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Starter Activity.

SQL databases are considered relational databases. They store related data in separate tables. When data is needed, it is queried from multiple tables to join the data back together.

MongoDB is a document database which is often referred to as a non-relational database. This does not mean that relational data cannot be stored in document databases. It means that relational data is stored differently. A better way to refer to it is as a non-tabular database.

MongoDB stores data in flexible documents. Instead of having multiple tables you can simply keep all of your related data together. This makes reading your data very fast.

You can still have multiple groups of data too. In MongoDB, instead of tables these are called collections.

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TechTalent Academy

Data Science Course

MongoDB

Course Content

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- What is MongoDB?
- SQL Database vs NoSQL Databases
- MongoDB commands to retrieve data

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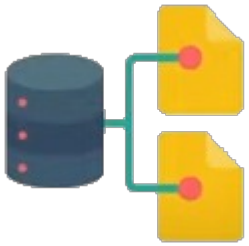
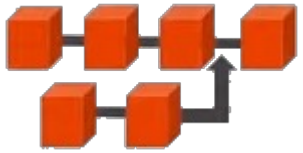
What is MongoDB?

MongoDB is a document-oriented, no sequel (NoSQL) database



Document based
Represents hierarchical relationship using a single record



No Schema
No strict defined structure

Data is stored as JSON

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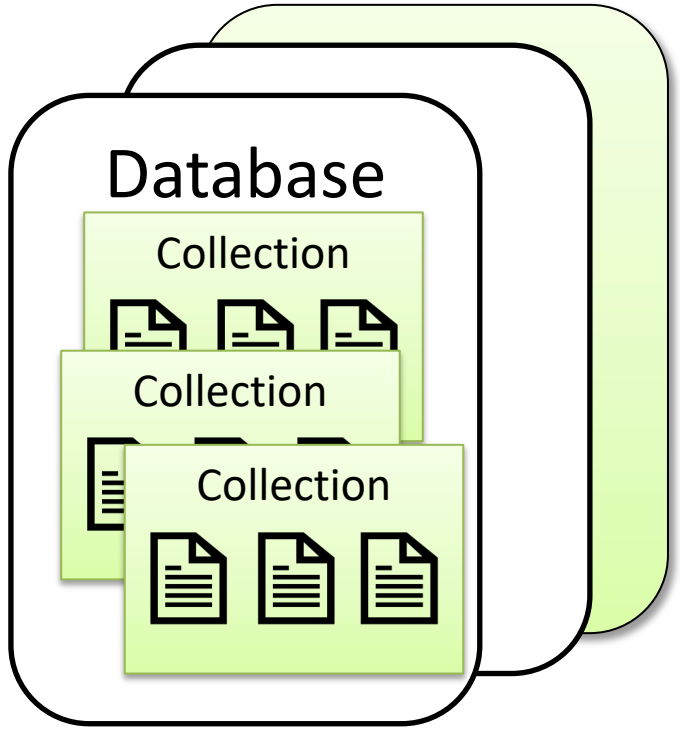
MongoDB Structure



Each database consists of collections and each collection consists of documents

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Some Terminology

RDBMS		MongoDB
Database	→	Database
Table	→	Collection
Row	→	Document
Join	→	Embedded

SQL Database vs NoSQL Databases

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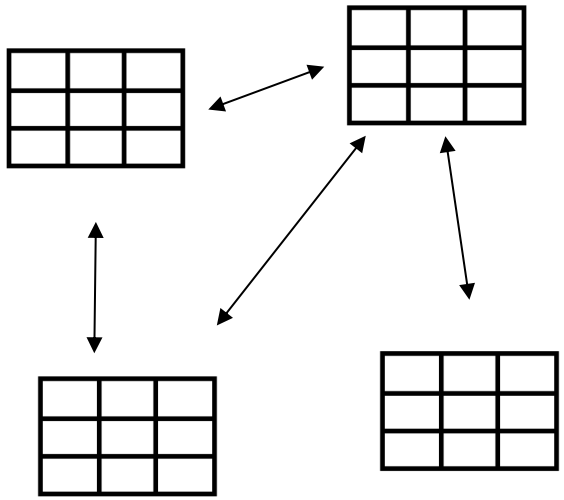
SQL Databases\ Relational DB

Tables are normally joined to retrieve data



NoSQL/ Document DB

Documents are independent of each other and they don't have the same schema.

