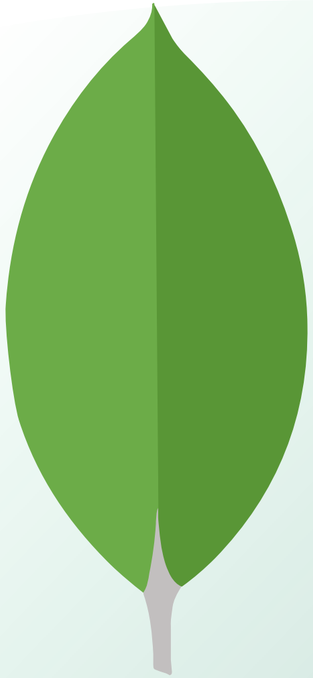
MEET MONGODB

- MongoDB is a **document-oriented** database.
- It is a **NoSQL database**, meaning it does not use a traditional relational database structure.
- MongoDB is **schema-less**, meaning that you do not need to define the structure of your data in advance.
- MongoDB is **highly scalable** and can be used to store large amounts of data.



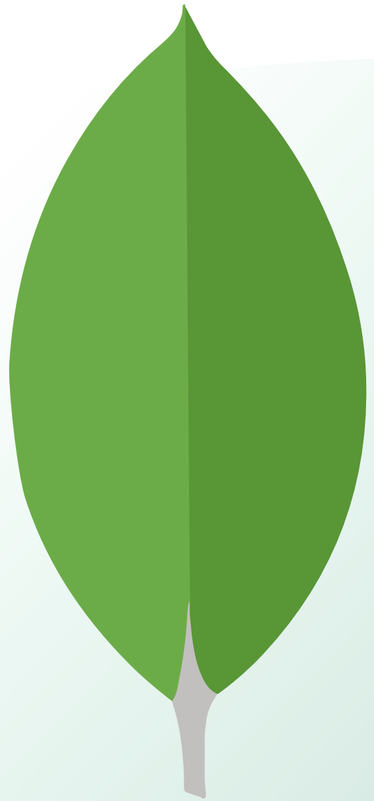
MEET MONGODB

MongoDB can manage

- Structured data
- Semi structured data
- Unstructured data

NoSQL Databases

- No table
- No row
- No complex join



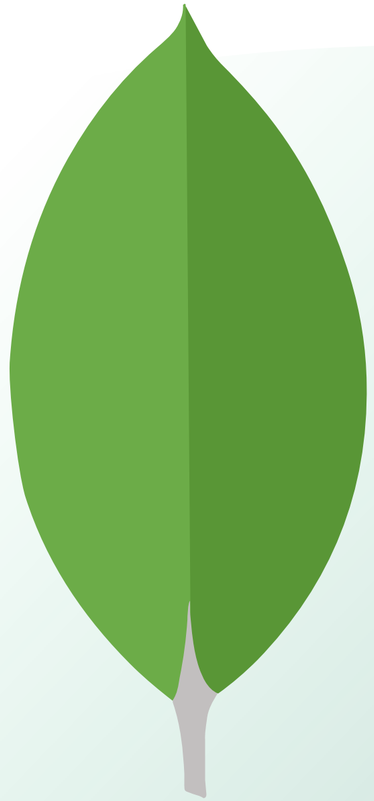
MEET MONGODB

Advantages

- Schema less
- single object
- No complex joins
- Deep query-ability
- Tuning
- Ease of scale-out
- Uses internal memory for storing

Where to Use MongoDB

- Big Data
- Content Management and Delivery
- Mobile and Social Infrastructure
- User Data Management
- Data Hub



