

Advanced Database Management System

Assignment: 1

AIM:

Create a database with suitable example using MongoDB and implement

1. Inserting and saving document (batch insert, insert validation)
2. Removing document
3. Updating document (document replacement, using modifiers, upserts, updating multiple documents, returning updated documents)
4. Execute at least 10 queries on any suitable MongoDB database that demonstrates following:
 - Find and find One (specific values)
 - Query criteria (Query conditionals, OR queries, \$not, Conditional semantics)
 - Type-specific queries (Null, Regular expression, Querying arrays) where queries
 - Cursors (Limit, skip, sort, advanced query options)

PROBLEM STATEMENT /DEFINITION

Create a database with suitable example using MongoDB and implement

- Inserting and saving document (batch insert, insert validation)
- Removing document
- Updating document (document replacement, using modifiers, upserts, updating multiple documents, returning updated documents)

OBJECTIVE:

To understand MongoDB basic commands

To implement the concept of document oriented databases.

To understand MongoDB retrieval commands

THEORY:

SQL Vs MongoDB

SQL Concepts	MongoDB Concepts
Database	Database
Table	Collection
Row	Document or BSON Document

Column	Field
Index	Index
Table Join	Embedded Documents & Linking
Primary Key	Primary Key
Specify Any Unique Column Or Column Combination As Primary Key.	In Mongodb, The Primary Key Is Automatically Set To The <u>_id</u> Field.
Aggregation (E.G. Group By)	Aggregation Pipeline

1.Create a collection in mongodb

```
db.createCollection("Teacher_info")
```

2.Create a capped collection in mongodb

```
>db.createCollection("audit", {capped:true, size:20480})
{ "ok" : 1 }
```

3.Insert a document into collection

```
db.Teacher_info.insert( { Teacher_id: "Pic001", Teacher_Name: "Ravi",Dept_Name:
"IT", Sal:30000, status: "A" } )
```

```
db.Teacher_info.insert( { Teacher_id: "Pic002", Teacher_Name: "Ravi",Dept_Name:
"IT", Sal:20000, status: "A" } )
```

```
db.Teacher_info.insert( { Teacher_id: "Pic003", Teacher_Name: "Akshay",Dept_Name:
"Comp", Sal:25000, status: "N" } )
```

4.Update a document into collection

```
db. Teacher_info.update( { sal: { $gt: 25000 } }, { $set: { Dept_name: "ETC" } }, {
multi: true } )
```

```
db. Teacher_info.update( { status: "A" } , { $inc: { sal: 10000 } }, { multi: true } )
```

5.Remove a document from collection

```
db.Teacher_info.remove({Teacher_id: "pic001"});  
db. Teacher_info.remove({})
```

6.Alter a field into a mongodb document

```
db.Teacher_info.update( { }, { $set: { join_date: new Date() } }, { multi: true} )
```

7.To drop a particular collection

```
db.Teacher_info.drop()
```

Retrieval From Database:-

When we retrieve a document from mongodb collection it always add a _id field in the every document which contain unique _id field.

ObjectId(<hexadecimal>)

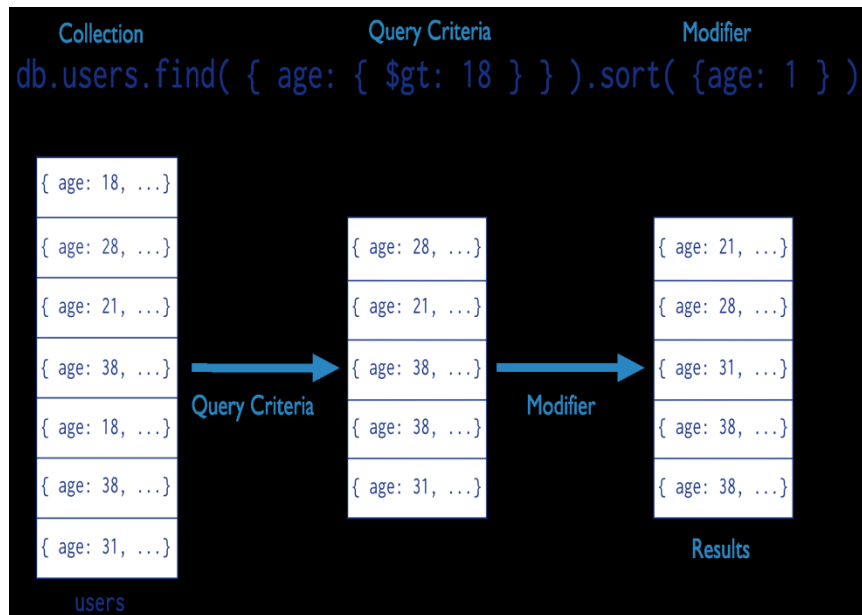
Returns a new ObjectId value. The 12-byte ObjectId value consists of:

4-byte value representing the seconds since the Unix epoch,

3-byte machine identifier,

2-byte process id, and

3-byte counter, starting with a random value.



