Министерство науки и высшего образования Российской Федерации
Федеральное государственное автономное образовательное
учреждение высшего образования
«НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИТМО»
Факультет инфокоммуникационных технологий

**ОТЧЕТ
О ЛАБОРАТОРНОЙ РАБОТЕ № 8**
по теме:
«Работа с БД в СУБД MongoDB»

по дисциплине: Проектирование и реализация баз данных
Специальность:
45.03.04 Интеллектуальные системы в гуманитарной сфере

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Оценка _____

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Цель работы: овладеть практическими навыками работы с CRUD-операциями, с вложенными объектами в коллекции базы данных MongoDB, агрегации и изменения данных, со ссылками и индексами в базе данных MongoDB.

Практические задания

8.1.1

```
C:\mongodb\bin\mongo.exe
> db.unicorns.insert({name: 'Unicrom', loves: ['energon', 'redbull'], weight: 984, gender: 'm', vampires: 182});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name: 'Rooooooodles', loves: ['apple'], weight: 575, gender: 'm', vampires: 99});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name: 'Solnara', loves:['apple', 'carrot', 'chocolate], weight:550, gender:&#39;f&#39;, vampires:80});
uncaught exception: SyntaxError: '' literal not terminated before end of script :
@(shell):1:122
> db.unicorns.insert({name: 'Solnara', loves:['apple', 'carrot', 'chocolate], weight:550, gender:'f', vampires:80});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name:'Ayna', loves: ['strawberry', lemon&#39;], weight: 733, gender: &#39;f&#39;, vampires: 40});
uncaught exception: SyntaxError: illegal character :
@(shell):1:61
> db.unicorns.insert({name:'Ayna', loves: ['strawberry', 'lemon'], weight: 733, gender: 'f', vampires: 40});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name:'Kenny', loves: ['grape', 'lemon'], weight: 690, gender: 'm', vampires: 39});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name: 'Raleigh', loves: ['apple', 'sugar'], weight: 421, gender: 'm', vampires: 2});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name: 'Leia', loves: ['apple', 'watermelon'], weight: 601, gender: 'f', vampires: 33});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name: 'Pilot', loves: ['apple', 'watermelon'], weight: 650, gender: 'm', vampires: 54});
WriteResult({ "nInserted" : 1 })
> db.unicorns.insert({name: 'Nimue', loves: ['grape', 'carrot'], weight: 540, gender: 'f'});
WriteResult({ "nInserted" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
```

```
> doc = {name: 'Dunx', loves: ['grape', 'watermelon'], weight: 704, gender: 'm', vampires: 165});
uncaught exception: SyntaxError: unexpected token: ')' :
@(shell):1:93
> doc = {name: 'Dunx', loves: ['grape', 'watermelon'], weight: 704, gender: 'm', vampires: 165}
{
        "name" : "Dunx",
        "loves" : [
                "grape",
                "watermelon"
        ],
        "weight" : 704,
        "gender" : "m",
        "vampires" : 165
}
> db.unicorns.insert(doc)
WriteResult({ "nInserted" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
```

8.1.2

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({gender: 'm'}).sort({name: 1})
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
> db.unicorns.find({gender: 'f'}).sort({name: 1}).limit(3)
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
> db.unicorns.find({gender: 'f', loves: 'carrot'}).limit(1)
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
> db.unicorns.findOne({gender: 'f', loves: 'carrot'})
{
        "_id" : ObjectId("60bcd21cb2ce5344e69d2090"),
        "name" : "Aurora",
        "loves" : [
                "carrot",
                "grape"
        ],
        "weight" : 450,
        "gender" : "f",
        "vampires" : 43
}
```

8.1.3

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({gender: 'm'}, {loves: 0, gender: 0}).sort({name: 1})
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "weight" : 704, "vampires" : 165 }
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "weight" : 600, "vampires" : 63 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "weight" : 690, "vampires" : 39 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "weight" : 650, "vampires" : 54 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "weight" : 421, "vampires" : 2 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "weight" : 575, "vampires" : 99 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "weight" : 984, "vampires" : 182 }
>
```

8.1.4

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({gender: 'm'}).sort({$natural: -1})
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
>
```

8.1.5

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({gender: 'm'}, {loves: {$slice: 1}, _id: 0})
{ "name" : "Horny", "loves" : [ "carrot" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "name" : "Unicrom", "loves" : [ "energon" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "name" : "Kenny", "loves" : [ "grape" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "name" : "Raleigh", "loves" : [ "apple" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "name" : "Pilot", "loves" : [ "apple" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "name" : "Dunx", "loves" : [ "grape" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
>
```

