

Министерство науки и высшего образования Российской Федерации
ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ
“НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ
УНИВЕРСИТЕТ ИТМО”

ФАКУЛЬТЕТ СРЕДНЕГО ПРОФЕССИОНАЛЬНОГО ОБРАЗОВАНИЯ

ОТЧЕТ
ПО ЛАБОРАТОРНОЙ РАБОТЕ № 7
«Знакомство с MongoDB»

Специальность 09.02.07 «Информационные системы и программирование»

Дисциплина «Основы проектирования баз данных»

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1 ИНДИВИДУАЛЬНОЕ ЗАДАНИЕ

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

Задание:

- 1) Попытаться уменьшить размер модели реляционной базы данных, с которой Вы работали.
- 2) Реализовать модель в MongoDB.
- 3) Заполнить модель данными, чтобы все запросы пункта 4) выдавали непустые строки.
- 4) Реализовать минимум 40% запросов, сделанных в работе по реляционным базам данных в MongoDB.

Выполнение задания:

1. Новая модель данных:

Коллекция Animals {

_id :

name_animal :

kind_of_animal :

dofb :

gender :

type :

age :

ration : {

_id :

name_ration :

employee : {

_id :

exp :

dob :

}

}

habitat : {

name :

```

        place :
        }
    feeding : {
        breakfast :
        lunch :
        dinner :
    }
}

```

2. Логи процесса реализации модели в MongoDB:

```

db.animals.insert({_id : 12345, name_animal : "Nufa", kind_of_animal :
"chicken", dofb : new Date(2020, 2, 27), gender : "m", type : "mammal", age : 1, ration
: {_id : 99, name_ration : "a", employee : {_id : 55, exp : 2, dob : new Date(2000, 12,
15)}}}, habitat : {name : "hh", place : "Moscow"}, feeding : {breakfast : "q", lunch :
"y", dinner : "j"}})

```

```

{
  "_id" : 12345,
  "name_animal" : "Nufa",
  "kind_of_animal" : "chicken",
  "dofb" : ISODate("2020-03-26T21:00:00Z"),
  "gender" : "m",
  "type" : "mammal",
  "age" : 1,
  "ration" : {
    "_id" : 99,
    "name_ration" : "a",
    "employee" : {
      "_id" : 55,
      "exp" : 2,
      "dob" : ISODate("2001-01-14T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hh",
    "place" : "Moscow"
  },
  "feeding" : {
    "breakfast" : "q",
    "lunch" : "y",
    "dinner" : "j"
  }
}

```

```

db.animals.insert({_id : 12222, name_animal : "Kiil", kind_of_animal : "kid",
dofb : new Date(2020, 6, 30), gender : "m", type : "mammal", age : 1, ration : {_id :
99, name_ration : "a", employee : {_id : 55, exp : 2, dob : new Date(2000, 12, 15)}}},

```

```
habitat : {name : "hhhh", place : "SPb"}, feeding : {breakfast : "q", lunch : "y", dinner : "j"}))
```

```
{
  "_id" : 12222,
  "name_animal" : "Kiil",
  "kind_of_animal" : "kid",
  "dofb" : ISODate("2020-07-29T21:00:00Z"),
  "gender" : "m",
  "type" : "mammal",
  "age" : 1,
  "ration" : {
    "_id" : 99,
    "name_ration" : "a",
    "employee" : {
      "_id" : 55,
      "exp" : 2,
      "dob" : ISODate("2001-01-14T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hhhh",
    "place" : "SPb"
  },
  "feeding" : {
    "breakfast" : "q",
    "lunch" : "y",
    "dinner" : "j"
  }
}
```

```
db.animals.insert({_id : 2315, name_animal : "Lopa", kind_of_animal : "pig",
dofb : new Date(2020, 1, 15), gender : "w", type : "mammal", age : 3, ration : {_id :
98, name_ration : "a", employee : {_id : 56, exp : 3, dob : new Date(1985, 5, 21)}},
habitat : {name : "hhhhh", place : "MSK"}, feeding : {breakfast : "w", lunch : "u",
dinner : "h"}))
```

```
{
  "_id" : 2315,
  "name_animal" : "Lopa",
  "kind_of_animal" : "pig",
  "dofb" : ISODate("2020-02-14T21:00:00Z"),
  "gender" : "w",
  "type" : "mammal",
  "age" : 3,
  "ration" : {
    "_id" : 98,
    "name_ration" : "a",
    "employee" : {
      "_id" : 56,
      "exp" : 3,
      "dob" : ISODate("1985-06-20T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hhhhhh",
    "place" : "MSK"
  },
  "feeding" : {
    "breakfast" : "w",
    "lunch" : "u",
    "dinner" : "h"
  }
}
```

