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ЛАБОРАТОРНАЯ РАБОТА №4

РАЗРАБОТКА ИНТЕРФЕЙСОВ ДЛЯ ВЫПОЛНЕНИЯ CRUD-ОПЕРАЦИЙ НАД БАЗОЙ ДАННЫХ СРЕДСТВАМИ PHP

по дисциплине:

«Проектирование и реализация баз данных»

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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.

Задание 8.1.1

Были созданы бд learn и коллекция unicorns добавлены данные в коллекцию unicorns, а также вывел их при помощи find().

```
> use learn
switched to db learn
> db.createCollection("unicorns")
{ "ok" : 1 }

> 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: 'f', vampires: 80));
WriteResult({ "nInserted" : 1 })
> 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 })
> 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("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Rooodooles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e0"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e4"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862a05088b5516cfc543e6"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("62862b0088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
```

Задание 8.1.2

Вывод всех мужских особей

```
> db.unicorns.find({gender: "m"})
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Rooodooles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862b0088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
```

Вывод женских особей, отсортированных по алфавиту и всего первых 3

```
> db.unicorns.find({gender: "f"}).sort((name: 1)).limit(3)
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("62862a05088b5516cfc543e4"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
```

Вывод первой женской особи, которая любит морковь (2 способами)

```
> db.unicorns.findOne({gender: "f", loves: "carrot"})
{
  "_id" : ObjectId("62862a05088b5516cfc543dd"),
  "name" : "Aurora",
  "loves" : [
    "carrot",
    "grape"
  ],
  "weight" : 450,
  "gender" : "f",
  "vampires" : 43
}
> db.unicorns.find({gender: "f", loves: "carrot"}).limit(1)
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
```

Задание 8.1.3

Модифицированный запрос для выборки самцов, где отсутствует колонка с полом, а также предпочтения.

```
> db.unicorns.find({gender: "m"}, {"loves": 0, "gender": 0})
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "weight" : 600, "vampires" : 63 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "weight" : 984, "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Rooodooles", "weight" : 575, "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "weight" : 690, "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "weight" : 421, "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "weight" : 650, "vampires" : 54 }
{ "_id" : ObjectId("62862b00088b5516cfc543e7"), "name" : "Dunx", "weight" : 704, "vampires" : 165 }
```

Задание 8.1.4

Выведен список данных по порядку их добавления.

```
> db.unicorns.find().sort({$natural: -1})
{ "_id" : ObjectId("62862b00088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("62862a05088b5516cfc543e6"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862a05088b5516cfc543e4"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("62862a05088b5516cfc543e0"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Rooodooles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energon", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot", "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
```

Задание 8.1.5

Вывести данные без id, а также вывести только первое предпочтение

```
> db.unicorns.find({}, {_id: 0, loves: {$slice : 1}})
{ "name" : "Horny", "loves" : [ "carrot" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "name" : "Aurora", "loves" : [ "carrot" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "name" : "Unicrom", "loves" : [ "energon" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "name" : "Rooodooles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "name" : "Solnara", "loves" : [ "apple" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "name" : "Ayna", "loves" : [ "strawberry" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "name" : "Kenny", "loves" : [ "grape" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "name" : "Raleigh", "loves" : [ "apple" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "name" : "Leia", "loves" : [ "apple" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "name" : "Pilot", "loves" : [ "apple" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "name" : "Nimue", "loves" : [ "grape" ], "weight" : 540, "gender" : "f" }
{ "name" : "Dunx", "loves" : [ "grape" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
```

Задание 8.1.6

Вывести все значения где вес больше 500 и меньше 700, а также скрыть id.

```
> 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" }
```

Задание 8.1.7

Выведен список самцов: которые предпочитают grape, lemon и весом больше 500, а также скрыт id.

```
> 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 }
```

Задание 8.1.8

Выбрать все данные, где есть ключ vampires.

```
> db.unicorns.find({vampires: {$exists: true}})
```

В результате запроса было выявлено, что таких данных нет.

