DS 503 - **Project 4**

By Team 14:
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Q1)

```
db.createCollection('test');

var array = [{
        "_id" : 1,
        "name" : {
        "first" : "John",
        "last" : "Backus"
        },
        "birth" : ISODate("1924-12-03T05:00:00Z"),
        "death" : ISODate("2007-03-17T04:00:00Z"),
        "contribs" : [
        "Fortran",
        "ALGOL",
        "Backus-Naur Form",
        "FP"
        ],
        "awards" : [
        {
        "award" : "W.W. McDowell Award",
        "year" : 1967,
        "by" : "IEEE Computer Society"
        },
        {
        "award" : "National Medal of Science",
        "year" : 1975,
        "by" : "National Science Foundation"
        },
        {
        "award" : "Turing Award",
        "year" : 1977,
        "by" : "ACM"
        },
        {
        "award" : "Draper Prize",
        "year" : 1993,
        "by" : "National Academy of Engineering"
        }
        ]
}
,
{
```

```
        "_id" : ObjectId("51df07b094c6acd67e492f41"),
        "name" : {
        "first" : "John",
        "last" : "McCarthy"
        },
        "birth" : ISODate("1927-09-04T04:00:00Z"),
        "death" : ISODate("2011-12-24T05:00:00Z"),
        "contribs" : [
        "Lisp",
        "Artificial Intelligence",
        "ALGOL"
        ],
        "awards" : [
        {
        "award" : "Turing Award",
        "year" : 1971,
        "by" : "ACM"
        },
        {
        "award" : "Kyoto Prize",
        "year" : 1988,
        "by" : "Inamori Foundation"
        },
        {
        "award" : "National Medal of Science",
        "year" : 1990,
        "by" : "National Science Foundation"
        }
        ]
}
,
{
        "_id" : 3,
        "name" : {
        "first" : "Grace",
        "last" : "Hopper"
        },
        "title" : "Rear Admiral",
        "birth" : ISODate("1906-12-09T05:00:00Z"),
        "death" : ISODate("1992-01-01T05:00:00Z"),
        "contribs" : [
        "UNIVAC",
        "compiler",
```

```
        "FLOW-MATIC",
        "COBOL"
        ],
        "awards" : [
        {
        "award" : "Computer Sciences Man of the Year",
        "year" : 1969,
        "by" : "Data Processing Management Association"
        },
        {
        "award" : "Distinguished Fellow",
        "year" : 1973,
        "by" : " British Computer Society"
        },
        {
        "award" : "W. W. McDowell Award",
        "year" : 1976,
        "by" : "IEEE Computer Society"
        },
        {
        "award" : "National Medal of Technology",
        "year" : 1991,
        "by" : "United States"
        }
        ]
}
,
{
        "_id" : 4,
        "name" : {
        "first" : "Kristen",
        "last" : "Nygaard"
        },
        "birth" : ISODate("1926-08-27T04:00:00Z"),
        "death" : ISODate("2002-08-10T04:00:00Z"),
        "contribs" : [
        "OOP",
        "Simula"
        ],
        "awards" : [
        {
        "award" : "Rosing Prize",
        "year" : 1999,
```

```
        "by" : "Norwegian Data Association"
        },
        {
        "award" : "Turing Award",
        "year" : 2001,
        "by" : "ACM"
        },
        {
        "award" : "IEEE John von Neumann Medal",
        "year" : 2001,
        "by" : "IEEE"
        }
        ]
}
,
{
        "_id" : 5,
        "name" : {
        "first" : "Ole-Johan",
        "last" : "Dahl"
        },
        "birth" : ISODate("1931-10-12T04:00:00Z"),
        "death" : ISODate("2002-06-29T04:00:00Z"),
        "contribs" : [
        "OOP",
        "Simula"
        ],
        "awards" : [
        {
        "award" : "Rosing Prize",
        "year" : 1999,
        "by" : "Norwegian Data Association"
        },
        {
        "award" : "Turing Award",
        "year" : 2001,
        "by" : "ACM"
        },
        {
        "award" : "IEEE John von Neumann Medal",
        "year" : 2001,
        "by" : "IEEE"
        }
```

```
        ]
}
,
{
        "_id" : 6,
        "name" : {
        "first" : "Guido",
        "last" : "van Rossum"
        },
        "birth" : ISODate("1956-01-31T05:00:00Z"),
        "contribs" : [
        "Python"
        ],
        "awards" : [
        {
        "award" : "Award for the Advancement of Free Software",
        "year" : 2001,
        "by" : "Free Software Foundation"
        },
        {
        "award" : "NLUUG Award",
        "year" : 2003,
        "by" : "NLUUG"
        }
        ]
}
,
{
        "_id" : ObjectId("51e062189c6ae665454e301d"),
        "name" : {
        "first" : "Dennis",
        "last" : "Ritchie"
        },
        "birth" : ISODate("1941-09-09T04:00:00Z"),
        "death" : ISODate("2011-10-12T04:00:00Z"),
        "contribs" : [
        "UNIX",
        "C"
        ],
        "awards" : [
        {
        "award" : "Turing Award",
        "year" : 1983,
```

```
        "by" : "ACM"
        },
        {
        "award" : "National Medal of Technology",
        "year" : 1998,
        "by" : "United States"
        },
        {
        "award" : "Japan Prize",
        "year" : 2011,
        "by" : "The Japan Prize Foundation"
        }
        ]
}
,
{
        "_id" : 8,
        "name" : {
        "first" : "Yukihiro",
        "aka" : "Matz",
        "last" : "Matsumoto"
        },
        "birth" : ISODate("1965-04-14T04:00:00Z"),
        "contribs" : [
        "Ruby"
        ],
        "awards" : [
        {
        "award" : "Award for the Advancement of Free Software",
        "year" : "2011",
        "by" : "Free Software Foundation"
        }
        ]
}
,
{
        "_id" : 9,
        "name" : {
        "first" : "James",
        "last" : "Gosling"
        },
        "birth" : ISODate("1955-05-19T04:00:00Z"),
        "contribs" : [
```

```
        "Java"
        ],
        "awards" : [
        {
        "award" : "The Economist Innovation Award",
        "year" : 2002,
        "by" : "The Economist"
        },
        {
        "award" : "Officer of the Order of Canada",
        "year" : 2007,
        "by" : "Canada"
        }
        ]
}
,
{
        "_id" : 10,
        "name" : {
        "first" : "Martin",
        "last" : "Odersky"
        },
        "contribs" : [
        "Scala"
        ]
}];

db.test.insert(array);
```

