

**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

Тема задания Знакомство с MongoDB

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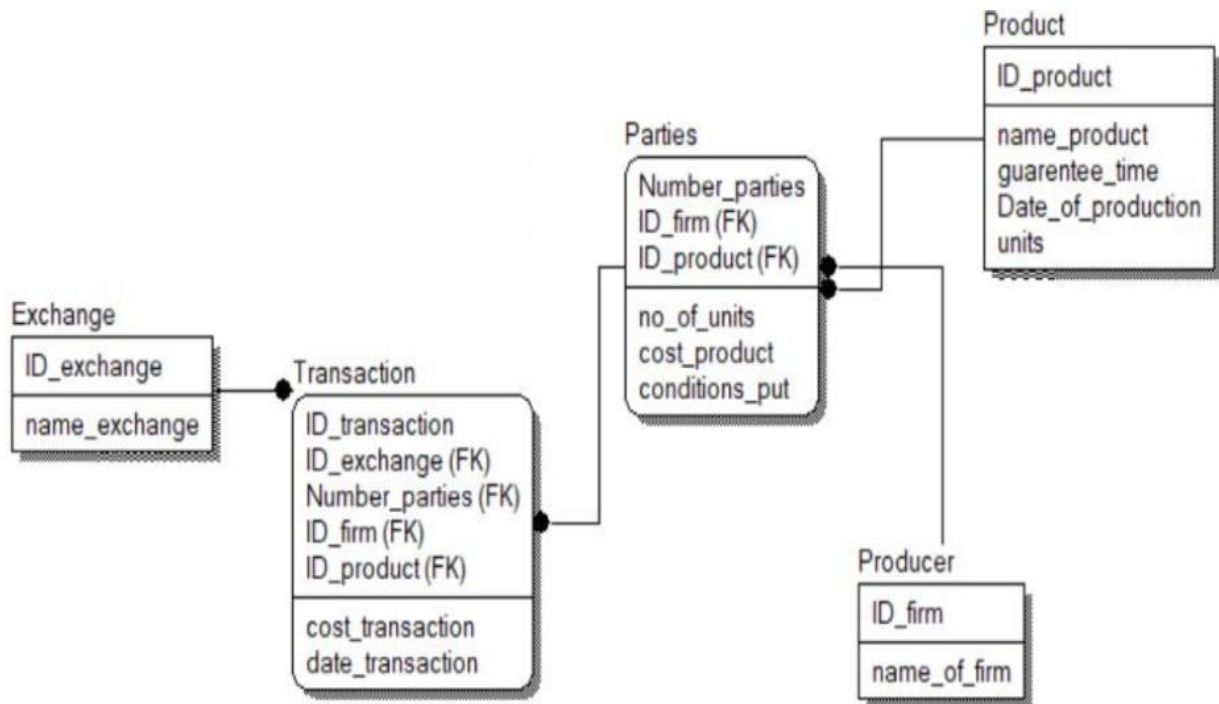
номер группы

**Санкт-Петербург
2020**

Цель работы

Овладеть практическими навыками и умениями реализации баз данных в MongoDB.

Модель базы данных



Создание базы в MongoDB

База данных создаётся командой: `use labwork`

```
> use labwork
switched to db labwork
```

```
... > db.createCollection("labwork")
... { "ok" : 1 }
```

Заполнение таблицы необходимыми данными.

```
> db.exchange.insertMany([
...   {
...     "amount": 100,
...     "price": 3000,
...     "manufacturer": "TitanWorks",
...     "product": {
...       "product_name": "Cobalt",
...       "date_of_manufacture": "20.01.2019",
...       "unit_of_measurement": "tonne"
...     },
...     "deal": {
...       "sum": 4550,
...       "date": "23.12.2019",
...       "exchange": "NYSE"
...     }
...   },
...   {
...     "amount": 19,
...     "price": 8000,
...     "manufacturer": "Amworks",
...     "product": {
...       "product_name": "Butter",
...       "date_of_manufacture": "21.03.2019",
...       "unit_of_measurement": "tonne"
...     },
...     "deal": {
...       "sum": 9200,
...       "date": "03.04.2020",

```

```
...     "exchange": "BSE"
...   },
...   {
...     "amount": 111,
...     "price": 90,
...     "manufacturer": "RProducts",
...     "product": {
...       "product_name": "milk",
...       "date_of_manufacture": "07.12.2018",
...       "unit_of_measurement": "tonne"
...     },
...     "deal": {
...       "sum": 80,
...       "date": "23.02.2020",
...       "exchange": "SPb"
...     }
...   },
...   {
...     "amount": 30,
...     "price": 5500,
...     "manufacturer": "AmWorks",
...     "product": {
...       "product_name": "Egg Yolk",
...       "date_of_manufacture": "24.03.2020",
...       "unit_of_measurement": "tonne"
...     },
...     "deal": {
...       "sum": 5000,
...       "date": "06.06.2020",
...       "exchange": "BSE"
...     }
...   },
...   {
...     "amount": 120,
...     "price": 8000,

```

```
...   }
... },
... {
...   "amount": 120,
...   "price": 8000,
...   "manufacturer": "Cadbury's",
...   "product": {
...     "product_name": "Eclairs",
...     "date_of_manufacture": "19.05.2020",
...     "unit_of_measurement": "tonne"
...   },
...   "deal": {
...     "sum": 25000,
...     "date": "23.02.2020",
...     "exchange": "SPb"
...   }
... }
... ])
```