All information related to that document is in one place and all queries are done on one document at a time.

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Why use MongoDB?

https://www.youtube.com/watch?v=0X43QfCfyk0

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Applications of MongoDB?

MongoDB Shell and MongoDB Server

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Mongo Shell

mongo

Management
Create\ Read\ Update \Delete

Mongo Server

mongod

Datastore

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What is JSON

- JSON stands for JavaScript Object Notation.
- **JSON is an open standard data-interchange format.**
- JSON is lightweight and self-describing.
- **JSON originated from JavaScript.**
- JSON is easy to read and write.
- **JSON is language independent.**
- JSON supports data structures such as arrays and objects.

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JSON Syntax Rules

- Data is in name/value pairs
- Data is separated by commas
- Curly braces hold objects
- Square brackets hold arrays

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JSON Objects

- Objects are defined using curly braces { }

Key on the left of the colon:

```
{key : "value"}

{key : 123}
```

Value on the right of the colon :

Values can be strings, numbers, arrays or another object

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JSON arrays

- Arrays are defined using square brackets [ ]

```
{key : [123, “str”]}
```

In JSON, array values can be of data type of string, number, object, array, boolean or *null*

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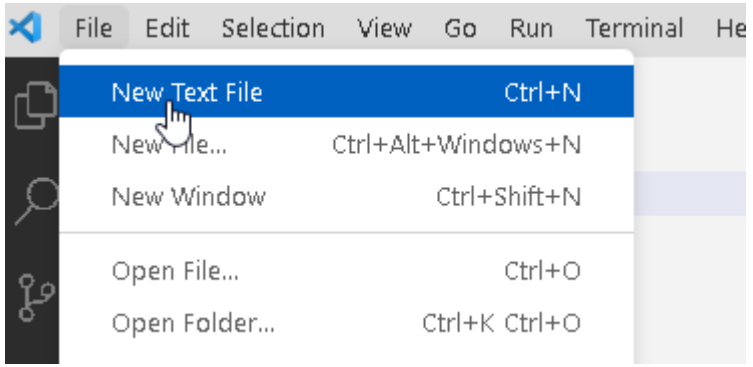
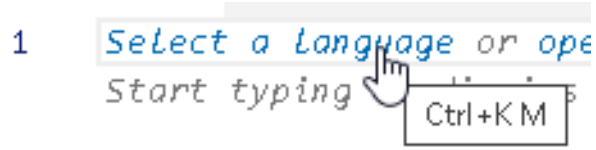
Testing MongoDB

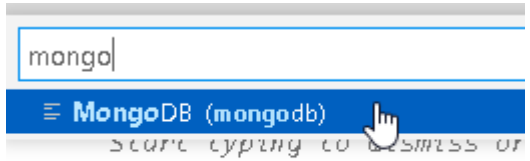
1. Click new file from the file menu



2. Click on select language



3. Type in mongo and select MongoDB



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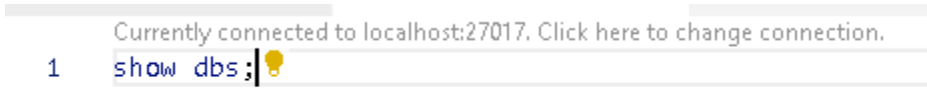
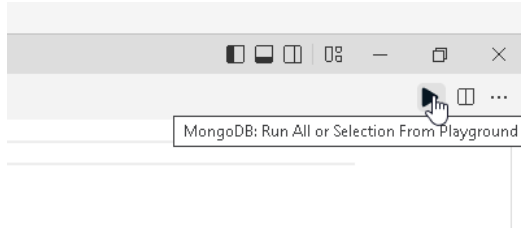
Trying MongoDB