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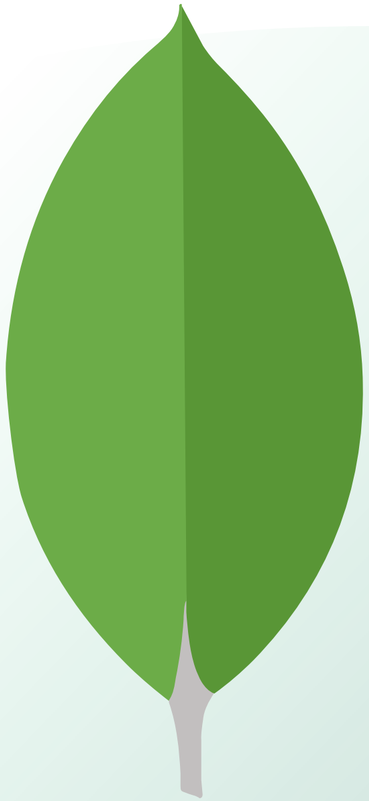
BASIC TERMINOLOGY

RDBMS	MongoDB
Database	Database
Table	Collection
Tuple/Row	Document
column	Field
Table Join	Embedded Documents
Primary Key	Default key _id provided by MongoDB itself)



EMBEDDED DATA MODEL

- In this model, you can have (embed) all the related data in a single document
- it is also known as de-normalized data model.

```
{
  _id: ,
  Emp_ID: "10025AE336"
  Personal_details:{
    First_Name: "Radhika",
    Last_Name: "Sharma",
    Date_Of_Birth: "1995-09-26"
  },
  Contact: {
    e-mail: "radhika_sharma.123@gmail.com",
    phone: "9848022338"
  },
  Address: {
    city: "Hyderabad",
    Area: "Madapur",
    State: "Telangana"
  }
}
```

NORMALIZED DATA MODEL

In this model, you can refer the sub documents in the original document.

```
{
  _id: <ObjectId101>,
  Emp_ID: "10025AE336",
}
```

```
{
  _id: <ObjectId104>,
  empDocID: " ObjectId101",
  city: "Hyderabad",
  Area: "Madapur",
  State: "Telangana"
}
```

```
{
  _id: <ObjectId103>,
  empDocID: " ObjectId101",
  e-mail: "radhika_sharma.123@gmail.com",
  phone: "9848022338",

}
```

```
{
  _id: <ObjectId102>,
  empDocID: " ObjectId101",
  First_Name: "Radhika",
  Last_Name: "Sharma",
  Date_Of_Birth: "1995-09-26",

}
```

DATATYPES

Data Types	Description
String	String is the most commonly used datatype. It is used to store data. A string must be UTF 8 valid in mongodb.
Integer	Integer is used to store the numeric value. It can be 32 bit or 64 bit depending on the server you are using.
Boolean	This datatype is used to store boolean values. It just shows YES/NO values.
Double	Double datatype stores floating point values.
Min/Max Keys	This datatype compare a value against the lowest and highest bson elements.
Arrays	This datatype is used to store a list or multiple values into a single key.
Object	Object datatype is used for embedded documents.
Null	It is used to store null values.
Symbol	It is generally used for languages that use a specific type.
Date	This datatype stores the current date or time in Unix time format. It makes you possible to specify your own date time by creating object of date and pass the value of date, month, year into it.

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SAMPLE DOCUMENT

- _id is a 12 bytes hexadecimal number
- First 4 bytes = current timestamp
- Next 3 bytes = machine id
- Next 2 bytes = process id
- Last 3 bytes = incremental VALUE

```
{
   _id: ObjectId(7df78ad8902c)
   title: 'value',
   tags: ['value', 'value', 'value'],
   likes: 100,
   comments: [
      {
         user:'value',
         message: 'value',
         dateCreated: new Date(2011,1,20,2,15),
         like: 0
      },
      {
         user:'value',
         message: 'value',
         dateCreated: new Date(2011,1,25,7,45),
         like: 5
      }
   ]
}
```