Результат заполнения таблицы

```
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("5f86470271f95f40e46853db"),
    ObjectId("5f86470271f95f40e46853dc"),
    ObjectId("5f86470271f95f40e46853dd"),
    ObjectId("5f86470271f95f40e46853de"),
    ObjectId("5f86470271f95f40e46853df")
  ]
}
```

Запросы к базе данных

Получение записей, связанных с конкретным производителем

```
db.labworks.find({"producer":"AmWorks"})
```

```
> db.labworks.find({"manufacturer":"AmWorks"})
{ "_id" : ObjectId("5f86503171f95f40e46853e3"), "amount" : 30, "price" : 5500,
  "manufacturer" : "AmWorks", "product" : { "product_name" : "Egg Yolk", "date_of_manufacture" : "24.03.2020", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 5000, "date" : "06.06.2020", "exchange" : "BSE" } }
```

Получение записей, в которых сделка была на сумму больше 10000.

```
db.labworks.find({"deal.sum":{$gt: 10000}})
```

```
> db.labworks.find({"deal.sum":{$gt: 10000}})
{ "_id" : ObjectId("5f86503171f95f40e46853e4"), "amount" : 120, "price" : 8000,
  "manufacturer" : "Cadbury's", "product" : { "product_name" : "Eclairs", "date_of_manufacture" : "19.05.2020", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 25000, "date" : "23.02.2020", "exchange" : "SPb" } }
```

Получение записей о сделках, продуктом которых было Cobalt.

```
db.labworks.find({"product.product_name":"Cobalt"})
```

```
> db.labworks.find({"product.product_name":"Cobalt"})
{ "_id" : ObjectId("5f86503171f95f40e46853e0"), "amount" : 100, "price" : 3000,
  "manufacturer" : "TitanWorks", "product" : { "product_name" : "Cobalt", "date_of_manufacture" : "20.01.2019", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 4550, "date" : "23.12.2019", "exchange" : "NYSE" } }
```

Получение записей о сделках на бирже Санкт-Петербурга.

```
db.labworks.find({"deal.exchange":"SPb"})
```

```
> db.labworks.find({"deal.exchange":"SPb"})
{ "_id" : ObjectId("5f86503171f95f40e46853e2"), "amount" : 111, "price" : 90, "manufacturer" : "RProducts", "product" : { "product_name" : "milk", "date_of_manufacture" : "07.12.2018", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 80, "date" : "23.02.2020", "exchange" : "SPb" } }
{ "_id" : ObjectId("5f86503171f95f40e46853e4"), "amount" : 120, "price" : 8000, "manufacturer" : "Cadbury's", "product" : { "product_name" : "Eclairs", "date_of_manufacture" : "19.05.2020", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 25000, "date" : "23.02.2020", "exchange" : "SPb" } }
```

Получение записей, в которых цена товара больше 1000.

```
db.labworks.find({"price":{$gt: 1000}})
```

```
> db.labworks.find({"price":{$gt: 1000}})
{ "_id" : ObjectId("5f86503171f95f40e46853e0"), "amount" : 100, "price" : 3000, "manufacturer" : "TitanWorks", "product" : { "product_name" : "Cobalt", "date_of_manufacture" : "20.01.2019", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 4550, "date" : "23.12.2019", "exchange" : "NYSE" } }
{ "_id" : ObjectId("5f86503171f95f40e46853e1"), "amount" : 19, "price" : 8000, "manufacturer" : "Amworks", "product" : { "product_name" : "Butter", "date_of_manufacture" : "21.03.2019", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 9200, "date" : "03.04.2020", "exchange" : "BSE" } }
{ "_id" : ObjectId("5f86503171f95f40e46853e3"), "amount" : 30, "price" : 5500, "manufacturer" : "AmWorks", "product" : { "product_name" : "Egg Yolk", "date_of_manufacture" : "24.03.2020", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 5000, "date" : "06.06.2020", "exchange" : "BSE" } }
{ "_id" : ObjectId("5f86503171f95f40e46853e4"), "amount" : 120, "price" : 8000, "manufacturer" : "Cadbury's", "product" : { "product_name" : "Eclairs", "date_of_manufacture" : "19.05.2020", "unit_of_measurement" : "tonne" }, "deal" : { "sum" : 25000, "date" : "23.02.2020", "exchange" : "SPb" } }
```

Получение общей суммы сделок каждой компании производителя.

```
> var F1 = function() {  
...   emit(this.manufacturer, this.deal.sum);  
... };  
>  
> var F2 = function(name, dealsum) {  
...   return Array.sum(dealsum);  
... };  
> db.exchange.mapReduce(  
...   F1,  
...   F2,  
...   { out: "total_sum" }  
... )  
{ "result" : "total_sum", "ok" : 1 }  
> {  
...   "result" : "total_sum",  
...   "timeMillis" : 175,  
...   "counts" : {  
...     "input" : 5,  
...     "emit" : 5,  
...     "reduce" : 2,  
...   },  
...   "output" : 3  
... },  
... "ok" : 1  
... }
```

```
> db.total_sum.find()  
{ "_id" : "Amworks", "value" : 9200 }  
{ "_id" : "Cadbury's", "value" : 25000 }  
{ "_id" : "RProducts", "value" : 80 }  
{ "_id" : "AmWorks", "value" : 5000 }  
{ "_id" : "TitanWorks", "value" : 4550 }  
>
```

Вывод

В ходе работы были получены навыки написания запросов к базе данных средствами MongoDB, а также освоены принципы создания бД средствами MongoDB.