1. Retrieve a collection in mongodb using Find command

db.Teacher.find()

```
{ "_id" : 101, "Name" : "Dev",
  "Address" : [ { "City" : "Pune", "Pin" : 444043 } ],
  "Department" : [ { "Dept_id" : 111, "Dept_name" : "IT" } ],
  "Salary" : 78000 }

{ "_id" : 135, "Name" : "Jennifer", "Address" : [ { "City" : "Mumbai", "Pin" : 444111 } ], "Department" :
[ { "Dept_id" : 112, "Dept_name" : "COMP" } ], "Salary" : 65000 }
{ "_id" : 126, "Name" : "Gaurav", "Address" : [ { "City" : "Nashik", "Pin" : 444198 } ], "Department" : [
{ "Dept_id" : 112, "Dept_name" : "COMP" } ], "Salary" : 90000 }
{ "_id" : 175, "Name" : "Shree", "Address" : [ { "City" : "Nagpur", "Pin" : 444158 } ], "Department" : [ {
"Dept_id" : 113, "Dept_name" : "ENTC" } ], "Salary" : 42000 }
{ "_id" : 587, "Name" : "Raman", "Address" : [ { "City" : "Bangalore", "Pin" : 445754 } ], "Department" :
[ { "Dept_id" : 113, "Dept_name" : "ENTC" } ], "Salary" : 79000 }
{ "_id" : 674, "Name" : "Mandar", "Address" : [ { "City" : "Jalgaon", "Pin" : 465487 } ], "Department" : [
{ "Dept_id" : 111, "Dept_name" : "IT" } ], "Salary" : 88000 }
{ "_id" : 573, "Name" : "Manish", "Address" : [ { "City" : "Washim", "Pin" : 547353 } ], "Department" : [
{ "Dept_id" : 112, "Dept_name" : "COMP" } ], "Salary" : 65000 }
```

2. Retrieve a document from collection in mongodb using Find command using condition

```
>db.Teacher_info.find({sal: 25000})
```

3. Retrieve a document from collection in mongodb using Find command using or operator

```
>db.Teacher_info.find( { $or: [ { status: "A" } , { sal:50000 } ] } )
```

4. Retrieve a document from collection in mongodb using Find command using greater than , less than, greater than and equal to ,less than and equal to operator

```
>db. Teacher_info.find( { sal: { $gt: 40000 } } )
```

```
>db.media.find( { Released : {$gt : 2000} }, { "Cast" : 0 } )
```

```
{ "_id" : ObjectId("4c4369a3c6030000000007ed3"), "Type" : "DVD", "Title" : "Toy Story 3", "Released" : 2010 }
```

```
>db.media.find ( { Released : {$gte : 1999 } }, { "Cast" : 0 } )
```

```
{ "_id" : ObjectId("4c43694bc6030000000007ed1"), "Type" : "DVD", "Title" : "Matrix, The", "Released" : 1999 }
```

```
{ "_id" : ObjectId("4c4369a3c6030000000007ed3"), "Type" : "DVD", "Title" : "Toy Story 3", "Released" : 2010 }
```

```
>db.media.find ( { Released : {$lt : 1999 } }, { "Cast" : 0 } )
```

```
{ "_id" : ObjectId("4c436969c6030000000007ed2"), "Type" : "DVD", "Title" : "Blade Runner", "Released" : 1982 }
```

```
>db.media.find( {Released : {$lte: 1999}}, { "Cast" : 0 })
```

```
{ "_id" : ObjectId("4c43694bc6030000000007ed1"), "Type" : "DVD", "Title" : "Matrix, The", "Released" : 1999 }
```

```
{ "_id" : ObjectId("4c436969c6030000000007ed2"), "Type" : "DVD", "Title" : "Blade Runner", "Released" : 1982 }
```

```
>db.media.find( {Released : {$gte: 1990, $lt : 2010}}, { "Cast" : 0 })
```

```
{ "_id" : ObjectId("4c43694bc6030000000007ed1"), "Type" : "DVD", "Title" : "Matrix, The", "Released" : 1999 }
```

