**11.implement map reduction with suitable example using mongodb**

**Inserting data:**

db.orders.insertMany([

{ "product": "Laptop", "category": "Electronics", "quantity": 3, "price": 1000, "purchaseDate": ISODate("2023-08-01") },

{ "product": "Chair", "category": "Furniture", "quantity": 10, "price": 50, "purchaseDate": ISODate("2023-08-01") },

{ "product": "Tablet", "category": "Electronics", "quantity": 5, "price": 600, "purchaseDate": ISODate("2023-08-02") },

{ "product": "Desk", "category": "Furniture", "quantity": 2, "price": 300, "purchaseDate": ISODate("2023-08-02") },

{ "product": "Phone", "category": "Electronics", "quantity": 8, "price": 700, "purchaseDate": ISODate("2023-08-03") }

])

**Defining map function:**

var mapFunction = function() {

emit(this.category, this.quantity \* this.price);

};

**Defining reduce function**

var reduceFunction = function(key, values) {

return Array.sum(values);

};

**Running the MapReduce Operation**

db.orders.mapReduce(

mapFunction,

reduceFunction,

{

out: "total\_revenue\_by\_category"

}

)

**Checking results:**

db.total\_revenue\_by\_category.find()

**Theory of MapReduce in MongoDB**

MapReduce is a programming model used for processing and generating large data sets. It consists of two main functions: Map and Reduce. This model is particularly useful for tasks that involve data aggregation and analysis. Here’s a brief overview of the two components:

Map Function: This function takes an input dataset and processes it to generate a set of intermediate key-value pairs. Each input document is processed individually, and the output is a list of pairs, where each pair consists of a key (a specific identifier) and a value (a quantity or measure related to that key).

Reduce Function: The reduce function takes the intermediate key-value pairs generated by the map function and merges those values based on their keys. This typically involves performing some kind of aggregation, such as summing values or calculating averages, resulting in a smaller set of values.