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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

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Санкт-Петербург 2020

## ЦЕЛЬ РАБОТЫ

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

## ЗАДАНИЕ

Для выполнения работы Вам потребуется:

- a. Попытаться уменьшить размер модели реляционной базы данных, с которой Вы работали.
- b. Реализовать Вашу модель в MongoDB.
- c. Заполнить модель данными, настолько, чтобы все запросы, реализуемые Вами в пункте 2.d, выдавали непустые строки.
- d. Реализовать минимум 40% Ваших запросов, сделанных в работе по реляционным базам данных в MongoDB.

# ВЫПОЛНЕНИЕ

1) Схема физической модели БД представлена на рисунке №1.

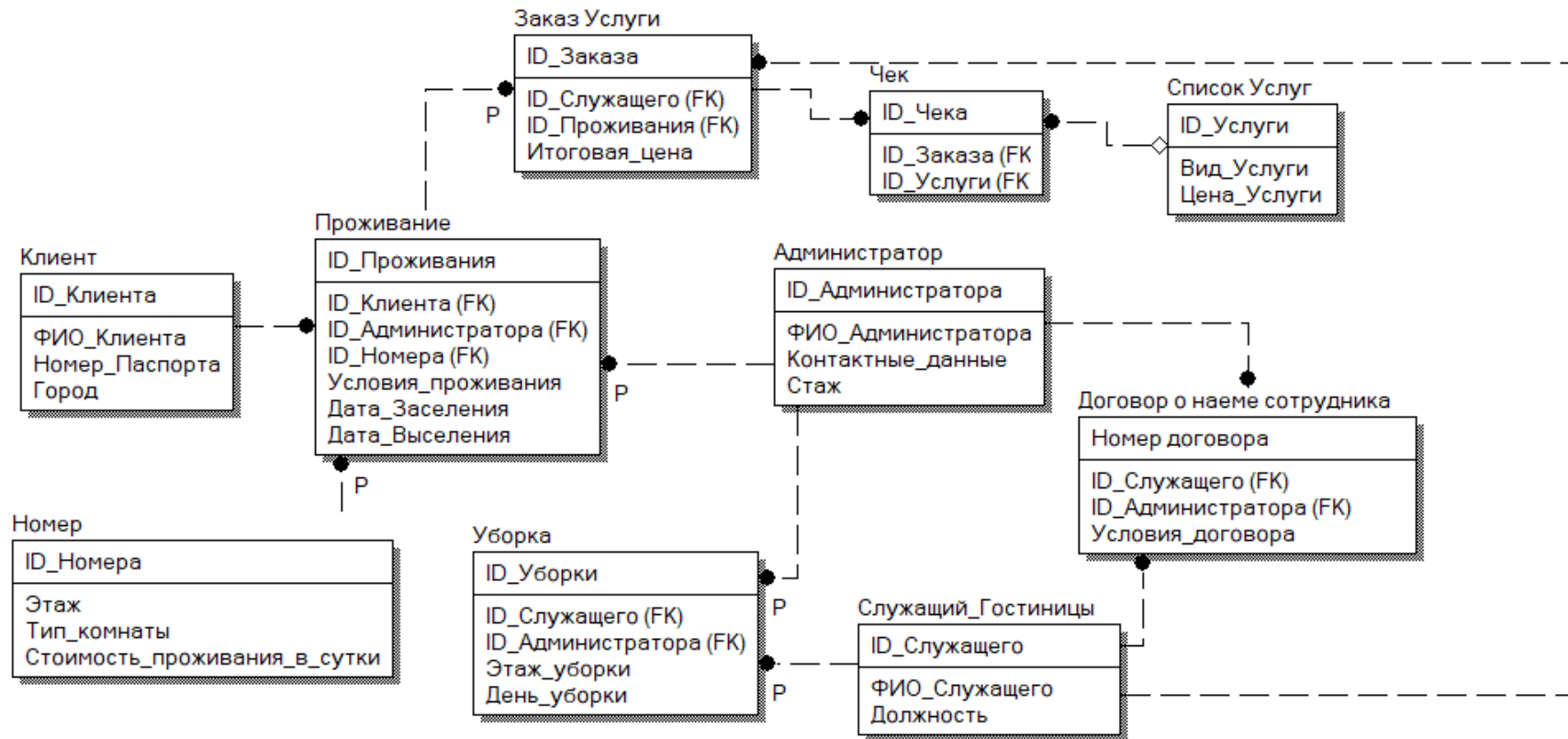


Рисунок 1 Схема инфологической модели данных БД

## 2) Логи модели:

Создание таблиц:

```
> db.createCollection("Customer")
> db.createCollection("Room")
> db.createCollection("Residence")
> db.createCollection("Admin")
> db.createCollection("Employee")
> db.createCollection("Contract")
> db.createCollection("Cleaning")
> db.createCollection("Service")
```

```
> db.createCollection("Customer")
{
  "ok" : 0,
  "errmsg" : "Collection already exists. NS: Hotel.Customer",
  "code" : 48,
  "codeName" : "NamespaceExists"
}
> db.createCollection("Room")
{
  "ok" : 0,
  "errmsg" : "Collection already exists. NS: Hotel.Room",
  "code" : 48,
  "codeName" : "NamespaceExists"
}
> db.createCollection("Residence")
{ "ok" : 1 }
> db.createCollection("Admin")
{ "ok" : 1 }
> db.createCollection("Employee")
{ "ok" : 1 }
> db.createCollection("Contract")
{ "ok" : 1 }
> db.createCollection("Cleaning")
{ "ok" : 1 }
> db.createCollection("Service")
{ "ok" : 1 }
```

Таблица Customer:

```
> db.Customer.insertOne({"name":"Igor      Igorevich","city":"Mos-
cow","ID_Customer":1,"Passport":111111})
> db.Customer.insertOne({"name":"Nikita      Bondarev","city":"Mos-
cow","ID_Customer":2,"Passport":222222})
> db.Customer.insertOne({"name":"Olga  Olgovna","city":"Piter","ID_Cus-
tomer":3,"Passport":333333})
```

```

> db.Customer.insertOne({"name":"Petr Petrovich","city":"Moscow","ID_Customer":4,"Passport":444444})
> db.Customer.insertOne({"name":"Vasya Vasilivich","city":"Piter","ID_Customer":5,"Passport":555555})