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MONGODB ATLAS

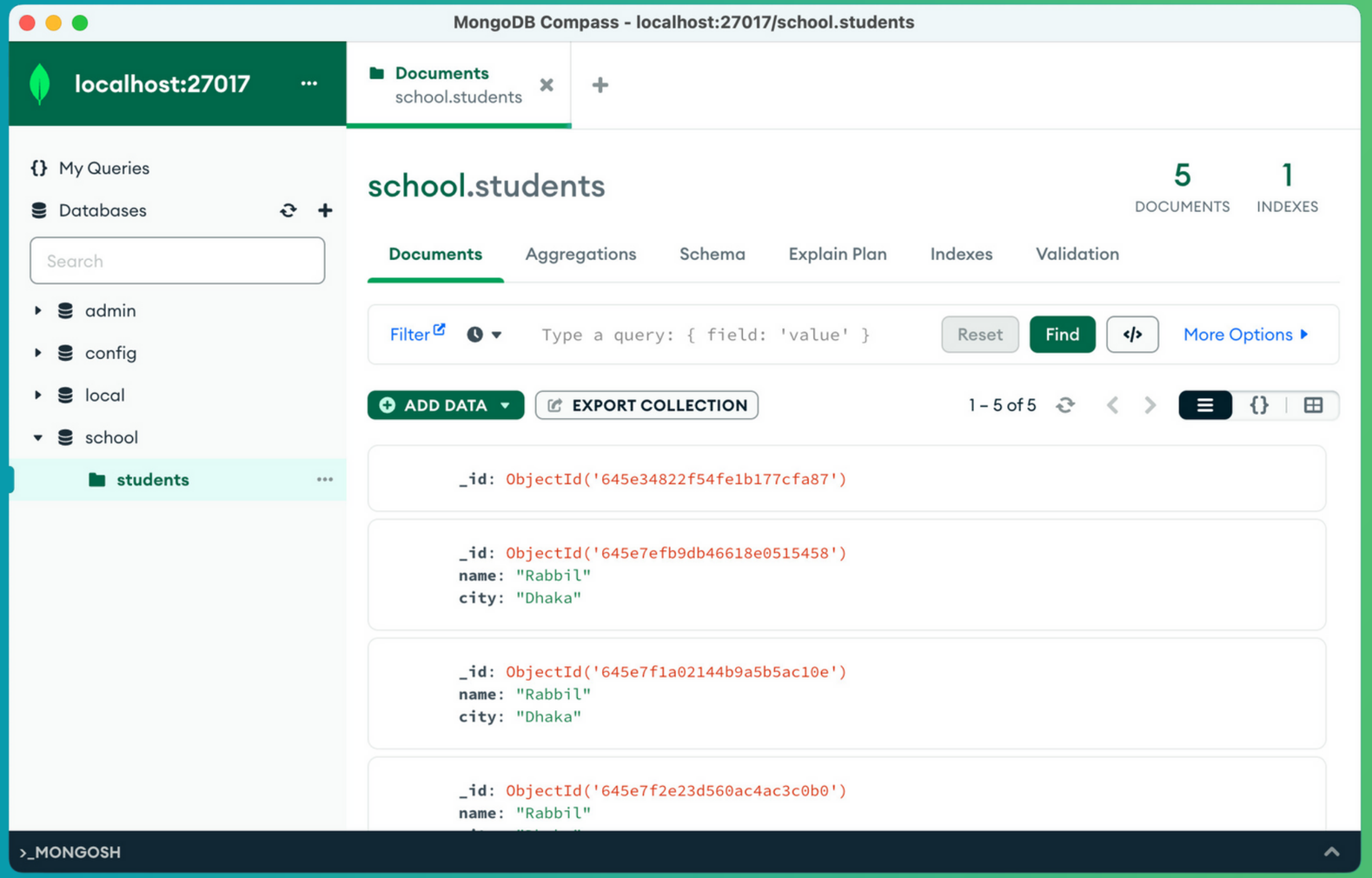
- MongoDB Atlas is a cloud-based database service
- That makes it easy to deploy, manage, and scale MongoDB databases
- Atlas is a fully managed service, so you don't need to worry about the underlying infrastructure
- Atlas is available on a variety of cloud providers, including AWS, Azure, and Google Cloud Platform

