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«НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ
УНИВЕРСИТЕТ ИТМО»
Факультет среднего профессионального образования

ОТЧЁТ
ПО ПРАКТИЧЕСКОЙ РАБОТЕ № 7
по теме: Знакомство с MongoDB
по дисциплине: Основы проектирования баз данных

Специальность 09.02.07 Информационные системы и программирование

Проверил:
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Оценка _____

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Цель практической работы №7: овладеть практическими навыками и умениями реализации баз данных в MongoDB.

ИНДИВИДУАЛЬНОЕ ЗАДАНИЕ

Создать программную систему, ориентированную на администрацию птицефабрики и позволяющую работать с информацией о работниках фабрики и об имеющихся на ней курах. О каждой курице должна храниться следующая информация: вес, возраст, порода, количество ежемесячно получаемых от курицы яиц, а также информация о местонахождении курицы. Сведения о породе включают в себя: название породы, среднее количество яиц в месяц (производительность) и средний вес, и содержание диеты. Птицефабрика имеет несколько цехов. В каждой клетке может находиться несколько куриц.

ВЫПОЛНЕНИЕ

```
> use lab7

> db.getCollectionNames()

[ "chicken", "diet", "farm", "breed", "worker" ]

> db.worker.find()

{ "_id" : ObjectId("5f7369563c4ca4a9cbcd8b96"), "id" : 1, "passport_data" : " Ivan E.S ",
  "farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "Z_P" : 31000 }

{ "_id" : ObjectId("5f73696e3c4ca4a9cbcd8b97"), "id" : 2, "passport_data" : " Oleg A.E ",
  "farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "Z_P" : 22000 }

{ "_id" : ObjectId("5f73698c3c4ca4a9cbcd8b98"), "id" : 3, "passport_data" : " Eva V.V ",
  "farm_name" : ObjectId("5f73657b3c4ca4a9cbcd8b8e"), "Z_P" : 27000 }

{ "_id" : ObjectId("5f7369a53c4ca4a9cbcd8b99"), "id" : 4, "passport_data" : "Alex V.V",
  "farm_name" : ObjectId("5f7365c03c4ca4a9cbcd8b8f"), "Z_P" : 34000 }

{ "_id" : ObjectId("5f7369c13c4ca4a9cbcd8b9a"), "id" : 5, "passport_data" : "Ramil N.K",
  "farm_name" : ObjectId("5f7365c03c4ca4a9cbcd8b8f"), "Z_P" : 41000 }

> db.farm.find()

{ "_id" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "farm_name" : "Krasnoyarskaya", "workers"
: 19, "chickens" : 125, "factorys" : 1 }

{ "_id" : ObjectId("5f73657b3c4ca4a9cbcd8b8e"), "farm_name" : "Minskaya", "workers" : 21,
  "chickens" : 137, "factorys" : 2 }

{ "_id" : ObjectId("5f7365c03c4ca4a9cbcd8b8f"), "farm_name" : "Lomonosovskaya", "workers"
: 15, "chickens" : 101, "factorys" : 3 }

{ "_id" : ObjectId("5f73666c3c4ca4a9cbcd8b90"), "factory_number" : 2, "farm_name" : Ob-
jectId("5f73655a3c4ca4a9cbcd8b8d"), "cells" : 24 }

{ "_id" : ObjectId("5f7367ae3c4ca4a9cbcd8b91"), "factory_number" : 8, "farm_name" : Ob-
jectId("5f73655a3c4ca4a9cbcd8b8d"), "cells" : 23 }

{ "_id" : ObjectId("5f7367b93c4ca4a9cbcd8b92"), "factory_number" : 5, "farm_name" : Ob-
jectId("5f73655a3c4ca4a9cbcd8b8d"), "cells" : 25 }

{ "_id" : ObjectId("5f7367e13c4ca4a9cbcd8b93"), "factory_number" : 3, "farm_name" : Ob-