db.animals.insert({_id : 1, name_animal : "Lip", kind_of_animal : "chicken",
dofb : new Date(2020, 2, 25), gender : "w", type : "bird", age : 1, ration : {_id : 95,
name_ration : "a", employee : {_id : 57, exp : 4, dob : new Date(2000, 3, 2)}}}, habitat
: { name : "hhhh", place : "SPb"}, feeding : {breakfast : "t", lunch : "k", dinner : "x"}))

```
{
  "_id" : 1,
  "name_animal" : "Lip",
  "kind_of_animal" : "chicken",
  "dofb" : ISODate("2020-03-24T21:00:00Z"),
  "gender" : "w",
  "type" : "bird",
  "age" : 1,
  "ration" : {
    "_id" : 95,
    "name_ration" : "a",
    "employee" : {
      "_id" : 57,
      "exp" : 4,
      "dob" : ISODate("2000-04-01T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hhhh",
    "place" : "SPb"
  },
  "feeding" : {
    "breakfast" : "t",
    "lunch" : "k",
    "dinner" : "x"
  }
}
```

```
db.animals.insert({_id : 3, name_animal : "Wip", kind_of_animal : "lizard",  
dofb : new Date(2020, 2, 12), gender : "m", type : "reptile", age : 2, ration : {_id : 96,  
name_ration : "a", employee : {_id : 58, exp : 6, dob : new Date(1999, 2, 6)}}}, habitat  
: {name : "hh", place : "Moscow"}, feeding : {breakfast : "r", lunch : "b", dinner :  
"s"}))
```

```
{  
  "_id" : 3,  
  "name_animal" : "Wip",  
  "kind_of_animal" : "lizard",  
  "dofb" : ISODate("2020-03-11T21:00:00Z"),  
  "gender" : "m",  
  "type" : "reptile",  
  "age" : 2,  
  "ration" : {  
    "_id" : 96,  
    "name_ration" : "a",  
    "employee" : {  
      "_id" : 58,  
      "exp" : 6,  
      "dob" : ISODate("1999-03-05T21:00:00Z")  
    }  
  },  
  "habitat" : {  
    "name" : "hh",  
    "place" : "Moscow"  
  },  
  "feeding" : {  
    "breakfast" : "r",  
    "lunch" : "b",  
    "dinner" : "s"  
  }  
}
```

```
db.animals.insert({_id : 5, name_animal : "Qie", kind_of_animal : "lizard", dofb  
: new Date(2020, 2, 9), gender : "m", type : "reptile", age : 1, ration : {_id : 97,  
name_ration : "a", employee : {_id : 59, exp : 1, dob : new Date(1998, 3, 2)}}}, habitat  
: {name : "hhhh", place : "Moscow"}, feeding : {breakfast : "e", lunch : "i", dinner :  
"g"}))
```

```
{
  "_id" : 5,
  "name_animal" : "Qie",
  "kind_of_animal" : "lizard",
  "dofb" : ISODate("2020-03-08T21:00:00Z"),
  "gender" : "m",
  "type" : "reptile",
  "age" : 1,
  "ration" : {
    "_id" : 97,
    "name_ration" : "a",
    "employee" : {
      "_id" : 59,
      "exp" : 1,
      "dob" : ISODate("1998-04-01T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hhhh",
    "place" : "Moscow"
  },
  "feeding" : {
    "breakfast" : "e",
    "lunch" : "i",
    "dinner" : "g"
  }
}
```

3. Текст запросов со скриншотами запроса и результата:

1) Вывести информацию по сотрудникам зоопарка, имеющих стаж больше 2 лет.

```
db.animals.find({"ration.employee.exp" : { $gt : 2 }}, {"ration.employee" : 1, _id : 0}).pretty()
```

```
> db.animals.find({"ration.employee.exp" : { $gt : 2 }}, {"ration.employee" : 1, _id : 0}).pretty()
{
  "ration" : {
    "employee" : {
      "_id" : 56,
      "exp" : 3,
      "dob" : ISODate("1985-06-20T21:00:00Z")
    }
  }
}
{
  "ration" : {
    "employee" : {
      "_id" : 57,
      "exp" : 4,
      "dob" : ISODate("2000-04-01T21:00:00Z")
    }
  }
}
{
  "ration" : {
    "employee" : {
      "_id" : 58,
      "exp" : 6,
      "dob" : ISODate("1999-03-05T21:00:00Z")
    }
  }
}
```

