

BIG DATA LAB

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1.Problem Statement & Dataset

Create a collection named "Employee" under the "EmployeeDB" database with each document in the format shown below Table

```
>use EmployeeDBLaisha
>db.createCollection("Employee1NT19IS147")
>show collections
```

```
> use EmployeeDBLaisha
switched to db EmployeeDBLaisha
> db.createCollection("Employee1NT19IS147")
{ "ok" : 1 }
> show collections
Employee1NT19IS147
```

Inserting the values:

```
>db.Employee1NT19IS147.insertMany([ {Firstname:"S",Middlename:"Liyakhatahmed",Lastname:"Laisha",Age:21,Salary:40000,Designation:"Employee",Role:"Software developer"}, {Firstname:"P",Middlename:"Sesha",Lastname:"Harshini",Age:21,Salary:75000,Designation:"HR",Role:"Manager"}, {Firstname:"T",Middlename:"Nikitha",Lastname:"Reddy",Age:23,Salary:45000,Designation:"Employee",Role:"Tester"}, {Firstname:"M",Middlename:"Kumar",Lastname:"Babu",Age:37,Salary:80000,Designation:"Researcher",Role:"Team Lead"}, {Firstname:"Rajesh",Middlename:"Patil",Lastname:"N",Age:36,Salary:50000,Designation:"Scientist",Role:"UI Designer"} ])
```

```
> db.Employee1NT19IS147.insertMany([ {Firstname:"S",Middlename:"Liyakhatahmed",Lastname:"Laisha",Age:21,Salary:40000,Designation:"Employee",Role:"Software developer"}, {Firstname:"P",Middlename:"Sesha",Lastname:"Harshini",Age:21,Salary:75000,Designation:"HR",Role:"Manager"}, {Firstname:"T",Middlename:"Nikitha",Lastname:"Reddy",Age:23,Salary:45000,Designation:"Employee",Role:"Tester"}, {Firstname:"M",Middlename:"Kumar",Lastname:"Babu",Age:37,Salary:80000,Designation:"Researcher",Role:"Team Lead"}, {Firstname:"Rajesh",Middlename:"Patil",Lastname:"N",Age:36,Salary:50000,Designation:"Scientist",Role:"UI Designer"} ])
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("629595bea62de58baff216cd"),
    ObjectId("629595bea62de58baff216ce"),
    ObjectId("629595bea62de58baff216cf"),
    ObjectId("629595bea62de58baff216d0"),
    ObjectId("629595bea62de58baff216d1")
  ]
}
```

```
>db.Employee1NT19IS147.insertMany([ {Firstname:"Prateek",Middlename:"P",Lastname:"Nayak",Age:30,Salary:45000,Designation:"Employee",Role:"Team
```

```
Lead"},{Firstname:"T",Middlename:"Madhu",Lastname:"Prakash",Age:30,Salary:40000,Designation:"Employee",Role:"Team Lead"},{Firstname:"T",Middlename:"H",Lastname:"Lakshana",Age:30,Salary:30000,Designation:"Employee",Role:"Software developer"},{Firstname:"Y",Middlename:"Mahitha",Lastname:"Reddy",Age:45,Salary:75000,Designation:"Scientist",Role:"Software developer"},{Firstname:"V",Middlename:"Mohan",Lastname:"Babu",Age:52,Salary:100000,Designation:"President",Role:"Software developer"}]})
```

```
> db.Employee1NT19IS147.insertMany([ {Firstname:"Prateek",Middlename:"P",Lastname:"Nayak",Age:30,Salary:45000,Designation:"Employee",Role:"Team Lead"},
{Firstname:"T",Middlename:"Madhu",Lastname:"Prakash",Age:30,Salary:40000,Designation:"Employee",Role:"Team Lead"},{Firstname:"T",Middlename:"H",Lastname:"Lakshana",Age:30,Salary:30000,Designation:"Employee",Role:"Software developer"},{Firstname:"Y",Middlename:"Mahitha",Lastname:"Reddy",Age:45,Salary:75000,Designation:"Scientist",Role:"Software developer"},{Firstname:"V",Middlename:"Mohan",Lastname:"Babu",Age:52,Salary:100000,Designation:"President",Role:"Software developer"}])
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("62959893a62de58baff216d2"),
    ObjectId("62959893a62de58baff216d3"),
    ObjectId("62959893a62de58baff216d4"),
    ObjectId("62959893a62de58baff216d5"),
    ObjectId("62959893a62de58baff216d6")
  ]
}
```

```
>db.Employee1NT19IS147.insertMany([ {Firstname:"A",Middlename:"Indu",Lastname:"Choudary",Age:39,Salary:75000,Designation:"Vice President",Role:"UI Designer"},{Firstname:"P",Middlename:"Snehitha",Lastname:"Choudary",Age:35,Salary:60000,Designation:"Associate",Role:"Tester"},{Firstname:"P",Middlename:"Pradeep",Lastname:"Kumar",Age:30,Salary:75000,Designation:"HR",Role:"Team Lead"},{Firstname:"Harsha",Middlename:"Vardhan",Lastname:"G",Age:31,Salary:40000,Designation:"Employee",Role:"Manager"},{Firstname:"S",Middlename:"Bhavana",Lastname:"Reddy",Age:27,Salary:50000,Designation:"Associate",Role:"UI Designer"}]})
```

```
> db.Employee1NT19IS147.insertMany([ {Firstname:"A",Middlename:"Indu",Lastname:"Choudary",Age:39,Salary:75000,Designation:"Vice President",Role:"UI Designer"},{Firstname:"P",Middlename:"Snehitha",Lastname:"Choudary",Age:35,Salary:60000,Designation:"Associate",Role:"Tester"},{Firstname:"P",Middlename:"Pradeep",Lastname:"Kumar",Age:30,Salary:75000,Designation:"HR",Role:"Team Lead"},{Firstname:"Harsha",Middlename:"Vardhan",Lastname:"G",Age:31,Salary:40000,Designation:"Employee",Role:"Manager"},{Firstname:"S",Middlename:"Bhavana",Lastname:"Reddy",Age:27,Salary:50000,Designation:"Associate",Role:"UI Designer"}])
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("62959aeba62de58baff216d7"),
    ObjectId("62959aeba62de58baff216d8"),
    ObjectId("62959aeba62de58baff216d9"),
    ObjectId("62959aeba62de58baff216da"),
    ObjectId("62959aeba62de58baff216db")
  ]
}
```

