DATABASE SYSTEMS LAB

Submitted By

Siyahul Haque T P

Semester 3

M.S.c Computer Science

Roll No: 97322607030

PROGRAM LIST

1. Retrieve all documents in a collection

2. Retrieve all documents that contain paid orders (the "paid" field is "Y")

3. Retrieve all documents that contain paid orders and the orders are from before 2019

4. Retrieve all documents that contain unpaid orders or whose orders are from before 2019

5. Retrieve all documents that contain orders whose price is in NOK

6. Retrieve all documents that contain orders whose price is less than 18 NOK

7. Retrieve all documents with orders that contain product "p2"

8. Retrieve all documents with orders that contain products whose quantity is less than 13

9. Retrieve all documents with orders that contain products whose quantity is less than 13 and

contain no products whose quantity exceeds 13

10.Retrieve all documents with orders that contain products whose first colour (i.e., first element in

the "colours" array) is blue

11.Retrieve the total number of delivery days, grouped by year; retrieve the results only after 2017(Hint: use aggregation pipelines)

The following collection of five documents is given. Documents consist of orders. An order has an id (e.g. “o1”), the year in which it was issues, the cost, the items in the order, and the number of days it took to deliver the order. The cost is specified as price in a given currency. The order items consist of products. A product has an id (e.g., “p1”), colours, and quantity.

{"order":"o1","year":2020,"paid":"Y","cost":{"price":30,"currency":"NOK"},
"items":[{"product":"p1","colours":["blue","black"],"quantity":15}],"delivery_d
ays":5}
{"order":"o2","year":2020,"paid":"Y","cost":{"price":13,"currency":"EUR"},
"items":[{"product":"p2","colours":["white"],"quantity":4},
{"product":"p3","colours":["white","black"],"quantity":1}],"delivery_days":4},
{"order":"o3","year":2018,"paid":"N","cost":{"price":33,"currency":"EUR"},
"items":[{"product":"p3","colours":["blue","black"],"quantity":4}],
"delivery_days":4},
{"order":"o4","year":2017,"paid":"Y","cost":{"price":17,"currency":"NOK"},
"items":[{"product":"p2","colours":["pink","black"],"quantity":14},
{"product":"p4","colours":["white"],"quantity":1}], "delivery_days":2},
{"order":"o5","year":2020,"paid":"Y","cost":{"price":19,"currency":"NOK"},
"items":[{"product":"p1","quantity":15}], "delivery_days":3}

=>created database

```
>use ord
```

OUTPUT

```
switched to db ord
```

=>create collections

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

OUTPUT

```
{ "ok" : 1 }
```

=>Insert Records into Orders collection

```
// Define the documents
const documents = [
  {
```

```
  "order": "o1",
  "year": 2020,
  "paid": "Y",
  "cost": {"price": 30,"currency": "NOK"},
  "items": [{"product": "p1","colours": ["blue","black"],"quantity": 15}],
  "delivery_days": 5
},
{
  "order": "o2",
  "year": 2020,
  "paid": "Y",
  "cost": {"price": 13,"currency": "EUR"},
  "items": [
    {"product": "p2","colours": ["white"],"quantity": 4},
    {"product": "p3","colours": ["white","black"],"quantity": 1}
  ],
  "delivery_days": 4
},
{
  "order": "o3",
  "year": 2018,
  "paid": "N",
  "cost": {"price": 33,"currency": "EUR"},
  "items": [{"product": "p3","colours": ["blue","black"],"quantity": 4}],
  "delivery_days": 4
},
{
```

```
    "order": "o4",
    "year": 2017,
    "paid": "Y",
    "cost": {"price": 17,"currency": "NOK"},
    "items": [
      {"product": "p2","colours": ["pink","black"],"quantity": 14},
      {"product": "p4","colours": ["white"],"quantity": 1}
    ],
    "delivery_days": 2
  },
  {
    "order": "o5",
    "year": 2020,
    "paid": "Y",
    "cost": {"price": 19,"currency": "NOK"},
    "items": [{"product": "p1","quantity": 15}],
    "delivery_days": 3
  }
];
// Insert the documents into the collection
db.orders.insertMany(documents, function(err, result) {
  if (err) {
    console.error("Error inserting documents: ", err);
  } else {
    console.log(`${result.insertedCount} documents inserted successfully.`);
  }
});
```

OUTPUT

```
{
        "acknowledged" : true,
        "insertedIds" : [
                ObjectId("65f7261e8c224a86312acfe2"),
                ObjectId("65f7261e8c224a86312acfe3"),
                ObjectId("65f7261e8c224a86312acfe4"),
                ObjectId("65f7261e8c224a86312acfe5"),
                ObjectId("65f7261e8c224a86312acfe6")
        ]
}
```