Retrieval a value from document which contain array field

Exact Match on an Array

```
db.inventory.find( { tags: [ 'fruit', 'food', 'citrus' ] } )
```

Match an Array Element

```
db.inventory.find( { tags: 'fruit' } )
```

Match a Specific Element of an Array

```
db.inventory.find( { 'tags.0' : 'fruit' } )
```

6.MongoDB provides a db.collection.findOne() method as a special case of find() that returns a single document.

7.Exclude One Field from a Result Set

```
>db.records.Find( { "user_id": { $lt: 42} }, { history: 0} )
```

8.Return Two fields and the _id Field

```
>db.records.find( { "user_id": { $lt: 42} }, { "name": 1, "email": 1} )
```

9.Return Two Fields and Exclude _id

```
>db.records.find( { "user_id": { $lt: 42} }, { "_id": 0, "name": 1 , "email": 1  
} )
```

10. Retrieve a collection in mongodb using Find command and pretty appearance

```
>db.<collection>.find().pretty()
```

```
db.users.find(collection  
    {age:{$gt:18}},query criteria  
    {name :1,address:1}projection  
}.limit(5) cursor modifier
```

Retrieve a document in ascending or descending order using 1 for ascending and -1 for descending from collection in mongodb

```
>db.Teacher_info.find( { status: "A" } ).sort( { sal: -1 } )
```

```
>db.audit.find().sort( { $natural: -1 } ).limit ( 10 )
```

```
>db.Employee.find().sort({_id:-1})
```

```
{ "_id" : 106, "Name" : "RAJ", "Address" : [ { "City" : "NASIK", "Pin" : 411002 } ], "Department" : [ {  
"Dept_id" : 113, "Dept_name" : "ACCOUNTING" } ], "Salary" : 50000 }  
{ "_id" : 105, "Name" : "ASHOK", "Address" : [ { "City" : "NASIK", "Pin" : 411002 } ], "Department" : [ {  
"Dept_id" : 113, "Dept_name" : "ACCOUNTING" } ], "Salary" : 40000 }  
{ "_id" : 104, "Name" : "JOY", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 112, "Dept_name" : "SALES" } ], "Salary" : 20000 }  
{ "_id" : 103, "Name" : "RAM", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 112, "Dept_name" : "SALES" } ], "Salary" : 10000 }  
{ "_id" : 102, "Name" : "AKASH", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 111, "Dept_name" : "HR" } ], "Salary" : 80000 }  
{ "_id" : 101, "Name" : "Dev", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 111, "Dept_name" : "HR" } ], "Salary" : 78000 }
```

```
>db.Employee.find().sort({_id:1})
```

```
{ "_id" : 101, "Name" : "Dev", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 111, "Dept_name" : "HR" } ], "Salary" : 78000 }  
{ "_id" : 102, "Name" : "AKASH", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 111, "Dept_name" : "HR" } ], "Salary" : 80000 }  
{ "_id" : 103, "Name" : "RAM", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 112, "Dept_name" : "SALES" } ], "Salary" : 10000 }  
{ "_id" : 104, "Name" : "JOY", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {  
"Dept_id" : 112, "Dept_name" : "SALES" } ], "Salary" : 20000 }  
{ "_id" : 105, "Name" : "ASHOK", "Address" : [ { "City" : "NASIK", "Pin" : 411002 } ], "Department" : [ {  
"Dept_id" : 113, "Dept_name" : "ACCOUNTING" } ], "Salary" : 40000 }  
{ "_id" : 106, "Name" : "RAJ", "Address" : [ { "City" : "NASIK", "Pin" : 411002 } ], "Department" : [ {  
"Dept_id" : 113, "Dept_name" : "ACCOUNTING" } ], "Salary" : 50000 }  
>db.Employee.find().sort({$natural:-1}).limit(2)  
{ "_id" : 106, "Name" : "RAJ", "Address" : [ { "City" : "NASIK", "Pin" : 411002 } ], "Department" : [ {  
"Dept_id" : 113, "Dept_name" : "ACCOUNTING" } ], "Salary" : 50000 }  
{ "_id" : 105, "Name" : "ASHOK", "Address" : [ { "City" : "NASIK", "Pin" : 411002 } ], "Department" : [ {  
"Dept_id" : 113, "Dept_name" : "ACCOUNTING" } ], "Salary" : 40000 }
```


