

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:
09.03.03 Мобильные и сетевые технологии

Проверила:	Выполнил:
Говорова М.М. _____	студент группы <u>K3241</u>
Дата: «__» _____ 20__ г.	<u>Иконенко Д. А.</u>
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: 'Rooodooles', 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" : "Rooodooles", "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" : "Rooodooles", "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" : "Rooodooles", "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": "Rooodoodles", "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": "Rooodoodles", "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": "Rooodoodles", "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": "Rooodoodles", "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("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": "Rooodoodles", "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 Bloomberg", 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" : "Roocoooodles", "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" : "Leila", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("60bcd3eab2ce5344e69d2098"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("60bcd41ab2ce5344e69d2099"), "name" : "Hlume", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("60bce0ac2ce5344e69d209e"), "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" : "Rooodoooodles", "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", "vampires" : 5 }
{"_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 170 }
{"_id" : ObjectId("60bcecab2ce5344e69d209e"), "name" : "Barney", "loves" : [ "grape" ], "weight" : 340, "gender" : "m", "vampires" : 5 }
```

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" : "Rooodoooodles", "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", "vampires" : 5 }
{"_id" : ObjectId("60bcd4fbb2ce5344e69d209a"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 170 }
{"_id" : ObjectId("60bcecab2ce5344e69d209e"), "name" : "Barney", "loves" : [ "grape" ], "weight" : 340, "gender" : "m", "vampires" : 5 }
```

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" : "Rooodoooodles", "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("60bcecab2ce5344e69d209e"), "name" : "Barney", "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" : [ "statue 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" : "Rooodoooodles", "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("60bcecab2ce5344e69d209e"), "name" : "Barney", "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" : "Rooodoodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 104 }
{ "_id" : ObjectId("60bcd30b2ce5344e69d2093"), "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("60bceacab2ce5344e69d209e"), "name" : "Barney", "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" : "Rooodoodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 104 }
{ "_id" : ObjectId("60bcd30b2ce5344e69d2093"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 85, "habitat" : 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" : DBRef("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("60bceacab2ce5344e69d209e"), "name" : "Barney", "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.