> db.Customer.insertOne({"name":"Sasha Aleksandrov","city":"Moscow","ID_Customer":6,"Passport":666666})
> db.Customer.insertOne({"name":"Masha Mariевна","city":"Omsk","ID_Customer":6,"Passport":777777})

```

```

> db.Customer.insertOne({"name":"Igor Igorevich","city":"Moscow","ID_Customer":1,"Passport":111111})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa4379e715413bd99f65066")
}
> db.Customer.insertOne({"name":"Nikita Bondarev","city":"Moscow","ID_Customer":2,"Passport":222222})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa437ea715413bd99f65067")
}
> db.Customer.insertOne({"name":"Olga Olgovna","city":"Piter","ID_Customer":3,"Passport":333333})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43826715413bd99f65068")
}
> db.Customer.insertOne({"name":"Petr Petrovich","city":"Moscow","ID_Customer":4,"Passport":444444})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43848715413bd99f65069")
}
> db.Customer.insertOne({"name":"Vasya Vasilivich","city":"Piter","ID_Customer":5,"Passport":555555})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa4386e715413bd99f6506a")
}
> db.Customer.insertOne({"name":"Sasha Aleksandrov","city":"Moscow","ID_Customer":6,"Passport":666666})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa4388e715413bd99f6506b")
}
> db.Customer.insertOne({"name":"Masha Mariевна","city":"Omsk","ID_Customer":6,"Passport":777777})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa438a9715413bd99f6506c")
}

```

Таблица Room:

```

> db.Room.insertOne({"ID_Room":1,"Floor":1,"Type":"Big","Cost":3000})
> db.Room.insertOne({"ID_Room":2,"Floor":1,"Type":"Medium","Cost":2000})
> db.Room.insertOne({"ID_Room":3,"Floor":2,"Type":"Small","Cost":1000})

```

```

> db.Room.insertOne({"ID_Room":4,"Floor":2,"Type":"Small","Cost":1000})
> db.Room.insertOne({"ID_Room":5,"Floor":2,"Type":"Small","Cost":1000})
> db.Room.insertOne({"ID_Room":6,"Floor":2,"Type":"Medium","Cost":2000})
> db.Room.insertOne({"ID_Room":7,"Floor":3,"Type":"Big","Cost":3000})

```

Таблица Admin:

```

> db.Admin.insertOne({"Name_Admin":"Ksenia","ID_Admin":1,"Phone":"8911241215"})
> db.Admin.insertOne({"Name_Admin":"Daria","ID_Admin":2,"Phone":"8911241216"})
> db.Admin.insertOne({"Name_Admin":"Nikolai","ID_Admin":3,"Phone":"8911241217"})

