

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНОМУ УНІВЕРСИТЕТІ “ЛЬВІВСЬКА
ПОЛІТЕХНІКА”**

Кафедра систем штучного інтелекту

**Лабораторна робота №14
з дисципліни
«Організація баз даних та знань»**

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Лабораторна робота №14

Тема: “Розробка бази даних типу NoSQL”

Мета роботи: здобуття практичних навичок створення та обробки бази даних типу NoSQL на прикладі СУБД MongoDB.

Короткі теоретичні відомості.

Функціональні можливості:

- узгодженість даних
- транзакції
- доступність
- можливості запитів
- масштабування

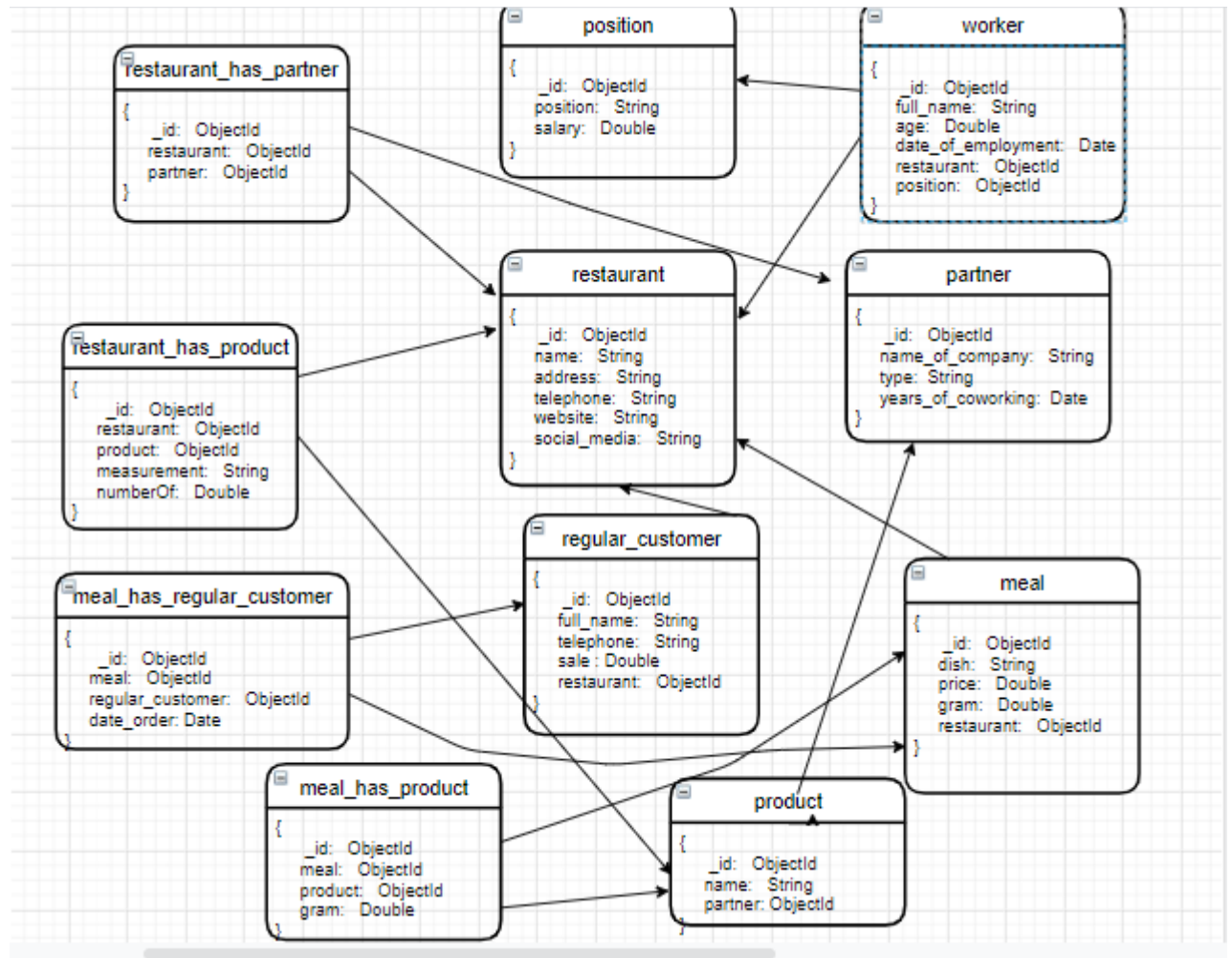
Типи значень:

- String • Array (масив)
- Binary data (двоичные данные)
- Boolean
- Date
- Double
- Integer
- JavaScript
- Min key/Max key
- Null
- Object
- ObjectId
- Regular expression
- Symbol
- Timestamp

Завдання.

