
🏥 New Use Case – Hospital Management System

We'll track **patients**, **doctors**, and **appointments**.

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1. Database & Collections Setup

```
use hospitalDB

// Patients Collection
db.patients.insertMany([
  { _id: 1, name: "Arjun Mehta", age: 34, gender: "Male", city: "Bangalore" },
  { _id: 2, name: "Neha Kapoor", age: 29, gender: "Female", city: "Delhi" },
  { _id: 3, name: "Ravi Sharma", age: 45, gender: "Male", city: "Hyderabad" },
  { _id: 4, name: "Priya Singh", age: 38, gender: "Female", city: "Chennai" }
]);

// Doctors Collection
db.doctors.insertMany([
  { _id: 101, name: "Dr. Ramesh", specialization: "Cardiology", experience: 15 },
  { _id: 102, name: "Dr. Sneha", specialization: "Dermatology", experience: 8 },
  { _id: 103, name: "Dr. Amit", specialization: "Neurology", experience: 12 },
  { _id: 104, name: "Dr. Pooja", specialization: "Orthopedics", experience: 10 }
]);

// Appointments Collection (patient_id references patients, doctor_id references
doctors)
db.appointments.insertMany([
  { patient_id: 1, doctor_id: 101, date: ISODate("2025-01-05"), status: "Completed",
fee: 2000 },
  { patient_id: 2, doctor_id: 102, date: ISODate("2025-01-06"), status: "Completed",
fee: 1500 },
  { patient_id: 3, doctor_id: 103, date: ISODate("2025-01-07"), status: "Scheduled",
fee: 2500 },
  { patient_id: 4, doctor_id: 104, date: ISODate("2025-01-08"), status: "Completed",
fee: 1800 },
  { patient_id: 1, doctor_id: 104, date: ISODate("2025-01-10"), status: "Completed",
fee: 2200 }
]);
```

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2. Exercises

CRUD Basics

1. Insert a new patient into the `patients` collection.
2. Find all doctors specializing in `"Cardiology"`.
3. Update Ravi Sharma's city to `"Pune"`.
4. Delete one appointment with `"status: Completed"`.

Indexing

5. Create an index on `patients.city`.
6. Create a compound index on `specialization` and `experience` in `doctors`.
7. Verify indexes using `getIndexes()`.
8. Write a query that benefits from the compound index.
9. Write a query that results in a **COLLSCAN**.

Aggregation Framework

10. Count how many appointments each doctor has handled.
11. Find the total consultation fees collected by each doctor.
12. Find the average age of patients per city.
13. Show all appointments with patient and doctor details (`$lookup`).
14. Find doctors who have treated more than 1 patient.
15. Show patients who spent more than 3000 in total fees.