INSTALL MONGODB ENVIRONMENT

- Download & Install MongoDB Community Server
- Download & Install MongoDB Compass
- Connect Compass With Server

LOOK INSIDE

MongoDB Compass



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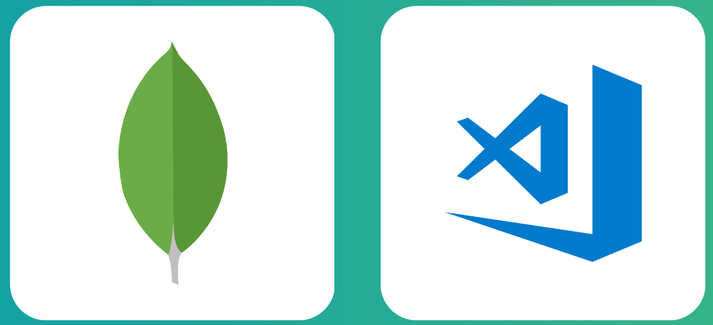
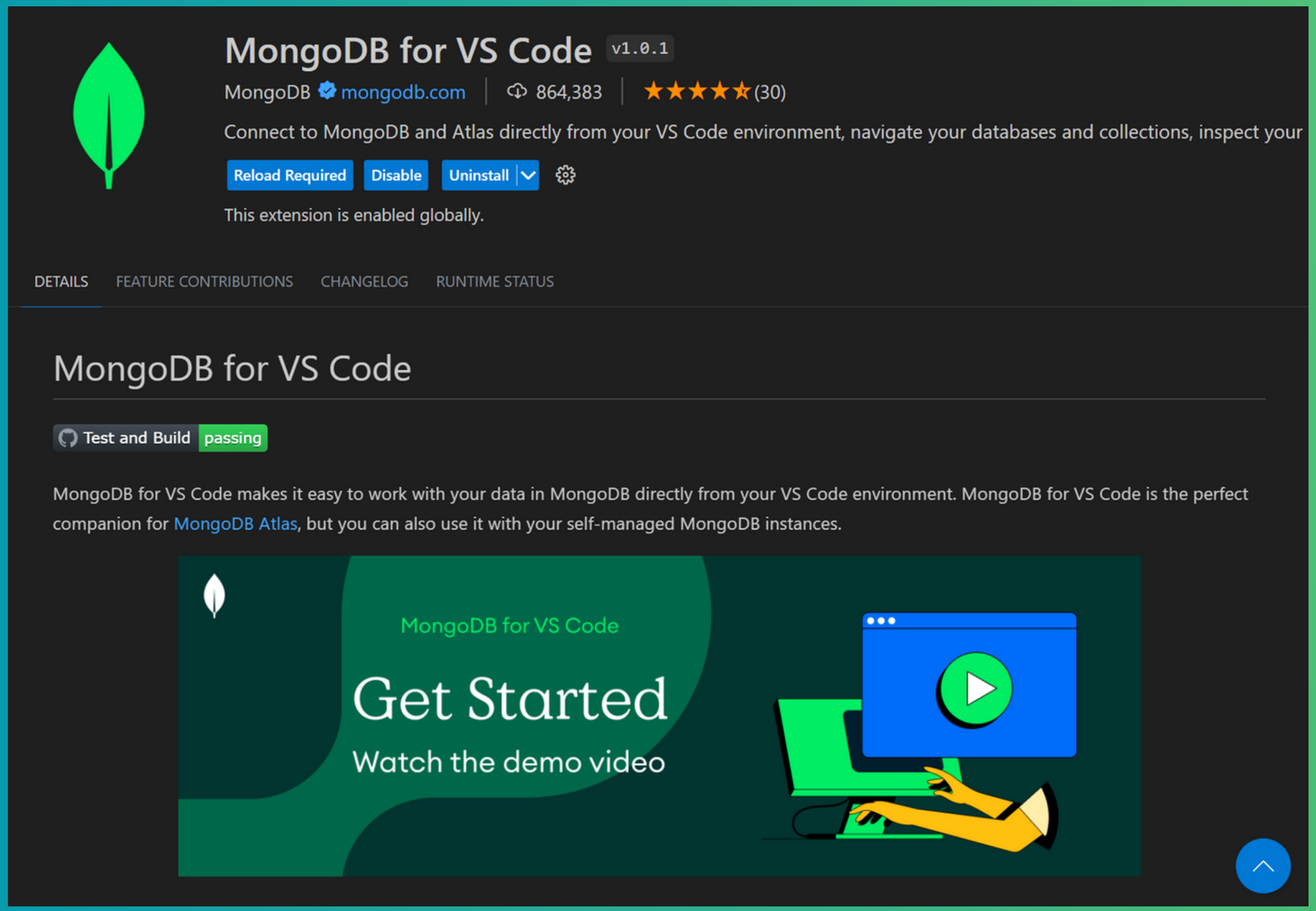
MONGODB