____

Q2

```
doc = db.test.findOne({'name.first' : 'John' , 'name.last': 'McCarthy'} );
db.test.remove({'_id' : doc._id});
doc._id = 2;
db.test.insert(doc);
```

____

Q3

```
var array = [
{
 "_id" : 20,
```

```
 "name" : {
 "first" : "Alex",
 "last" : "Chen"
 },
 "birth" : ISODate("1933-08-27T04:00:00Z"),
 "death" : ISODate("1984-11-07T04:00:00Z"),
 "contribs" : [
 "C++",
 "Simula"
 ],
 "awards" : [
 {
 "award" : "WPI Award",
 "year" : 1977,
 "by" : "WPI"
 }
 ]
} , {
 "_id" : 30,
 "name" : {
 "first" : "David",
 "last" : "Mark"
 },
 "birth" : ISODate("1911-04-12T04:00:00Z"),
 "death" : ISODate("2000-11-07T04:00:00Z"),
 "contribs" : [
 "C++",
 "FP",
 "Lisp",
 ],
 "awards" : [
 {
 "award" : "WPI Award",
 "year" : 1963,
 "by" : "WPI"
 },
 {
 "award" : "Turing Award",
 "year" : 1966,
 "by" : "ACM"
 }
 ]
}] ;
```

```
db.test.insert(array);
```

Q4 :

```
doc = db.test.find(
{
   awards: {$elemMatch: {award:'Turing Award', year: {$gt : 1976} }}
});
```

Q 5 :

```
doc = db.test.find(
{
   $or: [
      {'awards.2': {$exists: false}} ,
      {contribs: 'FP'}
      ]
});
```