1. Retrieve all documents in a collection

```
>db.orders.find({})
```

OUTPUT

{ "_id" : ObjectId("65f7261e8c224a86312acfe2"), "order" : "o1", "year" : 2020, "paid" : "Y", "cost" : { "price" : 30, "currency" : "NOK" }, "items" : [{ "product" : "p1", "colours" : ["blue", "black"], "quantity" : 15 }], "delivery_days" : 5 }

{ "_id" : ObjectId("65f7261e8c224a86312acfe3"), "order" : "o2", "year" : 2020, "paid" : "Y", "cost" : { "price" : 13, "currency" : "EUR" }, "items" : [{ "product" : "p2", "colours" : ["white"], "quantity" : 4 }, { "product" : "p3", "colours" : ["white", "black"], "quantity" : 1 }], "delivery_days" : 4 }
{ "_id" : ObjectId("65f7261e8c224a86312acfe4"), "order" : "o3", "year" : 2018, "paid" : "N", "cost" : { "price" : 33, "currency" : "EUR" }, "items" : [{ "product" : "p3", "colours" : ["blue", "black"], "quantity" : 4 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f7261e8c224a86312acfe5"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{ "product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }

{ "_id" : ObjectId("65f7261e8c224a86312acfe6"), "order" : "o5", "year" : 2020, "paid" : "Y", "cost" : { "price" : 19, "currency" : "NOK" }, "items" : [{ "product" : "p1", "quantity" : 15 }], "delivery_days" : 3 }

2. Retrieve all documents that contain paid orders (the "paid" field is "Y")

```
>db.orders.find({"paid": "Y"})
```

OUTPUT

{ "_id" : ObjectId("65f7261e8c224a86312acfe2"), "order" : "o1", "year" : 2020, "paid" : "Y", "cost" : { "price" : 30, "currency" : "NOK" }, "items" : [{ "product" : "p1", "colours" : ["blue", "black"], "quantity" : 15 }], "delivery_days" : 5 }

{ "_id" : ObjectId("65f7261e8c224a86312acfe3"), "order" : "o2", "year" : 2020, "paid" : "Y", "cost" : { "price" : 13, "currency" : "EUR" }, "items" : [{ "product" : "p2", "colours" : ["white"], "quantity" : 4 }, { "product" : "p3", "colours" : ["white", "black"], "quantity" : 1 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f7261e8c224a86312acfe5"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{ "product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }

{ "_id" : ObjectId("65f7261e8c224a86312acfe6"), "order" : "o5", "year" : 2020, "paid" : "Y", "cost" : { "price" : 19, "currency" : "NOK" }, "items" : [{ "product" : "p1", "quantity" : 15 }], "delivery_days" : 3 }

3. Retrieve all documents that contain paid orders and the orders are from before 2019

```
>db.orders.find({"paid": "Y", "year": {"$lt": 2019}})
```

OUTPUT

{ "_id" : ObjectId("65f7261e8c224a86312acfe5"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{ "product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }

4. Retrieve all documents that contain unpaid orders or whose orders are from before 2019

```
>db.orders.find({"$or": [{"paid": "N"}, {"year": {"$lt": 2019}}]})
```

OUTPUT

{ "_id" : ObjectId("65f72e02d6743f4563776e8e"), "order" : "o3", "year" : 2018, "paid" : "N", "cost" : { "price" : 33, "currency" : "EUR" }, "items" : [{ "product" : "p3", "colours" : ["blue", "black"], "quantity" : 4 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f72e02d6743f4563776e8f"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{ "product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }

5. Retrieve all documents that contain orders whose price is in NOK

```
>db.orders.find({"cost.currency": "NOK"})
```

OUTPUT

{ "_id" : ObjectId("65f7b6222e07f68aa3943021"), "order" : "o1", "year" : 2020, "paid" : "Y", "cost" : { "price" : 30, "currency" : "NOK" }, "items" : [{ "product" : "p1", "colours" : ["blue", "black"], "quantity" : 15 }], "delivery_days" : 5 }

{ "_id" : ObjectId("65f7b6222e07f68aa3943024"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{ "product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }
{ "_id" : ObjectId("65f7b6222e07f68aa3943025"), "order" : "o5", "year" : 2020, "paid" : "Y", "cost" : { "price" : 19, "currency" : "NOK" }, "items" : [{ "product" : "p1", "quantity" : 15 }], "delivery_days" : 3 }

