Lab: MongoDB Advanced

1. Go the testDB database using the following command
   use testDB

2. Use insertMany() to create a collection orders and populate the collection
   ```
   db.orders.insertMany( [
     { cust_id: "A123", amount: 500, status: "A" },
     { cust_id: "A123", amount: 250, status: "A" },
     { cust_id: "B212", amount: 200, status: "A" },
     { cust_id: "A123", amount: 300, status: "D" }
   ] );
   ```

3. $match stage

   ```
   db.orders.aggregate( [
       { $match : { status : "A" } }
   ] );

   db.orders.aggregate( [
       { $match : { cust_id: "A123" , status : "A" } }
   ] );

   db.orders.aggregate ( [
       { $match : { $or: [ {amount: {$gte: 300}} , {status : "D"}] } }
   ] );
   ```

4. $group stage

   ```
   db.orders.aggregate ( [
       { $group: { _id: "$cust_id", total: { $sum: "$amount" } } }
   ] );
   ```

   What is the equivalent SQL?

5. Aggregation pipeline

   ```
   db.orders.aggregate ( [
       { $match : { status : "A" } },
       { $group: { _id: "$cust_id", total: { $sum: "$amount" } } }
   ] );
   ```

6. $count

```
db.orders.aggregate ( [
    { $match : { status : "A" } }, { $group: { _id: null, count: { $sum: 1 } } }
] );
```

7. $sort

```
db.orders.aggregate ( [
    { $match : { status : "A" } },
    { $group: { _id: "$cust_id", total: { $sum: "$amount" } } },
    { $sort : { _id : 1 } }
] );
```

8. $min, $max, $avg

```
db.orders.aggregate ( [
    { $match : { status : "A" } },
    { $group: { _id: null, avg_amount: { $avg: "$amount" } } }
] );

db.orders.aggregate ( [
    { $group: { _id: "$cust_id", max_amount: { $max: "$amount" } } }
] );
```

9. A MapReduce example

```
db.orders.mapReduce (
    function() {emit( this.cust_id , this.amount ); },
    function(key,values) {return Array.sum( values )},
    {
            query: { status: "A" },
            out: "order_totals"
    }
);
```

Check the results

```
db.order_totals.find()
```

Or you can try

```
db.orders.mapReduce (
    function() {emit( this.cust_id , this.amount ); },
    function(key,values) {return Array.sum( values )},
    {
            query: { status: "A" },
            out: { inline: 1 }
    }
);
```

10. $lookup for Join

    Go the joinDB database using the following command

    ```
    use joinDB
    ```

    Create a collection orders with the following documents:

    ```
    db.orders.insertMany([
      { "_id" : 1, "item" : "almonds", "price" : 12, "quantity" : 2 },
      { "_id" : 2, "item" : "pecans", "price" : 20, "quantity" : 1 },
      { "_id" : 3  }
    ]);
    ```

    Create another collection inventory with the following documents:

    ```
    db.inventory.insertMany([
      { "_id" : 1, "sku" : "almonds", description: "product 1", "instock" : 120 },
      { "_id" : 2, "sku" : "bread", description: "product 2", "instock" : 80 },
      { "_id" : 3, "sku" : "cashews", description: "product 3", "instock" : 60 },
      { "_id" : 4, "sku" : "pecans", description: "product 4", "instock" : 70 },
      { "_id" : 5, "sku": null, description: "Incomplete" },
      { "_id" : 6 }
    ]);
    ```

Join on item=sku

```
db.orders.aggregate([
  {
    $lookup:
     {
       from: "inventory",
       localField: "item",
       foreignField: "sku",
       as: "inventory_docs"
     }
  }
]);
```

The operation would correspond to the following pseudo-SQL statement:

```
SELECT      *, inventory_docs
FROM        orders
WHERE       inventory_docs IN (SELECT *
                               FROM inventory
                               WHERE sku= orders.item);
```

11. Use $lookup with $mergeObjects

```
db.orders.aggregate([
  {
    $lookup:
     {
       from: "inventory",
       localField: "item",
       foreignField: "sku",
       as: "inventory_docs"
     }
  },
 {
     $replaceRoot: { newRoot: { $mergeObjects: [ { $arrayElemAt: [ "$inventory_docs", 0 ] },
"$$ROOT" ] } }
  },
  { $project: { inventory_docs: 0 } }
]);
```

References

https://www.tutorialspoint.com/mongodb/mongodb_aggregation.htm

https://docs.mongodb.com/manual/

https://appdividend.com/2018/10/25/mongodb-aggregate-example-tutorial/

https://appdividend.com/2018/10/26/mongodb-mapreduce-example-tutorial/

http://learnmongodbthehardway.com/schema/schemabasics/