**Assignment 2**

**Aim:** Implement Map-reduce and aggregation, indexing with suitable example in MongoDB. Demonstrate the following:

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

**Objective:**

* To understand the concept of Map-reduce in mongodb.
* To understand the concept of Aggregation in mongodb.
* To implement the concept of document-oriented databases.

**Theory:**

For the map-reduce operations, MongoDB provides the mapReduce database command. MapReduce functions are written in JavaScript.

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.

Map Function:

* var mapFunction1 = function()
* { emit(this.cust\_id, this.amount);};

Reduce Function:

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

Aggregation:

Aggregation operations process multiple documents and return computed results.

We can use aggregation operations to:

* Group values from multiple documents together.
* Perform operations on the grouped data to return a single result.
* Analyse data changes over time.

Indexing:

Indexes are special data structures that store a small portion of the collection's data set in an easy to traverse form.

The index stores the value of a specific field or set of fields, ordered by the value of the field.

The ordering of the index entries supports efficient equality matches and range-based query operations.

In addition, MongoDB can return sorted results by using the ordering in the index.

Output:

**Current database:**

**> use Books**

**switched to db Books**

**> db.Books.find().pretty()**

**{**

**"\_id" : ObjectId("611fa8bffc6e6eecbe413420"),**

**"name" : "Harry Potter",**

**"author" : "JK Rowling",**

**"id" : 123456789,**

**"price" : 490,**

**"pages" : 370**

**}**

**{**

**"\_id" : ObjectId("611fa8bffc6e6eecbe413421"),**

**"name" : "The mortal instruments",**

**"author" : "Cassandra Clare",**

**"id" : 4453356543,**

**"price" : 260,**

**"pages" : 290**

**}**

**{**

**"\_id" : ObjectId("611fa8bffc6e6eecbe413422"),**

**"name" : "Who will cry when you die",**

**"id" : 7656445678,**

**"price" : 240,**

**"pages" : 120**

**}**

**{**

**"\_id" : ObjectId("611fa8bffc6e6eecbe413423"),**

**"name" : "An Autobiography of a Yogi",**

**"id" : 8768905678,**

**"author" : "Paramhansa Yogananda",**

**"price" : 390,**

**"pages" : 560**

**}**

**{**

**"\_id" : ObjectId("611fa8bffc6e6eecbe413424"),**

**"name" : "The Subtle art of not giving a \*uck",**

**"author" : "Mark Manson",**

**"id" : 2574103698,**

**"price" : 450,**

**"pages" : 230**

**}**

**{**

**"\_id" : ObjectId("611fa8bffc6e6eecbe413425"),**

**"name" : "Who Moved My Cheese?",**

**"author" : "Spencer Johnson",**

**"id" : 9865741520,**

**"price" : 345,**

**"pages" : 180**

**}**

**>**