Задание 8.1.9

Выведен список самцов по порядку, с информацией о их первом предпочтении.

```
> db.unicorns.find({}, {loves: {$slice: 1}}).sort({name: 1})
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawberry" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("62862b00088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e4"), "name" : "Leia", "loves" : [ "apple" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("62862a05088b5516cfc543e6"), "name" : "Nimue", "loves" : [ "grape" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : [ "apple" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Rooooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e0"), "name" : "Solnara", "loves" : [ "apple" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energy" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
```

Задание 8.2.1.

Создана коллекция towns и заполнена данными.

Выполнен запрос к мэрам, у которых party = "I", также выведен в этом запросе только город и данные по мэру.

```
> db.towns.find({"mayor.party" : "I"}, {_id: 0, populatiuon : 0, last_sensus: 0, famous_for : 0})
{ "name" : "New York", "mayor" : { "name" : "Michael Bloomberg", "party" : "I" } }
```

Выполнена запрос для мэра, у которого нет партий, также выведен в этом запросе только город и данные по мэру.

```
> db.towns.find({"mayor.party" : null}, {_id: 0, populatiuon : 0, last_sensus: 0, famous_for : 0})
{ "name" : "Punxsutawney ", "mayor" : { "name" : "Jim Wehrle" } }
```

Задание 8.2.2.

Функция для вывода списка самцов

```
> fn = function() {return this.gender == "m"}
function() {return this.gender == "m"}
> db.unicorns.find(fn)
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energion", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Roooooodles", "loves" : [ "apple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : [ "apple", "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple", "watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862b00088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
```

Курсор для списка первых двух особей, в алфавитном порядке

```
> var cursor = db.unicorns.find();null;
null
> cursor.limit(2);null
null
> cursor.sort(name: 1);null
uncaught exception: SyntaxError: missing ) after argument list :
@(shell):1:16
> cursor.sort({name: 1});null
null
```

Вывод результата при помощи forEach

```
> cursor.forEach(function(obj) { print(obj.name); })  
Aurora  
Ayna
```

Задание 8.2.3.

Вывести количество самок весом от 500 до 600.

```
> db.unicorns.find({gender: "f", weight: {$gte: 500, $lte: 600}}).count()  
2
```

Задание 8.2.4

Вывести список предпочтений

```
> db.unicorns.distinct("loves")  
[  
  "apple",  
  "carrot",  
  "chocolate",  
  "energon",  
  "grape",  
  "lemon",  
  "papaya",  
  "redbull",  
  "strawberry",  
  "sugar",  
  "watermelon"  
]
```

Задание 8.2.5

Посчитать кол-во особей обоих полов.

```
> db.unicorns.aggregate({"$group":{_id:"$gender", count:{$sum:1}}})  
{ "_id" : "m", "count" : 7 }  
{ "_id" : "f", "count" : 5 }
```


Задание 8.2.6

Выполнена команда из задания.

```
> db.unicorns.aggregate({"$group":{"_id":"$gender", count:{$sum:1}}})
{ "_id" : "m", "count" : 7 }
{ "_id" : "f", "count" : 5 }
> db.unicorns.save({name: 'Barney', loves: ['grape'],
... weight: 340, gender: 'm'})
WriteResult({ "nInserted" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot",
"papaya" ], "weight" : 600, "gender" : "m", "vampires" : 63 }
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot"
, "grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energo
n", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Rooooooodles", "loves" : [ "ap
ple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e0"), "name" : "Solnara", "loves" : [ "apple"
, "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawberr
y", "lemon" ], "weight" : 733, "gender" : "f", "vampires" : 40 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape",
"lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : [ "apple"
, "sugar" ], "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e4"), "name" : "Leia", "loves" : [ "apple", "
watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple",
"watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862a05088b5516cfc543e6"), "name" : "Nimue", "loves" : [ "grape",
"carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("62862b00088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape", "
watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("6287a9fef7244a88a53d2b99"), "name" : "Barney", "loves" : [ "grape" ]
, "weight" : 340, "gender" : "m" }
```