2) Вывести информацию по рептилиям, живущим в Москве.

```
db.animals.find({"kind_of_animal" : "lizard", "habitat.place" : "Moscow"},  
{}).pretty()
```

```
> db.animals.find({"kind_of_animal" : "lizard", "habitat.place" : "Moscow"}, {}).pretty()  
{  
  "_id" : 3,  
  "name_animal" : "Wip",  
  "kind_of_animal" : "lizard",  
  "dob" : ISODate("2020-03-11T21:00:00Z"),  
  "gender" : "m",  
  "type" : "reptile",  
  "age" : 2,  
  "ration" : {  
    "_id" : 96,  
    "name_ration" : "a",  
    "employee" : {  
      "_id" : 58,  
      "exp" : 6,  
      "dob" : ISODate("1999-03-05T21:00:00Z")  
    }  
  },  
  "habitat" : {  
    "name" : "hh",  
    "place" : "Moscow"  
  },  
  "feeding" : {  
    "breakfast" : "r",  
    "lunch" : "b",  
    "dinner" : "s"  
  }  
}  
  
{  
  "_id" : 5,  
  "name_animal" : "Qie",  
  "kind_of_animal" : "lizard",  
  "dob" : ISODate("2020-03-08T21:00:00Z"),  
  "gender" : "m",  
  "type" : "reptile",  
  "age" : 1,  
  "ration" : {  
    "_id" : 97,  
    "name_ration" : "a",  
    "employee" : {  
      "_id" : 59,  
      "exp" : 1,  
      "dob" : ISODate("1998-04-01T21:00:00Z")  
    }  
  },  
  "habitat" : {  
    "name" : "hhhh",  
    "place" : "Moscow"  
  },  
  "feeding" : {  
    "breakfast" : "e",  
    "lunch" : "i",  
    "dinner" : "g"  
  }  
}
```

3) Вывести информацию по млекопитающим мужского пола

```
db.animals.find({"type" : "mammal", "gender" : "m"}, {}).pretty()
```



```

> db.animals.find({"type" : "mammal", "gender" : "m"}, {}).pretty()
{
  "_id" : 12345,
  "name_animal" : "Nufa",
  "kind_of_animal" : "chicken",
  "dob" : ISODate("2020-03-26T21:00:00Z"),
  "gender" : "m",
  "type" : "mammal",
  "age" : 1,
  "ration" : {
    "_id" : 99,
    "name_ration" : "a",
    "employee" : {
      "_id" : 55,
      "exp" : 2,
      "dob" : ISODate("2001-01-14T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hh",
    "place" : "Moscow"
  },
  "feeding" : {
    "breakfast" : "q",
    "lunch" : "y",
    "dinner" : "j"
  }
}
{
  "_id" : 12222,
  "name_animal" : "Kiil",
  "kind_of_animal" : "kid",
  "dob" : ISODate("2020-07-29T21:00:00Z"),
  "gender" : "m",
  "type" : "mammal",
  "age" : 1,
  "ration" : {
    "_id" : 99,
    "name_ration" : "a",
    "employee" : {
      "_id" : 55,
      "exp" : 2,
      "dob" : ISODate("2001-01-14T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hhhh",
    "place" : "SPb"
  },
  "feeding" : {
    "breakfast" : "q",
    "lunch" : "y",
    "dinner" : "j"
  }
}

```

4) Вывести информацию по животным, родившимся позже 2020 года

```
db.animals.find({"dob" : {$gt : ISODate("2020-03-08T21:00:00Z")}}).pretty()
```

```

> db.animals.find({"dob" : {$gt : ISODate("2020-03-08T21:00:00Z")}}).pretty()
{
  "_id" : 12345,
  "name_animal" : "Nufo",
  "kind_of_animal" : "chicken",
  "dob" : ISODate("2020-03-26T21:00:00Z"),
  "gender" : "m",
  "type" : "mammal",
  "age" : 1,
  "ration" : {
    "_id" : 99,
    "name_ration" : "a",
    "employee" : {
      "_id" : 55,
      "exp" : 2,
      "dob" : ISODate("2001-01-14T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hh",
    "place" : "Moscow"
  },
  "feeding" : {
    "breakfast" : "q",
    "lunch" : "y",
    "dinner" : "j"
  }
}
{
  "_id" : 12222,
  "name_animal" : "Kiil",
  "kind_of_animal" : "kid",
  "dob" : ISODate("2020-07-29T21:00:00Z"),
  "gender" : "m",
  "type" : "mammal",
  "age" : 1,
  "ration" : {
    "_id" : 99,
    "name_ration" : "a",
    "employee" : {
      "_id" : 55,
      "exp" : 2,
      "dob" : ISODate("2001-01-14T21:00:00Z")
    }
  },
  "habitat" : {
    "name" : "hhhh",
    "place" : "SPb"
  },
  "feeding" : {
    "breakfast" : "q",
    "lunch" : "y",
    "dinner" : "j"
  }
}

```