

Lecture-18 /19

Coding Blocks - Kartik Mathur

MongoDB Deep Dive
& Mongoose

Class Agenda

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MongoDB

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MongoDB

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MongoDB

- MongoDB installation
- Understanding CRUD operations on MongoDB
- Server Documentation vs Driver Documentation
- NodeJS and MongoDB: CRUD Operations

MongoDB

JOIN in mongoDB

MongoDB doesn't have join like SQL

We can achieve them, using certain functions in mongoDB

LET US SEE IT IN ACTION.....

Orders JSON : <https://gist.github.com/Kartik-Mathur/9c7508473587fd64408690c3b336245b>

Customers JSON: <https://gist.github.com/Kartik-Mathur/b6cd34b0ab5c233b5e9a1b83d9c3daba>

You can add them to mongoDB compass and continue with the queries, ahead.

MongoDB

Consider this to make things easier:

Customer ID	Name	Email	Order ID	Item	Customer Name (customerId)
c101	Kartik	kartik@cb.com	1001	Laptop	Kartik (c101)
c102	Kanak	kanak@cb.com	1002	Mouse	Kanak (c102)
c103	Abhishek	abhishek@cb.com	1003	Keyboard	Kanak (c102)
c104	Monu	monu@cb.com	1004	Monitor	Kanak (c102)
c105	Aayush	aayush@cb.com	1005	USB Cable	Abhishek (c103)
			1006	Charger	Abhishek (c103)

Joins in MongoDB

MongoDB doesn't have Traditional joins like SQL

Joins are:

1. Left outer join: Returns **all documents** from the left collection, and matching documents from the right. If no match, right side will be empty array. THIS IS THE DEFAULT JOIN by MONGODB

```
db.orders.aggregate([
  {
    $lookup: {
      from: "customers",
      localField: "customerId",
      foreignField: "_id",
      as: "customerDetails"
    }
  }
]);
```

Left outer join

LEFT JOIN

[Customers] [Orders]

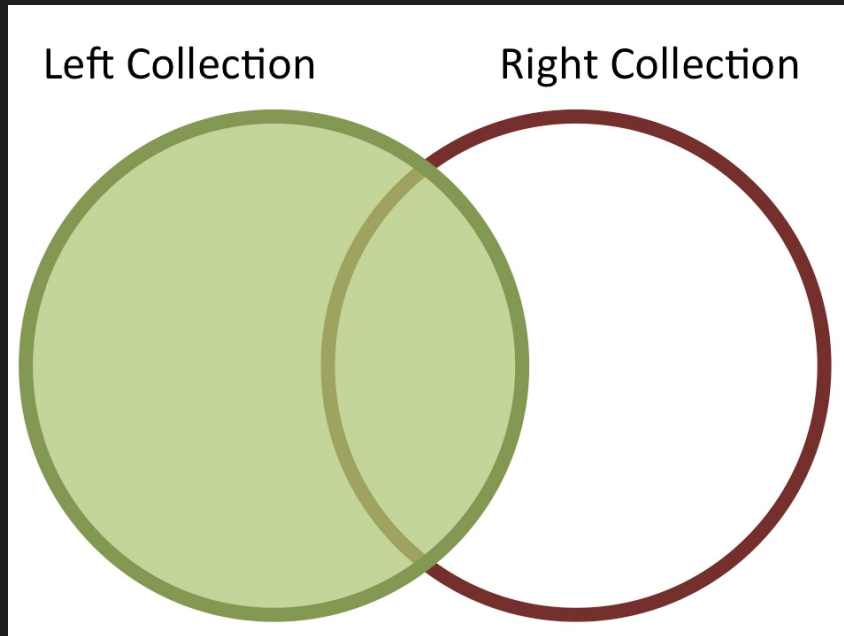
Kartik → Laptop

Kanak → Mouse, Keyboard, Monitor

Abhishek → USB Cable, Charger

Monu → ❌ No match (Still shown)

Aayush → ❌ No match (Still shown)



Inner JOIN

```
db.customers.aggregate([
  {
    $lookup: {
      from: "orders",
      localField: "_id",
      foreignField: "customerId",
      as: "orderDetails"
    }
  },
  { $unwind: "$orderDetails" } // removes empty arrays
]);
```

Inner JOIN

INNER JOIN

[Customers with Orders only]

Kartik → Laptop

Kanak → Mouse

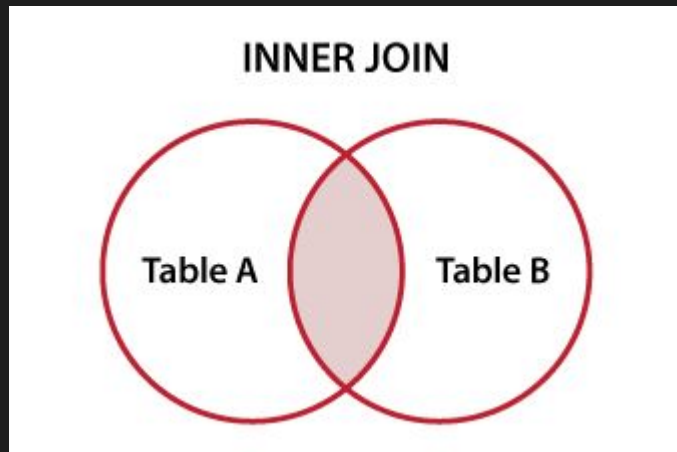
Kanak → Keyboard

Kanak → Monitor

Abhishek → USB Cable

Abhishek → Charger

✗ Monu and Aayush are removed



Understanding \$unwind

```
{  
  name: "Kartik",  
  hobbies: ["Coding", "Gaming", "Reading"]  
}
```

```
db.users.aggregate([  
  { $unwind: "$hobbies" }  
]);
```

```
{ name: "Kartik", hobbies: "Coding" }  
{ name: "Kartik", hobbies: "Gaming" }  
{ name: "Kartik", hobbies: "Reading" }
```

How to unwind the LEFT outer join?