2. Queries

1. Populate the database with atleast 15 documents

>db.Employee1NT19IS147.find()

```
> db.Employee1NT19IS147.find()
{ "_id" : ObjectId("629595bea62de58baff216cd"), "Firstname" : "S", "Middlename" : "Liyakhatahmed", "Lastname" : "Laisha", "Age" : 21, "Salary" : 40000, "Designation" : "Employee", "Role" : "Software developer" }
{ "_id" : ObjectId("629595bea62de58baff216ce"), "Firstname" : "P", "Middlename" : "Sesha", "Lastname" : "Harshint", "Age" : 21, "Salary" : 75000, "Designation" : "HR", "Role" : "Manager" }
{ "_id" : ObjectId("629595bea62de58baff216cf"), "Firstname" : "T", "Middlename" : "Nikitha", "Lastname" : "Reddy", "Age" : 23, "Salary" : 45000, "Designation" : "Employee", "Role" : "Tester" }
{ "_id" : ObjectId("629595bea62de58baff216d0"), "Firstname" : "M", "Middlename" : "Kumar", "Lastname" : "Babu", "Age" : 37, "Salary" : 80000, "Designation" : "Researcher", "Role" : "Team Lead" }
{ "_id" : ObjectId("629595bea62de58baff216d1"), "Firstname" : "Rajesh", "Middlename" : "Patil", "Lastname" : "N", "Age" : 36, "Salary" : 50000, "Designation" : "Scientist", "Role" : "UI Designer" }
{ "_id" : ObjectId("62959893a62de58baff216d2"), "Firstname" : "Prateek", "Middlename" : "P", "Lastname" : "Nayak", "Age" : 30, "Salary" : 45000, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d3"), "Firstname" : "T", "Middlename" : "Madhu", "Lastname" : "Prakash", "Age" : 30, "Salary" : 40000, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d4"), "Firstname" : "T", "Middlename" : "H", "Lastname" : "Lakshana", "Age" : 30, "Salary" : 30000, "Designation" : "Employee", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d5"), "Firstname" : "V", "Middlename" : "Mahitha", "Lastname" : "Reddy", "Age" : 45, "Salary" : 75000, "Designation" : "Scientist", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d6"), "Firstname" : "V", "Middlename" : "Mohan", "Lastname" : "Babu", "Age" : 52, "Salary" : 100000, "Designation" : "President", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d7"), "Firstname" : "A", "Middlename" : "Indu", "Lastname" : "Choudary", "Age" : 39, "Salary" : 75000, "Designation" : "Vice President", "Role" : "UI Designer" }
{ "_id" : ObjectId("62959893a62de58baff216d8"), "Firstname" : "P", "Middlename" : "Snehitha", "Lastname" : "Choudary", "Age" : 35, "Salary" : 60000, "Designation" : "Associate", "Role" : "Tester" }
{ "_id" : ObjectId("62959893a62de58baff216d9"), "Firstname" : "P", "Middlename" : "Pradeep", "Lastname" : "Kumar", "Age" : 30, "Salary" : 75000, "Designation" : "HR", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216da"), "Firstname" : "Harsha", "Middlename" : "Vardhan", "Lastname" : "G", "Age" : 31, "Salary" : 40000, "Designation" : "Employee", "Role" : "Manager" }
{ "_id" : ObjectId("62959893a62de58baff216db"), "Firstname" : "S", "Middlename" : "Bhavana", "Lastname" : "Reddy", "Age" : 27, "Salary" : 50000, "Designation" : "Associate", "Role" : "UI Designer" }
```

