



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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EXPERIMENT- 10

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1. Aim: To create and connect a PostgreSQL database instance on **Amazon RDS (Relational Database Service)** and EC2.

2. Objective:

To understand the ACID property and the AWS completely.

3. Tools / Software

- ② Amazon Web Services (AWS) PostgreSQL
- ② pgAdmin 4
- ② RDS (Relational Database Service)
- ②

4. Program:

No-SQL Database: MongoDB

It's a document-based database. Objects are used as similar to the Javascript.

1. show dbs: to show all the databases
2. use db_name: to create new database and use it.
3. db: to check in which database you are currently.
4. db.createCollection('Collection_name').

Collection is also created just by inserting a record in a new collection.

5. Db.user.insert({name: 'alok', class:'btech'})
6. show collections: to show all the collections.
7. db.dropDatabase(): to drop the database
8. db.collection_name.drop(): to drop the collection

```
switched to db car_dealership
car_dealership>

car_dealership> db.createCollection("cars")
{ ok: 1 }
car_dealership> █
```

INSERT OPERATION

insertOne:

```
car_dealership> db.cars.insertOne(
... {
...   "maker": "Tata",
...   "model": "Nexon",
...   "fuel_type": "Petrol",
...   "transmission": "Automatic",
...   "engine": {
...     "type": "Turbocharged",
...     "cc": 1199,
...     "torque": "170 Nm"
...   },
...   "features": [
...     "Touchscreen",
...     "Reverse Camera",
...     "Bluetooth Connectivity"
...   ],
...   "sunroof": false,
...   "airbags": 2
... }
```

insertMany():

READ OPERATION

Find(): gives all data - deprecated

```
car_dealership> db.cars.find()
[
  {
    _id: ObjectId('66b8a525d95b225bbc381167'),
    maker: 'Tata',
    model: 'Nexon',
    fuel_type: 'Petrol',
    transmission: 'Automatic',
    engine: { type: 'Turbocharged', cc: 1199, torque: '170 Nm' },
    features: [ 'Touchscreen', 'Reverse Camera', 'Bluetooth Connectivity' ],
    sunroof: false,
    airbags: 2
  },
  {
    _id: ObjectId('66b8a5b5d95b225bbc381168'),
    maker: 'Hyundai',
    model: 'Creta',
    fuel_type: 'Diesel',
    transmission: 'Manual',
    engine: { type: 'Naturally Aspirated', cc: 1493, torque: '250 Nm' },
    features: [ 'Sunroof', 'Leather Seats', 'Wireless Charging' ],
    sunroof: true,
    airbags: 6
  }
]
```

FindOne(): First found data from the collection.

```
car_dealership> db.cars.findOne()
{
  _id: ObjectId('66b8a525d95b225bbc381167'),
  maker: 'Tata',
  model: 'Nexon',
  fuel_type: 'Petrol',
  transmission: 'Automatic',
  engine: { type: 'Turbocharged', cc: 1199, torque: '170 Nm' },
  features: [ 'Touchscreen', 'Reverse Camera', 'Bluetooth Connectivity' ],
  sunroof: false,
  airbags: 2
}
```

Find(): showing specific columns , 1: true, 0:false

```
car_dealership> db.cars.find({}, {model:1})
[
  { _id: ObjectId('66b8a525d95b225bbc381167'), model: 'Nexon' },
  { _id: ObjectId('66b8a5b5d95b225bbc381168'), model: 'Creta' },
  { _id: ObjectId('66b8a5b5d95b225bbc381169'), model: 'Baleno' },
  { _id: ObjectId('66b8a5b5d95b225bbc38116a'), model: 'XUV500' },
  { _id: ObjectId('66b8a5b5d95b225bbc38116b'), model: 'City' }
]
car_dealership> ■
```

Let's say you only want Model column not _id column, then make _id as 0

```
car_dealership> db.cars.find({}, {model:1, _id:0})
[
  { model: 'Nexon' },
  { model: 'Creta' },
  { model: 'Baleno' },
  { model: 'XUV500' },
  { model: 'City' }
]
```

```
car_dealership> db.cars.find({}, {model:1, maker:1, _id:0})
[
  { maker: 'Tata', model: 'Nexon' },
  { maker: 'Hyundai', model: 'Creta' },
  { maker: 'Maruti Suzuki', model: 'Baleno' },
  { maker: 'Mahindra', model: 'XUV500' },
  { maker: 'Honda', model: 'City' }
]
```

Find function with condition: I want details of cars having fuel type as 'Petrol'.

```
car_dealership> db.cars.find({fuel_type:"Petrol"})
```

Find function for nested document:

```
car_dealership> db.cars.find({"engine.type": "Turbocharged"})
[
  {
    _id: ObjectId('66b8a525d95b225bbc381167'),
    maker: 'Tata',
    model: 'Nexon',
    fuel_type: 'Petrol',
    transmission: 'Automatic',
    engine: { type: 'Turbocharged', cc: 1199, torque: '170 Nm' },
    features: [ 'Touchscreen', 'Reverse Camera', 'Bluetooth Connectivity' ],
    sunroof: false,
    airbags: 2
  },
  {
    _id: ObjectId('66b8a5b5d95b225bbc38116a'),
    maker: 'Mahindra',
    model: 'XUV500',
    fuel_type: 'Diesel',
    transmission: 'Manual',
    engine: { type: 'Turbocharged', cc: 2179, torque: '360 Nm' },
    features: [ 'All-Wheel Drive', 'Navigation System', 'Cruise Control' ],
    sunroof: true,
    airbags: 6
  }
]
```

