

**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ ОБРАЗОВАТЕЛЬНОЕ  
УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ**

**САНКТ-ПЕТЕРБУРГСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ  
УНИВЕРСИТЕТ**

**ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ, МЕХАНИКИ И ОПТИКИ**

Факультет «Инфокоммуникационных технологий»  
Кафедра «Интеллектуальных технологий в гуманитарной сфере»  
Направление подготовки «09.03.03 Прикладная информатика»

## **ОТЧЕТ**

### **По лабораторной работе №6**

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Тема задания Знакомство с MongoDB

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**Выполнил:**

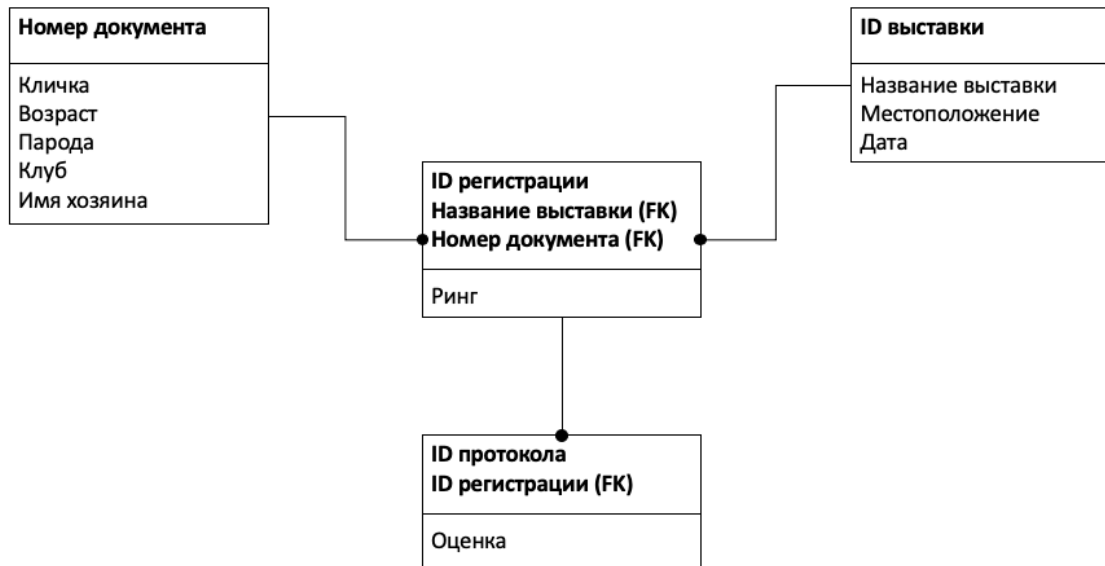
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**Санкт-Петербург  
2020**

## Цель работы

Овладеть практическими навыками и умениями реализации баз данных в MongoDB.

## Модель базы данных



## Создание базы в MongoDB

База данных создается командой: `use dog_show.`

Заполнение таблицы необходимыми данными.

```
db.dog_show.insertMany([
... {
...   "score": 25,
...   "registration": {
...     "reg_number": 1,
...     "ring": 3,
...     "show": {
...       "Name": "Champion",
...       "Place": "Saint Petersburg",
...       "Date": "04/28/2020"
...     },
...   },
...   "dog": {
...     "Document_num": 129588,
...     "Name": "Bella",
```

```
...   "Dog_age": 7,
...   "Breed": "Spaniel",
...   "Club": "Friend",
...   "Owner_name": "Igor"
... }
... }
... },
... {
...   "score": 18,
...   "registration": {
...     "reg_number": 2,
...     "ring": 1,
...     "show": {
...       "Name": "Champion",
...       "Place": "Saint Petersburg",
...       "Date": "04/28/2020"
...     },
...     "dog": {
...       "Document_num": 938726,
...       "Name": "Scooby",
...       "Dog_age": 8,
...       "Breed": "Pudel",
...       "Club": "Cornuel",
...       "Owner_name": "Elena"
...     }
...   }
... },
... {
...   "score": 24,
...   "registration": {
...     "reg_number": 3,
...     "ring": 2,
...     "show": {
...       "Name": "Champion",
```

```
...     "Place": "Saint Petersburg",
...     "Date": "04/28/2020"
... },
...     "dog": {
...         "Document_num": 209483,
...         "Name": "Molly",
...         "Dog_age": 7,
...         "Breed": "Dalmatian",
...         "Club": "Friend",
...         "Owner_name": "Sergei"
...     }
... }
... },
... {
...     "score": 15,
...     "registration": {
...         "reg_number": 4,
...         "ring": 3,
...         "show": {
...             "Name": "Fantom",
...             "Place": "Saint Petersburg",
...             "Date": "12/28/2020"
...         },
...         "dog": {
...             "Document_num": 839420,
...             "Name": "Lucky",
...             "Dog_age": 7,
...             "Breed": "Spaniel",
...             "Club": "Friend",
...             "Owner_name": "Sofia"
...         }
...     }
... },
... {
```

```

...   "score": 15,
...   "registration": {
...     "reg_number": 5,
...     "ring": 2,
...     "show": {
...       "Name": "Fantom",
...       "Place": "Saint Petersburg",
...       "Date": "12/28/2020"
...     },
...     "dog": {
...       "Document_num": 938726,
...       "Name": "Scooby",
...       "Dog_age": 8,
...       "Breed": "Pudel",
...       "Club": "Cornuel",
...       "Owner_name": "Elena"
...     }
...   }
... }
... }
... ])

