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«САНКТ-ПЕТЕРБУРГСКИЙ НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ  
УНИВЕРСИТЕТ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ,  
МЕХАНИКИ И ОПТИКИ»  
(УНИВЕРСИТЕТ ИТМО)  
Факультет среднего профессионального образования

ОТЧЁТ  
О ПРАКТИЧЕСКОЙ РАБОТЕ № 7  
по теме: Знакомство с MongoDB

Специальность 09.02.07 Информационные системы и программирование

Проверил:

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Дата: « \_\_\_\_ » \_\_\_\_\_ 2020г.

Оценка \_\_\_\_\_

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## ПОСТАНОВКА ЗАДАЧИ

Цель лабораторной работы №6: овладеть практическими навыками и умениями реализации баз данных в MongoDB.

## ЗАДАНИЕ

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

## ВЫПОЛНЕНИЕ

1. Создана новая модель данных, схема которой изображена на рисунке 1.

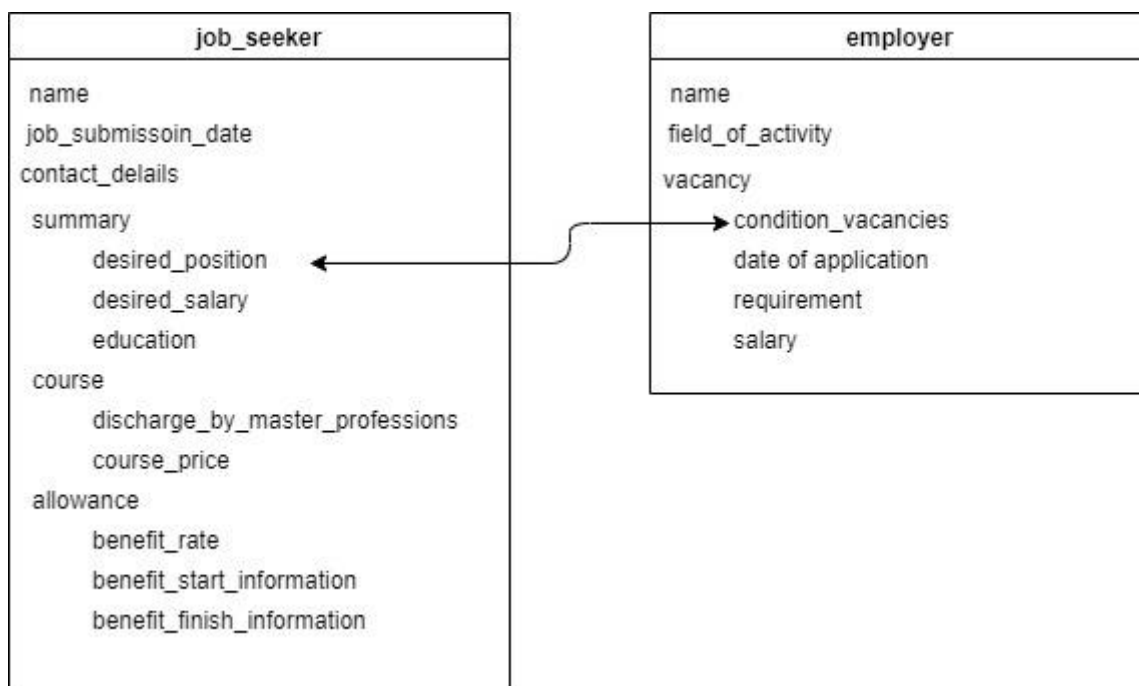


Рисунок 1 – Модель базы данных

2. Логи процесса реализации модели в MongoDB.

```
> use lr
```

```
switched to db lr
```

```
> db.createCollection("job_seeker")
```

```
{ "ok" : 1 }
```

```
> db.job_seeker.insert({"name":"Omar Ayuso","job_submissoin_date":new
Date('2020-04-28'),"contact_details":"777-18-49","summary":[{"desired_posi-
tion":"manager","desired_salary":50000,"education":"higher educa-
tion":"banker","desired_salary":75000,"education":"higher educa-
tion"}], "course":[{"discharge_by_master_professions":["ingeneer","me-
chanic"],"course_price":12000}]})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.job_seeker.insert({"name":"Aron Piper","job_submissoin_date":new
Date('2020-02-10'),"contact_details":"134-24-36","summary":{"desired_posi-
tion":"ingeneer","desired_salary":80000,"education":"higher education"},
"course":[{"discharge_by_master_professions":["ingeneer","me-
chanic"],"course_price":12000}, {"discharge_by_master_professions":["inge-
```

```
neer","builder"],["course_price":20000}], "allowance":{"benefit_rate":15000,"benefit_start_information":new Date('2020-03-10'), "benefit_start_information":new Date('2020-06-10')}})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.job_seeker.insert({"name":"Miguel Bernaeduau","job_submissoin_date":new Date('2020-02-25'),"contact_delails":"kimano@gmail.com","summary":[{"desired_position":"ingeneer","desired_salary":90000,"education":"secondary education"}, {"desired_position":"banker","desired_salary":75000,"education":"higher education"}], "course":[{"discharge_by_master_professions":["ingeneer","mechanic"],"course_price":12000}, {"discharge_by_master_professions":["banker","manager"],"course_price":12000}, {"discharge_by_master_professions":["ingeneer","builder"],"course_price":20000}], "allowance":{"benefit_rate":15000,"benefit_start_information":new Date('2020-02-25'), "benefit_finish_information":new Date('2020-06-25')}})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.job_seeker.insert({"name":"Itzan Escamilla","job_submissoin_date":new Date('2020-06-05'),"contact_delails":["milk@gmail.com","122-34-34"],"summary":[{"desired_position":"accountant","desired_salary":100000,"education":"higher education"}, {"desired_position":"manager","desired_salary":50000,"education":"higher education"}], "allowance":{"benefit_rate":17000,"benefit_start_information":new Date('2020-06-05')}})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.job_seeker.insert({"name":"Silvia Quer","job_submissoin_date":new Date('2020-01-10'),"contact_delails":["limonad@gmail.com","123-12-23"],"summary":{"desired_position":"journalist","desired_salary":650000,"education":"secondary education"}, "course":{"discharge_by_master_professions":["banker","manager"],"course_price":12000}, "allowance":{"benefit_rate":14000,"benefit_start_information":new Date('2020-01-10')}})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.createCollection("employer")