Задание 8.2.7

Для самки единорога Ауна внести изменения в БД: теперь ее вес 800, она убила 51 вампира.

```
> db.unicorns.update({name: "Ayna"}, {name: "Ayna", weight: 800, vampires: 51})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawber
y", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 51 }
```

Задание 8.2.8

Для самца единорога Raleigh внести изменения в БД: теперь он любит рэдбул.

```
> db.unicorns.update({name: "Raleigh"}, {$set : {loves: "RedBull"}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : "RedBull"
, "weight" : 421, "gender" : "m", "vampires" : 2 }
```

Задание 8.2.9

Всем самцам единорогов увеличить количество убитых вапмиров на 5.

```
> db.unicorns.update({gender: "m"}, {$inc: {vampires: 5}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.unicorns.find()
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot",
"papaya" ], "weight" : 600, "gender" : "m", "vampires" : 68 }
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot",
"grape" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energo
n", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Roooooodles", "loves" : [ "ap
ple" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e0"), "name" : "Solnara", "loves" : [ "apple",
"carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawberr
y", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 51 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape",
"lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : "RedBull",
"weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e4"), "name" : "Leia", "loves" : [ "apple", "
watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple",
"watermelon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862a05088b5516cfc543e6"), "name" : "Nimue", "loves" : [ "grape",
"carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("62862b00088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape", "
watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("6287a9fef7244a88a53d2b99"), "name" : "Barney", "loves" : [ "grape" ],
"weight" : 340, "gender" : "m" }
>
```

Задание 8.2.10

Изменить информацию о городе Портланд: мэр этого города теперь беспартийный.

```
> db.towns.update({name: "Portland"}, {$unset: {mayor: 1}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.towns.find()
{ "_id" : ObjectId("62874dfcf7244a88a53d2b96"), "name" : "Punxsutawney ", "populatiuon"
: 6200, "last_sensus" : ISODate("2008-01-31T00:00:00Z"), "famous_for" : [ "" ], "mayor
" : { "name" : "Jim Wehrle" } }
{ "_id" : ObjectId("62874e02f7244a88a53d2b97"), "name" : "New York", "populatiuon" : 22
200000, "last_sensus" : ISODate("2009-07-31T00:00:00Z"), "famous_for" : [ "status of li
berty", "food" ], "mayor" : { "name" : "Michael Bloomberg", "party" : "I" } }
{ "_id" : ObjectId("62874e08f7244a88a53d2b98"), "name" : "Portland", "populatiuon" : 52
8000, "last_sensus" : ISODate("2009-07-20T00:00:00Z"), "famous_for" : [ "beer", "food" ]
}
```


Задание 8.2.11

Изменить информацию о самце единорога Pilot: теперь он любит и шоколад.

```
> db.unicorns.update({name : "Pilot"}, {$push: {loves: "chocolate"}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })

{ "_id" : ObjectId("62862a05088b5516cfc543e0"), "name" : "Solnara", "loves" : [ "apple",
"carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
```

Задание 8.2.12

Изменить информацию о самке единорога Aurora: теперь она любит еще и сахар, и лимоны.

```
> db.unicorns.update({name : "Aurora"}, {$addToSet: {loves: {$each: ["sugar", "lemon"]}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })

{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot",
"grape", "sugar", "lemon" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
```

