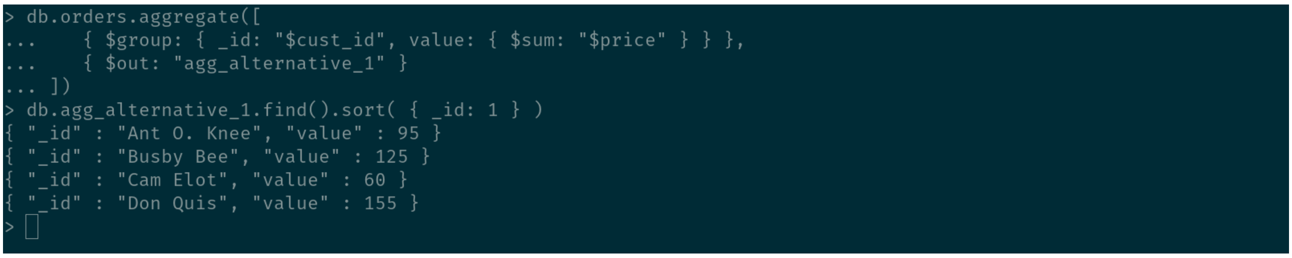
Group C: Assignment 5

Implement the aggregation and indexing with suitable example on any MongoDB database.
Demonstrate Following