Q6 :

```
doc = db.test.find({'name.first': 'Dennis' , 'name.last': 'Ritchie'},  {'name':1, 'contribs':1});
```

Outputs:
UNIX
C

___

Q7

```
doc = db.test.updateOne({'name.first': 'Guido' , 'name.last': 'van Rossum'}, { $push: {contribs:
'OOP' } });
```

Q8 :

```
doc = db.test.updateOne({'name.first': 'Alex' , 'name.last': 'Chen'}, { $pushAll: {comments:  [ 'He taught in 3 universities', 'died from cancer', 'lived in CA']} });
```

Q9:

```
db.test.find({'name.first': 'Alex' , 'name.last': 'Chen'}, {contribs:1}).forEach(function(x){
   x.contribs.forEach(function(c) {
      docs = db.test.find({'contribs': c});
      print ('{ Contribution: '+ '"' + c + '" , ');
      print ('People : [');
      docs.forEach(function(doc) {
         print ('{ first : "'+ doc.name.first + '", last  : "'+ doc.name.last + '" } ' );
      });
      print ('] }');
   })
});
```

Outputs:

```
{ Contribution: "C++" ,
People : [
{ first : "Alex", last  : "Chen" }
{ first : "David", last  : "Mark" }
] }
{ Contribution: "Simula" ,
People : [
{ first : "Kristen", last  : "Nygaard" }
{ first : "Ole-Johan", last  : "Dahl" }
{ first : "Alex", last  : "Chen" }
] }
```

Another Solution *(We are not sure if the requirements want's output as* ***string*** *or want's it as* ***regular mongodb outputs*** *: This query will return the same result but JSON format that can be parsed.*

```
var result = {};
result.contribs = []
db.test_copy.find({'name.first': 'Alex' , 'name.last': 'Chen'}, {contribs:1}).forEach(function(x){
   x.contribs.forEach(function(c) {
      var contrib = {'contribution' : c};
      contrib.people = new Array();
      docs = db.test.find({'contribs': c});
      docs.forEach(function(doc) {
         contrib.people.push(doc.name);
      });
      result.contribs.push(contrib);
   })
```

```
});
print(result);
```

10)

```
db.test.find(  { 'name.first': { $regex : '^Jo.*'} }).sort( { 'name.last': 1 } );
```

11)

```
db.test.distinct( "awards.by" );
```

12)

```
db.test.update({}, {$unset: {death:""}} , {multi: true});
```

13)

```
db.test.update(
        { },
        { $pull: { awards: { year: 2011} } },
        { multi: true }
)
```

But because in some objects, “year” is considered of type Int like the case on object
"_id" : ObjectId("51e062189c6ae665454e301d")

But of type string like the case on object
"_id" :8
We need to cover both using OR.

Final solution:

```
db.test.update(
        { },
        { $pull: { awards: {$or: [ {year:2011}, {year:"2011"}]  } }},
        { multi: true }
)
```

14)

```
db.test.update({_id:30 , 'awards.by':'WPI'},{$set:{'awards.$.year': '1965'} })
```

15)

```
doc = db.test.findOne({_id:3}, {contribs:1});
db.test.update(
       { _id:30},
       { "$pushAll": { "contribs": doc.contribs } }
 )
```

16)

```
db.test.aggregate( [
   {$match:  { 'awards.year' : 2001 }} ,
   {$unwind : '$awards'},
   { $group: { _id: {'_id': '$_id' , 'year' : '$awards.year'} , count: { $sum: 1 } , "firstName": { "$first":
"$name.first" }, "lastName": { "$first": "$name.last" }} },
    { $match: { count: { $gte: 2} } },
    {$project : {_id: 0, firstName: 1, lastName:1}}
] )
```

17)

```
var cursor=db.test.find({}).sort({_id:-1}).limit(1);
db.test.find( { _id :  cursor.toArray()[0]._id } );
```

18)

```
db.test.findOne({'awards.by':'ACM'});

19 )

db.test.remove(   {$or: [ {_id:20}, {_id:30}]  });

20 )

db.test.count()
```