National University of Computer and Emerging Sciences

Week 10 Express.JS MVC and MongoDB

for

Web Programming

Spring 2024

FAST School of Computer Science

Today's Agenda

Module 1: Getting started with MongoDB

Module 2: Introduction to MVC

Module 3: Implementing Complete Application using MVC architecture.

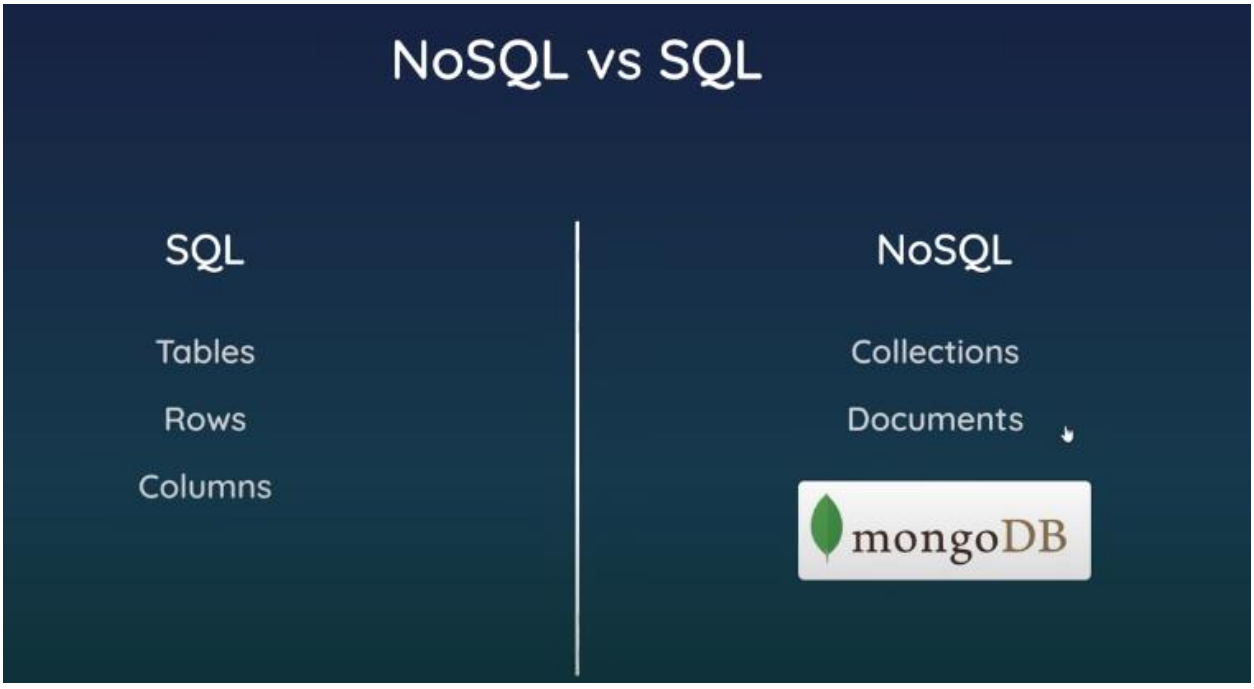
Module 1: Getting started with MongoDB

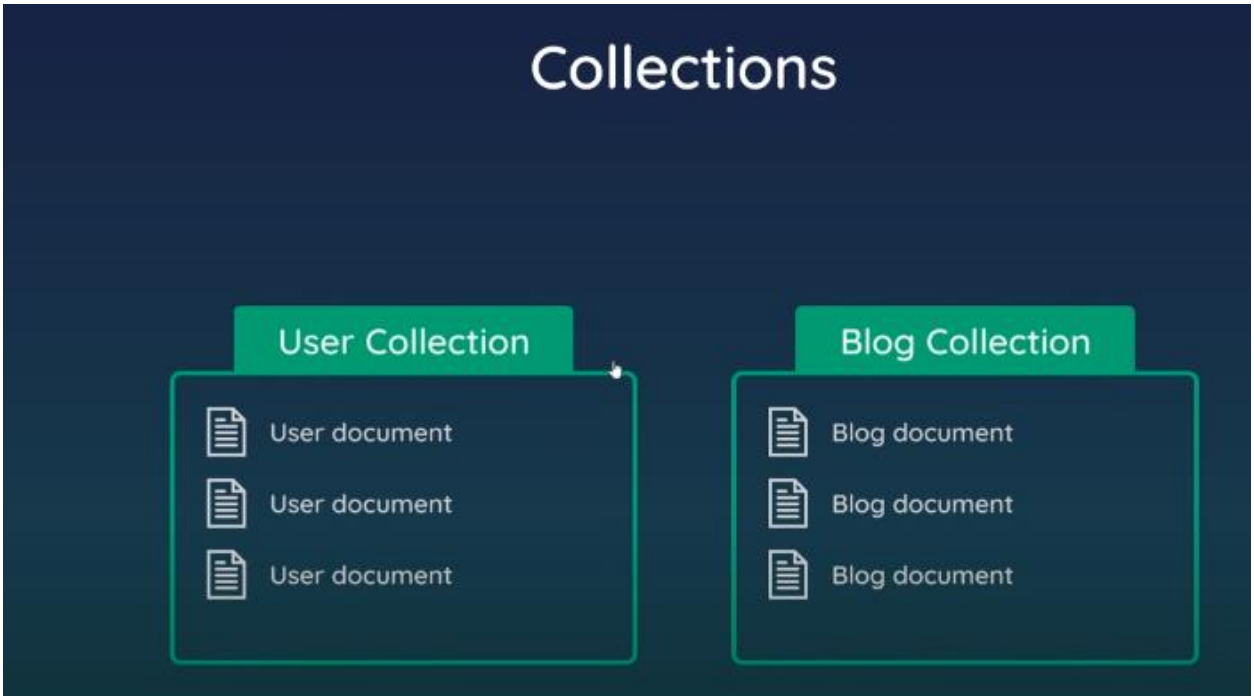