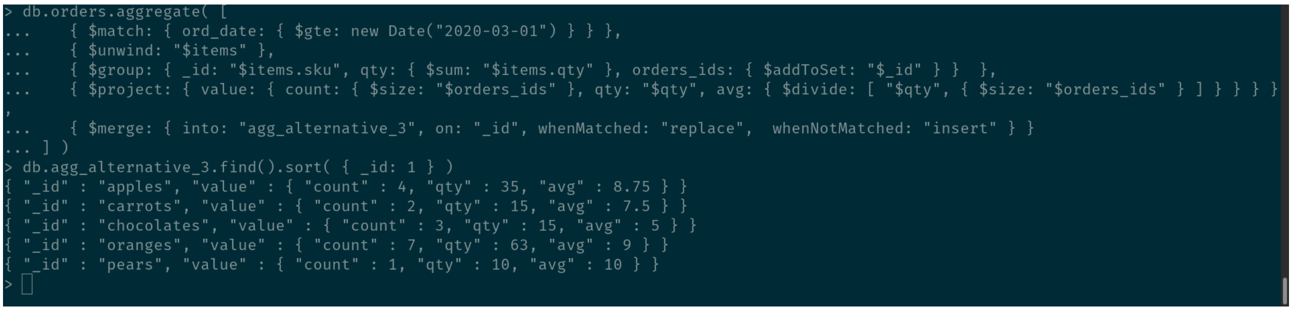
Aggregation framework

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

1) Aggregation

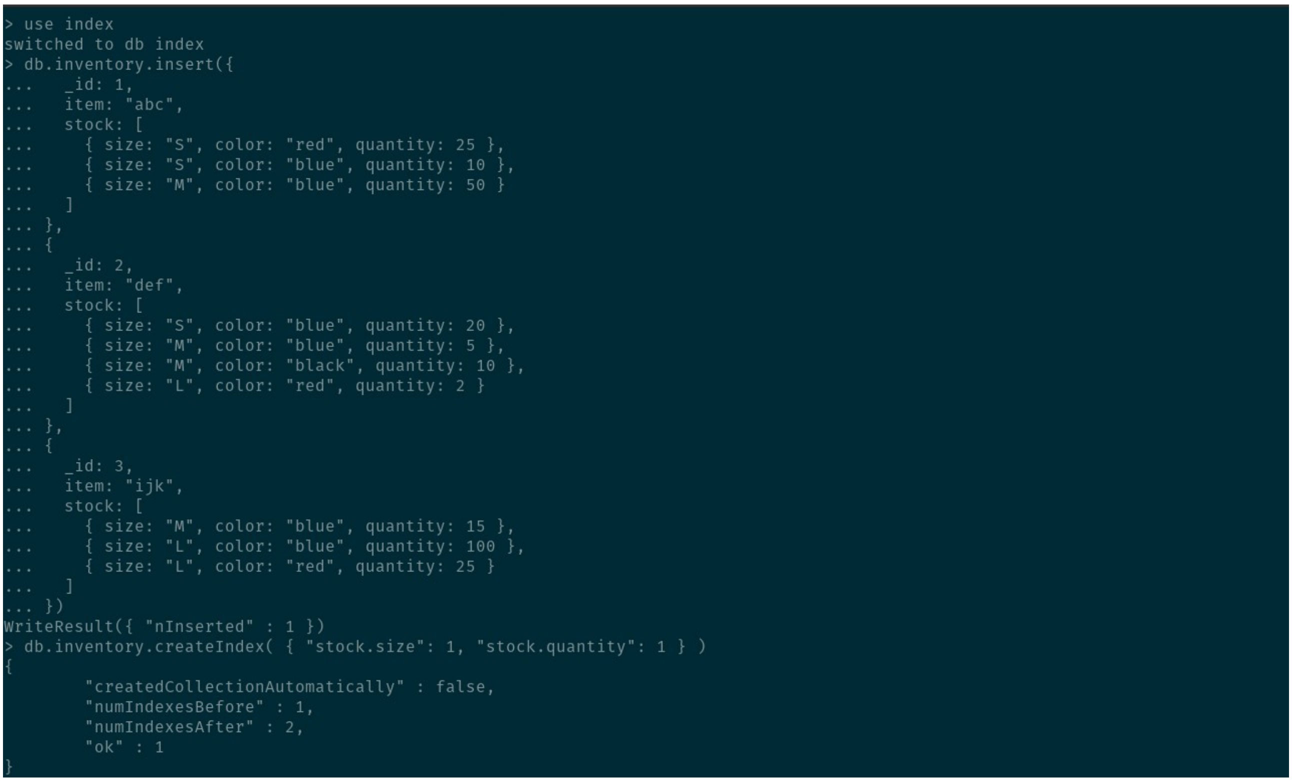


```
> db.orders.aggregate([
...    { $group: { _id: "$cust_id", value: { $sum: "$price" } } },
...    { $out: "agg_alternative_1" }
... ])
> db.agg_alternative_1.find().sort( { _id: 1 } )
{ "_id" : "Ant O. Knee", "value" : 95 }
{ "_id" : "Busby Bee", "value" : 125 }
{ "_id" : "Cam Elot", "value" : 60 }
{ "_id" : "Don Quis", "value" : 155 }
> 
```

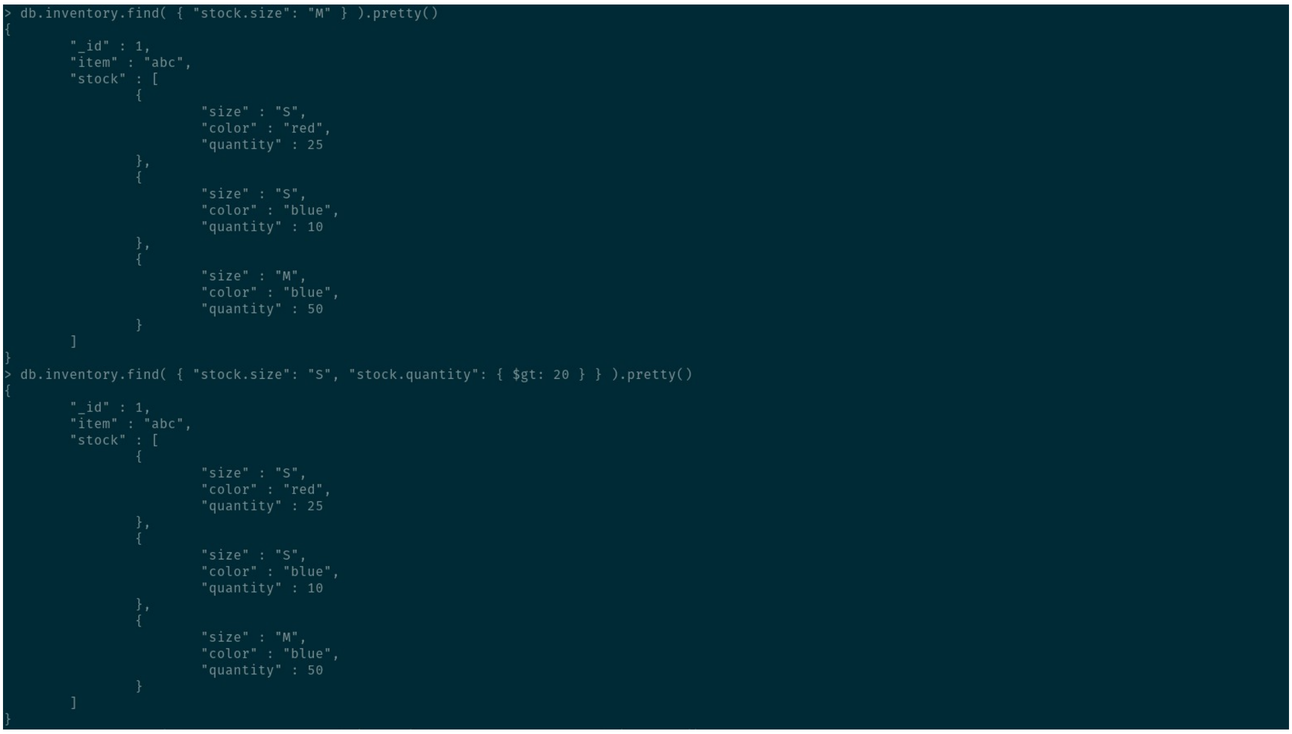


```
> db.orders.aggregate( [
...    { $match: { ord_date: { $gte: new Date("2020-03-01") } } },
...    { $unwind: "$items" },
...    { $group: { _id: "$items.sku", qty: { $sum: "$items.qty" }, orders_ids: { $addToSet: "$_id" } }  },
...    { $project: { value: { count: { $size: "$orders_ids" }, qty: "$qty", avg: { $divide: [ "$qty", { $size: "$orders_ids" } ] } } } }
,
...    { $merge: { into: "agg_alternative_3", on: "_id", whenMatched: "replace",  whenNotMatched: "insert" } }
... ] )
> db.agg_alternative_3.find().sort( { _id: 1 } )
{ "_id" : "apples", "value" : { "count" : 4, "qty" : 35, "avg" : 8.75 } }
{ "_id" : "carrots", "value" : { "count" : 2, "qty" : 15, "avg" : 7.5 } }
{ "_id" : "chocolates", "value" : { "count" : 3, "qty" : 15, "avg" : 5 } }
{ "_id" : "oranges", "value" : { "count" : 7, "qty" : 63, "avg" : 9 } }
{ "_id" : "pears", "value" : { "count" : 1, "qty" : 10, "avg" : 10 } }
> 
```