1. Розробити схему бази даних на основі предметної області з лабораторної роботи №1 у спосіб, що застосовується в СУБД MongoDB..

Розроблена схема.



2. Перетворити сутності діаграми БД, розробленої для лабораторної роботи №1, у структури, прийнятні для обробки в MongoDB.

Створюю бд restaurantbusiness.

```
> use restaurantbusiness
switched to db restaurantbusiness
```

Додаю колекції на основі предметної області з лабораторної роботи №1.

```

> db.createCollection('restaurant')
{ "ok" : 1 }
> show collections
restaurant
> db.createCollection('worker')
{ "ok" : 1 }
> db.createCollection('position')
{ "ok" : 1 }
> db.createCollection('partner')
{ "ok" : 1 }
> db.createCollection('product')
{ "ok" : 1 }
> db.createCollection('meal')
{ "ok" : 1 }
> db.createCollection('regular_customer')
{ "ok" : 1 }
> show collections

```

```

> db.createCollection('meal_has_product',{
... capped:true,
... size:9500,
... max:100});
{ "ok" : 1 }

```

```

> db.createCollection('restaurant_has_product',{ capped:true, autoIndexId:true,size:9000,max:100});
{
  "note" : "the autoIndexId option is deprecated and will be removed in a future release",
  "ok" : 1
}
> db.createCollection('restaurant_has_partner',{capped:true,size:10000});
{ "ok" : 1 }
> db.createCollection('meal_has_regular_customer',{capped:true,size:10000,validationLevel:"off"});
{ "ok" : 1 }

```

Виконую insertOne(),insert(),insertMany().Таким чином заповнюю всі колекції.

```

> Burger = ({ "dish" : "Big Mack","price":90,"gram":300,restaurant:2});
{ "dish" : "Big Mack", "price" : 90, "gram" : 300, "restaurant" : 2 }