Dedicated VS Code Extension



LOOK INSIDE

MongoDB VS Code Extension



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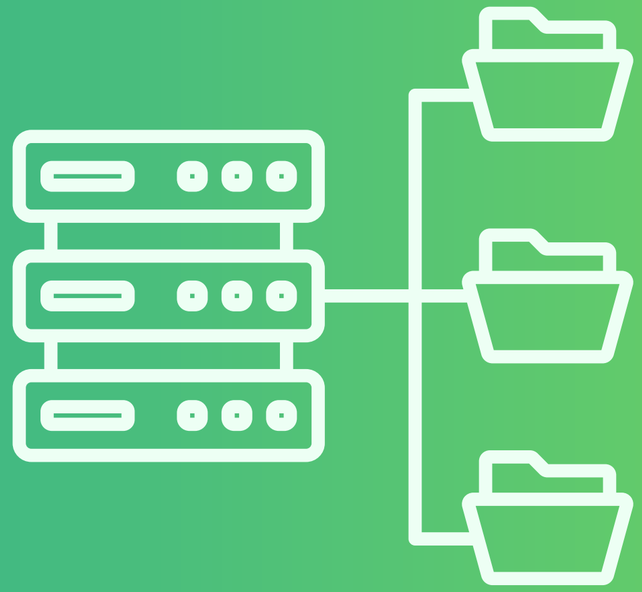
LETS START

MongoDB Query Writing



DATABASE RELATED METHODS

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db.help()

Common db objects. Displays method descriptions

db.hostInfo()

Returns a document record containing information about the operating system MongoDB is running on.

db.getName()

Returns the name of the current database.

db.getMongo()

Returns the name of the current database.

db.currentOp()

Reports the current in-progress operations.

DATABASE RELATED METHODS

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db.dropDatabase()

Removes the current database.

db.getCollectionInfos()

Returns collection information for all collections in the current database.

db.getCollectionNames()

Lists all collections in the current database.

db.getLastError()

Checks and returns the status of the last operation

db.getLastErrorObj()

Returns the status document for the last operation.

DATABASE RELATED METHODS

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db.isMaster()

Returns a document object containing a status report for the replica set.

db.getReplicationInfo()

Returns statistics for a replica set.

db.listCommands()

Displays a list of common database commands.

db.logout()

Terminates an authenticated session.

db.printCollectionStats()

Display statistics for each collection.

DATABASE RELATED METHODS

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db.serverBuildInfo()

Returns a mongod documentation record containing the compile parameters for the instance.

db.serverStatus()

Returns a document that provides an overview of the state of the database process.

db.shutdownServer()

Cleanly and safely stops the current mongod or mongos process.

db.stats()

Returns a document record containing a report on the current database state.

db.version()

Returns the version number of the mongod instance:

DATABASE RELATED METHODS

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db.createCollection('demo')

Returns a mongod documentation record containing the compile parameters for the instance.

db.CollectionName.drop()

It completely removes a collection from the database and does not leave any indexes associated with the dropped collections

INSERT QUERY

The **insertOne()** method allows you to insert a single document into a collection.

```
db.employee.insertOne(
    {
        "name": "Nafis",
        "designation": "Manager",
        "salary": 95000,
        "city": "Dhaka"
    }
)
```

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INSERT QUERY

The **insertMany()** allows you to insert multiple documents into a collection.

```
db.brands.insertMany(
    [
     {"Name":"IBM"},
     {"Name":"BP"},
     {"Name":"UPS"},
     {"Name":"BMW"}
    ]
)
```

FIND QUERY

The findOne() returns a single document from a collection that satisfies the specified condition.