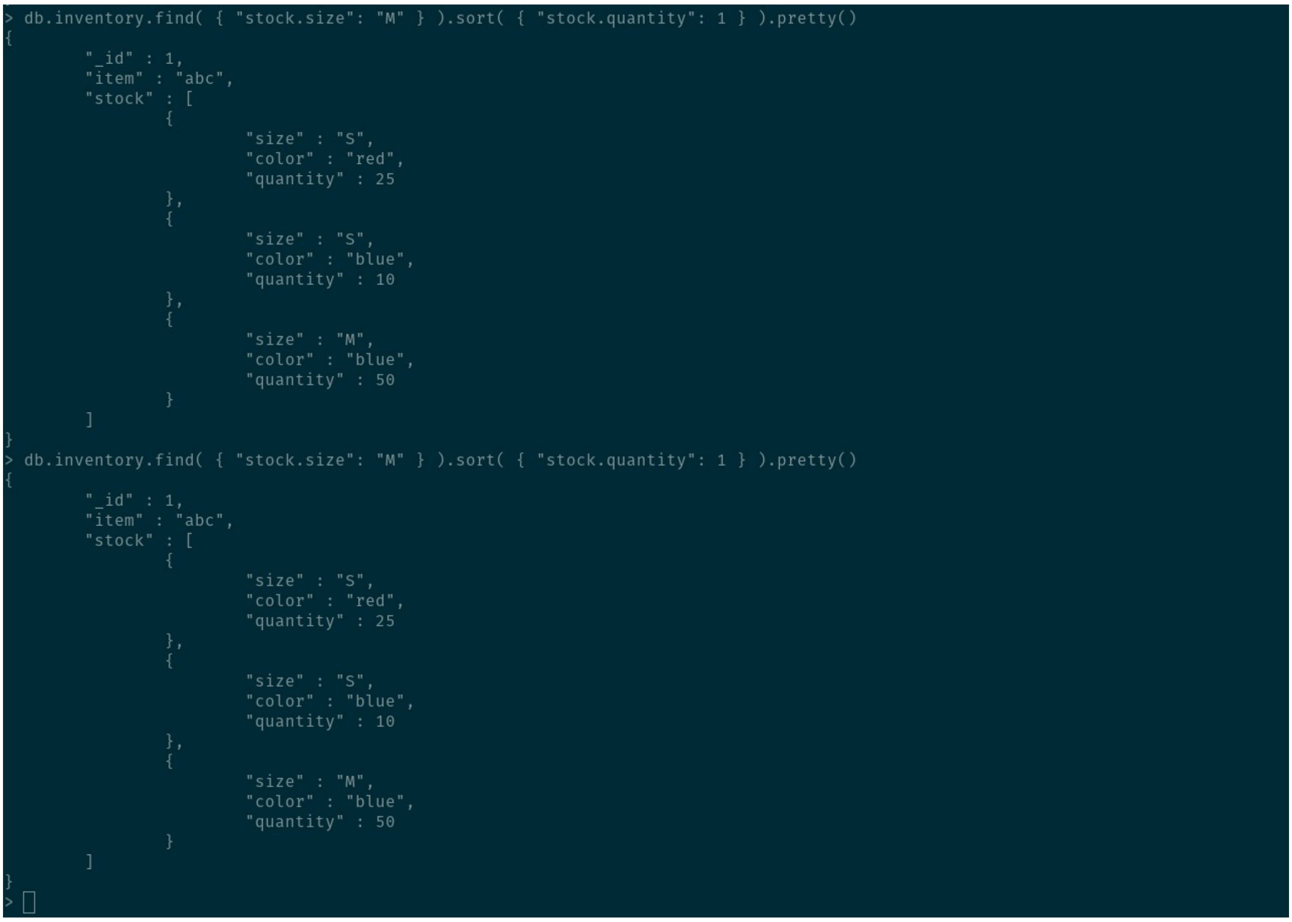
2) Multi-Key Index



```
> use index
switched to db index
> db.inventory.insert({
...   _id: 1,
...   item: "abc",
...   stock: [
...     { size: "S", color: "red", quantity: 25 },
...     { size: "S", color: "blue", quantity: 10 },
...     { size: "M", color: "blue", quantity: 50 }
...   ]
... },
... {
...   _id: 2,
...   item: "def",
...   stock: [
...     { size: "S", color: "blue", quantity: 20 },
...     { size: "M", color: "blue", quantity: 5 },
...     { size: "M", color: "black", quantity: 10 },
...     { size: "L", color: "red", quantity: 2 }
...   ]
... },
... {
...   _id: 3,
...   item: "ijk",
...   stock: [
...     { size: "M", color: "blue", quantity: 15 },
...     { size: "L", color: "blue", quantity: 100 },
...     { size: "L", color: "red", quantity: 25 }
...   ]
... })
WriteResult({ "nInserted" : 1 })
> db.inventory.createIndex( { "stock.size": 1, "stock.quantity": 1 } )
{
        "createdCollectionAutomatically" : false,
        "numIndexesBefore" : 1,
        "numIndexesAfter" : 2,
        "ok" : 1
}
```