jectId("5f73657b3c4ca4a9cbcd8b8e"), "cells" : 29 }

{ "_id" : ObjectId("5f73680c3c4ca4a9cbcd8b94"), "factory_number" : 5, "farm_name" : Ob-
jectId("5f7365c03c4ca4a9cbcd8b8f"), "cells" : 15 }

{ "_id" : ObjectId("5f7368203c4ca4a9cbcd8b95"), "factory_number" : 6, "farm_name" : Ob-
jectId("5f7365c03c4ca4a9cbcd8b8f"), "cells" : 19 }

> db.breed.find()
```

```
{ "_id" : ObjectId("5f73604a3c4ca4a9cbcd8b8a"), "nazvanie_porodi" : "leghorn", "diet" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "perfomance" : 40, "average_weight" : 4 }
```

```
{ "_id" : ObjectId("5f7360b53c4ca4a9cbcd8b8b"), "nazvanie_porodi" : "satsuma", "diet" : ObjectId("5f735c353c4ca4a9cbcd8b86"), "perfomance" : 37, "average_weight" : 5 }
```

```
{ "_id" : ObjectId("5f7360d03c4ca4a9cbcd8b8c"), "nazvanie_porodi" : "bedouin", "diet" : ObjectId("5f735c353c4ca4a9cbcd8b87"), "perfomance" : 32, "average_weight" : 3 }
```

```
> db.chicken.find()
```

```
{ "_id" : ObjectId("5f736bbb3c4ca4a9cbcd8b9b"), "id" : 1, "nazvanie_porodi" : ObjectId("5f73604a3c4ca4a9cbcd8b8a"), "nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "weight" : 2.1, "year" : 4 }
```

```
{ "_id" : ObjectId("5f736bcc3c4ca4a9cbcd8b9c"), "id" : 1, "nazvanie_porodi" : ObjectId("5f73604a3c4ca4a9cbcd8b8a"), "nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "weight" : 2.3, "year" : 2 }
```

```
{ "_id" : ObjectId("5f736bd43c4ca4a9cbcd8b9d"), "id" : 1, "nazvanie_porodi" : ObjectId("5f73604a3c4ca4a9cbcd8b8a"), "nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "weight" : 1.4, "year" : 8 }
```

```
{ "_id" : ObjectId("5f736c033c4ca4a9cbcd8b9e"), "id" : 1, "nazvanie_porodi" : ObjectId("5f73604a3c4ca4a9cbcd8b8a"), "nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "weight" : 2.4, "year" : 5 }
```

```
{ "_id" : ObjectId("5f736c3c3c4ca4a9cbcd8b9f"), "id" : 1, "nazvanie_porodi" : ObjectId("5f73604a3c4ca4a9cbcd8b8a"), "nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "farm_name" : ObjectId("5f73657b3c4ca4a9cbcd8b8e"), "weight" : 2.4, "year" : 1 }
```

```
{ "_id" : ObjectId("5f736ca93c4ca4a9cbcd8ba0"), "id" : 1, "nazvanie_porodi" : ObjectId("5f7360b53c4ca4a9cbcd8b8b"), "nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "farm_name" : ObjectId("5f73657b3c4ca4a9cbcd8b8e"), "weight" : 2.4, "year" : 3 }
```

```
{ "_id" : ObjectId("5f736cb73c4ca4a9cbcd8ba1"), "id" : 1, "nazvanie_porodi" : ObjectId("5f7360b53c4ca4a9cbcd8b8b"), "nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "farm_name" : ObjectId("5f73657b3c4ca4a9cbcd8b8e"), "weight" : 1.9, "year" : 3 }
```

```
> db.diet.find()
```

```
{ "_id" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "nomer_dieti" : 1, "soderjanie_dieti" : "115g mixed fodder, 25g greenery" }
```

```
{ "_id" : ObjectId("5f735c4d3c4ca4a9cbcd8b86"), "nomer_dieti" : 2, "soderjanie_dieti" : "107g mixed fodder, 30g greenery" }
```

```
{ "_id" : ObjectId("5f735c5a3c4ca4a9cbcd8b87"), "nomer_dieti" : 3, "soderjanie_dieti" : "143g mixed fodder, 55g greenery" }
```

