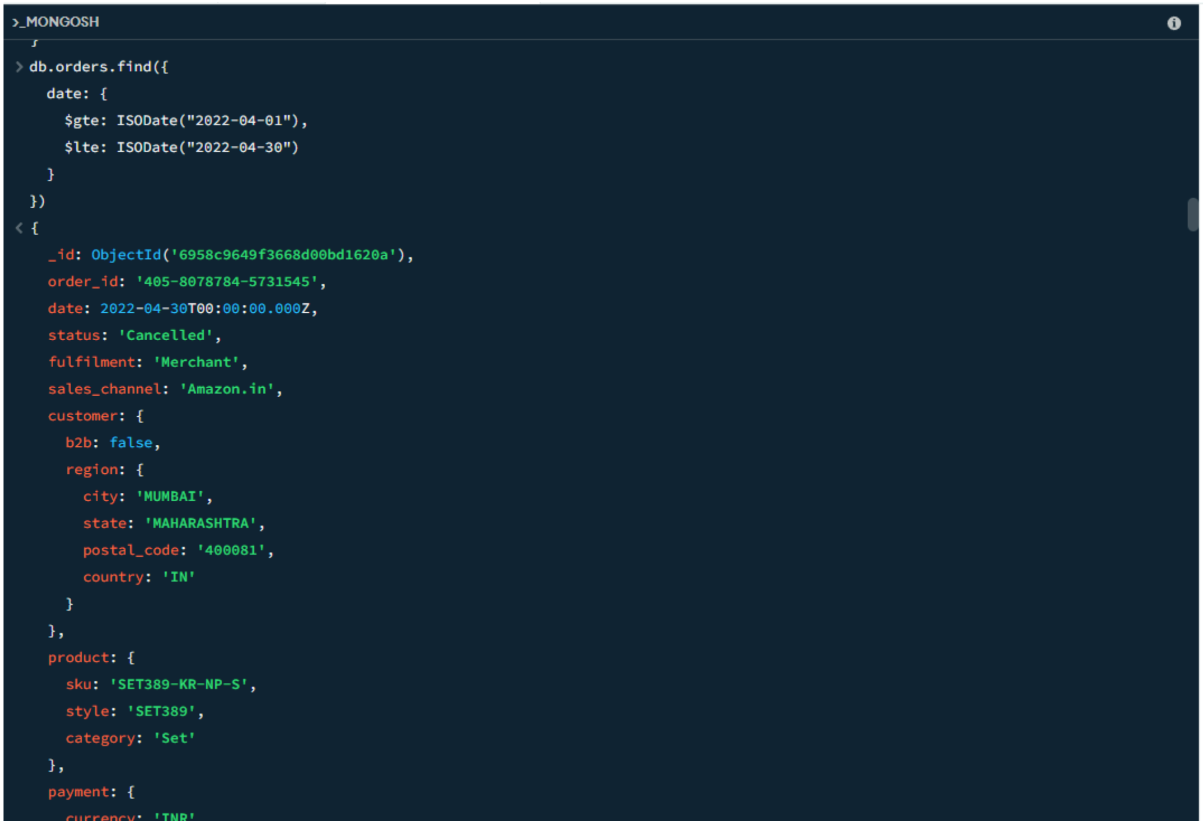
```
_id: ObjectId('6958c9649f3668d00bd1620a')
order_id : "405-8078784-5731545"
date : 2022-04-30T00:00:00.000+00:00
status : "Cancelled"
fulfilment : "Merchant"
sales_channel : "Amazon.in"
customer : Object
product : Object
payment : Object

_id: ObjectId('6958c9649f3668d00bd1620b')
order_id : "171-9198151-1101146"
date : 2022-04-30T00:00:00.000+00:00
status : "Shipped - Delivered to Buyer"
fulfilment : "Merchant"
sales_channel : "Amazon.in"
customer : Object
product : Object
payment : Object

_id: ObjectId('6958c9649f3668d00bd1620c')
order_id : "404-0687676-7273146"
date : 2022-04-30T00:00:00.000+00:00
status : "Shipped"
fulfilment : "Amazon"
sales_channel : "Amazon.in"
customer : Object
```