2. List all the records having salary in the range of 20000 - 35000(Exclusive)

>db.Employee1NT19IS147.find({\$and:[{\$Salary:{\$gt:20000}},{\$Salary:{\$lt:35000}}]})

```
> db.Employee1NT19IS147.find({$and:[{$Salary:{$gt:20000}},{$Salary:{$lt:35000}}]})
{ "_id" : ObjectId("62959893a62de58baff216d4"), "Firstname" : "T", "Middlename" : "H", "Lastname" : "Lakshana", "Age" : 30, "Salary" : 30000, "Designation" : "Employee", "Role" : "Software developer" }
```

3. List all the Employee whose Middle name is "Kumar"

> db.Employee1NT19IS147.find({Middlename:"Kumar"})

```
> db.Employee1NT19IS147.find({Middlename:"Kumar"})
{ "_id" : ObjectId("629595bea62de58baff216d0"), "Firstname" : "M", "Middlename" : "Kumar", "Lastname" : "Babu", "Age" : 37, "Salary" : 80000, "Designation" : "Researcher", "Role" : "Team Lead" }
```

4. Count the number of Employees who has a role "Manager" in the Role field

> db.Employee1NT19IS147.count({Role:"Manager"})

```
> db.Employee1NT19IS147.count({Role:"Manager"})
2
```

5. Find out all the documents who have age < 35 and salary in the range of 30000-50000

```
>db.Employee1NT19IS147.find({$and:[{Salary:{$gt:30000}},{Salary:{$lt:50000}},{Age:{$lt:35}}]})
```

```
> db.Employee1NT19IS147.find({$and:[{Salary:{$gt:30000}},{Salary:{$lt:50000}},{Age:{$lt:35}}]})
{ "_id" : ObjectId("629595bea62de58baff216cd"), "Firstname" : "S", "Middlename" : "Liyakhatahmed", "Lastname" : "Laisha", "Age" : 21, "Salary" : 40000, "Designation" : "Employee", "Role" : "Software developer" }
{ "_id" : ObjectId("629595bea62de58baff216cf"), "Firstname" : "T", "Middlename" : "Nikitha", "Lastname" : "Reddy", "Age" : 23, "Salary" : 45000, "Designation" : "Employee", "Role" : "Tester" }
{ "_id" : ObjectId("62959893a62de58baff216d2"), "Firstname" : "Prateek", "Middlename" : "P", "Lastname" : "Nayak", "Age" : 30, "Salary" : 45000, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d3"), "Firstname" : "T", "Middlename" : "Madhu", "Lastname" : "Prakash", "Age" : 30, "Salary" : 40000, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959aeba62de58baff216da"), "Firstname" : "Harsha", "Middlename" : "Vardhan", "Lastname" : "G", "Age" : 31, "Salary" : 40000, "Designation" : "Employee", "Role" : "Manager" }
```