8.1.6

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({gender: 'f', weight: {$gte: 500, $lte: 700}}, {_id: 0})
{ "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
```

8.1.7

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({gender: 'm', weight: {$gte: 500}, loves: {$all: ['grape', 'lemon']}}, {_id: 0})
{ "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
```

8.1.8

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({vampires: {$exists: true}})
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
```

8.1.9

```
C:\mongodb\bin\mongo.exe
> db.unicorns.find({}, {loves: {$slice: 1}, name: 1, loves: 1, _id: 0}).sort({name: 1})
{ "name" : "Aurora", "loves" : [ "carrot", "grape" ] }
{ "name" : "Ayna", "loves" : [ "strawberry", "lemon" ] }
{ "name" : "Dunx", "loves" : [ "grape", "watermelon" ] }
{ "name" : "Horny", "loves" : [ "carrot", "papaya" ] }
{ "name" : "Kenny", "loves" : [ "grape", "lemon" ] }
{ "name" : "Leia", "loves" : [ "apple", "watermelon" ] }
{ "name" : "Nimue", "loves" : [ "grape", "carrot" ] }
{ "name" : "Pilot", "loves" : [ "apple", "watermelon" ] }
{ "name" : "Raleigh", "loves" : [ "apple", "sugar" ] }
{ "name" : "Rooooodles", "loves" : [ "apple" ] }
{ "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ] }
{ "name" : "Unicrom", "loves" : [ "energon", "redbull" ] }
```

8.2.1

```
C:\mongodb\bin\mongo.exe                                                          —    ⬜   ✕
> use towns
switched to db towns
> db.towns.insert({name: 'Punxsutawney', population: 6200, last_census: ISODate("2008-01-31"), famous_for: [''], mayor: {name: "Jim Wehrle"}}))
uncaught exception: SyntaxError: missing } after property list :
@(shell):1:138
> db.towns.insert({name: 'Punxsutawney', population: 6200, last_census: ISODate("2008-01-31"), famous_for: [''], mayor: {name: "Jim Wehrle"}})
WriteResult({ "nInserted" : 1 })
> db.towns.insert({name: 'New York', population: 22200000, last_census: ISODate("2009-07-31"), famous_for: ['statue of liberty', 'food'], mayor: {name: "Michael Bloom
berg", party: 'I'}})
WriteResult({ "nInserted" : 1 })
> db.towns.insert({name: 'Portland', population: 528000, last_census: ISODate("2009-07-20"), famous_for: ['beer', 'food'], mayor: {name: 'Sam Adams', party: 'D'}})
WriteResult({ "nInserted" : 1 })
```

```
> db.towns.find({"mayor.party": 'I'}, {_id: 0, name: 1, mayor: 1})
{ "name" : "New York", "mayor" : { "name" : "Michael Bloomberg", "party" : "I" } }
> db.towns.find({"mayor.party": {$exists: false}}, {_id: 0, name: 1, mayor: 1})
{ "name" : "Punxsutawney", "mayor" : { "name" : "Jim Wehrle" } }
```

8.2.2

```
C:\mongodb\bin\mongo.exe                                                          —    ⬜   ✕
> fn = function() {return this.gender == 'm'}
function() {return this.gender == 'm'}
> var cursor = db.unicorns.find(fn); null;
null
> cursor.limit(2).sort({name: 1}); null
null
> cursor.forEach(function(obj) { print(obj.name); })
Dunx
Horny
```

8.2.3

```
C:\mongodb\bin\mongo.exe                                                          —    ⬜   ✕
> db.unicorns.find({gender: 'f', weight: {$gte: 500, $lte: 600}}).count()
2
```

8.2.4

```
C:\mongodb\bin\mongo.exe                                                          —    ⬜   ✕
> db.unicorns.distinct('loves')
[
        "apple",
        "carrot",
        "chocolate",
        "energon",
        "grape",
        "lemon",
        "papaya",
        "redbull",
        "strawberry",
        "sugar",
        "watermelon"
]
```

8.2.5

```
C:\mongodb\bin\mongo.exe                                                          —    ⬜   ✕
> db.unicorns.aggregate([{"$group" : {_id:"$gender", count:{$sum:1}}} ])
{ "_id" : "f", "count" : 5 }
{ "_id" : "m", "count" : 7 }
```

8.2.6

```
> db.unicorns.save({name: 'Barny', loves: ['grape'], weight: 340, gender: 'm'})
WriteResult({ "nInserted" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("60bcecacb2ce5344e69d209e"), "name" : "Barny", "loves" : [ "grape" ], "weight" : 340, "gender" : "m" }
```

8.2.7