```

```
{ "ok" : 1 }
```

```
> db.employer.insert({"name":"JPMorgan","field_of_activity":"Bank", "vacancy":[{"condition_vacancies":"banker", "date of application":new Date('2020-06-08'),"requirement":["higher education","full day"], "salary":78000}, {"condition_vacancies":"ingeneer", "date of application":new Date('2020-05-08'),"re-
```

```
requirement":["higher education","full day"], "salary":70000},{ "condition_vacan-
cies":"manager", "date of application":new Date('2020-06-08'),"require-
ment":["higher education","part time"], "salary":85000}}])
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.employer.insert({ "name":"General Electric", "field_of_activity":"Engineer-
ing", "vacancy":[{"condition_vacancies":"journalist", "date of application":new
Date('2020-04-28'),"requirement":"full day", "salary":68000}, {"condition_vacan-
cies":"ingeneer", "date of application":new Date('2020-04-29'),"require-
ment":["higher education","full day"], "salary":70000}, {"condition_vacan-
cies":"manager", "date of application":new Date('2020-04-29'),"require-
ment":["higher education","full day"], "salary":75000}, {"condition_vacan-
cies":"mechanic", "date of application":new Date('2020-05-08'),"sal-
ary":45000}]})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.employer.insert({ "name":"Citigroup", "field_of_activity":"Bank", "va-
cancy":{"condition_vacancies":"banker", "date of application":new Date('2020-
05-13'),"requirement":["higher education","full day"], "salary":70000}})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.employer.insert({ "name":"Wells Fargo", "field_of_activity":"Bank", "va-
cancy":[{"condition_vacancies":"banker", "date of application":new Date('2020-
05-15'),"requirement":["higher education","full day"], "salary":70000}, {"condi-
tion_vacancies":"journalist", "date of application":new Date('2020-05-28'),"re-
quirement":["higher education","full day"], "salary":60000}]})
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.employer.insert({ "name":"Ford", "field_of_activity":"Engineering", "va-
cancy":[{"condition_vacancies":"manager", "date of application":new Date('2020-
05-29'),"requirement":["higher education","full day"], "salary":70000}, {"condi-
tion_vacancies":"mechanic", "date of application":new Date('2020-05-18'),"sal-
ary":50000}, {"condition_vacancies":"ingeneer", "date of application":new
Date('2020-05-23'),"requirement":["higher education","full day"], "sal-
ary":70000}, {"condition_vacancies":"manager", "date of application":new
Date('2020-05-29'),"requirement":["higher education","full day"], "sal-
ary":75000}, {"condition_vacancies":"mechanic", "date of application":new
Date('2020-05-20'),"salary":45000}]})
```

```
WriteResult({ "nInserted" : 1 })
```

### 3. Запросы:

а) Подсчитать количество выплачиваемых пособий на текущий момент.

```
db.job_seeker.count( {'allowance.benefit_finish_information': { '$exists' : false
}})
```

```
db.job_seeker.count( {'allowance.benefit_finish_information': { '$exists' : false }})
4
>
_
```

- b) Подсчитать количество вакансий, в которых требуется высшее образование и заработная плата от 5000 до 60000.

```
db.employer.count({'vacancy.requirement':"higher education",'vacancy.salary':{' $gte: 5000, $lte: 60000 } })
```

```
> db.employer.count({'vacancy.requirement':"higher education",'vacancy.salary':{' $gte: 5000, $lte: 60000 } })
3
>
_
```