```

```

> db.Admin.insertOne({"Name_Admin":"Ksenia","ID_Admin":1,"Phone":"8911241215"})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43cac715413bd99f65074")
}
> db.Admin.insertOne({"Name_Admin":"Daria","ID_Admin":2,"Phone":"8911241216"})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43cc4715413bd99f65075")
}
> db.Admin.insertOne({"Name_Admin":"Nikolai","ID_Admin":3,"Phone":"8911241217"})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43cd9715413bd99f65076")
}

```

Таблица Employee:

```

> db.Employee.insertOne({"ID_Employee":1,"Name_Employee":"Olga","Position_Employee":"Uborshik"})
> db.Employee.insertOne({"ID_Employee":2,"Name_Employee":"Gleb","Position_Employee":"Barman"})

```

```
> db.Employee.insertOne({ "ID_Employee":3,"Name_Employee":"Sveta","Position_Employee":"Uborshik" })
> db.Employee.insertOne({ "ID_Employee":4,"Name_Employee":"Anna","Position_Employee":"Barman" })
```

Таблица Contract:

```
> db.Contract.insertOne({ "ID_Contract":1,"ID_Employee":1,"ID_Admin":1,"work_conditions":"Uborka" })
> db.Contract.insertOne({ "ID_Contract":2,"ID_Employee":2,"ID_Admin":2,"work_conditions":"Napitki" })
> db.Contract.insertOne({ "ID_Contract":3,"ID_Employee":3,"ID_Admin":3,"work_conditions":"Cleaning" })
> db.Contract.insertOne({ "ID_Contract":4,"ID_Employee":4,"ID_Admin":2,"work_conditions":"Eda pokushat delat" })
```

```
> db.Contract.insertOne({ "ID_Contract":1,"ID_Employee":1,"ID_Admin":1,"work_conditions":"Uborka" })
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa445bd715413bd99f6507b")
}
> db.Contract.insertOne({ "ID_Contract":2,"ID_Employee":2,"ID_Admin":2,"work_conditions":"Napitki" })
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa445d4715413bd99f6507c")
}
> db.Contract.insertOne({ "ID_Contract":3,"ID_Employee":3,"ID_Admin":3,"work_conditions":"Cleaning" })
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa445e6715413bd99f6507d")
}
> db.Contract.insertOne({ "ID_Contract":4,"ID_Employee":4,"ID_Admin":2,"work_conditions":"Eda pokushat delat" })
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa4460c715413bd99f6507e")
}
```



```

> db.Room.insertOne({"ID_Room":1,"Floor":1,"Type":"Big","Cost":3000})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43a7e715413bd99f6506d")
}
> db.Room.insertOne({"ID_Room":2,"Floor":1,"Type":"Medium","Cost":2000})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43a97715413bd99f6506e")
}
> db.Room.insertOne({"ID_Room":3,"Floor":2,"Type":"Small","Cost":1000})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43aac715413bd99f6506f")
}
> db.Room.insertOne({"ID_Room":4,"Floor":2,"Type":"Small","Cost":1000})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43ab2715413bd99f65070")
}
> db.Room.insertOne({"ID_Room":5,"Floor":2,"Type":"Small","Cost":1000})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43ab7715413bd99f65071")
}
> db.Room.insertOne({"ID_Room":6,"Floor":2,"Type":"Medium","Cost":2000})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43ac9715413bd99f65072")
}
> db.Room.insertOne({"ID_Room":7,"Floor":3,"Type":"Big","Cost":3000})
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5fa43ad6715413bd99f65073")
}
>

```

Таблица Cleaning:

```

db.Cleaning.insertMany([
  {"id_cleaning":1,"id_employee":1,"id_admin":1,"Cleaning_Floor":1,"Cleaning_Date":"2020-01-15"},
  {"id_cleaning":2,"id_employee":3,"id_admin":1,"Cleaning_Floor":2,"Cleaning_Date":"2020-01-15"},
  {"id_cleaning":3,"id_employee":1,"id_admin":1,"Cleaning_Floor":3,"Cleaning_Date":"2020-01-16"},
  {"id_cleaning":4,"id_employee":1,"id_admin":2,"Cleaning_Floor":1,"Cleaning_Date":"2020-01-30"},
  {"id_cleaning":5,"id_employee":3,"id_admin":2,"Cleaning_Floor":2,"Cleaning_Date":"2020-01-30"},

```

```

    {"id_cleaning":6,"id_employee":3,"id_admin":2,"Cleaning_Floor":3,"Cleaning_Date":"2020-01-30"}
  })