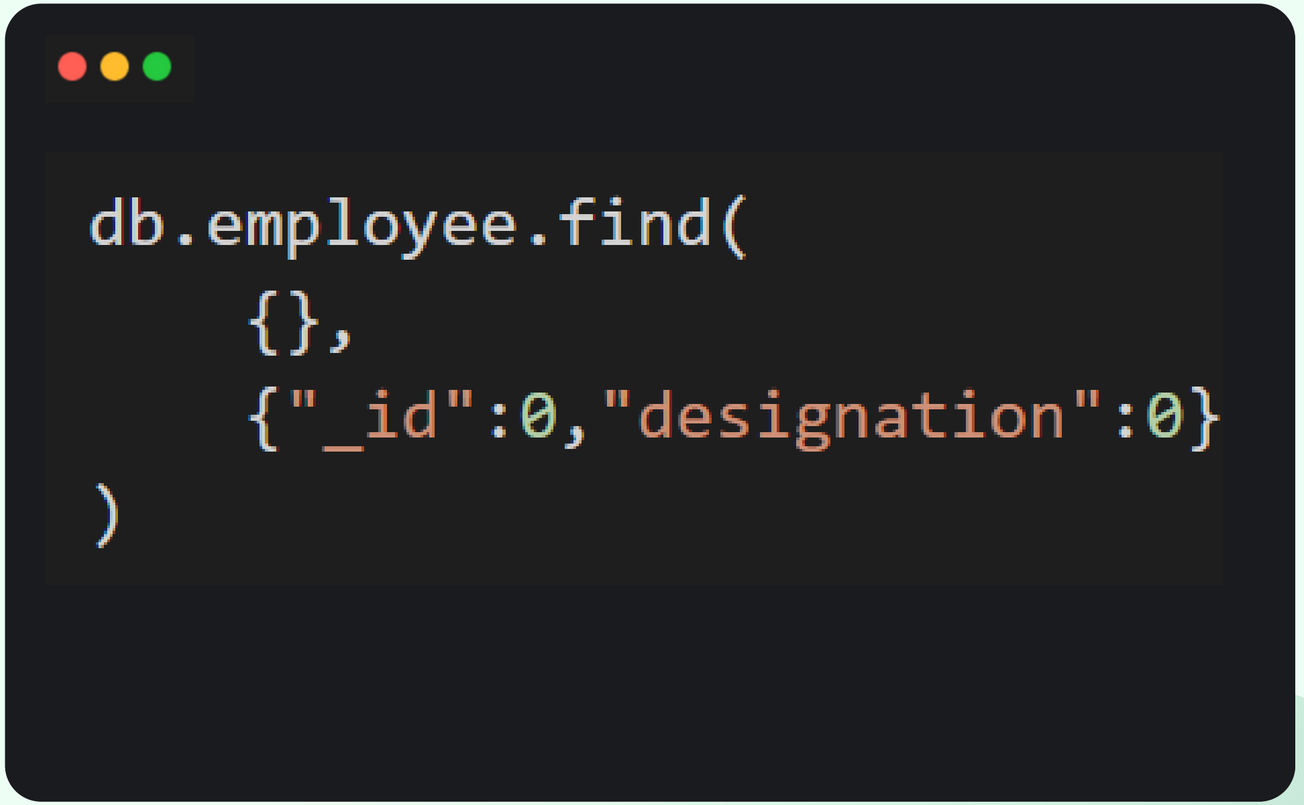
The find() method finds the documents that satisfy a specified condition and returns a cursor to the matching documents

```
db.brands.find();
```

```
db.brands.findOne(
    {'Name':'Walton'}
);
```

PROJECTION

In MongoDB, projection means selecting only the necessary data rather than selecting whole of the data of a document.