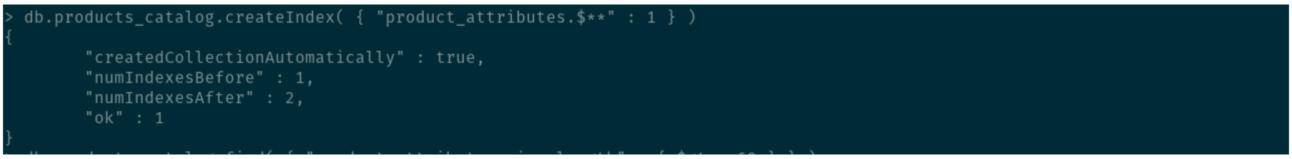


```
> db.inventory.find( { "stock.size": "M" } ).pretty()
{
        "_id" : 1,
        "item" : "abc",
        "stock" : [
                {
                        "size" : "S",
                        "color" : "red",
                        "quantity" : 25
                },
                {
                        "size" : "S",
                        "color" : "blue",
                        "quantity" : 10
                },
                {
                        "size" : "M",
                        "color" : "blue",
                        "quantity" : 50
                }
        ]
}
> db.inventory.find( { "stock.size": "S", "stock.quantity": { $gt: 20 } } ).pretty()
{
        "_id" : 1,
        "item" : "abc",
        "stock" : [
                {
                        "size" : "S",
                        "color" : "red",
                        "quantity" : 25
                },
                {
                        "size" : "S",
                        "color" : "blue",
                        "quantity" : 10
                },
                {
                        "size" : "M",
                        "color" : "blue",
                        "quantity" : 50
                }
        ]
}
```