>db.Employee.find().sort({\$natural:1}).limit(2)

```
{ "_id" : 101, "Name" : "Dev", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {
"Dept_id" : 111, "Dept_name" : "HR" } ], "Salary" : 78000 }
{ "_id" : 102, "Name" : "AKASH", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {
"Dept_id" : 111, "Dept_name" : "HR" } ], "Salary" : 80000 }
>db.Employee.find({Salary:{$in:[10000,30000]}})
{ "_id" : 103, "Name" : "RAM", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ], "Department" : [ {
"Dept_id" : 112, "Dept_name" : "SALES" } ], "Salary" : 10000 }
>db.Employee.update({"Name":"RAM"},{ $set:{Address:{City: "Nasik"}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
>db.Employee.find({"Name":"RAM"})
{ "_id" : 103, "Name" : "RAM", "Address" : { "City" : "Nasik" }, "Department" : [ { "Dept_id" : 112,
"Dept_name" : "SALES" } ], "Salary" : 10000 }
>db.Employee.update({"Name":"RAM"},{$inc:{"Salary": 10000 } })
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
>db.Employee.find({"Name":"RAM"})
{ "_id" : 103, "Name" : "RAM", "Address" : { "City" : "Nasik" }, "Department" : [ { "Dept_id" : 112,
"Dept_name" : "SALES" } ], "Salary" : 20000 }
```

Retrieve document with a particular from collection in mongodb

>db.Employee.find().limit(2).pretty()

```
{
  "_id" : 101,
  "Name" : "Dev",
  "Address" : [
    {
      "City" : "Pune",
      "Pin" : 444043
    }
  ],
  "Department" : [
    {
      "Dept_id" : 111,
      "Dept_name" : "HR"
    }
  ],
  "Salary" : 78000
}
{
  "_id" : 102,
  "Name" : "AKASH",
  "Address" : [
    {
      "City" : "Pune",
      "Pin" : 444043
    }
  ],
  "Department" : [
```

```

        {
            "Dept_id" : 111,
            "Dept_name" : "HR"
        }
    ],
    "Salary" : 80000
}

```

Retrieve document skipping some documents from collection in mongodb

>db.Employee.find().skip(3).pretty()

```

{
  "_id" : 104,
  "Name" : "JOY",
  "Address" : [
    {
      "City" : "Pune",
      "Pin" : 444043
    }
  ],
  "Department" : [
    {
      "Dept_id" : 112,
      "Dept_name" : "SALES"
    }
  ],
  "Salary" : 20000
}
{
  "_id" : 105,
  "Name" : "ASHOK",
  "Address" : [
    {
      "City" : "NASIK",
      "Pin" : 411002
    }
  ],
  "Department" : [
    {
      "Dept_id" : 113,
      "Dept_name" : "ACCOUNTING"
    }
  ],
  "Salary" : 40000
}
{
  "_id" : 106,
  "Name" : "RAJ",
  "Address" : [
    {
      "City" : "NASIK",
      "Pin" : 411002
    }
  ],
  "Department" : [
    {
      "Dept_id" : 113,
      "Dept_name" : "ACCOUNTING"
    }
  ],
  "Salary" : 40000
}

```

```
        }
    ],
    "Department" : [
        {
            "Dept_id" : 113,
            "Dept_name" : "ACCOUNTING"
        }
    ],
    "Salary" : 50000
}
```

REFERENCE BOOK:

Kristina Chodorow, MongoDB The definitive guide, O'Reilly Publications, ISBN:978-93-5110-269-4, 2nd Edition.

CONCLUSION:

Understand to implement data from mongodb database with the help of statement and operators.

Assignment: 2

AIM: Implement Map reduces operation with suitable example on above MongoDB database

- Aggregation framework
- Create and drop different types of indexes and explain () to show the advantage of the indexes.

PROBLEM STATEMENT /DEFINITION

Implement Map reduces operation with suitable example on above MongoDB database

- Aggregation framework
- Create and drop different types of indexes and explain () to show the advantage of the indexes.