6. Retrieve all documents that contain orders whose price is less than 18 NOK

```
>db.orders.find({"cost.price": {"$lt": 18}})
```

OUTPUT

{ "_id" : ObjectId("65f7b68dea4023266c786948"), "order" : "o2", "year" : 2020, "paid" : "Y", "cost" : { "price" : 13, "currency" : "EUR" }, "items" : [{ "product" : "p2", "colours" : ["white"], "quantity" : 4 }, { "product" : "p3", "colours" : ["white", "black"], "quantity" : 1 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f7b68dea4023266c78694a"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{

"product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }

7. Retrieve all documents with orders that contain product "p2"

>db.orders.find({"items.product": "p2"})

OUTPUT

{ "_id" : ObjectId("65f7b6d6ae635d0109e976d6"), "order" : "o2", "year" : 2020, "paid" : "Y", "cost" : { "price" : 13, "currency" : "EUR" }, "items" : [{ "product" : "p2", "colours" : ["white"], "quantity" : 4 }, { "product" : "p3", "colours" : ["white", "black"], "quantity" : 1 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f7b6d6ae635d0109e976d8"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{ "product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }

8. Retrieve all documents with orders that contain products whose quantity is less than 13

>db.orders.find({"items.quantity": {"$lt": 13}})

OUTPUT

{ "_id" : ObjectId("65f7b7885f3d60970916f011"), "order" : "o2", "year" : 2020, "paid" : "Y", "cost" : { "price" : 13, "currency" : "EUR" }, "items" : [{ "product" : "p2", "colours" : ["white"], "quantity" : 4 }, { "product" : "p3", "colours" : ["white", "black"], "quantity" : 1 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f7b7885f3d60970916f012"), "order" : "o3", "year" : 2018, "paid" : "N", "cost" : { "price" : 33, "currency" : "EUR" }, "items" : [{ "product" : "p3", "colours" : ["blue", "black"], "quantity" : 4 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f7b7885f3d60970916f013"), "order" : "o4", "year" : 2017, "paid" : "Y", "cost" : { "price" : 17, "currency" : "NOK" }, "items" : [{ "product" : "p2", "colours" : ["pink", "black"], "quantity" : 14 }, { "product" : "p4", "colours" : ["white"], "quantity" : 1 }], "delivery_days" : 2 }

9. Retrieve all documents with orders that contain products whose quantity is less than 13 and contain no products whose quantity exceeds 13

>db.orders.find({"items.quantity": {"$lt": 13}, "items.quantity": {"$not": {"$gt": 13}}})

OUTPUT

{ "_id" : ObjectId("65f7b592df38edd7f44c71ef"), "order" : "o2", "year" : 2020, "paid" : "Y", "cost" : { "price" : 13, "currency" : "EUR" }, "items" : [{ "product" : "p2", "colours" : ["white"], "quantity" : 4 }, { "product" : "p3", "colours" : ["white", "black"], "quantity" : 1 }], "delivery_days" : 4 }

{ "_id" : ObjectId("65f7b592df38edd7f44c71f0"), "order" : "o3", "year" : 2018, "paid" : "N", "cost" : { "price" : 33, "currency" : "EUR" }, "items" : [{ "product" : "p3", "colours" : ["blue", "black"], "quantity" : 4 }], "delivery_days" : 4 }

10.Retrieve all documents with orders that contain products whose first colour (i.e., first element in the "colours" array) is blue

>db.orders.find({"items.colours.0": "blue"})

OUTPUT

{ "_id" : ObjectId("65f7b8ff46172a70f5c8e9b3"), "order" : "o1", "year" : 2020, "paid" : "Y", "cost" : { "price" : 30, "currency" : "NOK" }, "items" : [{ "product" : "p1", "colours" : ["blue", "black"], "quantity" : 15 }], "delivery_days" : 5 }

{ "_id" : ObjectId("65f7b8ff46172a70f5c8e9b5"), "order" : "o3", "year" : 2018, "paid" : "N", "cost" : { "price" : 33, "currency" : "EUR" }, "items" : [{ "product" : "p3", "colours" : ["blue", "black"], "quantity" : 4 }], "delivery_days" : 4 }

11.Retrieve the total number of delivery days, grouped by year; retrieve the results only after 2017 (Hint: use aggregation pipelines)

```
>db.orders.aggregate([
   {"$match": {"year": {"$gt": 2017}}},
   {"$group": {"_id": "$year", "total_delivery_days": {"$sum": "$delivery_days"}}}
])
```

OUTPUT

{ "_id" : 2020, "total_delivery_days" : 48 }

{ "_id" : 2018, "total_delivery_days" : 16 }