```
C:\mongodb\bin\mongo.exe
> db.unicorns.update({name: 'Ayna'}, {name: 'Ayna', loves: ['strawberry', 'lemon'], weight: 800, gender: 'f', vampires: 51})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 51 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("60bcecacb2ce5344e69d209e"), "name" : "Barny", "loves" : [ "grape" ], "weight" : 340, "gender" : "m" }
```

8.2.8

```
C:\mongodb\bin\mongo.exe
> db.unicorns.update({name: 'Raleigh'}, {$set: {loves: ['Redbull']}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 51 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "Redbull" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("60bcecacb2ce5344e69d209e"), "name" : "Barny", "loves" : [ "grape" ], "weight" : 340, "gender" : "m" }
```

8.2.9

```
C:\mongodb\bin\mongo.exe
> db.unicorns.update({}, {$inc: {vampires: 5}}, {multi: true})
WriteResult({ "nMatched" : 13, "nUpserted" : 0, "nModified" : 13 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 68 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 48 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 187 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 104 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 85 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 56 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 44 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "Redbull" ], "weight" : 421, "gender" : "m", "vampires" : 7 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 38 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 59 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f", "vampires" : 5 }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 170 }
{ "_id" : ObjectId("60bcecacb2ce5344e69d209e"), "name" : "Barny", "loves" : [ "grape" ], "weight" : 340, "gender" : "m", "vampires" : 5 }
```

8.2.10

```
C:\mongodb\bin\mongo.exe
> use towns
switched to db towns
> db.towns.update({name: 'Portland'}, {$set: {"mayor.party": 'I'}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.towns.find()
{ "_id" : ObjectId("60bce086b2ce5344e69d209b"), "name" : "Punxsutawney", "population" : 6200, "last_census" : ISODate("2008-01-31T00:00:00Z"), "famous_for" : [ "" ],
"mayor" : { "name" : "Jim Wehrle" } }
{ "_id" : ObjectId("60bce0f4b2ce5344e69d209c"), "name" : "New York", "population" : 22200000, "last_census" : ISODate("2009-07-31T00:00:00Z"), "famous_for" : [ "statu
e of liberty", "food" ], "mayor" : { "name" : "Michael Bloomberg", "party" : "I" } }
{ "_id" : ObjectId("60bce249b2ce5344e69d209d"), "name" : "Portland", "population" : 528000, "last_census" : ISODate("2009-07-20T00:00:00Z"), "famous_for" : [ "beer",
"food" ], "mayor" : { "name" : "Sam Adams", "party" : "I" } }
```

8.2.11

```
C:\mongodb\bin\mongo.exe
> db.unicorns.update({name: 'Pilot'}, {$push: {loves: 'chocolate'}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 68 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 48 }
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 187 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 104 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 85 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 56 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 44 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "Redbull" ], "weight" : 421, "gender" : "m", "vampires" : 7 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 38 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon", "chocolate" ], "weight" : 650, "gender" : "m", "vampires" : 59 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f", "vampires" : 5 }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 170 }
{ "_id" : ObjectId("60bcecacb2ce5344e69d209e"), "name" : "Barny", "loves" : [ "grape" ], "weight" : 340, "gender" : "m", "vampires" : 5 }
```

8.2.12

```
C:\mongodb\bin\mongo.exe                                                          —     □     ×
> db.unicorns.update({name: 'Aurora'}, {$addToSet: {loves: {$each: ['sugar', 'lemon']}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208f"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 68 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape", "sugar", "lemon" ], "weight" : 450, "gender" : "f", "vampires" : 48
}
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 187 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 104 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 85 }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 56 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 44 }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "Redbull" ], "weight" : 421, "gender" : "m", "vampires" : 7 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 38 }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon", "chocolate" ], "weight" : 650, "gender" : "m", "vampires" : 59 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f", "vampires" : 5 }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 170 }
{ "_id" : ObjectId("60bcecacb2ce5344e69d209e"), "name" : "Barny", "loves" : [ "grape" ], "weight" : 340, "gender" : "m", "vampires" : 5 }
```

8.2.13