What is MongoDB?

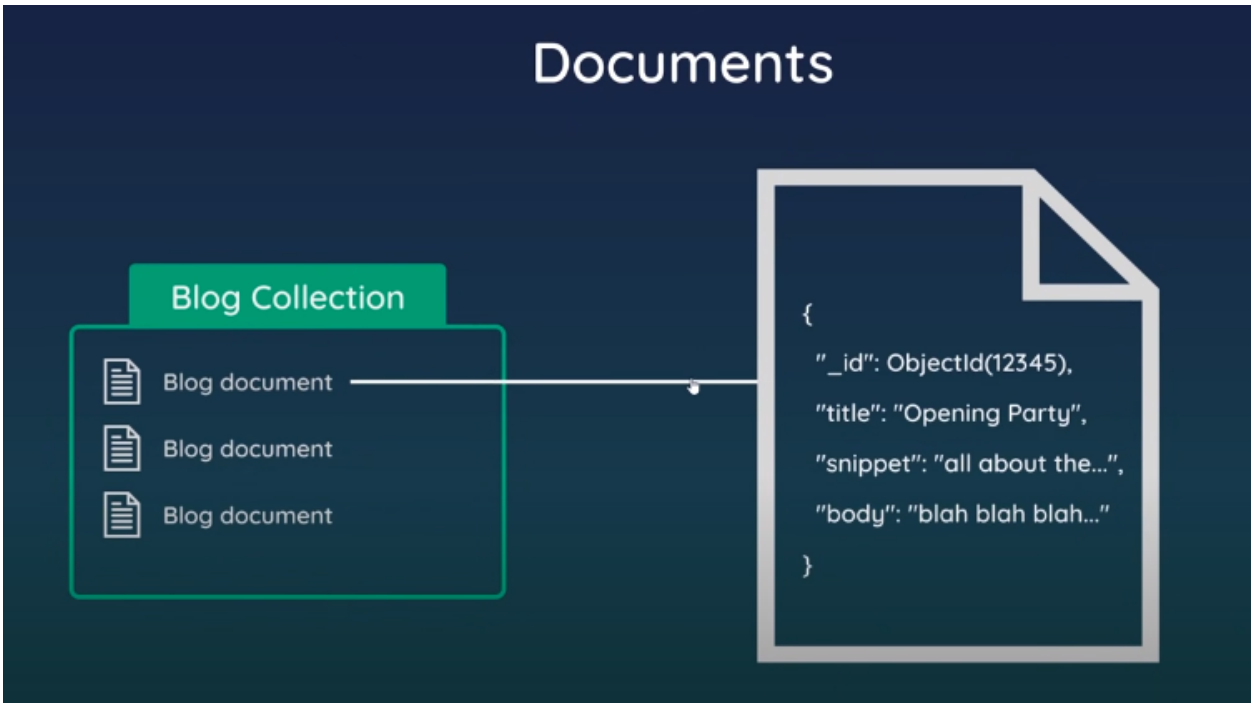
MongoDB is a popular open-source NoSQL database management system that uses a document-oriented data model. It is designed to store and manage unstructured, semi-structured, and structured data. MongoDB is known for its flexibility, scalability, and performance, making it suitable for a wide range of applications, from small-scale projects to large-scale enterprise applications.