```

Результат заполнения таблицы.

```

{
  [
    "acknowledged" : true,
    "insertedIds" : [
      ObjectId("5ede190c46920bb001a5ba72"),
      ObjectId("5ede190c46920bb001a5ba73"),
      ObjectId("5ede190c46920bb001a5ba74"),
      ObjectId("5ede190c46920bb001a5ba75"),
      ObjectId("5ede190c46920bb001a5ba76")
    ]
  ]
}

```

## Запросы к базе данных

Получение записей, связанных с конкретной собакой.

`db.dog_show.find({"registration.dog.Document_num": 938726})`

```
> db.dog_show.find({"registration.dog.Document_num": 938726 })
{ "_id" : ObjectId("5ede190c46920bb001a5ba73"), "score" : 18, "registration" : { "reg_number" : 2, "ring" : 1, "show" :
  { "Name" : "Champion", "Place" : "Saint Petersburg", "Date" : "04/28/2020" }, "dog" : { "Document_num" : 938726, "Name
": "Scooby", "Dog_age" : 8, "Breed" : "Pudel", "Club" : "Cornuel", "Owner_name" : "Elena" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba76"), "score" : 15, "registration" : { "reg_number" : 5, "ring" : 2, "show" :
  { "Name" : "Fantom", "Place" : "Saint Petersburg", "Date" : "12/28/2020" }, "dog" : { "Document_num" : 938726, "Name
": "Scooby", "Dog_age" : 8, "Breed" : "Pudel", "Club" : "Cornuel", "Owner_name" : "Elena" } } }
```

Получение записей, связанных с определенной выставкой.

`db.dog_show.find({"registration.show.Name": "Fantom"})`

```
> db.dog_show.find({"registration.show.Name": "Fantom" })
[ { "_id" : ObjectId("5ede190c46920bb001a5ba75"), "score" : 15, "registration" : { "reg_number" : 4, "ring" : 3, "show" :
  { "Name" : "Fantom", "Place" : "Saint Petersburg", "Date" : "12/28/2020" }, "dog" : { "Document_num" : 839420, "Name
": "Lucky", "Dog_age" : 7, "Breed" : "Spaniel", "Club" : "Friend", "Owner_name" : "Sofia" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba76"), "score" : 15, "registration" : { "reg_number" : 5, "ring" : 2, "show" :
  { "Name" : "Fantom", "Place" : "Saint Petersburg", "Date" : "12/28/2020" }, "dog" : { "Document_num" : 938726, "Name
": "Scooby", "Dog_age" : 8, "Breed" : "Pudel", "Club" : "Cornuel", "Owner_name" : "Elena" } } }
```

Получение записей о выставках, которые проходят в Санкт-Петербурге.