LEFT JOIN + UNWIND

Kartik → Laptop
Kanak → Mouse
Kanak → Keyboard
Kanak → Monitor
Abhishek → USB Cable
Abhishek → Charger
Monu → empty
Aayush → empty

```
db.customers.aggregate([
  {
    $lookup: {
      from: "orders",
      localField: "_id",
      foreignField: "customerId",
      as: "orderDetails"
    }
  },
  {
    $unwind: {
      path: "$orderDetails",
      preserveNullAndEmptyArrays: true
    }
  }
]);
```

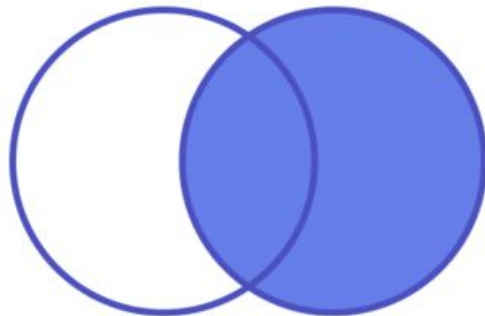
Right JOIN

```
db.orders.aggregate([
  {
    $lookup: {
      from: "customers",
      localField: "customerId",
      foreignField: "_id",
      as: "customerInfo"
    }
  },
  { $unwind: "$customerInfo" }
]);
```

Here we query on orders and not customers

RIGHT JOIN

Laptop → Kartik
Mouse → Kanak
Keyboard → Kanak
Monitor → Kanak
USB Cable → Abhishek
Charger → Abhishek
[No Monu or Aayush – since no orders]



RIGHT JOIN

Pipelines

In MongoDB, a pipeline is a sequence of stages that process documents step-by-step, used inside:

The main `aggregate()` function

Operators like `$lookup` and `$unionWith`

Pipelines Structure

```
db.collection.aggregate([  
    { $stage1: { ... } },  
    { $stage2: { ... } },  
    ...  
]);
```

Stage	Purpose
\$match	Filter documents (like SQL WHERE)
\$project	Pick or reshape fields (like SQL SELECT)
\$group	Group by a field and perform aggregations
\$sort	Sort the documents
\$limit	Limit number of output documents
\$skip	Skip documents (use with pagination)
\$lookup	Join with another collection (like JOIN)
\$unwind	Flatten array fields into separate docs
\$addFields	Add new computed fields
\$count	Count total documents after filtering
\$unionWith	Combine documents from another collection

Pipelines: Consider the json

```
[  
  { name: "DSA with C++", mentor:  
    "Kartik", duration: 12 },  
  
  { name: "Web Development",  
    mentor: "Kanak", duration: 10 },  
  
  { name: "Data Science", mentor:  
    "Abhishek", duration: 14 },  
  
  { name: "Android Development",  
    mentor: "Monu", duration: 8 },  
  
  { name: "Machine Learning",  
    mentor: "Aayush", duration: 16 }  
]
```

For json visit:

<https://gist.github.com/Kartik-Mathur/b51726b86aedcf0c5289215b9988386e>

Pipelines: Consider the json

Task:

1. Show only the courses taught by **Kartik**, **Kanak**, and **Abhishek**
2. Show only the name and mentor (hide duration)
3. Add a field platform: "Coding Blocks"

Pipelines: Consider the json

Task:

1. Show only the courses taught by **Kartik**, **Kanak**, and **Abhishek**
2. Show only the name and mentor (hide duration)
3. Add a field platform: "Coding Blocks"

```
db.courses.aggregate([
  {
    $match: { mentor: { $in: ["Kartik", "Kanak", "Abhishek"] } }
  },
  {
    $project: { name: 1, mentor: 1 }
  },
  {
    $addFields: { platform: "Coding Blocks" } // it will be added as extra field
  }
]);
```

Output to pipeline query

```
db.courses.aggregate([
  {
    $match: { mentor: { $in: ["Kartik", "Kanak", "Abhishek"] } }
  },
  {
    $project: { name: 1, mentor: 1 }
  },
  {
    $addFields: { platform: "Coding Blocks" } // it will be added as extra field
  }
]);

[
  { name: "DSA with C++", mentor: "Kartik", platform: "Coding Blocks" },
  { name: "Web Development", mentor: "Kanak", platform: "Coding Blocks" },
  { name: "Data Science", mentor: "Abhishek", platform: "Coding Blocks" }
]
```

You are GOOD TO GO with MONGODB now

Mongoose

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Mongoose

Mongoose is a Node.js-based Object Data Modeling (ODM) library for MongoDB, a popular NoSQL database. It provides a way to interact with MongoDB using a schema-based, object-oriented approach, making it easier for developers to manage data in their applications.

Let us see Mongoose in action!

Mongoose: Structure

MongoDB