COMPARISON QUERY OPERATOR

$eq: Equal To Operator

$lt: Less Than Operator

$lte: Less Than or Equal To Operator

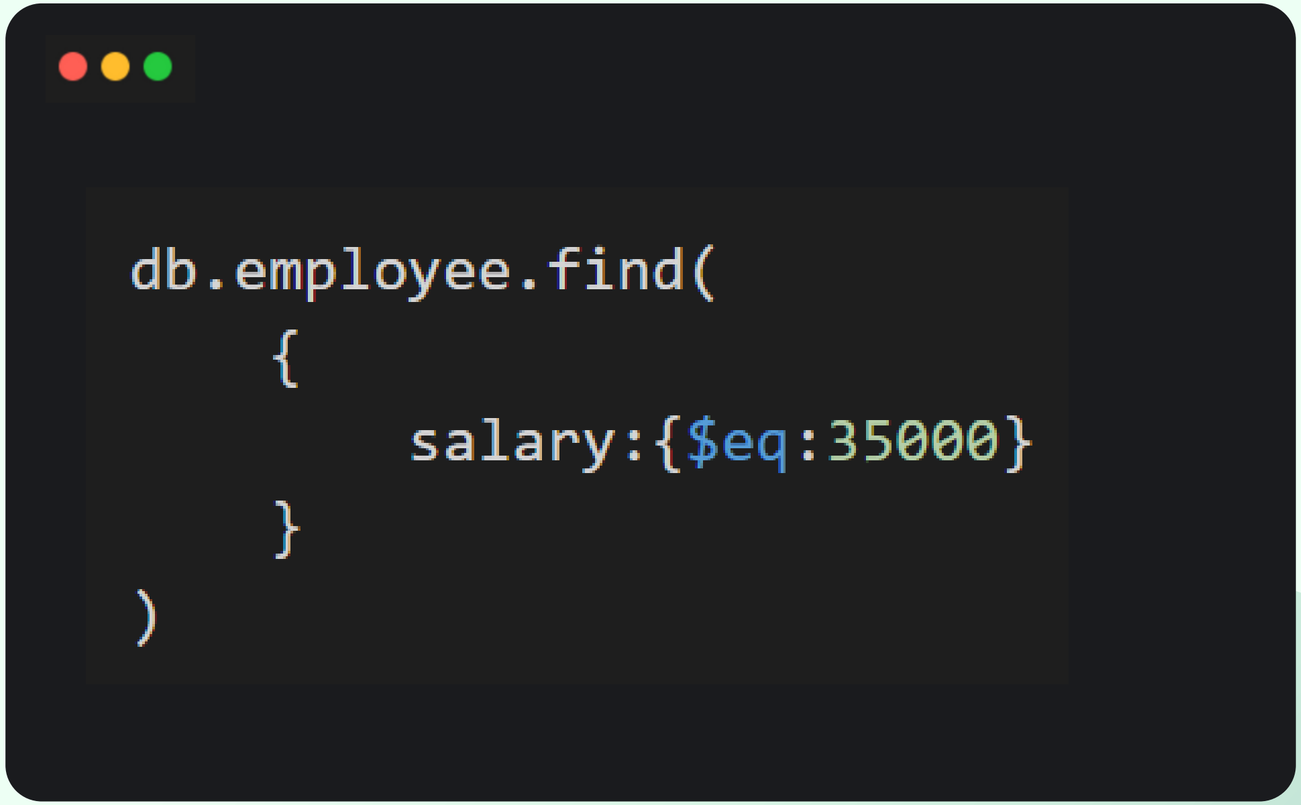
$gt: Greater Than Operator

$gte: Greater Than or Equal To Operator

$ne: Not Equal To Operator

$in: In Operator

$nin: Not In Operator



LOGICAL QUERY OPERATOR

$and: Logical AND Opeartor
$or: Logical OR Operator
$not: Logical NOT operation
$nor: Logical NOR operation

```
db.employee.find( {
    $and: [
       {salary:{$gte:35000}},
       {name:{$eq:'Rupom'}},
    ]
 })
```

```
db.employee.find( {
    $or: [
       {salary:{$gte:35000}},
       {name:{$eq:'Rabbil'}},
    ]
 })
```