Запросы:

2: Вывод породы, у которой продуктивность 37 и более, а средний вес 4 и более

```
>db.breed.find({performace:37,average_weight:4},{nazvanie_porodi: 1})  
{ "_id" : ObjectId("5f73604a3c4ca4a9cbcd8b8a"), "nazvanie_porodi" : "satsuma" }  
{ "_id" : ObjectId("5f7360b53c4ca4a9cbcd8b8b"), "nazvanie_porodi" : "leghorn" }
```

3: Вывод кормления, где даты в диапазоне от 2020-04 до 2020-08

```
> db.eat.find({time: {$gte:new Date("2020-04"), $lte:new Date("2020-08")}})  
  
{   "_id"       :   ObjectId("5f737b0d3c4ca4a9cbcd8ba2"),   "chicken"       :   Ob-  
jectId("5f736bbb3c4ca4a9cbcd8b9b"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"),  
"nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-  
15T14:00:00Z") }  
  
{   "_id"       :   ObjectId("5f737b4d3c4ca4a9cbcd8ba3"),   "chicken"       :   Ob-  
jectId("5f736bd43c4ca4a9cbcd8b9d"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"),  
"nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-  
15T14:00:00Z ") }  
  
{   "_id"       :   ObjectId("5f737b613c4ca4a9cbcd8ba4"),   "chicken"       :   Ob-  
jectId("5f736ca93c4ca4a9cbcd8ba0"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"),  
"nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-  
15T14:00:00Z ") }  
  
{   "_id"       :   ObjectId("5f737b783c4ca4a9cbcd8ba5"),   "chicken"       :   Ob-  
jectId("5f736cb73c4ca4a9cbcd8ba1"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"),  
"nomer_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-  
15T14:00:00Z ") }  
  
{   "_id"       :   ObjectId("5f737bab3c4ca4a9cbcd8ba6"),   "chicken"       :   Ob-  
jectId("5f736cb73c4ca4a9cbcd8ba1"), "worker" : ObjectId("5f7369c13c4ca4a9cbcd8b9a"),  
"nomer_dieti" : ObjectId("5f735c4d3c4ca4a9cbcd8b86"), "time" : ISODate("2020-05-  
15T13:00:00Z ") }  
  
{   "_id"       :   ObjectId("5f737bc13c4ca4a9cbcd8ba7"),   "chicken"       :   Ob-  
jectId("5f736c033c4ca4a9cbcd8b9e"), "worker" : ObjectId("5f7369c13c4ca4a9cbcd8b9a"),  
"nomer_dieti" : ObjectId("5f735c4d3c4ca4a9cbcd8b86"), "time" : ISODate("2020-05-  
15T13:00:00Z ") }
```

4: Вывод имен рабочих, у которых есть буква Е в Фιο

```
>db.worker.find({passport_data:/.*E.*/},{passport_data:1})  
{ "_id" : ObjectId("5f7369563c4ca4a9cbcd8b96"), "passport_data" : "Ivan E.S" }  
{ "_id" : ObjectId("5f73698c3c4ca4a9cbcd8b98"), "passport_data" : "Oleg A.E" }  
{ "_id" : ObjectId("5f7369a53c4ca4a9cbcd8b99"), "passport_data" : "Eva V.V" }
```

8:Вывод работников, у которых есть паспортные данные

```
> db.worker.find({passport_data:{$exists:true}})
```

```
{ "_id" : ObjectId("5f7369563c4ca4a9cbcd8b96"), "id" : 1, "passport_data" : " Ivan E.S ",  
"farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "Z_P" : 31000 }
```

```
{ "_id" : ObjectId("5f73696e3c4ca4a9cbcd8b97"), "id" : 2, "passport_data" : " Oleg A.E ",  
"farm_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "Z_P" : 22000 }
```

```
{ "_id" : ObjectId("5f73698c3c4ca4a9cbcd8b98"), "id" : 3, "passport_data" : " Eva V.V ",  
"farm_name" : ObjectId("5f73657b3c4ca4a9cbcd8b8e"), "Z_P" : 27000 }
```

```
{ "_id" : ObjectId("5f7369a53c4ca4a9cbcd8b99"), "id" : 4, "passport_data" : "Alex V.V",  
"farm_name" : ObjectId("5f7365c03c4ca4a9cbcd8b8f"), "Z_P" : 34000 }
```

```
{ "_id" : ObjectId("5f7369c13c4ca4a9cbcd8b9a"), "id" : 5, "passport_data" : "Ramil N.K",  
"farm_name" : ObjectId("5f7365c03c4ca4a9cbcd8b8f"), "Z_P" : 41000 }
```

Сложение диеты и её содержания

```
$lookup
```

```
db.diet.aggregate([ { $lookup: { from: "breed", localField: "nomer_dieti", foreignField:  
"nazvanie_porodi", as: "diet+breed" } } ])
```

```
{ "_id" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "nomer_dieti" : 1, "soderjanie_dieti" : "115g  
mixed fodder, 25g greenery", "diet+breed" : [ ] }
```

```
{ "_id" : ObjectId("5f735c4d3c4ca4a9cbcd8b86"), "nomer_dieti" : 2, "soderjanie_dieti" : "107g  
mixed fodder, 30g greenery", "diet+breed" : [ ] }
```

```
{ "_id" : ObjectId("5f735c5a3c4ca4a9cbcd8b87"), "nomer_dieti" : 3, "soderjanie_dieti" : "143g  
mixed fodder, 55g greenery", "diet+breed" : [ ] }
```

```
> var mapfunction1 = function() { emit(this.nazvanie_porodi, this.perfomance); };  
> var reducefunction1 = function(nazv,prod){ return Array.sum(prod); };  
> db.breed.mapReduce(mapfunction1, reducefunction1, {out:"result"})  
> db.result.find()
```

```
{ "_id" : " leghorn ", "value" : 40 }
```

```
{ "_id" : " satsuma ", "value" : 37 }
```

```
{ "_id" : " bedouin ", "value" : 32 }
```


ВЫВОД

В лабораторной работе №7 были получены практические навыки создания базы данных в MongoDB, заполнение их рабочими данными и выполнение запросов.