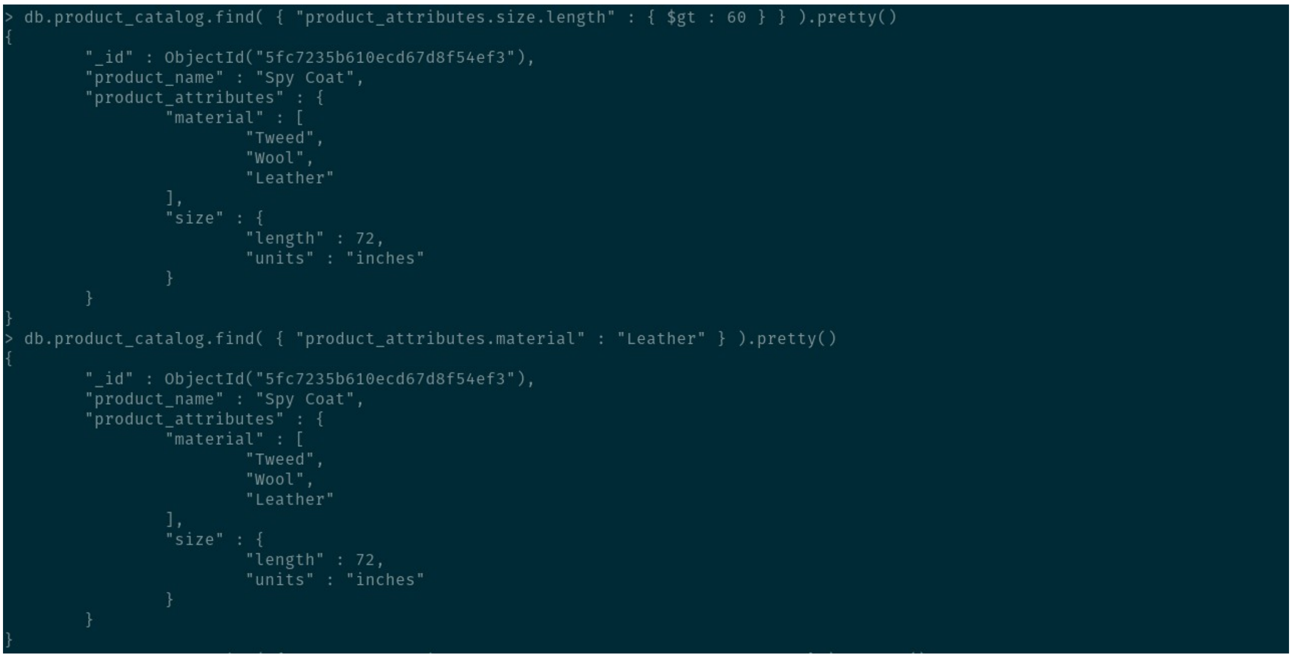


```
> db.inventory.find( { "stock.size": "M" } ).sort( { "stock.quantity": 1 } ).pretty()
{
        "_id" : 1,
        "item" : "abc",
        "stock" : [
                {
                        "size" : "S",
                        "color" : "red",
                        "quantity" : 25
                },
                {
                        "size" : "S",
                        "color" : "blue",
                        "quantity" : 10
                },
                {
                        "size" : "M",
                        "color" : "blue",
                        "quantity" : 50
                }
        ]
}
> db.inventory.find( { "stock.size": "M" } ).sort( { "stock.quantity": 1 } ).pretty()
{
        "_id" : 1,
        "item" : "abc",
        "stock" : [
                {
                        "size" : "S",
                        "color" : "red",
                        "quantity" : 25
                },
                {
                        "size" : "S",
                        "color" : "blue",
                        "quantity" : 10
                },
                {
                        "size" : "M",
                        "color" : "blue",
                        "quantity" : 50
                }
        ]
}
> 
```

3) Wildcard Indexes



```
> db.products_catalog.createIndex( { "product_attributes.$**" : 1 } )
{
        "createdCollectionAutomatically" : true,
        "numIndexesBefore" : 1,
        "numIndexesAfter" : 2,
        "ok" : 1
}
```



```
> db.product_catalog.find( { "product_attributes.size.length" : { $gt : 60 } } ).pretty()
{
        "_id" : ObjectId("5fc7235b610ecd67d8f54ef3"),
        "product_name" : "Spy Coat",
        "product_attributes" : {
                "material" : [
                        "Tweed",
                        "Wool",
                        "Leather"
                ],
                "size" : {
                        "length" : 72,
                        "units" : "inches"
                }
        }
}
> db.product_catalog.find( { "product_attributes.material" : "Leather" } ).pretty()
{
        "_id" : ObjectId("5fc7235b610ecd67d8f54ef3"),
        "product_name" : "Spy Coat",
        "product_attributes" : {
                "material" : [
                        "Tweed",
                        "Wool",
                        "Leather"
                ],
                "size" : {
                        "length" : 72,
                        "units" : "inches"
                }
        }
}
```

Advantages of indexes:

1) Speed up SELECT query
2) Helps to make a row unique or without duplicates(primary,unique)
3) If index is set to fill-text index, then we can search against large string values. for example to find a word from a sentence etc.