**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ**

**САНКТ-ПЕТЕРБУРГСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ**

**ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ, МЕХАНИКИ И ОПТИКИ**

Факультет «Инфокоммуникационных технологий»

Направление подготовки «09.03.03 Мобильные и сетевые технологии»

# О Т Ч Е Т

**ЛАБОРАТОРНАЯ РАБОТА №6**

**Тема задания:**    ЗНАКОМСТВО С MONGO DB

**Выполнил:**

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**Проверил:**

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                        **(**Фамилия И.О)
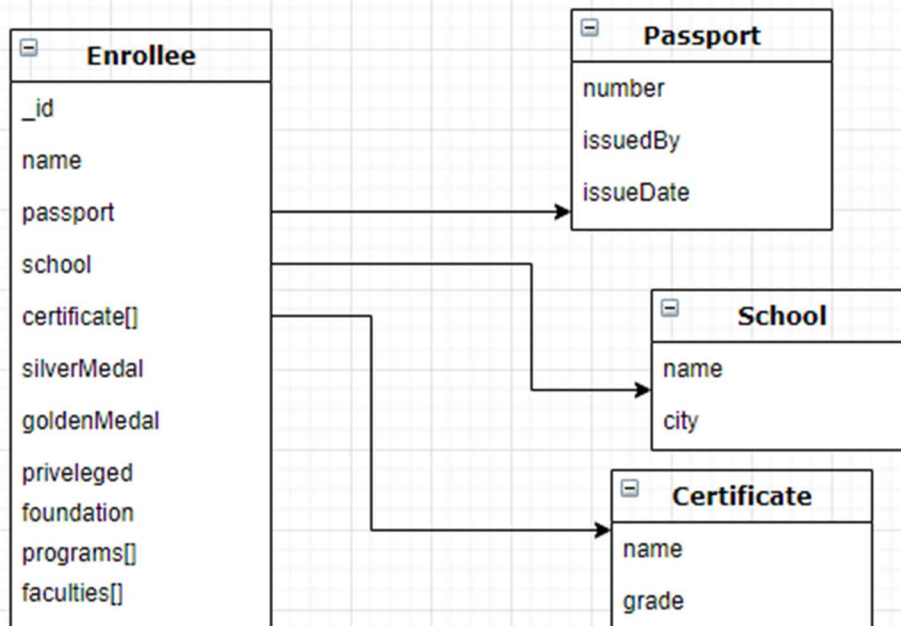
**Санкт-Петербург**

**2020**

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

**Программное обеспечение:** MongoDB server**.**

**Отчет:**

1) Модель данных была обновлена. Данные развернуты внутри одной коллекции «Enrollee»



2) Заполним таблицу тестовыми данными
```
db.enrollee.insert({
 name: "Mr. Nekto",
 passport: {
 number: "4728572336",
 issueDate: "2016-02-02",
 issuedBy: "Some OUFMS"
 },
 school: {
 name: "School #777",
 city: "Moscow"
 },
 certificate: {
 math: "5",
 english: "5",
 history: "5"
 },
 silverMedal: "false",
```

```
    goldenMedal: "true",
    priveleged: "false",
    foundation: "commercial",
    programs: ["Political science"],
    faculties: ["Faculty of law"]
    })

db.enrollee.insert({)
    name: "Navalny Alexey",
    passport: {
    number: "1114232556",
    issueDate: "2016-02-02",
    issuedBy: "Some OUFMS"
    },
    school: {
    name: "School #777",
    city: "Moscow"
    },
    certificate: {
    math: "5",
    english: "5",
    history: "5"
    },
    silverMedal: "false",
    goldenMedal: "true",
    priveleged: "false",
    foundation: "commercial",
    programs: ["Political science"],
    faculties: ["Faculty of law"]
    }

db.enrollee.insert({
    name: "Putin Vladimir",
    passport: {
    number: "1114232556",
    issueDate: "2016-02-02",
    issuedBy: "Some OUFMS"
    },
    school: {
    name: "School #77",
    city: "Leningrad"
    },
    certificate: {
    math: "2",
    english: "2",
    history: "2"
```

```
    },
    silverMedal: "false",
    goldenMedal: "true",
    priveleged: "true",
    foundation: "budget",
    programs: ["Corruption"],
    faculties: ["Faculty of corruption"]
    })

db.enrollee.insert({
    name: "Lord Handsome",
    passport: {
    number: "1114232446",
    issueDate: "2017-02-02",
    issuedBy: "Some OUFMS"
    },
    school: {
    name: "School #77",
    city: "Moscow"
    },
    certificate: {
    math: "5",
    english: "5",
    history: "4"
    },
    silverMedal: "false",
    goldenMedal: "true",
    priveleged: "true",
    foundation: "budget",
    programs: ["Math"],
    faculties: ["Faculty of math"]
    })

db.enrollee.insert({
    name: "Lorem Ipsum",
    passport: {
    number: "1214232446",
    issueDate: "2018-02-02"
    issuedBy: "Some OUFMS"
    },
    school: {
    name: "School #45",
    city: "Grozny"
    },
    certificate: {
    math: "4",
```

```
    english: "5"
    },
    silverMedal: "false",
    goldenMedal: "true",
    priveleged: "false",
    foundation: "budget",
    programs: ["Computer Science", "Math"],
    faculties: ["Faculty of informatics", "Faculty of math"]
    }
```