Задание 8.2.13

Удалите документы с беспартийными мэрами.

```
> db.towns.remove({"mayor.party": null}, true)
WriteResult({ "nRemoved" : 1 })
> db.towns.find()
{ "_id" : ObjectId("6287baa1f7244a88a53d2b9b"), "name" : "New York", "popujatiuon" : 22
200000, "last_sensus" : ISODate("2009-07-31T00:00:00Z"), "famous_for" : [ "status of li
berty", "food" ], "mayor" : { "name" : "Michael Bloomberg", "party" : "I" } }
{ "_id" : ObjectId("6287baa3f7244a88a53d2b9c"), "name" : "Portland", "popujatiuon" : 52
8000, "last_sensus" : ISODate("2009-07-20T00:00:00Z"), "famous_for" : [ "beer", "food"
], "mayor" : { "name" : "Sam Adams", "party" : "D" } }
```

```
> db.towns.remove({})
WriteResult({ "nRemoved" : 2 })
> db.stats()
{
  "db" : "learn",
  "collections" : 2,
  "views" : 0,
  "objects" : 13,
  "avgObjSize" : 127.3846153846153,
  "dataSize" : 1656,
  "storageSize" : 61440,
  "indexes" : 2,
  "indexSize" : 61440,
  "totalSize" : 122880,
  "scaleFactor" : 1,
  "fsUsedSize" : 64767516672,
  "fsTotalSize" : 74747736064,
  "ok" : 1
}
> show collections
towns
unicorns
```

Задание 8.3.1

Создать коллекцию для описания места обитания

```
> db.home.insert({_id: "wa", name: "water"})
WriteResult({ "nInserted" : 1 })
> db.home.insert({_id: "ea", name: "earth"})
WriteResult({ "nInserted" : 1 })
> db.home.find()
{ "_id" : "wa", "name" : "water" }
{ "_id" : "ea", "name" : "earth" }
```

Включить ссылку на зону обитания

```
> db.unicorns.update({_id: ObjectId("62862a04088b5516cfc543dc")}, {$set:{home:{$ref:"home", id: "wa"}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 0 })
> var horny = db.unicorns.findOne({"_id":ObjectId("62862a04088b5516cfc543dc")})
> horny
{
  "_id" : ObjectId("62862a04088b5516cfc543dc"),
  "name" : "Horny",
  "loves" : [
    "carrot",
    "papaya"
  ],
  "weight" : 600,
  "gender" : "m",
  "vampires" : 68,
  "home" : {
    "$ref" : "home",
    "id" : "wa"
  }
}
```

Вывод таблицы после редактирования

```
> db.unicorns.find()
{ "_id" : ObjectId("62862a04088b5516cfc543dc"), "name" : "Horny", "loves" : [ "carrot", "papaya" ], "weight" : 600, "gender" : "m", "vampires" : 68, "home" : { "$ref" : "home", "id" : "wa" } }
{ "_id" : ObjectId("62862a05088b5516cfc543dd"), "name" : "Aurora", "loves" : [ "carrot", "grape", "sugar", "lemon" ], "weight" : 450, "gender" : "f", "vampires" : 43 }
{ "_id" : ObjectId("62862a05088b5516cfc543de"), "name" : "Unicrom", "loves" : [ "energo", "redbull" ], "weight" : 984, "gender" : "m", "vampires" : 182 }
{ "_id" : ObjectId("62862a05088b5516cfc543df"), "name" : "Rooooooodles", "loves" : [ "apple", "watermelon" ], "weight" : 575, "gender" : "m", "vampires" : 99 }
{ "_id" : ObjectId("62862a05088b5516cfc543e0"), "name" : "Solnara", "loves" : [ "apple", "carrot", "chocolate" ], "weight" : 550, "gender" : "f", "vampires" : 80 }
{ "_id" : ObjectId("62862a05088b5516cfc543e1"), "name" : "Ayna", "loves" : [ "strawberry", "lemon" ], "weight" : 800, "gender" : "f", "vampires" : 51 }
{ "_id" : ObjectId("62862a05088b5516cfc543e2"), "name" : "Kenny", "loves" : [ "grape", "lemon" ], "weight" : 690, "gender" : "m", "vampires" : 39 }
{ "_id" : ObjectId("62862a05088b5516cfc543e3"), "name" : "Raleigh", "loves" : "RedBull", "weight" : 421, "gender" : "m", "vampires" : 2 }
{ "_id" : ObjectId("62862a05088b5516cfc543e4"), "name" : "Leia", "loves" : [ "apple", "watermelon" ], "weight" : 601, "gender" : "f", "vampires" : 33 }
{ "_id" : ObjectId("62862a05088b5516cfc543e5"), "name" : "Pilot", "loves" : [ "apple", "watermelon", "chocolate", "sugar", "lemon" ], "weight" : 650, "gender" : "m", "vampires" : 54 }
{ "_id" : ObjectId("62862a05088b5516cfc543e6"), "name" : "Nimue", "loves" : [ "grape", "carrot" ], "weight" : 540, "gender" : "f" }
{ "_id" : ObjectId("62862b0088b5516cfc543e7"), "name" : "Dunx", "loves" : [ "grape", "watermelon" ], "weight" : 704, "gender" : "m", "vampires" : 165 }
{ "_id" : ObjectId("6287a9fef7244a88a53d2b99"), "name" : "Barney", "loves" : [ "grape" ], "weight" : 340, "gender" : "m" }
```