`db.dog_show.find({"registration.show.Place": "Saint Petersburg" })`

```
> db.dog_show.find({"registration.show.Place": "Saint Petersburg" })
{ "_id" : ObjectId("5ede190c46920bb001a5ba72"), "score" : 25, "registration" : { "reg_number" : 1, "ring" : 3, "show" :
  { "Name" : "Champion", "Place" : "Saint Petersburg", "Date" : "04/28/2020" }, "dog" : { "Document_num" : 129588, "Name
": "Bella", "Dog_age" : 7, "Breed" : "Spaniel", "Club" : "Friend", "Owner_name" : "Igor" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba73"), "score" : 18, "registration" : { "reg_number" : 2, "ring" : 1, "show" :
  { "Name" : "Champion", "Place" : "Saint Petersburg", "Date" : "04/28/2020" }, "dog" : { "Document_num" : 938726, "Name
": "Scooby", "Dog_age" : 8, "Breed" : "Pudel", "Club" : "Cornuel", "Owner_name" : "Elena" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba74"), "score" : 24, "registration" : { "reg_number" : 3, "ring" : 2, "show" :
  { "Name" : "Champion", "Place" : "Saint Petersburg", "Date" : "04/28/2020" }, "dog" : { "Document_num" : 209483, "Name
": "Molly", "Dog_age" : 7, "Breed" : "Dalmatian", "Club" : "Friend", "Owner_name" : "Sergei" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba75"), "score" : 15, "registration" : { "reg_number" : 4, "ring" : 3, "show" :
  { "Name" : "Fantom", "Place" : "Saint Petersburg", "Date" : "12/28/2020" }, "dog" : { "Document_num" : 839420, "Name
": "Lucky", "Dog_age" : 7, "Breed" : "Spaniel", "Club" : "Friend", "Owner_name" : "Sofia" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba76"), "score" : 15, "registration" : { "reg_number" : 5, "ring" : 2, "show" :
  { "Name" : "Fantom", "Place" : "Saint Petersburg", "Date" : "12/28/2020" }, "dog" : { "Document_num" : 938726, "Name
": "Scooby", "Dog_age" : 8, "Breed" : "Pudel", "Club" : "Cornuel", "Owner_name" : "Elena" } } }
```

Получение записей, в которых собака набрала больше 20 баллов.

`db.dog_show.find({"score": {$gt: 20}})`

```
> db.dog_show.find({"score": {$gt: 20}})
{ "_id" : ObjectId("5ede190c46920bb001a5ba72"), "score" : 25, "registration" : { "reg_number" : 1, "ring" : 3, "show" :
  { "Name" : "Champion", "Place" : "Saint Petersburg", "Date" : "04/28/2020" }, "dog" : { "Document_num" : 129588, "Name
": "Bella", "Dog_age" : 7, "Breed" : "Spaniel", "Club" : "Friend", "Owner_name" : "Igor" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba74"), "score" : 24, "registration" : { "reg_number" : 3, "ring" : 2, "show" :
  { "Name" : "Champion", "Place" : "Saint Petersburg", "Date" : "04/28/2020" }, "dog" : { "Document_num" : 209483, "Name
": "Molly", "Dog_age" : 7, "Breed" : "Dalmatian", "Club" : "Friend", "Owner_name" : "Sergei" } } }
```

Получение записей собаках, которые старше 7 лет.

`db.dog_show.find({"registration.dog.Dog_age": {$gt: 7}})`

```
> db.dog_show.find({"registration.dog.Dog_age": {$gt: 7}})
{ "_id" : ObjectId("5ede190c46920bb001a5ba73"), "score" : 18, "registration" : { "reg_number" : 2, "ring" : 1, "show" :
  { "Name" : "Champion", "Place" : "Saint Petersburg", "Date" : "04/28/2020" }, "dog" : { "Document_num" : 938726, "Name
": "Scooby", "Dog_age" : 8, "Breed" : "Pudel", "Club" : "Cornuel", "Owner_name" : "Elena" } } }
{ "_id" : ObjectId("5ede190c46920bb001a5ba76"), "score" : 15, "registration" : { "reg_number" : 5, "ring" : 2, "show" :
  { "Name" : "Fantom", "Place" : "Saint Petersburg", "Date" : "12/28/2020" }, "dog" : { "Document_num" : 938726, "Name
": "Scooby", "Dog_age" : 8, "Breed" : "Pudel", "Club" : "Cornuel", "Owner_name" : "Elena" } } }
```

Получение суммы баллов собак во всех выставках.

`var F1 = function() {`

`... emit(this.registration.dog.Name, this.score);`

```

... };
>
> var F2 = function(names, score) {
... return Array.sum(score);
... };
>
> db.dog_show.mapReduce(
...   F1,
...   F2,
...   { out: "whole_result" }
... )
{
  "result" : "whole_result",
  "timeMillis" : 174,
  "counts" : {
    "input" : 5,
    "emit" : 5,
    "reduce" : 1,
    "output" : 4
  },
  "ok" : 1
}
[> db.whole_result.find()
{ "_id" : "Bella", "value" : 25 }
{ "_id" : "Lucky", "value" : 15 }
{ "_id" : "Molly", "value" : 24 }
{ "_id" : "Scooby", "value" : 33 }

```

## Вывод

В ходе работы были освоены основы создания базы данных с помощью MongoDB. Получены навыки написания запросов к базе данных средствами MongoDB.