OBJECTIVE:

To understand the concept of Mapreduce in mongodb.

To understand the concept of Aggregation in mongodb.

To implement the concept of document oriented databases.

THEORY:

- Implements the MapReduce model for processing large data sets.
- Can choose from one of several output options (inline, new collection, merge, replace, reduce)
- MapReduce functions are written in JavaScript.
- Supports non-sharded and sharded input collections.
- Can be used for incremental aggregation over large collections.
- MongoDB 2.2 implements much better support for sharded map reduce output.
- New feature in the Mongodb2.2.0 production release (August, 2012).
- Designed with specific goals of **improving performance and usability**.
- Returns result set inline.
- Supports **non-sharded and sharded** input collections.

- Uses a **"pipeline"** approach where objects are transformed as they pass through a series of pipeline operators such as matching, projecting, sorting, and grouping.
- **Pipeline operators need not produce one output document for every input document:** operators may also generate new documents or filter out documents.
- Map/Reduce involves two steps:
 - first, map the data from the collection specified;
 - second, reduce the results.

```
>db.createCollection("Order")
```

- { "ok" : 1 }

```
>db.order.insert({cust_id:"A123",amount:500,status:"A"})
```

- WriteResult({ "nInserted" : 1 })

```
>db.order.insert({cust_id:"A123",amount:250,status:"A"})
```

- WriteResult({ "nInserted" : 1 })

```
>db.order.insert({cust_id:"B212",amount:200,status:"A"})
```

- WriteResult({ "nInserted" : 1 })

```
>db.order.insert({cust_id:"A123",amount:300,status:"d"})
```

- WriteResult({ "nInserted" : 1 })

● Map Function

- var mapFunction1 = function()
- { emit(this.cust_id, this.amount);};

● Reduce Function

- var reduceFunction1 = function(key, values)
- {return Array.sum(values);};

```
db.order.mapReduce
```

```
(mapFunction1, reduceFunction1, {query: {status: "A" },
out: "order_totals"});
```

```

    "result" : "order_totals",
    "timeMillis" : 28,
    "counts" : {
        "input" : 3,
        "emit" : 3,
        "reduce" : 1,
        "output" : 2
    },
    "ok" : 1,}
>db.order.mapReduce(
Map Function -> function() { emit( this.cust_id, this.amount);},
Reduce Function -> function( key, values ) { return Array.sum ( values )},
Query à {query: { status:"A"},
Output collection à out: "order_ totals"} )
{
    "result" : "order_totals",
    "timeMillis" : 27,
    "counts" : {
        "input" : 3,
        "emit" : 3,
        "reduce" : 1,
        "output" : 2
    },
    "ok" : 1,
}

```

To display result of mapReduce function use collection created in OUT.

Db.<collection name>.find();

```

db.order_totals.find();
{ "_id" : "A123", "value" : 750 }
{ "_id" : "B212", "value" : 200 }

```

Implementation of Aggregation:-

```

> use Teacher
switched to db Teacher
>db.Teacher.find()
{ "_id" : 101, "Name" : "Dev", "Address" : [ { "City" : "Pune", "Pin" : 444043 } ],
"Department" : [ { "Dept_id" : 111, "Dept_name" : "IT" } ], "Salary" : 78000 }
{ "_id" : 135, "Name" : "Jennifer", "Address" : [ { "City" : "Mumbai", "Pin" : 444111 } ],
"Department" : [ { "Dept_id" : 112, "Dept_name" : "COMP" } ], "Salary" : 65000 }
{ "_id" : 126, "Name" : "Gaurav", "Address" : [ { "City" : "Nashik", "Pin" : 444198 } ],
"Department" : [ { "Dept_id" : 112, "Dept_name" : "COMP" } ], "Salary" : 90000 }
{ "_id" : 175, "Name" : "Shree", "Address" : [ { "City" : "Nagpur", "Pin" : 444158 } ],
"Department" : [ { "Dept_id" : 113, "Dept_name" : "ENTC" } ], "Salary" : 42000 }
{ "_id" : 587, "Name" : "Raman", "Address" : [ { "City" : "Banglore", "Pin" : 445754 } ],
"Department" : [ { "Dept_id" : 113, "Dept_name" : "ENTC" } ], "Salary" : 79000 }
{ "_id" : 674, "Name" : "Mandar", "Address" : [ { "City" : "Jalgaon", "Pin" : 465487 } ],
"Department" : [ { "Dept_id" : 111, "Dept_name" : "IT" } ], "Salary" : 88000 }
{ "_id" : 573, "Name" : "Manish", "Address" : [ { "City" : "Washim", "Pin" : 547353 } ],
"Department" : [ { "Dept_id" : 112, "Dept_name" : "COMP" } ], "Salary" : 65000 }

