

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ  
ФЕДЕРАЦИИ ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ  
ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ

«Санкт – Петербургский национальный исследовательский  
университет информационных технологий, механики и оптики»

Факультет инфокоммуникационных технологий

Лабораторная работа №6

“Знакомство с MongoDB”

Выполнила студентка группы К3242

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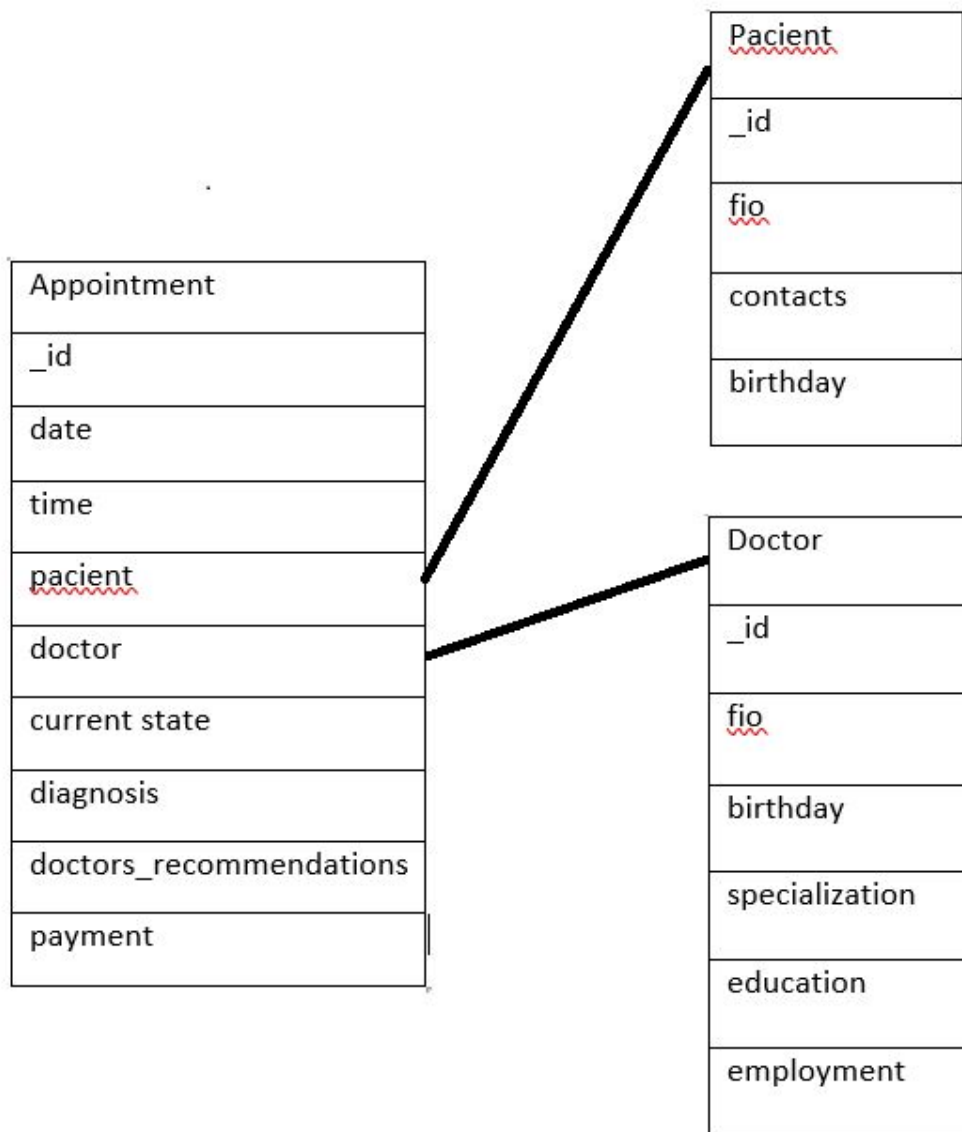
Санкт- Петербург, 2020