Key features of MongoDB include:

Document-Oriented: MongoDB stores data in flexible, JSON-like documents called BSON (Binary JSON), which allows developers to store data in a hierarchical structure similar to native data types in many programming languages.







Schemaless: Unlike traditional relational databases, MongoDB does not require a predefined schema for data storage. This flexibility allows developers to store data without specifying its structure in advance, making it easier to adapt to changing requirements and evolving data models.

Scalability: MongoDB is designed to scale horizontally across multiple servers, enabling applications to handle large volumes of data and high levels of traffic. It supports sharding, which allows data to be distributed across multiple servers to improve performance and reliability.

High Performance: MongoDB offers high performance and low latency for read and write operations. It uses indexing, caching, and other optimization techniques to efficiently retrieve and manipulate data.

Rich Query Language: MongoDB provides a powerful query language that supports a wide range of operations, including CRUD (Create, Read, Update, Delete), aggregation, sorting, filtering, and geospatial queries.

Replication and High Availability: MongoDB supports automatic failover and data replication to ensure data durability and availability. It can maintain multiple copies of data across different servers and automatically promote a new primary node in case of failure.

Community and Enterprise Editions: MongoDB is available in both open-source Community Edition and commercial Enterprise Edition. The Community Edition is free to use and suitable for most development and small-scale production environments, while the Enterprise Edition offers additional features, security enhancements, and professional support services.