```

```

>db.Teacher.aggregate([
... {$group:{$_id:"$Department",totalsalary:{$sum:"$Salary"}}}
... ])
{
  "result" : [
    {
      "_id" : [
        {
          "Dept_id" : 113,
          "Dept_name" : "ENTC"
        }
      ],
      "totalsalary" : 121000
    },
    {
      "_id" : [
        {
          "Dept_id" : 112,
          "Dept_name" : "COMP"
        }
      ]
    }
  ]
}

```

```

        ],
        "totalsalary" : 220000
    },
    {
        "_id" : [
            {
                "Dept_id" : 111,
                "Dept_name" : "IT"
            }
        ],
        "totalsalary" : 166000
    }
],
"ok" : 1
}

>db.Teacher.aggregate([
{$group:{_id:"$Department",totalsalary:{$sum:"$Salary"}}},{$group:{_id:"$ _id.Department",AvgSal:{$sum:"$totalsalary"}}}]
{ "result" : [ { "_id" : [ ], "AvgSal" : 507000 } ], "ok" : 1 }
>db.Teacher.aggregate([
{$group:{_id:"$Department",totalsalary:{$sum:"$Salary"}}},{$match:{totalsalary:{$gte:200000}}}]
{
    "result" : [
        {
            "_id" : [
                {
                    "Dept_id" : 112,
                    "Dept_name" : "COMP"
                }
            ],
            "totalsalary" : 220000
        }
    ],
    "ok" : 1
}

>db.Teacher.aggregate([ {$group:{_id:"$Department",totalsalary:{$sum:"$Salary"}}}, {
$sort:{totalsalary:1}}])
{
    "result" : [
        {
            "_id" : [
                {
                    "Dept_id" : 113,
                    "Dept_name" : "ENTC"
                }
            ]
        }
    ]
}

```



```

        ],
        "totalsalary" : 121000
    },
    {
        "_id" : [
            {
                "Dept_id" : 111,
                "Dept_name" : "IT"
            }
        ],
        "totalsalary" : 166000
    },
    {
        "_id" : [
            {
                "Dept_id" : 112,
                "Dept_name" : "COMP"
            }
        ],
        "totalsalary" : 220000
    }
],
"ok" : 1
}

>db.Teacher.aggregate([ {$group: {_id:"$Department",totalsalary:{$sum:"$Salary"}}}, {
$group: { _id:"$_id.Department", big: { $last: "$_id.Dept_name" }, bigsalary: {
$last:"$totalsalary"}, small: { $first:"$_id.Dept_name"}, smallsalary: {
$first:"$totalsalary"} }} ])
{
    "result" : [
        {
            "_id" : [ ],
            "big" : [
                "IT"
            ],
            "bigsalary" : 166000,
            "small" : [
                "ENTC"
            ],
            "smallsalary" : 121000
        }
    ],
    "ok" : 1
}

```

REFERENCE BOOK:

Kristina Chodorow, MongoDB The definitive guide, O'Reilly Publications, ISBN:978-93-5110-269-4, 2nd Edition.

CONCLUSION:

Understand to mapreduce operation in mongodb

Assignment 3

Aim : Case Study: Design conceptual model using Star and Snowflake schema for any one database

Problem statement: Design conceptual model using Star and Snowflake schema for any one database

OBJECTIVE:

1. To understand concepts of multidimensional data.
2. To understand the relational implementation of the multidimensional data model is typically a star schema, or a snowflake schema.