## Queries:



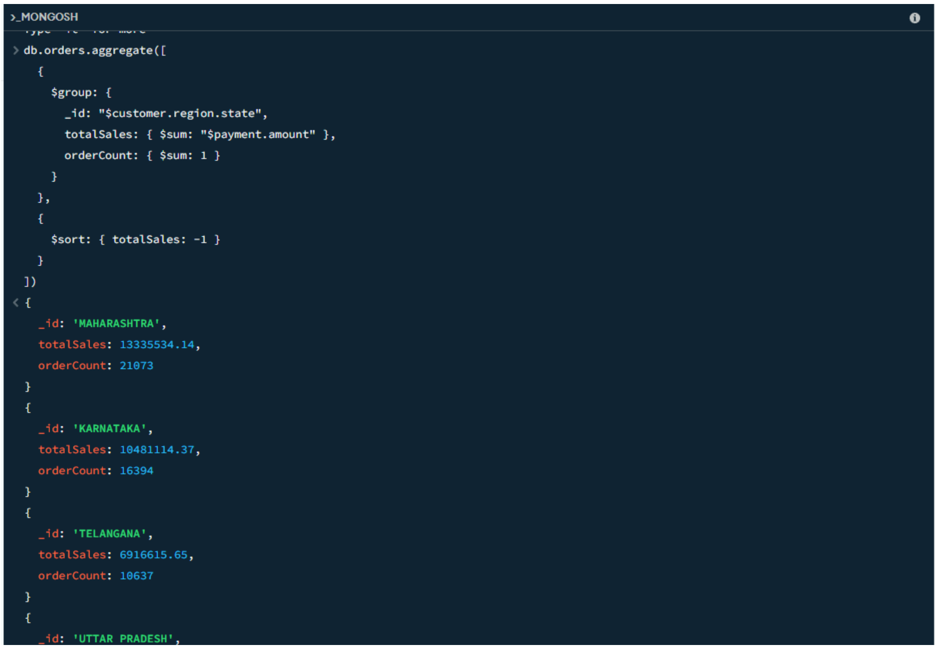
```
> use sales_db
< switched to db sales_db
> db.orders.find().limit(5)
< {
    _id: ObjectId('6958c9649f3668d00bd1620a'),
    order_id: '405-8078784-5731545',
    date: 2022-04-30T00:00:00.000Z,
    status: 'Cancelled',
    fulfilment: 'Merchant',
    sales_channel: 'Amazon.in',
    customer: {
      b2b: false,
      region: {
        city: 'MUMBAI',
        state: 'MAHARASHTRA',
        postal_code: '400081',
        country: 'IN'
      }
    },
    product: {
      sku: 'SET389-KR-NP-S',
      style: 'SET389',
      category: 'Set'
    },
    payment: {
      currency: 'INR',
      amount: 647.62,
      promotion_ids: 'No Promotion'
    }
```

Orders in given date range:



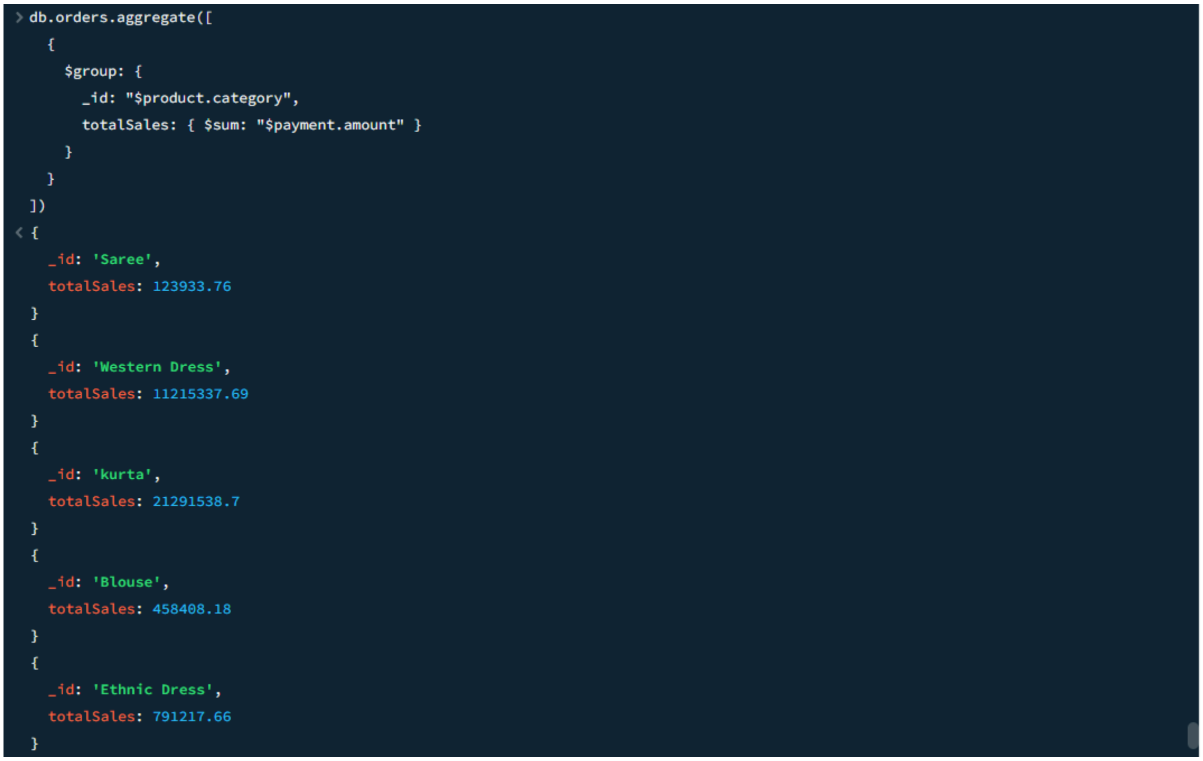
```
}
> db.orders.find({
    date: {
      $gte: ISODate("2022-04-01"),
      $lte: ISODate("2022-04-30")
    }
  })
< {
    _id: ObjectId('6958c9649f3668d00bd1620a'),
    order_id: '405-8078784-5731545',
    date: 2022-04-30T00:00:00.000Z,
    status: 'Cancelled',
    fulfilment: 'Merchant',
    sales_channel: 'Amazon.in',
    customer: {
      b2b: false,
      region: {
        city: 'MUMBAI',
        state: 'MAHARASHTRA',
        postal_code: '400081',
        country: 'IN'
      }
    },
    product: {
      sku: 'SET389-KR-NP-S',
      style: 'SET389',
      category: 'Set'
    },
    payment: {
      currency: 'INR'
```

Group sales by state:



```
Type "it" for more
> db.orders.aggregate([
    {
      $group: {
        _id: "$customer.region.state",
        totalSales: { $sum: "$payment.amount" },
        orderCount: { $sum: 1 }
      }
    },
    {
      $sort: { totalSales: -1 }
    }
  ])
< {
    _id: 'MAHARASHTRA',
    totalSales: 13335534.14,
    orderCount: 21073
  }
  {
    _id: 'KARNATAKA',
    totalSales: 10481114.37,
    orderCount: 16394
  }
  {
    _id: 'TELANGANA',
    totalSales: 6916615.65,
    orderCount: 10637
  }
  {
    _id: 'UTTAR PRADESH',
```

Group by category:



```
> db.orders.aggregate([
    {
      $group: {
        _id: "$product.category",
        totalSales: { $sum: "$payment.amount" }
      }
    }
  ])
< {
    _id: 'Saree',
    totalSales: 123933.76
  }
  {
    _id: 'Western Dress',
    totalSales: 11215337.69
  }
  {
    _id: 'kurta',
    totalSales: 21291538.7
  }
  {
    _id: 'Blouse',
    totalSales: 458408.18
  }
  {
    _id: 'Ethnic Dress',
    totalSales: 791217.66
  }
```