6. Delete an Employee whose "Firstname" is "Rajesh" and having the designation as "Scientist"

```
>db.Employee1NT19IS147.deleteOne({$and:[{Firstname:"Rajesh"},{Designation:"Scientist"}]})
```

```
> db.Employee1NT19IS147.deleteOne({$and:[{Firstname:"Rajesh"},{Designation:"Scientist"}]})
{ "acknowledged" : true, "deletedCount" : 1 }
```

```
>db.Employee1NT19IS147.find()
```

```
> db.Employee1NT19IS147.find()
{ "_id" : ObjectId("629595bea62de58baff216cd"), "Firstname" : "S", "Middlename" : "Liyakhatahmed", "Lastname" : "Laisha", "Age" : 21, "Salary" : 40000, "Designation" : "Employee", "Role" : "Software developer" }
{ "_id" : ObjectId("629595bea62de58baff216ce"), "Firstname" : "P", "Middlename" : "Sesha", "Lastname" : "Harshini", "Age" : 21, "Salary" : 75000, "Designation" : "HR", "Role" : "Manager" }
{ "_id" : ObjectId("629595bea62de58baff216cf"), "Firstname" : "T", "Middlename" : "Nikitha", "Lastname" : "Reddy", "Age" : 23, "Salary" : 45000, "Designation" : "Employee", "Role" : "Tester" }
{ "_id" : ObjectId("629595bea62de58baff216d0"), "Firstname" : "H", "Middlename" : "Kumar", "Lastname" : "Babu", "Age" : 37, "Salary" : 80000, "Designation" : "Researcher", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d2"), "Firstname" : "Prateek", "Middlename" : "P", "Lastname" : "Nayak", "Age" : 30, "Salary" : 45000, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d3"), "Firstname" : "T", "Middlename" : "Madhu", "Lastname" : "Prakash", "Age" : 30, "Salary" : 40000, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d4"), "Firstname" : "T", "Middlename" : "H", "Lastname" : "Lakshana", "Age" : 30, "Salary" : 30000, "Designation" : "Employee", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d5"), "Firstname" : "Y", "Middlename" : "Mahitha", "Lastname" : "Reddy", "Age" : 45, "Salary" : 75000, "Designation" : "Scientist", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d6"), "Firstname" : "V", "Middlename" : "Mohan", "Lastname" : "Babu", "Age" : 52, "Salary" : 100000, "Designation" : "President", "Role" : "Software developer" }
{ "_id" : ObjectId("62959aeba62de58baff216d7"), "Firstname" : "A", "Middlename" : "Indu", "Lastname" : "Choudary", "Age" : 39, "Salary" : 75000, "Designation" : "Vice President", "Role" : "UI Designer" }
{ "_id" : ObjectId("62959aeba62de58baff216d8"), "Firstname" : "P", "Middlename" : "Sneetha", "Lastname" : "Choudary", "Age" : 35, "Salary" : 60000, "Designation" : "Associate", "Role" : "Tester" }
{ "_id" : ObjectId("62959aeba62de58baff216d9"), "Firstname" : "P", "Middlename" : "Pradeep", "Lastname" : "Kumar", "Age" : 30, "Salary" : 75000, "Designation" : "HR", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959aeba62de58baff216da"), "Firstname" : "Harsha", "Middlename" : "Vardhan", "Lastname" : "G", "Age" : 31, "Salary" : 40000, "Designation" : "Employee", "Role" : "Manager" }
{ "_id" : ObjectId("62959aeba62de58baff216db"), "Firstname" : "S", "Middlename" : "Bhavana", "Lastname" : "Reddy", "Age" : 27, "Salary" : 50000, "Designation" : "Associate", "Role" : "UI Designer" }
```

7. Update all the Employees whose role is "Team Lead" with a salary of 55650 INR

```
> db.Employee1NT19IS147.updateMany({Role:"Team Lead"},{$set:{Salary:55650}})
```

```
> db.Employee1NT19IS147.updateMany({Role:"Team Lead"},{$set:{Salary:55650}})
{ "acknowledged" : true, "matchedCount" : 4, "modifiedCount" : 4 }
```