**Цель работы:** овладеть практическими навыками и умениями реализации баз данных в MongoDB.

**Оборудование:** УКК(факультет СПО УНиверситета ИТМО)

**Программные средства:** MongoDB Server

**Обновленная модель БД:**



**Выполнение:**

1. Заполнение таблиц Appointment

```

1 use medclinic
2
3 ▾ db.Appointment.insert({
4     date: "12-09-2019",
5     time: "11.00",
6     patient: {
7         fio: "Borisova Veronika Vitalevna",
8         contacts: "967893",
9         birthday: "23-10-1995",
10    },
11    doctor: {
12        fio: "Potashev Pavel Aleksandrovich",
13        birthday: "30-12-1979",
14        specialization: "endocrinologist",
15        education: "St.Petersburg State Paediatric Medical University",
16        employment: "documents",
17    },
18    current state: "rapid weight loss, increased fatigue and general weakness",
19    diagnosis: "diabetes",
20    doctors recommendations: "optimal compensation for diabetes, blood pressure control, kidney function, normal blood cholesterol, smoking cessation",
21    payment: "no",
22 })
23
24 ▾ db.Appointment.insert({
25     date: "26-10-2019",
26     time: "10.00",
27     patient: {
28         fio: "Evgrafova Margarita Dmitrievna",
29         contacts: "507129",
30         birthday: "01-05-1972",
31     },
32     doctor: {
33         fio: "Semenova Nadezhda Konstantinovna",
34         birthday: "08-06-1965",
35         specialization: "cardiologist",
36         education: "North-Western state Medical University named after I.I.Mechnikov",
37         employment: "documents",
38     },
39     current state: "heart pain, dizziness",
40     diagnosis: "rhuematic heart disease",
41     doctors recommendations: "diclofenac(oral 100 mg/day in tablets and retard capsules of 100 mg rectally-100 mg/day in candles",
42     payment: "yes",
43 })
44
45 ▾ db.Appointment.insert({
46     date: "18-11-2019",
47     time: "10.30",
48     patient: {
49         fio: "Kuzmichov Kirill Maksimovich",
50         contacts: "967893",
51         birthday: "11-04-2000",
52     },
53     doctor: {
54         fio: "Sergeeva Anna Vladimirovna",
55         birthday: "18-09-1982",
56         specialization: "gastroenterologist",
57         education: "Saint-Petersburg Medico-Social Institute",
58         employment: "documents",
59     },
60     current state: "pain in the upper abdomen",
61     diagnosis: "gastritis",
62     doctors recommendations: "make the aluminium phosphate gel, Trihopol",
63     payment: "yes",
64 })

```

```

65
66 db.Appointment.insert({
67     date: "15-08-2019",
68     time: "10.00",
69     pacient: {
70         fio: "Zmievskiy Danil Aleksandrovich",
71         contacts: "367821",
72         birthday: "22-12-2000",
73     },
74     doctor: {
75         fio: "Chernikov Nikolay Olegovich",
76         birthday: "26-12-1978",
77         specialization: "surgeon",
78         education: "Pavlov University",
79         employment: "documents",
80     },
81     current state: "the cut is still healing",
82     diagnosis: "acute traumatic wound",
83     doctors recommendations: "washing the wound every day, smear the wound with Levomekol",
84     payment: "no",
85 })

86
87 db.Appointment.insert({
88     date: "04-08-2019",
89     time: "13.00",
90     pacient: {
91         fio: "Miroshnichenko Vladimir Nikolaevich",
92         contacts: "789121",
93         birthday: "03-09-2005",
94     },
95     doctor: {
96         fio: "Gonchar Dmitriy Valentinovich",
97         birthday: "10-02-1979",
98         specialization: "ophthalmologist",
99         education: "North-Western state Medical University named after I.I.Mechnikov",
100        employment: "documents",
101    },
102    current state: "the appearance of a new benign formation on the upper eyelid",
103    diagnosis: "papilloma",
104    doctors recommendations: "you should do the dressing once a day(if necessary). For some time after the operation, you can not take a bath, go to the bath or sauna, or stay in the open sun",
105    payment: "yes",
106 })

```

## 2. Выполнение запросов:

- 1) Вывод id и fio всех врачей, которые учились в Медико-Социальном институте

Запрос: `db.Appointment.find({"doctor.education": "Saint-Petersburg Medico-Social Insitute"}, {_id: 0, "doctor.fio": 1})`

Результат:

```
{ "doctor" : { "fio" : "Sergeeva Anna Vladimirovna"
} }
```

```
> db.Appointment.find({"doctor.education": "Saint-Petersburg Medico-Social Insitute"}, {_id: 0, "doctor.fio": 1})
{ "doctor" : { "fio" : "Sergeeva Anna Vladimirovna" } }
```

- 2) Вывод информации об оплаченных приёмах

Запрос: `db.Appointment.find({payment: "no"}, {_id: 0, "pacient.fio": 1, "doctor.fio": 1, date: 1, time: 1, current_state: 1, diagnosis: 1, doctors_recommendations: 1})`