3) Выполним запросы к полученной базе данных

1. Имя абитуриента и его паспортные данные
   db.enrollee.find({}, {name: 1, passport: 1}).sort({"passport.number":-1})

```
{ "_id" : ObjectId("5ee771713879085da8ee72bc"), "name" : "Mr. Nekto", "passport" : { "number" : "4728572336", "issueDate" : "2016-02-02", "issuedBy" : "Some OUFMS" } }
{ "_id" : ObjectId("5ee76dd33879085da8ee72bb"), "name" : "Navalny Alexey", "passport" : { "number" : "1214574444", "issueDate" : "2016-02-02", "issuedBy" : "Some OUFMS" } }
{ "_id" : ObjectId("5ee76ab33879085da8ee72b8"), "name" : "Lorem Ipsum", "passport" : { "number" : "1214232446", "issueDate" : "2018-02-02", "issuedBy" : "Some OUFMS" } }
{ "_id" : ObjectId("5ee76cbb3879085da8ee72ba"), "name" : "Putin Vladimir", "passport" : { "number" : "1114232556", "issueDate" : "2016-02-02", "issuedBy" : "Some OUFMS" } }
{ "_id" : ObjectId("5ee76b803879085da8ee72b9"), "name" : "Lord Handsome", "passport" : { "number" : "1114232446", "issueDate" : "2017-02-02", "issuedBy" : "Some OUFMS" } }
>
```

2. Имена паспортные данные всех абитуриентов кроме абитуриента с именем "Putin Vladimir"
   db.enrollee.find({name:{$ne:"Putin Vladimir"}}, {name: 1, passport: 1})

```
{ "_id" : ObjectId("5ee76ab33879085da8ee72b8"), "name" : "Lorem Ipsum", "passport" : { "number" : "1214232446", "issueDate" : "2018-02-02", "issuedBy" : "Some OUFMS" } }
{ "_id" : ObjectId("5ee76b803879085da8ee72b9"), "name" : "Lord Handsome", "passport" : { "number" : "1114232446", "issueDate" : "2017-02-02", "issuedBy" : "Some OUFMS" } }
{ "_id" : ObjectId("5ee76dd33879085da8ee72bb"), "name" : "Navalny Alexey", "passport" : { "number" : "1214574444", "issueDate" : "2016-02-02", "issuedBy" : "Some OUFMS" } }
{ "_id" : ObjectId("5ee771713879085da8ee72bc"), "name" : "Mr. Nekto", "passport" : { "number" : "4728572336", "issueDate" : "2016-02-02", "issuedBy" : "Some OUFMS" } }
```

3. Имя абитуриента и информация о его школе.
   db.enrollee.find({}, {name: 1, school: 1})

```
{ "_id" : ObjectId("5ee76ab33879085da8ee72b8"), "name" : "Lorem Ipsum", "school" : { "name" : "School #45", "city" : "Grozny" } }
{ "_id" : ObjectId("5ee76b803879085da8ee72b9"), "name" : "Lord Handsome", "school" : { "name" : "School #77", "city" : "Moscow" } }
{ "_id" : ObjectId("5ee76cbb3879085da8ee72ba"), "name" : "Putin Vladimir", "school" : { "name" : "School #77", "city" : "Leningrad" } }
{ "_id" : ObjectId("5ee76dd33879085da8ee72bb"), "name" : "Navalny Alexey", "school" : { "name" : "School #777", "city" : "Moscow" } }
{ "_id" : ObjectId("5ee771713879085da8ee72bc"), "name" : "Mr. Nekto", "school" : { "name" : "School #777", "city" : "Moscow" } }
```

4. Таблица выпускников каждой школы
   db.enrollee.aggregate([{$group:{_id:{name:"$school.name", city:"$school.city"}, graduates:{$push:"$name"}}}])

```
{ "_id" : { "name" : "School #45", "city" : "Grozny" }, "graduates" : [ "Lorem Ipsum" ] }
{ "_id" : { "name" : "School #777", "city" : "Moscow" }, "graduates" : [ "Navalny Alexey", "Mr. Nekto" ] }
{ "_id" : { "name" : "School #77", "city" : "Leningrad" }, "graduates" : [ "Putin Vladimir" ] }
{ "_id" : { "name" : "School #77", "city" : "Moscow" }, "graduates" : [ "Lord Handsome" ] }
```

5. Количество поданных заявлений на каждый факультет
   db.enrollee.aggregate([{$unwind:"$faculties"}, {$group:{_id:"$faculties", count:{$sum:1}}}])

```
{ "_id" : "Faculty of corruption", "count" : 1 }
{ "_id" : "Faculty of informatics", "count" : 1 }
{ "_id" : "Faculty of law", "count" : 2 }
{ "_id" : "Faculty of math", "count" : 2 }
```

**Вывод:** В результате выполнения лабораторной работы были изучены принципы проектирования нереляционных (NoSQL) баз данных.