Day 5:

What is MongoDB?

MongoDB is a **NoSQL, document-oriented database** that stores data in **JSON-like format (BSON)** instead of tables like traditional SQL databases.

👉 Instead of rows and columns, MongoDB stores data in:

- **Database → Collections → Documents**

A **document** is similar to a JSON object.

Example:

```
{
  "name": "Vandana",
  "age": 22,
  "course": "B.Tech"
}
```

Why We Use MongoDB in Web Development?

MongoDB is widely used in web development because:

1️⃣ **Flexible Schema**

- No fixed structure required.
- You can store different types of data in the same collection.

2️⃣ **JSON Format**

- Works perfectly with **JavaScript / Node.js**.
- Easy to convert between frontend and backend.

3️⃣ **Fast & Scalable**

- Good performance.
- Supports horizontal scaling (sharding).

4️⃣ **Easy Integration with Node.js**

- Popular stack: **MongoDB + Express + React + Node.js (MERN Stack)**

5️⃣ **Cloud Support**

- Can use **MongoDB Atlas** for cloud database hosting.

Real-Life Example

🛒 Example: E-Commerce Website

Suppose you are building an online shopping website.

You need to store:

- User details
- Product details
- Orders
- Cart items

Product Document Example:

```
{
  "name": "Laptop",
  "price": 50000,
  "brand": "HP",
  "inStock": true
}
```

Instead of creating multiple tables like SQL, MongoDB stores everything as flexible documents.

MongoDB Basic Structure

SQL Term	MongoDB Term
Database	Database
Table	Collection
Row	Document
Column	Field

🔑 Important Key Points About MongoDB

1️⃣ Database

Container that holds collections.

2️⃣ Collection

Group of documents (like table).

3️⃣ Document

Single record (JSON-like object).

4️⃣ _id

- Unique identifier.
- Automatically generated.

Example:

```
{
  "_id": "6748394hdhd73",
  "name": "Vandana"
}
```

🛠️ How to Connect MongoDB to Server (Node.js + Express)

Step 1: Install Packages

```
npm install mongoose express
```

We use **Mongoose** to connect MongoDB with Node.js.

Step 2: Basic Server Code

```
const express = require("express");
const mongoose = require("mongoose");

const app = express();
app.use(express.json());

// Connect to MongoDB
mongoose.connect("mongodb://127.0.0.1:27017/mydatabase")
.then(() => console.log("MongoDB Connected"))
.catch((err) => console.log(err));

// Create Schema
const userSchema = new mongoose.Schema({
    name: String,
    age: Number,
  course: String
});

// Create Model
const User = mongoose.model("User", userSchema);

// POST API
app.post("/addUser", async (req, res) => {
  const user = new User(req.body);
  await user.save();
  res.send("User Added");
});

// GET API
app.get("/users", async (req, res) => {
  const users = await User.find();
  res.json(users);
});

app.listen(3000, () => {
  console.log("Server running on port 3000");
});
```

If Using MongoDB Atlas (Cloud)

Replace connection string:

```
mongoose.connect("mongodb+srv://username:password@cluster.mongodb.net/mydatabase")
```

You can create a cluster from **MongoDB Atlas** website.

Important MongoDB Commands (Shell)

```
show dbs
use mydatabase
```

```
show collections

db.users.find()

db.users.insertOne({name:"Vandana"})

db.users.deleteOne({name:"Vandana"})
```

🔥 Advantages of MongoDB

✓ Easy to learn
✓ No fixed schema
✓ High performance
✓ Best for real-time applications
✓ Works great with Node.js

⚠️ When NOT to Use MongoDB

❌ If your project needs very complex joins
❌ If strong relational structure is required

🎯 Where MongoDB is Used

- E-commerce websites
- Social media apps
- Blogging platforms
- Chat applications
- REST APIs

Companies using MongoDB:

- Netflix
- Uber
- eBay

Summary (Exam Notes)

- MongoDB is a NoSQL document database.
- Stores data in JSON-like format (BSON).
- Flexible schema.
- Used in MERN stack.

- Connected using Mongoose in Node.js.
- Uses collections and documents instead of tables and rows.