```

```

> db.meal.insert(Burger)
WriteResult({ "nInserted" : 1 })
> db.meal.insertOne({"dish" : "Spaghetti","price":150,"gram":450,restaurant:5ec06a8161bc856fc9722bea});
2020-05-17T01:50:30.298+0300 E QUERY [js] uncaught exception: SyntaxError: missing exponent :
@(shell):1:74
> db.meal.insertOne({"dish" : "Spaghetti","price":150,"gram":450,restaurant:"5ec06a8161bc856fc9722bea"});
{
  "acknowledged" : true,
  "insertedId" : ObjectId("5ec06e4361bc856fc9722bed")
}
> db.meal.find()
{ "_id" : ObjectId("5ec06de361bc856fc9722bec"), "dish" : "Big Mack", "price" : 90, "gram" : 300, "restaurant" : 2 }
{ "_id" : ObjectId("5ec06e4361bc856fc9722bed"), "dish" : "Spaghetti", "price" : 150, "gram" : 450, "restaurant" : "5ec06a8161bc856fc9722bea" }
>

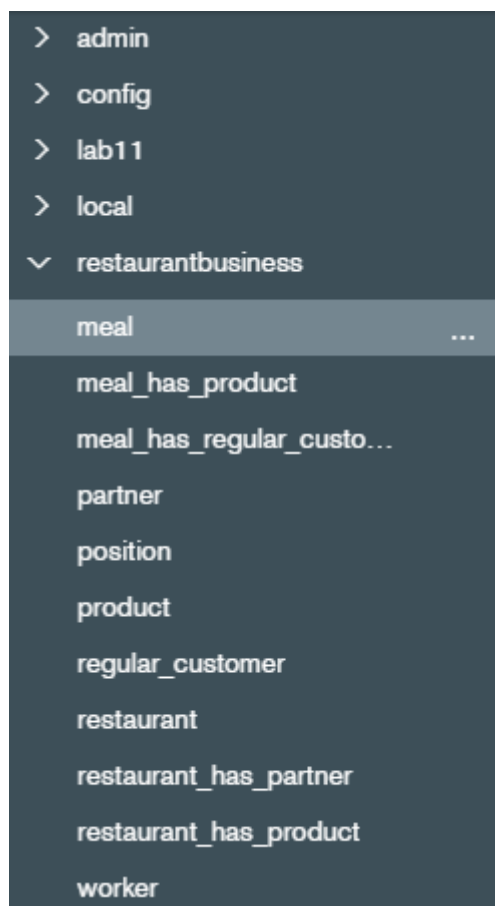
```

```











































> db.restaurant.insertMany([
... {"name": "Korona", "description": "Best rest in Lviv", "adress": "Doroshenka st.", "telephone": "0932342010", "website": "https://", "social_media": "https://vk.com/"},
... {"name": "Galytskyi Dvir", "adress": "Chmelnyckogo st.", "telephone": "+380932342010", "website": "", "social_media": ""},
... {"name": "Zora", "description": "Best rest in Lviv", "adress": "Saharova st.", "telephone": "0932421043", "website": "", "social_media": ""},
... {"name": "Nova Galaxy", "adress": "Mickelangelo st.", "telephone": "+380931421043", "website": "", "social_media": ""},
... {"name": "Bescyd", "description": "Best rest in Lviv", "adress": "Maksimenka st.", "telephone": "2334402", "website": "", "social_media": ""},
... {"name": "Romantic", "description": "", "adress": "Derevyana st.", "telephone": "2379201", "website": "", "social_media": ""},
... {"name": "Mom's Spaghetti", "description": "", "adress": "Maxymovycha st.", "telephone": "2304020", "website": "", "social_media": ""},
... {"name": "Friends", "description": "Best zone in Lviv", "adress": "Novovolynska st.", "telephone": "24023021", "website": "", "social_media": ""},
... {"name": "Zakarpattia", "adress": "Tymoshenka st.", "telephone": "2134123", "website": "", "social_media": ""},
... {"name": "Twister", "description": "Best place in Lviv", "adress": "Volodymyra Velykoho", "telephone": "123423", "website": "", "social_media": ""},
... {"name": "Wood", "description": "", "adress": "Novotroicka st.", "telephone": "23421342", "website": "", "social_media": ""},
... {"name": "Kfc", "description": "Best rest in Lviv", "adress": "Symonenka st.", "telephone": "2341234", "website": "", "social_media": ""},
... {"name": "Macdonalds", "description": "", "adress": "Naukova st.", "telephone": "", "website": "93929192", "social_media": ""},
... {"name": "Shawerma", "description": "Best rest in Lviv", "adress": "Pasichna st.", "telephone": "03920123", "website": "", "social_media": ""},
... {"name": "DesertWorld", "description": "", "adress": "Dvirceva st.", "telephone": "23428439", "website": "", "social_media": ""}
... ]);
{
  "acknowledged": true,
  "insertedIds": [
    ObjectId("5ec06a8161bc856fc9722bdc"),
    ObjectId("5ec06a8161bc856fc9722bdd"),
    ObjectId("5ec06a8161bc856fc9722bde"),
    ObjectId("5ec06a8161bc856fc9722bdf"),
    ObjectId("5ec06a8161bc856fc9722be0"),
    ObjectId("5ec06a8161bc856fc9722be1"),
    ObjectId("5ec06a8161bc856fc9722be2"),
    ObjectId("5ec06a8161bc856fc9722be3"),
    ObjectId("5ec06a8161bc856fc9722be4"),
    ObjectId("5ec06a8161bc856fc9722be5"),
    ObjectId("5ec06a8161bc856fc9722be6"),
    ObjectId("5ec06a8161bc856fc9722be7"),
    ObjectId("5ec06a8161bc856fc9722be8"),
    ObjectId("5ec06a8161bc856fc9722be9"),
    ObjectId("5ec06a8161bc856fc9722bea")
  ]
}

```

Бд та колекції restaurantbusiness в MongoDBCompass.



Документи ресторану в табличній формі MongoDBCompass

restaurant						
	_id Double	name String	description String	adress String	telephone String	
1	1	"Korona"	"Best rest in Lviv"	"Doroshenka st."	"0932342010"	  
2	2	"Galytsky Dvir"	No field	"Chmelnyckogo st."	"+380932342010"	  
3	3	"Zora"	"Best rest in Lviv"	"Saharova st."	"0932421043"	  
4	4	"Nova Galaxy"	No field	"Mickelangelo st."	"+380931421043"	  
5	5	"Bescyd"	"Best rest in Lviv"	"Maksimenka st."	"2334402"	  
6	6	"Romantic"	"	"Derevyana st."	"2379201"	  
7	7	"Mom's Spaghetti"	"	"Maxymovycha st."	"2304020"	  
8	8	"Friends"	"Best zone in Lviv"	"Novovolynska st."	"24023021"	  
9	9	"Zakarpattya"	No field	"Tymoshenka st."	"2134123"	  
10	10	"Twister"	"Best place in Lviv"	"VolodymyraVelykoho "	"123423"	  
11	11	"Wood"	"	"Novotroicka st."	"23421342"	  
12	12	"Kfc"	"Best rest in Lviv"	"Symonenka st."	"2341234"	  
13	13	"Macdonalds"	"	"Naukova st."	"	  
14	14	"Shawerma"	"Best rest in Lviv"	"Pasichna st."	"03920123"	  