ELEMENT QUERY OPERATOR

$exists: Matches documents that have the specified field.

$type: Selects documents if a field is of the specified type.

Type	Number	Alias
Double	1	"double"
String	2	"string"
Object	3	"object"
Array	4	"array"
Binary data	5	"binData"
ObjectId	7	"objectId"
Boolean	8	"bool"
Date	9	"date"
Null	10	"null"
Regular Expression	11	"regex"
32-bit integer	16	"int"
Timestamp	17	"timestamp"
64-bit integer	18	"long"
Decimal128	19	"decimal"

ELEMENT QUERY OPERATOR

```
db.employee.find(
    {
        address: { $exists: true }
    }
)
```

```
db.employee.find(
    {
        salary: { $type: 2 }
    }
)
```

EVALUATION QUERY OPERATOR

$expr
Allows use of aggregation expressions within the query language.

$jsonSchema
Validate documents against the given JSON Schema.

$mod
Performs a modulo operation on the value of a field and selects documents with a specified result.

$regex
Selects documents where values match a specified regular expression.

$text
Performs text search.

$where
Matches documents that satisfy a JavaScript expression.

EVALUATION QUERY OPERATOR

```
db.monthlyBudget.find(
    {
        $expr:
        {
            $gt: [ "$budget" , "$spent" ]
        }
    }
)
```

```
db.monthlyBudget.find(
    { spent: { $mod: [ 2, 0 ] } }
)
```

EVALUATION QUERY OPERATOR

```
db.employee.find(
    { name: { $regex: "(?i)R(?-i)abb" } }
)
```

```
db.monthlyBudget.find(
   { $where:"this.budget>this.spent"}
)
```

SORT LIMIT DISTINCT & ROW COUNT

```
db.employee.find().sort({salary:-1})
```

```
db.employee.find().count('total')
```

```
db.employee.find().limit(2)
```

```
db.brands.distinct( "Name")
```

DELETE

```
db.employee.deleteOne(
    {
        "_id" : ObjectId("646b1073731f226d9c806daf")
    }
)
```

```
db.employee.deleteMany({
    salary:{$gt:30000}
})
```

UPDATE ONE & MANY

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```
db.monthlyBudget.updateMany(
    { budget: {$eq:100}},
    {
    $set: {
        budget: 105
    }
})
```

```
db.monthlyBudget.updateOne(
    { _id:ObjectId('646b2b64f34dfc345beacdf0')},
    {
    $set: {
        budget: 450
    }
})
```

INCREMENT & DECREMENT

```
db.monthlyBudget.updateMany(
    { budget: {$eq:105}},
    {
    $inc: {
        budget: 5
    }
})
```

```
db.monthlyBudget.updateMany(
    { budget: {$eq:110}},
    {
    $inc: {
        budget: -5
    }
})
```

UNSET & RENAME

```
db.monthlyBudget.updateMany(
    { budget: {$eq:105}},
    {
    $unset: {
        budget: ""
    }
})
```

```
db.monthlyBudget.updateMany({}, {
    $rename: {
        spent: "expense"
    }
})
```

UPSERT

Upsert is a combination of update and insert. Upsert performs two functions:

- Update data if there is a matching document.
- Insert a new document in case there is no document matches the query criteria.

```
db.monthlyBudget.updateOne(
    {category: "Soft Drinks"},
    {
        $set:{
            "category": "Soft Drinks",
            "budget": 4,
            "expense": 450
        }

    },
    { upsert: true}
)
```