```
C:\mongodb\bin\mongo.exe                                                          —     □     ×
> db.towns.remove({"mayor.party": "I"}, true)
WriteResult({ "nRemoved" : 1 })
> db.towns.find()
{ "_id" : ObjectId("60bce086b2ce5344e69d209b"), "name" : "Punxsutawney", "population" : 6200, "last_census" : ISODate("2008-01-31T00:00:00Z"), "famous_for" : [ "" ],
"mayor" : { "name" : "Jim Wehrle" } }
{ "_id" : ObjectId("60bce249b2ce5344e69d209d"), "name" : "Portland", "population" : 528000, "last_census" : ISODate("2009-07-20T00:00:00Z"), "famous_for" : [ "beer",
"food" ], "mayor" : { "name" : "Sam Adams", "party" : "D" } }
> db.towns.remove()
uncaught exception: Error: remove needs a query :
DBCollection.prototype._parseRemove@src/mongo/shell/collection.js:362:15
DBCollection.prototype.remove@src/mongo/shell/collection.js:389:18
@(shell):1:1
> db.towns.remove({})
WriteResult({ "nRemoved" : 2 })
> db.towns.find()
> show collections
towns
```

8.3.1

```
C:\mongodb\bin\mongo.exe                                                          —     □     ×
> db.createCollection('habitats')
{ "ok" : 1 }
> show collections
habitats
unicorns
> db.habitats.insert({_id: 'cld', name: 'cloud', description: 'pink fluffy candy cloud'})
WriteResult({ "nInserted" : 1 })
> db.habitats.insert({_id: 'flwr', name: 'sunflower', description: 'a yellow flower whose head follows the sun'})
WriteResult({ "nInserted" : 1 })
> db.habitats.insert({_id: 'rvr', full_name: 'moon river', description: 'a river that shines just like silver when the moonlight hits it'})
WriteResult({ "nInserted" : 1 })
> db.habitats.find()
{ "_id" : "cld", "name" : "cloud", "description" : "pink fluffy candy cloud" }
{ "_id" : "flwr", "name" : "sunflower", "description" : "a yellow flower whose head follows the sun" }
{ "_id" : "rvr", "full_name" : "moon river", "description" : "a river that shines just like silver when the moonlight hits it" }
```

```
C:\mongodb\bin\mongo.exe                                                          —     □     ×
> db.unicorns.update({name: 'Solnara'}, {$set: {habitat {$ref: 'habitats', $id: 'cld'}}})
uncaught exception: SyntaxError: missing : after property id :
@(shell):1:54
> db.unicorns.update({name: 'Solnara'}, {$set: {habitat: {$ref: 'habitats', $id: 'cld'}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.update({name: 'Kenny'}, {$set: {habitat: {$ref: 'habitats', $id: 'rvr'}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.update({name: 'Leia'}, {$set: {habitat: {$ref: 'habitats', $id: 'flwr'}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("60bcd1e4b2ce5344e69d208F"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 68 }
{ "_id" : ObjectId("60bcd21cb2ce5344e69d2090"), "name" : "Aurora", "loves" : [ "carrot", "grape", "sugar", "lemon" ], "weight" : 450, "gender" : "f", "vampires" : 48
}
{ "_id" : ObjectId("60bcd2adb2ce5344e69d2091"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 187 }
{ "_id" : ObjectId("60bcd2cbb2ce5344e69d2092"), "name" : "Rooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 104 }
{ "_id" : ObjectId("60bcd302b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 85, "ha
bitat" : DBRef("habitats", "cld") }
{ "_id" : ObjectId("60bcd33cb2ce5344e69d2094"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 56 }
{ "_id" : ObjectId("60bcd360b2ce5344e69d2095"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 44, "habitat" : DBRef("
habitats", "rvr") }
{ "_id" : ObjectId("60bcd397b2ce5344e69d2096"), "name" : "Raleigh", "loves" : [ "Redbull" ], "weight" : 421, "gender" : "m", "vampires" : 7 }
{ "_id" : ObjectId("60bcd3beb2ce5344e69d2097"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 38, "habitat" : DBR
ef("habitats", "flwr") }
{ "_id" : ObjectId("60bcd3e4b2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon", "chocolate" ], "weight" : 650, "gender" : "m", "vampires" : 59 }
{ "_id" : ObjectId("60bcd448b2ce5344e69d2099"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f", "vampires" : 5 }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 170 }
{ "_id" : ObjectId("60bcecacb2ce5344e69d209e"), "name" : "Barny", "loves" : [ "grape" ], "weight" : 340, "gender" : "m", "vampires" : 5 }
```

8.3.2, 8.3.3


```
C:\mongodb\bin\mongo.exe                                                    –   □   ×
> db.unicorns.ensureIndex({name: 1}, {unique: true})
{
        "createdCollectionAutomatically" : false,
        "numIndexesBefore" : 1,
        "numIndexesAfter" : 2,
        "ok" : 1
}
> db.system.indexes.find()
> db.unicorns.getIndexes()
[
        {
                "v" : 2,
                "key" : {
                        "_id" : 1
                },
                "name" : "_id_"
        },
        {
                "v" : 2,
                "unique" : true,
                "key" : {
                        "name" : 1
                },
                "name" : "name_1"
        }
]
> db.unicorns.dropIndex('name_1')
{ "nIndexesWas" : 2, "ok" : 1 }
> db.unicorns.dropIndex('_id_')
{
        "ok" : 0,
        "errmsg" : "cannot drop _id index",
        "code" : 72,
        "codeName" : "InvalidOptions"
}
```

8.3.4