```

```

> db.Cleaning.insertMany([
... {"id_cleaning":1,"id_employee":1,"id_admin":1,"Cleaning_Floor":1,"Cleaning_Date":"2020-01-15"},
... {"id_cleaning":2,"id_employee":3,"id_admin":1,"Cleaning_Floor":2,"Cleaning_Date":"2020-01-15"},
... {"id_cleaning":3,"id_employee":1,"id_admin":1,"Cleaning_Floor":3,"Cleaning_Date":"2020-01-16"},
... {"id_cleaning":4,"id_employee":1,"id_admin":2,"Cleaning_Floor":1,"Cleaning_Date":"2020-01-30"},
... {"id_cleaning":5,"id_employee":3,"id_admin":2,"Cleaning_Floor":2,"Cleaning_Date":"2020-01-30"},
... {"id_cleaning":6,"id_employee":3,"id_admin":2,"Cleaning_Floor":3,"Cleaning_Date":"2020-01-30"}
... ])
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("5fa44f05bedec8332757b956"),
    ObjectId("5fa44f05bedec8332757b957"),
    ObjectId("5fa44f05bedec8332757b958"),
    ObjectId("5fa44f05bedec8332757b959"),
    ObjectId("5fa44f05bedec8332757b95a"),
    ObjectId("5fa44f05bedec8332757b95b")
  ]
}

```

Таблица Residence:

```

db.Residence.insertMany([
  {"id_residence":1,"id_room":1,"id_customer":1,"id_admin":1,"residence_conditions":"Very cool",
    "residence_date_in":"2020-01-10","residence_date_out":"2020-01-14"},
  {"id_residence":2,"id_room":1,"id_customer":2,"id_admin":2,"residence_conditions":"Very good",
    "residence_date_in":"2020-01-16","residence_date_out":"2020-01-18"},
  {"id_residence":3,"id_room":2,"id_customer":3,"id_admin":1,"residence_conditions":"Great",
    "residence_date_in":"2020-01-17","residence_date_out":"2020-01-20"},
  {"id_residence":4,"id_room":3,"id_customer":4,"id_admin":3,"residence_conditions":"nice",
    "residence_date_in":"2020-01-21","residence_date_out":"2020-01-24"},
  {"id_residence":5,"id_room":4,"id_customer":1,"id_admin":2,"residence_conditions":"ok",
    "residence_date_in":"2020-01-22","residence_date_out":"2020-01-28"},

```

```

        {"id_residence":6,"id_room":1,"id_customer":1,"id_admin":1,"residence_conditions":"good",
        "residence_date_in":"2020-02-04","residence_date_out":"2020-02-10"}
    ])

```

```

> db.Residence.insertMany([
... {"id_residence":1,"id_room":1,"id_customer":1,"id_admin":1,"residence_conditions":"Very cool", "residence_date_in":"2020-01-10", "residence_date_out":"2020-01-14"},
... {"id_residence":2,"id_room":1,"id_customer":2,"id_admin":2,"residence_conditions":"Very good", "residence_date_in":"2020-01-16", "residence_date_out":"2020-01-18"},
... {"id_residence":3,"id_room":2,"id_customer":3,"id_admin":1,"residence_conditions":"Great", "residence_date_in":"2020-01-17", "residence_date_out":"2020-01-20"},
... {"id_residence":4,"id_room":3,"id_customer":4,"id_admin":3,"residence_conditions":"nice", "residence_date_in":"2020-01-21", "residence_date_out":"2020-01-24"},
... {"id_residence":5,"id_room":4,"id_customer":1,"id_admin":2,"residence_conditions":"ok", "residence_date_in":"2020-01-22", "residence_date_out":"2020-01-28"},
... {"id_residence":6,"id_room":1,"id_customer":1,"id_admin":1,"residence_conditions":"good", "residence_date_in":"2020-02-04", "residence_date_out":"2020-02-10"}
... ])
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("5fa452efbedec8332757b95c"),
    ObjectId("5fa452efbedec8332757b95d"),
    ObjectId("5fa452efbedec8332757b95e"),
    ObjectId("5fa452efbedec8332757b95f"),
    ObjectId("5fa452efbedec8332757b960"),
    ObjectId("5fa452efbedec8332757b961")
  ]
}

