Министерство науки и высшего образования Российской Федерации

федеральное государственное автономное образовательное учреждение высшего образования

«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

Выполнил:

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Дата: «\_\_\_\_» \_\_\_\_\_\_\_\_\_\_\_\_ 2020г.

Оценка \_\_\_\_\_\_\_\_\_\_\_

Санкт-Петербург 2020

Цель работы

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" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "cells" : 24 }*

*{ "\_id" : ObjectId("5f7367ae3c4ca4a9cbcd8b91"), "factory\_number" : 8, "farm\_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "cells" : 23 }*

*{ "\_id" : ObjectId("5f7367b93c4ca4a9cbcd8b92"), "factory\_number" : 5, "farm\_name" : ObjectId("5f73655a3c4ca4a9cbcd8b8d"), "cells" : 25 }*

*{ "\_id" : ObjectId("5f7367e13c4ca4a9cbcd8b93"), "factory\_number" : 3, "farm\_name" : ObjectId("5f73657b3c4ca4a9cbcd8b8e"), "cells" : 29 }*

*{ "\_id" : ObjectId("5f73680c3c4ca4a9cbcd8b94"), "factory\_number" : 5, "farm\_name" : ObjectId("5f7365c03c4ca4a9cbcd8b8f"), "cells" : 15 }*

*{ "\_id" : ObjectId("5f7368203c4ca4a9cbcd8b95"), "factory\_number" : 6, "farm\_name" : ObjectId("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" : bjectId("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({perfomance: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" : ObjectId("5f736bbb3c4ca4a9cbcd8b9b"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"), "nomer\_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-15T14:00:00Z") }*

*{ "\_id" : ObjectId("5f737b4d3c4ca4a9cbcd8ba3"), "chicken" : ObjectId("5f736bd43c4ca4a9cbcd8b9d"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"), "nomer\_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-15T14:00:00Z ") }*

*{ "\_id" : ObjectId("5f737b613c4ca4a9cbcd8ba4"), "chicken" : ObjectId("5f736ca93c4ca4a9cbcd8ba0"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"), "nomer\_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-15T14:00:00Z ") }*

*{ "\_id" : ObjectId("5f737b783c4ca4a9cbcd8ba5"), "chicken" : ObjectId("5f736cb73c4ca4a9cbcd8ba1"), "worker" : ObjectId("5f73696e3c4ca4a9cbcd8b97"), "nomer\_dieti" : ObjectId("5f735c353c4ca4a9cbcd8b85"), "time" : ISODate("2020-05-15T14:00:00Z ") }*

*{ "\_id" : ObjectId("5f737bab3c4ca4a9cbcd8ba6"), "chicken" : ObjectId("5f736cb73c4ca4a9cbcd8ba1"), "worker" : ObjectId("5f7369c13c4ca4a9cbcd8b9a"), "nomer\_dieti" : ObjectId("5f735c4d3c4ca4a9cbcd8b86"), "time" : ISODate("2020-05-15T13:00:00Z ") }*

*{ "\_id" : ObjectId("5f737bc13c4ca4a9cbcd8ba7"), "chicken" : ObjectId("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 Фио**

*>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.**