4. Type in show dbs;



5. Click on the Play icon



6. Database structure will be displayed

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Creating documents from MongoDB

MongoDB Basics: Data Types in MongoDB

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```
db.TestCollection.insertMany(
[
{"Integer": 62},    // Create and integer
{"Boolean": true},   // Create Boolean
{"double data type": 3.1415}, // Create Double
{"string data type" : "This is a String"}, // Create String

{" Array" : " Here is an example of array",
" Qualification" : ["BCA", "BS", "MCA"]} // Create Array

])
```

```
{
  "_id": {
    "$oid": "62fa4627c63e15f170cbd4b9"
  },
```

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Creating a Database

To create a database type the following line and click play

```
use('moviedatabase');
```

Name of database

This will switch you to the new database, the database is not created until we create a collection

Table ===➔ Collection

DB ====➔ Database

ROW ====➔ Document

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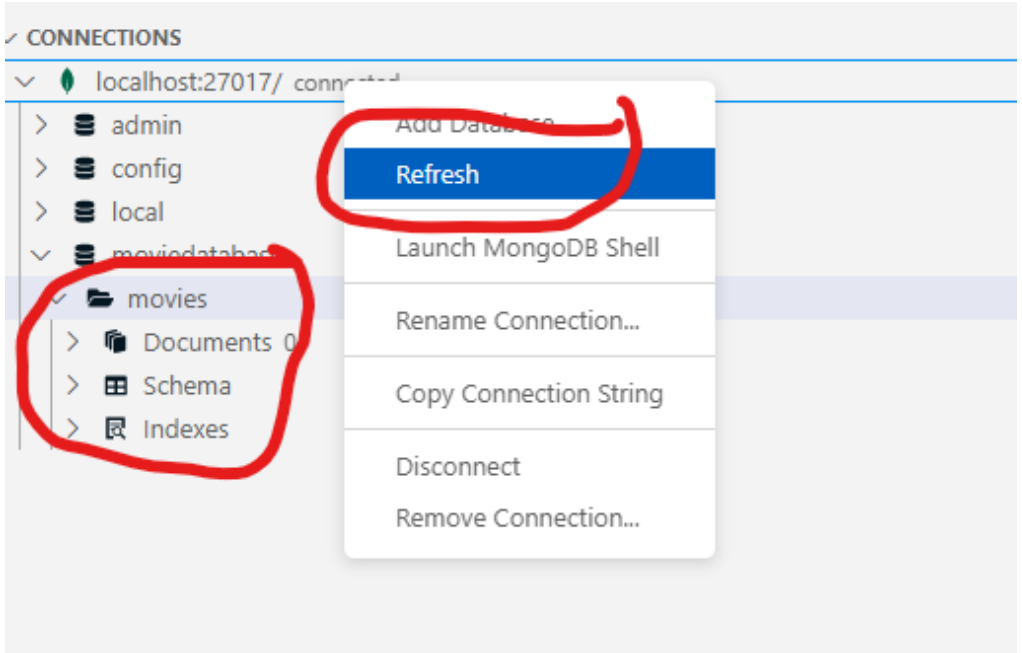
Creating a collection

To create a collection type the following line and click play

```
db.createCollection('movies')
```



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Delete the database

This will drop the existing database in which you are residing.