UPDATING THE RECORDS

UpdateOne:

```
car_dealership> db.cars.updateOne(  
... {model:"Nexon"},  
... {$set:{color:"Red"}}  
... )  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 1,  
  modifiedCount: 1,  
  upsertedCount: 0  
}
```

Updating a value inside an array in a document: adding data in features column which is array.

\$push:

```
car_dealership> db.cars.updateOne(  
... {model:"Nexon"},  
... {$push:{features:"Heated Seats"}}  
... )  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 1,  
  modifiedCount: 1,  
  upsertedCount: 0  
}
```

\$pull:

```
car_dealership> db.cars.updateOne( { model: "Nexon" }, { $pull: { features: "Heated Seats" } } )  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 1,  
  modifiedCount: 1,  
  upsertedCount: 0  
}
```

UPDATE MANY

UpdateMany will do this for every record present inside the collection, while updateOne will only do this for the first matched record only.

```
car_dealership> db.cars.updateMany( { fuel_type: "Diesel" }, { $set: { alloys: "yes" } } )  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 2,  
  modifiedCount: 1,  
  upsertedCount: 0  
}
```

```
car_dealership> db.cars.updateOne(  
... {model:"Creta"},  
... {$set:{"engine.torque":"270 Nm"}}  
... )  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 1,  
  modifiedCount: 1,  
  upsertedCount: 0  
}
```

-----Updating multiple values inside an array in a document-----

```
car_dealership> db.cars.updateOne(  
... {model:"Nexon"},  
... {$push:{features:{$each:["Wireless charging", "Voice Control"]}}}  
... )  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 1,  
  modifiedCount: 1,  
  upsertedCount: 0  
}
```

Removing a field by \$unset:

```
car_dealership> db.cars.updateOne( { model: "Nexon" }, { $unset: { color: "" } } )  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 1,  
  modifiedCount: 1,  
  upsertedCount: 0  
}
```

--Adding one extra column colors to all the documents in one go.

```
car_dealership> db.cars.updateMany({}, {$set:{color:"Blue"})  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 4,  
  modifiedCount: 4,  
  upsertedCount: 0  
}
```

\$Upsert: If a document matching your filter exists → **update it**,

If no document matches → **insert a new document = upsert**

```
car_dealership> db.cars.updateMany(  
... {model:"Venue"},  
... {$set:{Maker:"Hyundai"}},  
... {upsert:true}  
... )  
{  
  acknowledged: true,  
  insertedId: ObjectId('66d6dc4dc1b5e4adce90fd72'),  
  matchedCount: 0,  
  modifiedCount: 0,  
  upsertedCount: 1  
}
```

-----DELETE OPERATION-----

DeleteOne(): will delete the first matching record from the document.

```
car_dealership> db.cars.deleteOne({fuel_type:"Petrol"})
{ acknowledged: true, deletedCount: 1 }
car_dealership>
```

DeleteMany(): db.cars.deleteMany({ fuel_type: "Petrol" })

To delete all data from a collection: db.cars.deleteMany({ })

-----GROUPING IN MONGO-DB-----

```
car_dealership> db.cars.aggregate([
...   {$group:{_id:"$maker"}}
... ])
[
  { _id: 'Hyundai' },
  { _id: 'Mahindra' },
  { _id: 'Maruti Suzuki' },
  { _id: 'Honda' },
  { _id: 'Tata' }
]
```

Find number of cars for each specific brand: \$sum

```
car_dealership> db.cars.aggregate([
...   {$group:{
...     _id:"$maker",
...     TotalCars: {$sum:1}
...   }}
... ])
[
  { _id: 'Mahindra', TotalCars: 1 },
  { _id: 'Hyundai', TotalCars: 4 },
  { _id: 'Maruti Suzuki', TotalCars: 3 },
  { _id: 'Honda', TotalCars: 3 },
  { _id: 'Tata', TotalCars: 3 }
]
```

When you write `$sum: 1`, you're telling MongoDB:

“Add 1 for each document in this group.”

Eg:

```
{ maker: "Hyundai" }
```

```
{ maker: "Hyundai" }
```

```
{ maker: "Tata" }
```

Hyundai → $(1 + 1) = 2$

Tata → $(1) = 1$

Find the number of cars based on different fuel type:

```
car_dealership> db.cars.aggregate([
...   {$group: {
...     _id: "$fuel_type",
...     TotalCars: {$sum:1}
...   }}
... ])
[
  { _id: 'Electric', TotalCars: 2 },
  { _id: 'Petrol', TotalCars: 6 },
  { _id: 'Diesel', TotalCars: 4 },
  { _id: 'CNG', TotalCars: 2 }
]
```