>db.Employee1NT19IS147.find()

```
> db.Employee1NT19IS147.find()
{ "_id" : ObjectId("629595bea62de58baff216cd"), "Firstname" : "S", "Middlename" : "Liyakhatahmed", "Lastname" : "Laisha", "Age" : 21, "Salary" : 40000, "Designation" : "Employee", "Role" : "Software developer" }
{ "_id" : ObjectId("629595bea62de58baff216ce"), "Firstname" : "P", "Middlename" : "Sesha", "Lastname" : "Harshini", "Age" : 21, "Salary" : 75000, "Designation" : "HR", "Role" : "Manager" }
{ "_id" : ObjectId("629595bea62de58baff216cf"), "Firstname" : "T", "Middlename" : "Nikitha", "Lastname" : "Reddy", "Age" : 23, "Salary" : 45000, "Designation" : "Employee", "Role" : "Tester" }
{ "_id" : ObjectId("629595bea62de58baff216d0"), "Firstname" : "M", "Middlename" : "Kumar", "Lastname" : "Babu", "Age" : 37, "Salary" : 55650, "Designation" : "Researcher", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d2"), "Firstname" : "Prateek", "Middlename" : "P", "Lastname" : "Nayak", "Age" : 30, "Salary" : 55650, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d3"), "Firstname" : "T", "Middlename" : "Madhu", "Lastname" : "Prakash", "Age" : 30, "Salary" : 55650, "Designation" : "Employee", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216d4"), "Firstname" : "T", "Middlename" : "H", "Lastname" : "Lakshana", "Age" : 30, "Salary" : 30000, "Designation" : "Employee", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d5"), "Firstname" : "Y", "Middlename" : "Mahitha", "Lastname" : "Reddy", "Age" : 45, "Salary" : 75000, "Designation" : "Scientist", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d6"), "Firstname" : "V", "Middlename" : "Mohan", "Lastname" : "Babu", "Age" : 52, "Salary" : 100000, "Designation" : "President", "Role" : "Software developer" }
{ "_id" : ObjectId("62959893a62de58baff216d7"), "Firstname" : "A", "Middlename" : "Indu", "Lastname" : "Choudary", "Age" : 39, "Salary" : 75000, "Designation" : "Vice President", "Role" : "UI Designer" }
{ "_id" : ObjectId("62959893a62de58baff216d8"), "Firstname" : "P", "Middlename" : "Snehitha", "Lastname" : "Choudary", "Age" : 35, "Salary" : 60000, "Designation" : "Associate", "Role" : "Tester" }
{ "_id" : ObjectId("62959893a62de58baff216d9"), "Firstname" : "P", "Middlename" : "Pradeep", "Lastname" : "Kumar", "Age" : 30, "Salary" : 55650, "Designation" : "HR", "Role" : "Team Lead" }
{ "_id" : ObjectId("62959893a62de58baff216da"), "Firstname" : "Harsha", "Middlename" : "Vardhan", "Lastname" : "G", "Age" : 31, "Salary" : 40000, "Designation" : "Employee", "Role" : "Manager" }
{ "_id" : ObjectId("62959893a62de58baff216db"), "Firstname" : "S", "Middlename" : "Bhavana", "Lastname" : "Reddy", "Age" : 27, "Salary" : 50000, "Designation" : "Associate", "Role" : "UI Designer" }
```

8. Group all the Employees by their age(common age should be there) and calculate the average salary obtained in the each group

>db.Employee1NT19IS147.aggregate([{\$group:{_id:"\$Age",Average:{\$avg:"\$Salary"}}}])

```
> db.Employee1NT19IS147.aggregate([{$group:{_id:"$Age",Average:{$avg:"$Salary"}}}])
{ "_id" : 35, "Average" : 60000 }
{ "_id" : 31, "Average" : 40000 }
{ "_id" : 52, "Average" : 100000 }
{ "_id" : 23, "Average" : 45000 }
{ "_id" : 37, "Average" : 55650 }
{ "_id" : 45, "Average" : 75000 }
{ "_id" : 27, "Average" : 50000 }
{ "_id" : 39, "Average" : 75000 }
{ "_id" : 21, "Average" : 57500 }
{ "_id" : 30, "Average" : 49237.5 }
```

9. Apply the map-reduce to perform the above operation and obtain the results

```
> var mapfunction=function(){emit(this.Age,this.Salary)}
```

```
> var reducefunction=function(key,values){return Array.avg(values)}
```

```
>db.Employee1NT19IS147.mapReduce(mapfunction,reducefunction,{'out':'result'})
```

```
>db.Employee1NT19IS147.mapReduce(mapfunction,reducefunction,{ 'out':'result'})
{ "result" : "result", "ok" : 1 }
```

```
> db.result.find()
```

```
> var mapfunction=function(){emit(this.Age,this.Salary)}
> var reducefunction=function(key,values){return Array.avg(values)}
> db.Employee1NT19IS147.mapReduce(mapfunction,reducefunction,{'out':'result'})
uncaught exception: SyntaxError: missing ) in parenthetical :
@(shell):1:65
> db.Employee1NT19IS147.mapReduce(mapfunction,reducefunction,{'out':'result'})
{ "result" : "result", "ok" : 1 }
> db.result.find()
{ "_id" : 35, "value" : 60000 }
{ "_id" : 31, "value" : 40000 }
{ "_id" : 52, "value" : 100000 }
{ "_id" : 23, "value" : 45000 }
{ "_id" : 45, "value" : 75000 }
{ "_id" : 37, "value" : 55650 }
{ "_id" : 27, "value" : 50000 }
{ "_id" : 39, "value" : 75000 }
{ "_id" : 21, "value" : 57500 }
{ "_id" : 30, "value" : 49237.5 }
```