```
db.dropDatabase();
```

Creating a collection

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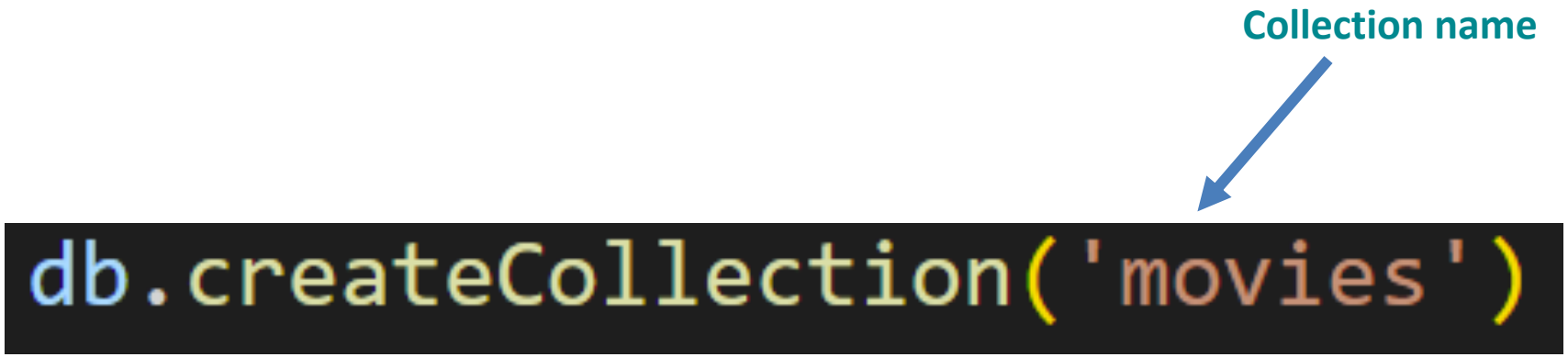
If you don’t create a collection it will be automatically created when we insert data.



MongoDB Basics: Insert Documents

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MongoDB supports the below mentioned three methods to insert document data in your database:

- insert()
- insertOne()
- insertMany()

Inserting documents

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Collection name

```
db.movies.insertOne({
  title: 'The Shawshank Redemption',
  genre: 'Drama',
  certificate: 15,
  rating: 9.3,
  tags: ['prison', 'escape']
})
```

JSON Object in { }

JSON Array in [ ]

The Insertmany() Method

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Insertmany() can be used to insert multiple documents into a collection.

Here we are inserting data for 4 films into the movies collection

```
db.movies.insertMany([
  {
    title: 'Schindlers List',
    genre: ['Biography', 'Drama', 'History'],
    certificate: 15,
    rating: 9.0,
    tags: ['accountant', 'villa', 'womanizer']
  },
  {
    title: "Forrest Gump",
    genre: ['Drama', 'Romance'],
    certificate: 12,
    rating: 8.8,
    tags: ['vietnam war', 'shrimp boat']
  },
  {
    title: "Inception",
    genre: ['Action', 'Adventure', 'Sci-Fi'],
    certificate: '12A',
    rating: 8.8,
    tags: ['dream', 'mindbender', 'subconscious']
  },
  {
    title: "Monsters, Inc",
    genre: ['Animation', 'Adventure', 'Comedy'],
    certificate: 'U',
    rating: 8.1,
    tags: ['monster', 'scream', 'portal door']
  }
])
```

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Database Query with MongoDB

The find() method:

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```
db.movies.find()
```

Can be used to find all the documents within the movie collection.

```
db.movies.find({ genre: 'Adventure' })
```

We can pass an object inside of find() to define what we are looking for. This will return all films which match the genre ‘Adventure’

The find() method with “AND” Condition:

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MongoDB also allows you in specifying data values of the documents holding two or more specified values to be fetched from the query. Here is an example showing the use of specifying queries using AND.

```
db.movies.find({ genre: 'Adventure', certificate :'U' })
```


```
[
  {
    "_id": {
      "$oid": "63247d7962c49521487a
    },
    "title": "Monsters, Inc",
    "genre": [
      "Animation",
      "Adventure",
      "Comedy"
    ],
    "certificate": "U",
    "rating": 8.1,
    "tags": [
      "monster",
      "scream",
      "portal door"
    ]
  }
]
```

The find() method with “or” Condition:

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MongoDB allows users to specify either one or multiple values to be true

```
db.movies.find({$or:[{ genre: 'Adventure'}, {certificate :12 }]})
```


```
[
  {
    "_id": {
      "$oid": "63247d7962c49521487a5374"
    },
    "title": "Forrest Gump",
    "genre": [
      "Drama",
      "Romance"
    ],
    "certificate": 12,
    "rating": 8.8,
    "tags": [
      "vietnam war",
      "shrimp boat"
    ]
  },
  {
    Edit Document
    "_id": {
      "$oid": "63247d7962c49521487a5375"
    },
    "title": "Inception",
    "genre": [
      "Action",
      "Adventure",
      "Sci-Fi"
    ],
    "certificate": "12A",
    "rating": 8.8,
    "tags": [
      "dream",
      "mindbender",
      "subconscious"
    ]
  },
  {
    Edit Document
    "_id": {
      "$oid": "63247d7962c49521487a5376"
    },
    "title": "Monsters, Inc",
    "genre": [
      "Animation",
      "Adventure",
      "Comedy"
    ],
    "certificate": "U",
    "rating": 8.1,
    "tags": [
      "monster",
      "scream",
      "portal door"
    ]
  }
]
```

The find() method continued

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Sorting Documents

```
// Sorting documents
// Ascending
use("moviedatabase");
db.movies.find().sort({ title: 1 })

//Descending
use("moviedatabase");
db.movies.find().sort({ title: -1 })
```

Counting Documents

```
// Count Documents
use("moviedatabase");
db.movies.find().count()

// Count number of movies in the genre Drama
use("moviedatabase");
db.movies.find({ genre: 'Drama' }).count()
```

The find() method continued

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Find First 4 Documents

```
// Limit Documents - returns the first 4 documents
use("moviedatabase");
db.movies.find().limit(4)
```

Find the first 2 Documents and sort in ascending order by title

```
// Chaining - chain on multiple methods
// This example will find the first two titles and sort in ascending order
use("moviedatabase");
db.movies.find().limit(2).sort({ title: 1 })
```

The find() method continued

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We can chain together multiple methods. In this example will find the first two titles and sort in ascending order.

```
use("moviedatabase");
db.movies.find().limit(2).sort({ title: 1 })
```

Find one Document - returns the first match

```
use("moviedatabase");
db.movies.findOne({ rating: { $gt: 3 } })
```

$**gt** selects those documents where the value of the field is greater than

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Database Update with MongoDB

UpdateOne()

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UpdateOne() will enable us to update one document at a time. The $ ensures only the rating is updated in this query.

```
use("moviedatabase");

db.movies.updateOne({ title: 'Monsters, Inc' },
{
  $set: {
    rating: 9.0
  }
})
```

Update or upsert

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Adding in upsert : true to the end of our update query will insert the document if it does not already exist and therefore cannot be updated

```
use("moviedatabase");

db.movies.updateOne({ title: 'Gone Girl' },
{
  $set: {
    title: 'Gone Girl',
    genre: ['Drama', 'Mystery', 'Thriller'],
    certificate: 18,
    rating: 8.1,
    tags: ['missing person', 'disappearance', 'murder']
  }
},
{
  upsert: true
})
```

Update

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We can use the updateone() to rename a field. In this example we are using the $ to ensure it is only the rating for the title ‘Gone Girl’ which will be updated.

```
use("moviedatabase");

db.posts.updateOne({ title: 'Gone Girl' },
{
  $rename: {
    rating: 'IMDB Rating'
  }
})
```

Deleting Documents in MongoDB

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MongoDB allows you to delete a document or documents collectively using its one of the three methods. Three methods provided by MongoDB for deleting documents are

- db.collection.deleteOne()
- db.collection.remove()
- db.collection.deleteMany()

The deleteOne() Method

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This method is used to delete only a single document, even when more than one document matches with the criteria.

```
use("moviedatabase");
db.movies.deleteOne({ title: 'Gone Girl' })
```

The deleteMany() Method

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Using the deletemany() method we are able to delete all documents which have the matching genre for ‘Drama’

```
use("moviedatabase");
db.movies.deleteMany({ genre: 'Drama' })
```

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Plenary.

What type of database is MongoDB?

```
MongoDB is a          database.
```

Complete the command to create a new database.

```
db.                   ("users")
```

Assuming the `object` is an array of multiple documents, complete the command to insert all of the documents at once.

```
db.posts.             (object)
```