A short Tour

https://youtu.be/bxsemcrY4gQ

MongoDB official

https://www.mongodb.com/docs/manual/tutorial/install-mongodb-on-windows/

How to Download and install MongoDB server and shell

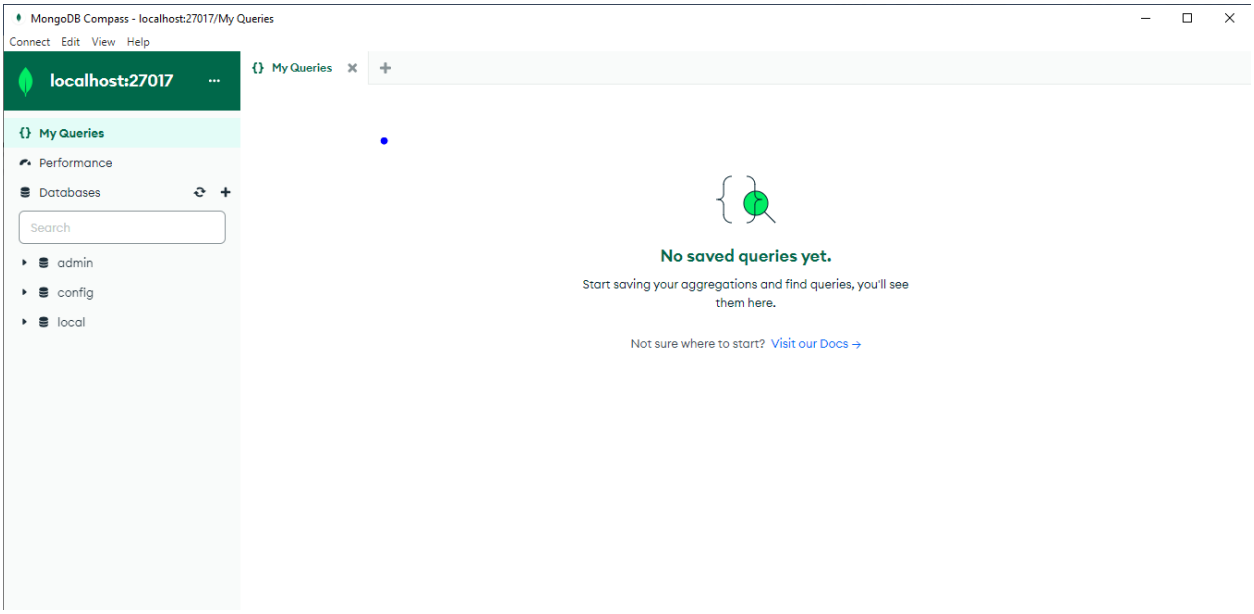
Follow this tutorial for installation of MongoDB
https://www.youtube.com/watch?v=gB6WLkSrtJk

Step1: Download latest version of mongoDB
https://www.mongodb.com/try/download/community

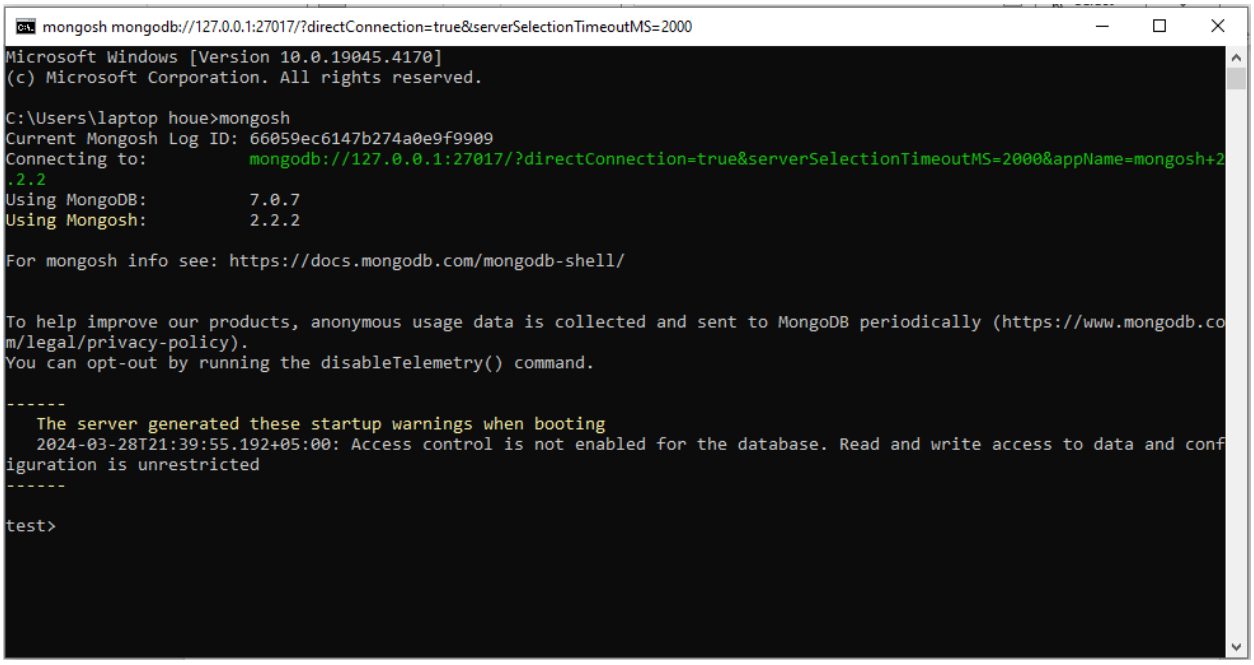
Step 2: Download MongoDB shell latest version