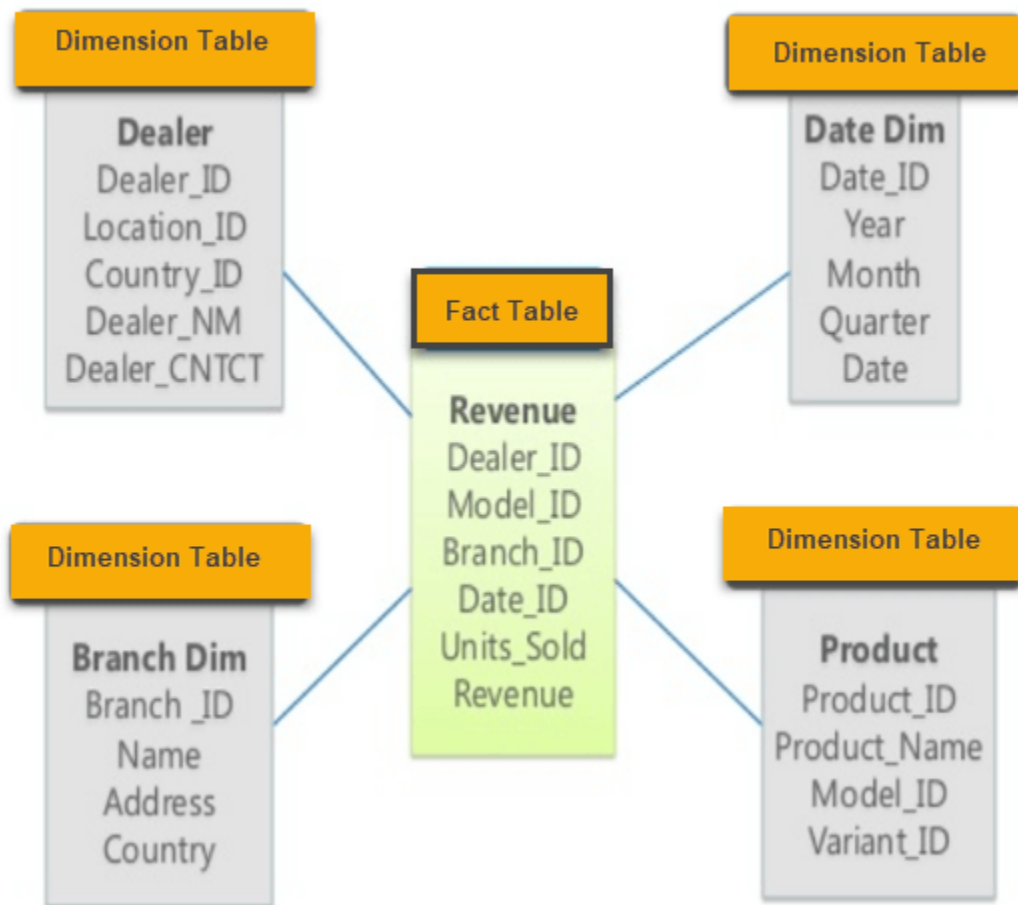
Theory:

The data warehouses are considered modern ancient techniques, since the early days for the relational databases, the idea of the keeping a historical data for reference when it needed has been originated, and the idea was primitive to create archives for the historical data to save these data, despite of the usage of a special techniques for the recovery of these data from the different storage modes. This research applied of structured databases for a trading company operating across the continents, has a set of branches each one has its own stores and showrooms, and the company branch's group of sections with specific activities, such as stores management, showrooms management, accounting management, contracts and other departments. It also assumes that the company center exported software to manage databases for all branches to ensure the safety performance, standardization of processors and prevent the possible errors and bottlenecks problems. Also the research provides this methods the best requirements have been used for the applied of the data warehouse (DW), the information that managed by such an applied must be with high accuracy. It must be emphasized to ensure compatibility information and hedge its security, in schemes domain, been applied to a comparison between the two schemes (Star and Snowflake Schemas) with the concepts of multidimensional database. It turns out that Star Schema is better than Snowflake Schema in (Query complexity, Query performance, Foreign Key Joins), And finally it has been concluded that Star Schema center fact and change, while Snowflake Schema center fact and not change.