- c) Показать список специальностей и квалификации, для которых курсы стоят больше 5000

```
db.job_seeker.find({'course.course_price':{'$gte :5000}}, {course:1, _id:0})
```

```
> db.job_seeker.find({'course.course_price':{'$gte :5000}}, {course:1, _id:0})
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "banker", "manager" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "banker", "manager" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "banker", "manager" ], "course_price" : 12000 } ] }
_
```

- d) Показать отсортированные по возрастанию специальности, где курсы по повышению квалификации относятся к профессии Механик и цена курсов больше 1200.

```
db.job_seeker.find( { "course": { $elemMatch: { discharge_by_master_professions: 'mechanic', course_price: { $gte :12000 } } } })
```

```
> db.job_seeker.find( { "course": { $elemMatch: { discharge_by_master_professions: 'mechanic', course_price: { $gte :12000 } } } })
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "ingeneer", "mechanic" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "banker", "manager" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "banker", "manager" ], "course_price" : 12000 }, { "discharge_by_master_professions" : [ "ingeneer", "builder" ], "course_price" : 20000 } ] }
{ "course" : [ { "discharge_by_master_professions" : [ "banker", "manager" ], "course_price" : 12000 } ] }
_
```

- e) Посчитать количество дней выплат пособий.

```
db.job_seeker.aggregate( [ { $project: { allowance: 1, total: { $subtract: [ new Date(), "$allowance.benefit_start_information" ] } } } ] )
```

```
> db.job_seeker.aggregate( [ { $project: { allowance: 1, total: { $subtract: [ "$$NOW", "$allowance.benefit_start_information" ] } } } ] )
{ "_id" : "5ee6403cbb211d5abf065e9a", "total" : null, "allowance" : 1 }
{ "_id" : "5ee6403cbb211d5abf065e9b", "total" : 405125861, "allowance" : 1 }
{ "_id" : "5ee6403cbb211d5abf065e9c", "total" : 9563525861, "allowance" : 1 }
{ "_id" : "5ee6403cbb211d5abf065e9d", "total" : 837125861, "allowance" : 1 }
{ "_id" : "5ee6403cbb211d5abf065e9e", "total" : 13537925861, "allowance" : 1 }
```

- f) Получить все возможные варианты вакансий для соискателей.

```
db.employer.find({},{vacancy:1,_id:0})
```

```

> db.employer.find({}, {vacancy:1, _id:0})
{ "vacancy" : [ { "condition_vacancies" : "banker", "date_of_application" : ISODate("2020-06-08T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 78000 }, { "condition_vacancies" : "ingenieur", "date_of_application" : ISODate("2020-05-08T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 70000 }, { "condition_vacancies" : "manager", "date_of_application" : ISODate("2020-06-08T00:00:00Z"), "requirement" : [ "higher education", "part time" ], "salary" : 85000 } ] }
{ "vacancy" : [ { "condition_vacancies" : "journalist", "date_of_application" : ISODate("2020-04-28T00:00:00Z"), "requirement" : "full day", "salary" : 68000 }, { "condition_vacancies" : "ingenieur", "date_of_application" : ISODate("2020-04-29T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 70000 }, { "condition_vacancies" : "manager", "date_of_application" : ISODate("2020-04-29T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 75000 }, { "condition_vacancies" : "mechanic", "date_of_application" : ISODate("2020-05-08T00:00:00Z"), "salary" : 45000 } ] }
{ "vacancy" : [ { "condition_vacancies" : "banker", "date_of_application" : ISODate("2020-05-13T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 70000 } ] }
{ "vacancy" : [ { "condition_vacancies" : "banker", "date_of_application" : ISODate("2020-05-15T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 70000 }, { "condition_vacancies" : "journalist", "date_of_application" : ISODate("2020-05-28T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 60000 } ] }
{ "vacancy" : [ { "condition_vacancies" : "manager", "date_of_application" : ISODate("2020-05-29T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 70000 }, { "condition_vacancies" : "mechanic", "date_of_application" : ISODate("2020-05-18T00:00:00Z"), "salary" : 50000 }, { "condition_vacancies" : "ingenieur", "date_of_application" : ISODate("2020-05-23T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 70000 }, { "condition_vacancies" : "manager", "date_of_application" : ISODate("2020-05-29T00:00:00Z"), "requirement" : [ "higher education", "full day" ], "salary" : 75000 }, { "condition_vacancies" : "mechanic", "date_of_application" : ISODate("2020-05-20T00:00:00Z"), "salary" : 45000 } ] }

```



## ВЫВОД

В практической работе №6 были получены практические навыки создания таблиц базы данных в MongoDB, заполнения их рабочими данными, резервного копирования и восстановления баз данных.