https://www.mongodb.com/try/download/shell

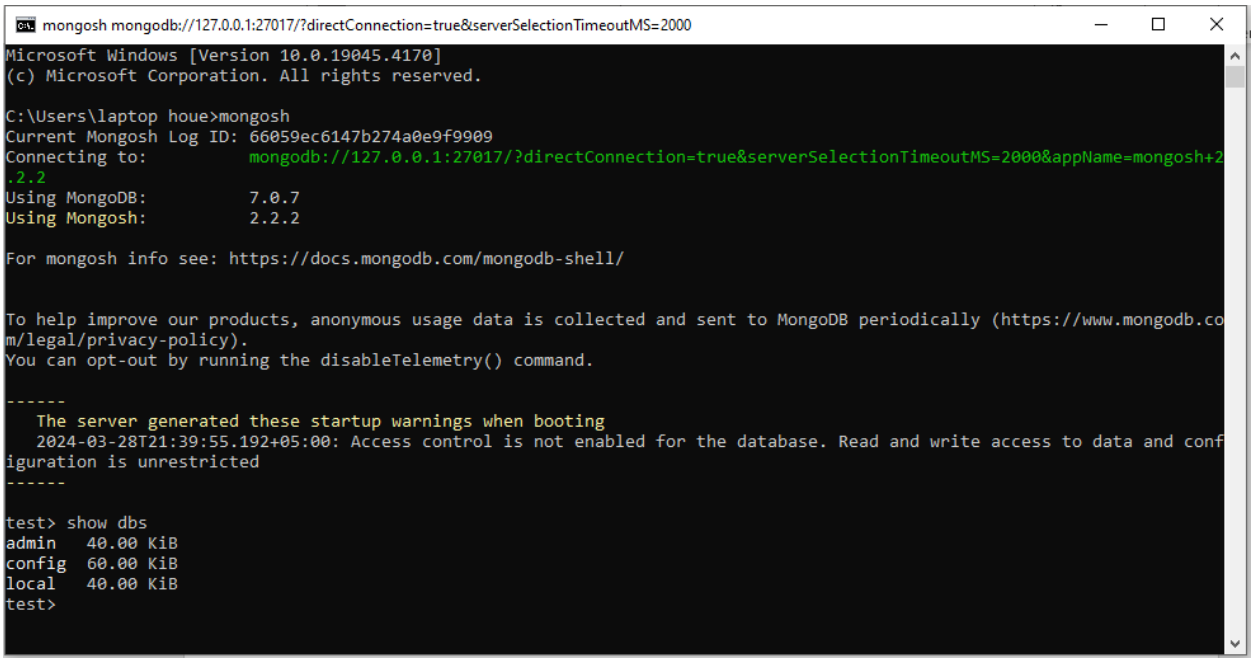
Step 3: Once you install the server and shell, check your default databases.