Результат:

```
{ "date" : "12-09-2019", "time" : "11.00", "patient"
: { "fio" : "Borisova Veronika Vitalevna" },
"doctor" : { "fio" : "Potashev Pavel Aleksandrovich"
}, "current_state" : "rapid weightloss, increased
fatigue and general weakness",
"doctors_recommendations" : "optimal compensation
for diabetes, blood pressure control, kidney
function, normal blood chlolesterol, smoking
cessation" }
{ "date" : "15-08-2019", "time" : "10.00", "patient"
: { "fio" : "Zmievskiy Danil ALeksandrovich" },
"doctor" : { "fio" : "Chernikov Nikolay Olegovich"
}, "current_state" : "the cut is still healing",
"diagnosis" : "acute traumatic wound",
"doctors_recommendations" : "washing the wound every
day, smear the wound with Lovomekol" }
```

```
db.Appointment.find(payment: "no"), {_id: 0, "patient.fio": 1, "doctor.fio": 1, date: 1, time: 1, current_state: 1, diagnosis: 1, doctors_recommendations: 1})
{ "date" : "12-09-2019", "time" : "11.00", "patient" : { "fio" : "Borisova Veronika Vitalevna" }, "doctor" : { "fio" : "Potashev Pavel Aleksandrovich" }, "current_state" : "rapid weightloss, increased fatigue an
general weakness", "doctors_recommendations" : "optimal compensation for diabetes, blood pressure control, kidney function, normal blood chlolesterol, smoking cessation" }
{ "date" : "15-08-2019", "time" : "10.00", "patient" : { "fio" : "Zmievskiy Danil Aleksandrovich" }, "doctor" : { "fio" : "Chernikov Nikolay Olegovich" }, "current_state" : "the cut is still healing", "diagnosis
: "acute traumatic wound", "doctors_recommendations" : "washing the wound every day, smear the wound with Lovomekol" }
```

### 3) Количество оплаченных приёмов

Запрос: `db.Appointment.count({payment: "yes"})`

Результат: 3

```
> db.Appointment.count({payment: "yes"})
3
```

### 4) Вывод информации о пациентах, которые были на приёме 15 августа

Запрос: `db.Appointment.find({date: "15-08-2019"}, {_id: 0, "patient.fio": 1, "patient.contacts": 1, "patient.birthday": 1})`

Результат: { "patient" : { "fio" : "Zmievskiy Danil ALeksandrovich", "birthday" : "22-12-2000" } }

```
> db.Appointment.find({date: "04-08-2019"}, {_id: 0, "patient.fio": 1, "patient.contacts": 1, "patient.birthday": 1})
> db.Appointment.find({date: "15-08-2019"}, {_id: 0, "patient.fio": 1, "patient.contacts": 1, "patient.birthday": 1})
{ "patient" : { "fio" : "Zmievskiy Danil ALeksandrovich", "birthday" : "22-12-2000" } }
```

### 5) Вывод выборочной информации о приёме у кардиолога

**Запрос:** `db.Appointment.find({"doctor.specialization": "cardiologist"}, {_id: 0, date: 1, time: 1, diagnosis: 1})`

**Результат:** `{ "date" : "26-10-2019", "time" : "10.00", "diagnosis" : "rhuematic heart daisease" }`

```
> db.Appointment.find({"doctor.specialization": "cardiologist"}, {_id: 0, date: 1, time: 1, diagnosis: 1})
{
  "_id" : 0,
  "date" : "26-10-2019",
  "time" : "10.00",
  "diagnosis" : "rhuematic heart daisease"
}
```

## 6) MapReduce

```
> db.Appointment.mapReduce( function() {emit(this.doctor.fio, this.doctor.specialization);}, function(values) {return values;}, {out: "mapreduce_Appointment"});
{
  "result" : "mapreduce_Appointment",
  "timeMillis" : 212,
  "counts" : {
    "input" : 5,
    "emit" : 5,
    "reduce" : 0,
    "output" : 5
  },
  "ok" : 1
}
> db.mapreduce_Appointment.find()
{ "_id" : "Chernikov Nikolay Olegovich", "value" : "surgeon" }
{ "_id" : "Gonchar Dmitriy Valentinovich", "value" : "ophthalmologist" }
{ "_id" : "Potashev Pavel Aleksandrovich", "value" : "endocrinologist" }
{ "_id" : "Semenova Nadezhda Konstantinovna", "value" : "cardiologist" }
{ "_id" : "Sergeeva Anna Vladimirovna", "value" : "gastroenterologist" }
```

**Вывод:** В процессе выполнения лабораторной работы были получены навыки реализации базы данных при помощи MongoDB. В результате была спроектирована нереляционная база данных и выполнены некоторые запросы к ней.