```
C:\mongodb\bin\mongo.exe                                                    –   □   ×
> use numbers
switched to db numbers
> for (i = 0; i < 100000; i++) {db.numbers.insert({value: i})}
WriteResult({ "nInserted" : 1 })
> db.numbers.find().limit(10)
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a2"), "value" : 0 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a3"), "value" : 1 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a4"), "value" : 2 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a5"), "value" : 3 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a6"), "value" : 4 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a7"), "value" : 5 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a8"), "value" : 6 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20a9"), "value" : 7 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20aa"), "value" : 8 }
{ "_id" : ObjectId("60bd0437b2ce5344e69d20ab"), "value" : 9 }
```



```
C:\mongodb\bin\mongo.exe                                                    –   □   ×
> db.numbers.explain('executionStats').find().sort({$natural: -1}).limit(4)
{
        "queryPlanner" : {
                "plannerVersion" : 1,
                "namespace" : "numbers.numbers",
                "indexFilterSet" : false,
                "parsedQuery" : {

                },
                "winningPlan" : {
                        "stage" : "LIMIT",
                        "limitAmount" : 4,
                        "inputStage" : {
                                "stage" : "COLLSCAN",
                                "direction" : "backward"
                        }
                },
                "rejectedPlans" : [ ]
        },
        "executionStats" : {
                "executionSuccess" : true,
                "nReturned" : 4,
                "executionTimeMillis" : 0,
                "totalKeysExamined" : 0,
                "totalDocsExamined" : 4,
                "executionStages" : {
                        "stage" : "LIMIT",
                        "nReturned" : 4,
                        "executionTimeMillisEstimate" : 0,
                        "works" : 6,
                        "advanced" : 4,
                        "needTime" : 1,
                        "needYield" : 0,
                        "saveState" : 0,
                        "restoreState" : 0,
                        "isEOF" : 1,
                        "limitAmount" : 4,
                        "inputStage" : {
                                "stage" : "COLLSCAN",
                                "nReturned" : 4,
                                "executionTimeMillisEstimate" : 0,
```

```
C:\mongodb\bin\mongo.exe                                                                          —    □    ×
> db.numbers.ensureIndex({value: 1})
{
        "createdCollectionAutomatically" : false,
        "numIndexesBefore" : 1,
        "numIndexesAfter" : 2,
        "ok" : 1
}
> db.numbers.getIndexes()
[
        {
                "v" : 2,
                "key" : {
                        "_id" : 1
                },
                "name" : "_id_"
        },
        {
                "v" : 2,
                "key" : {
                        "value" : 1
                },
                "name" : "value_1"
        }
]
```

```
C:\mongodb\bin\mongo.exe                                                                          —    □    ×
> db.numbers.explain('executionStats').find().sort({$natural: -1}).limit(4)
{
        "queryPlanner" : {
                "plannerVersion" : 1,
                "namespace" : "numbers.numbers",
                "indexFilterSet" : false,
                "parsedQuery" : {

                },
                "winningPlan" : {
                        "stage" : "LIMIT",
                        "limitAmount" : 4,
                        "inputStage" : {
                                "stage" : "COLLSCAN",
                                "direction" : "backward"
                        }
                },
                "rejectedPlans" : [ ]
        },
        "executionStats" : {
                "executionSuccess" : true,
                "nReturned" : 4,
                "executionTimeMillis" : 0,
                "totalKeysExamined" : 0,
                "totalDocsExamined" : 4,
                "executionStages" : {
                        "stage" : "LIMIT",
                        "nReturned" : 4,
                        "executionTimeMillisEstimate" : 0,
                        "works" : 6,
                        "advanced" : 4,
                        "needTime" : 1,
                        "needYield" : 0,
                        "saveState" : 0,
                        "restoreState" : 0,
                        "isEOF" : 1,
                        "limitAmount" : 4,
                        "inputStage" : {
                                "stage" : "COLLSCAN",
                                "nReturned" : 4,
                                "executionTimeMillisEstimate" : 0,
```

Выводы

С помощью СУБД MongoDB можно делать различные запросы на добавление, изменение, удаление и просмотр данных. Значения параметров передаются в виде объектов JSON.