Задание 8.3.2

Проверка создания ключа name с флагом unique.

```
> db.unicorns.ensureIndex({"name": 1}, {"unique": true});
uncaught exception: TypeError: db.unicorns.ensureIndex is not a function :
@(shell):1:1
```

Задание 8.3.3

Получить информацию о всех индексах

```
> db.unicorns.getIndexes()
[ { "v" : 2, "key" : { "_id" : 1 }, "name" : "_id_" } ]
```

Задание 8.3.4

Создайте объемную коллекцию numbers, задействовав курсор.

```
> var cursor = db.numbers.find(); null;
null
> for(i = 0; i < 100000; i++){db.numbers.insert({value: i})}
WriteResult({ "nInserted" : 1 })
>
>
> ;
> db.numbers.find();
{ "_id" : ObjectId("62882071f7244a88a53d2bab"), "value" : 0 }
{ "_id" : ObjectId("62882071f7244a88a53d2bac"), "value" : 1 }
{ "_id" : ObjectId("62882071f7244a88a53d2bad"), "value" : 2 }
{ "_id" : ObjectId("62882071f7244a88a53d2bae"), "value" : 3 }
{ "_id" : ObjectId("62882071f7244a88a53d2baf"), "value" : 4 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb0"), "value" : 5 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb1"), "value" : 6 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb2"), "value" : 7 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb3"), "value" : 8 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb4"), "value" : 9 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb5"), "value" : 10 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb6"), "value" : 11 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb7"), "value" : 12 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb8"), "value" : 13 }
{ "_id" : ObjectId("62882071f7244a88a53d2bb9"), "value" : 14 }
{ "_id" : ObjectId("62882071f7244a88a53d2bba"), "value" : 15 }
{ "_id" : ObjectId("62882071f7244a88a53d2bbb"), "value" : 16 }
{ "_id" : ObjectId("62882071f7244a88a53d2bbc"), "value" : 17 }
{ "_id" : ObjectId("62882071f7244a88a53d2bbd"), "value" : 18 }
{ "_id" : ObjectId("62882071f7244a88a53d2bbe"), "value" : 19 }
Type "it" for more
```

Выберите последних четыре документа.

```
> db.numbers.find().sort({value: -1}).limit(4);
{ "_id" : ObjectId("628820a5f7244a88a53eb24a"), "value" : 99999 }
{ "_id" : ObjectId("628820a5f7244a88a53eb249"), "value" : 99998 }
{ "_id" : ObjectId("628820a5f7244a88a53eb248"), "value" : 99997 }
{ "_id" : ObjectId("628820a5f7244a88a53eb247"), "value" : 99996 }
```

Узнать время запроса

```
"executionTimeMillis" : 78,
```

Создать индексы и получить их

```
> db.numbers.getIndexes()
[
  {
    "v" : 2,
    "key" : {
      "_id" : 1
    },
    "name" : "_id_"
  },
  {
    "v" : 2,
    "key" : {
      "value" : 1
    },
    "name" : "value_1"
  },
  {
    "v" : 2,
    "key" : {
      "value" : 99999
    },
    "name" : "value_99999"
  },
]
```

Время выполнения после добавления индексов

```
"executionTimeMillis" : 54,
```

Вывод:

В данной работе были изучены основные функции MongoDB.