Example:

1. Star Schema

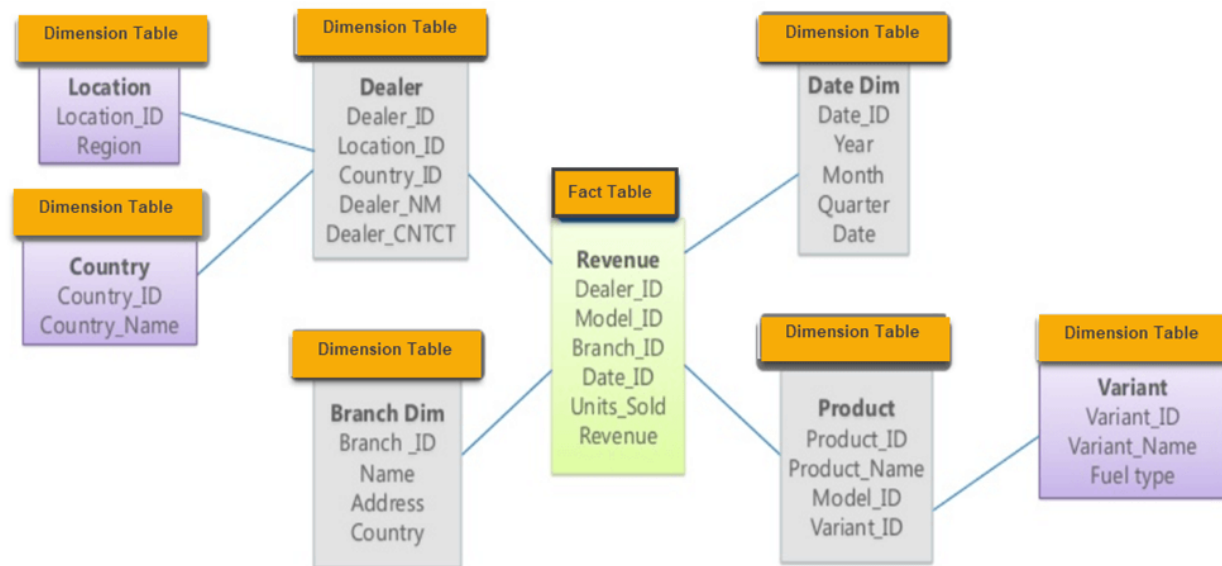
Star Schema in data warehouse, in which the center of the star can have one fact table and a number of associated dimension tables. It is known as star schema as its structure resembles a star. The Star Schema data model is the simplest type of Data Warehouse schema. It is also known as Star Join Schema and is optimized for querying large data sets.



2. Snowflake Schema?

Snowflake Schema in data warehouse is a logical arrangement of tables in a multidimensional database such that the [ER diagram](#) resembles a snowflake shape. A Snowflake Schema is an extension of a Star Schema, and it adds additional dimensions. The dimension tables are normalized which splits data into additional tables.

In the following Snowflake Schema example, Country is further normalized into an individual table.



- **Conclusion:** Multidimensional schema is especially designed to model data warehouse systems
- The star schema is the simplest type of Data Warehouse schema. It is known as star schema as its structure resembles a star.
- Comparing Snowflake vs Star schema, a Snowflake Schema is an extension of a Star Schema, and it adds additional dimensions. It is called snowflake because its diagram resembles a Snowflake.
- In a star schema, only single join defines the relationship between the fact table and any dimension tables.
- Star schema contains a fact table surrounded by dimension tables.
- Snowflake schema is surrounded by dimension table which are in turn surrounded by dimension table
- A snowflake schema requires many joins to fetch the data.
- Comparing Star vs Snowflake schema, Start schema has simple DB design, while Snowflake schema has very complex DB design.

REFERENCE BOOK:

Jiawei Han, Micheline Kamber, Jian Pei “Data Mining: concepts and techniques”, 2nd Edition,
Publisher: Elsevier/Morgan Kaufmann.

CONCLUSION: Understand to concept of multidimensional data.

GROUP D
MINI PROJECT
OR
DATABASE APPLICATION
DEVELOPMENT

Assignment: 4

AIM: Design and Implement Database Mini Project.

PROBLEM STATEMENT /DEFINITION

Build the mini project based on the requirement document and design prepared as a part of **Database Management Lab** in second year.

Form teams of around 3 to 4 people.

- A. Develop the application: Build a suitable GUI by using forms and placing the controls on it for any application. Proper data entry validations are expected.
- B. Add the database connection with front end. Implement the basic CRUD operations.
- C. Prepare and submit report to include: Title of the Project, Abstract, List the hardware and software requirements at the backend and at the front end, Source Code, Graphical User Interface, Conclusion.

OBJECTIVE:

- 3. To understand applications of document oriented database by implementing mini project.
- 4. To learn effective UI designs.
- 5. To learn to design & implement database system for specific domain.
- 6. To learn to design system architectural & flow diagram.

Mini Project Report Format:

Abstract

Acknowledgement

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