```

Таблица Service:

```

db.Service.insertMany([
    {"id_service":1,"id_customer":1,"id_admin":1,"id_employee":2,"service_description":"Zavtrak", "Total_cost":259},
    {"id_service":2,"id_customer":2,"id_admin":2,"id_employee":4,"service_description":"Tea", "Total_cost":100},
    {"id_service":3,"id_customer":5,"id_admin":1,"id_employee":2,"service_description":"Obed na dvoih", "Total_cost":500},
    {"id_service":4,"id_customer":1,"id_admin":2,"id_employee":2,"service_description":"Yzhin", "Total_cost":300},
    {"id_service":5,"id_customer":2,"id_admin":2,"id_employee":2,"service_description":"Zavtrak v2", "Total_cost":320}
])

```

```

> db.Service.insertMany([
... {"id_service":1,"id_customer":1,"id_admin":1,"id_employee":2,"service_description":"Zavtrak", "Total_cost":259},
... {"id_service":2,"id_customer":2,"id_admin":2,"id_employee":4,"service_description":"Tea", "Total_cost":100},
... {"id_service":3,"id_customer":5,"id_admin":1,"id_employee":2,"service_description":"Obed na dvoih", "Total_cost":500},
... ],
... {"id_service":4,"id_customer":1,"id_admin":2,"id_employee":2,"service_description":"Vzhin", "Total_cost":300},
... {"id_service":5,"id_customer":2,"id_admin":2,"id_employee":2,"service_description":"Zavtrak v2", "Total_cost":320}
... ])
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("5fa4550cbdec8332757b962"),
    ObjectId("5fa4550cbdec8332757b963"),
    ObjectId("5fa4550cbdec8332757b964"),
    ObjectId("5fa4550cbdec8332757b965"),
    ObjectId("5fa4550cbdec8332757b966")
  ]
}

```

### 3) Запросы:

а) Вывести полную информацию о больших комнатах

`db.Room.find({Type: "Big"})`

```
> db.Room.find({Type: "Big"})
{ "_id" : ObjectId("5fa43a7e715413bd99f6506d"), "ID_Room" : 1, "Floor" : 1, "Type" : "Big", "Cost" : 3000 }
{ "_id" : ObjectId("5fa43ad6715413bd99f65073"), "ID_Room" : 7, "Floor" : 3, "Type" : "Big", "Cost" : 3000 }
>
```

б) Вывести имена всех клиентов, приехавших из Москвы

`db.Customer.find({city:"Moscow"}, {name:true})`

```
> db.Customer.find({city:"Moscow"}, {name:true})
{ "_id" : ObjectId("5fa4379e715413bd99f65066"), "name" : "Igor Igorevich" }
{ "_id" : ObjectId("5fa437ea715413bd99f65067"), "name" : "Nikita Bondarev" }
{ "_id" : ObjectId("5fa43848715413bd99f65069"), "name" : "Petr Petrovich" }
{ "_id" : ObjectId("5fa4388e715413bd99f6506b"), "name" : "Sasha Aleksandrov" }
>
```

в) Вывести информацию о всех заказах превысивших 260 рублей:

`db.Service.find({"Total_cost": {$gt : 260 }},{_id:0})`

```
> db.Service.find({"Total_cost": {$gt : 260 }},{_id:0})
{ "id_service" : 3, "id_customer" : 5, "id_admin" : 1, "id_employee" : 2, "service_description" : "Obed na dvoih", "Total_cost" : 500 }
{ "id_service" : 4, "id_customer" : 1, "id_admin" : 2, "id_employee" : 2, "service_description" : "Yzhin", "Total_cost" : 300 }
{ "id_service" : 5, "id_customer" : 2, "id_admin" : 2, "id_employee" : 2, "service_description" : "Zavtrak v2", "Total_cost" : 320 }
>
```

г) Вывести все данные об уборках, которые проводил сотрудник №3:

`db.Cleaning.find({"id_employee":3})`

```
> db.Cleaning.find({"id_employee":3})
{ "_id" : ObjectId("5fa44f05bedec8332757b957"), "id_cleaning" : 2, "id_employee" : 3, "id_admin" : 1, "Cleaning_Floor" : 2, "Cleaning_Date" : "2020-01-15" }
{ "_id" : ObjectId("5fa44f05bedec8332757b95a"), "id_cleaning" : 5, "id_employee" : 3, "id_admin" : 2, "Cleaning_Floor" : 2, "Cleaning_Date" : "2020-01-30" }
{ "_id" : ObjectId("5fa44f05bedec8332757b95b"), "id_cleaning" : 6, "id_employee" : 3, "id_admin" : 2, "Cleaning_Floor" : 3, "Cleaning_Date" : "2020-01-30" }
>
```

## ВЫВОД

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