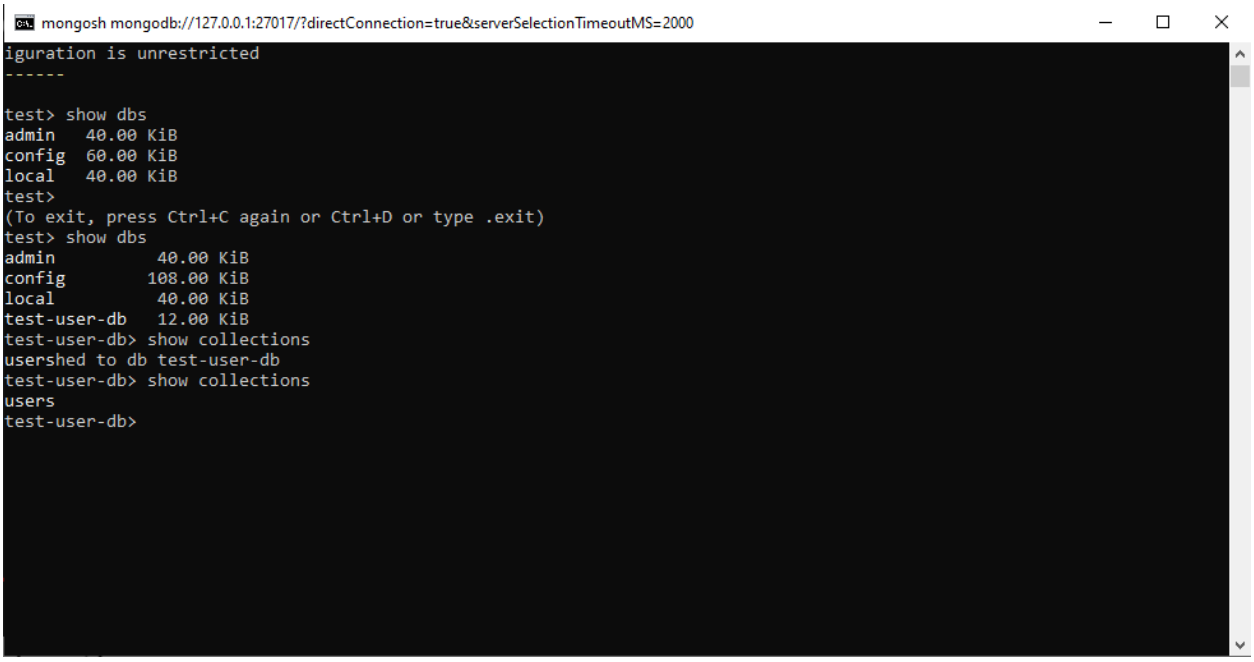
Step 4: Now open cmd and type “mongosh”



Step 5: Now check current dbs



Step 6: After establishing connection switch to db by typing “use test-user-db”



```
mongosh mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000
To help improve our products, anonymous usage data is collected and sent
m/legal/privacy-policy).
You can opt-out by running the disableTelemetry() command.

------
   The server generated these startup warnings when booting
   2024-03-28T21:39:55.192+05:00: Access control is not enabled for the d
iguration is unrestricted
------

test> show dbs
admin   40.00 KiB
config  60.00 KiB
local   40.00 KiB
test>
(To exit, press Ctrl+C again or Ctrl+D or type .exit)
test> show dbs
admin          40.00 KiB
config        108.00 KiB
local          40.00 KiB
test-user-db   12.00 KiB
test-user-db> show collections
usershed to db test-user-db
test-user-db> show collections
users
test-user-db> db.users.find({})
ReferenceError: users is not defined
test-user-db> db.users.find({})

test-user-db>
```

Module 2: Introduction to MVC

The MVC pattern promotes separation of concerns, making it easier to maintain, extend, and test the application. It also enables developers to work on different components of the application independently, which improves code organization and collaboration among team members.

View

A View is that part of the application that represents the presentation of data.

Views are created by the data collected from the model data. A view requests the model to give information so that it presents the output presentation to the user.

The view also represents the data from charts, diagrams, and tables. For example, any customer view will include all the UI components like text boxes, drop downs, etc.

Controller

The Controller is that part of the application that handles the user interaction. The controller interprets the mouse and keyboard inputs from the user, informing model and the view to change as appropriate.

A Controller send's commands to the model to update its state(E.g., Saving a specific document). The controller also sends commands to its associated view to change the view's presentation (For example scrolling a particular document).

Model

The model component stores data and its related logic. It represents data that is being transferred between controller components or any other related business logic. For example, a Controller object will retrieve the customer info from the database. It manipulates data and sends back to the database or uses it to render the same data.