3. Забезпечити реалізацію функцій редагування, додавання та видалення інформації в «сутність».

Вибірка даних

```
> db.meal.find().skip(1).limit(2)
{ "_id" : ObjectId("5ec06e4361bc856fc9722bed"), "dish" : "Spaghetti", "price" : 150, "gram" : 450, "restaurant" : "5ec06a8161bc856fc9722bea" }
{ "_id" : ObjectId("5ec0887961bc856fc9722c01"), "dish" : "Soup with fish", "price" : 220, "gram" : 300, "restaurant" : "5ec06a8161bc856fc9722bdd" }
```

Вибірка без _id.

```
> db.meal.find({}, {_id:0}).skip(1).limit(4)
{ "dish" : "Spaghetti", "price" : 150, "gram" : 450, "restaurant" : "5ec06a8161bc856fc9722bea" }
{ "dish" : "Soup with fish", "price" : 220, "gram" : 300, "restaurant" : "5ec06a8161bc856fc9722bdd" }
{ "dish" : "Pudding", "price" : 175, "gram" : 400, "restaurant" : "5ec06a8161bc856fc9722bde" }
{ "dish" : "Salat with fish", "price" : 120, "gram" : 200, "restaurant" : "5ec06a8161bc856fc9722be2" }
```

Сортування елементів.

```
> db.partner.find({}, {_id:0}).sort({name_of_company:1});
{ "name_of_company" : "Baker", "type" : "Food filler", "years_of_coworking" : ISODate("2005-04-03T00:00:00Z") }
{ "name_of_company" : "BestServe", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2000-09-10T00:00:00Z") }
{ "name_of_company" : "Breader", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "Bubbles", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2012-04-06T00:00:00Z") }
{ "name_of_company" : "ChemicWorld", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2003-04-06T00:00:00Z") }
{ "name_of_company" : "Fanta", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "Lobsters", "type" : "Food filler", "years_of_coworking" : ISODate("2010-03-02T00:00:00Z") }
{ "name_of_company" : "Meater", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-02T00:00:00Z") }
{ "name_of_company" : "TechLeader", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2008-09-10T00:00:00Z") }
> db.partner.find({}, {_id:0}).sort({name_of_company:-1});
{ "name_of_company" : "TechLeader", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2008-09-10T00:00:00Z") }
{ "name_of_company" : "Meater", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-02T00:00:00Z") }
{ "name_of_company" : "Lobsters", "type" : "Food filler", "years_of_coworking" : ISODate("2010-03-02T00:00:00Z") }
{ "name_of_company" : "Fanta", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "ChemicWorld", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2003-04-06T00:00:00Z") }
{ "name_of_company" : "Bubbles", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2012-04-06T00:00:00Z") }
{ "name_of_company" : "Breader", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "BestServe", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2000-09-10T00:00:00Z") }
{ "name_of_company" : "Baker", "type" : "Food filler", "years_of_coworking" : ISODate("2005-04-03T00:00:00Z") }
```

```
> db.partner.find({}, {_id:0}).sort({years_of_coworking:1,name_of_company:1});
{ "name_of_company" : "BestServe", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2000-09-10T00:00:00Z") }
{ "name_of_company" : "Your Lavash", "type" : "Food filler", "years_of_coworking" : ISODate("2000-09-10T00:00:00Z") }
{ "name_of_company" : "Meater", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-02T00:00:00Z") }
{ "name_of_company" : "Breader", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "Fanta", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "ChemicWorld", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2003-04-06T00:00:00Z") }
{ "name_of_company" : "Baker", "type" : "Food filler", "years_of_coworking" : ISODate("2005-04-03T00:00:00Z") }
{ "name_of_company" : "TechLeader", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2008-09-10T00:00:00Z") }
{ "name_of_company" : "Lobsters", "type" : "Food filler", "years_of_coworking" : ISODate("2010-03-02T00:00:00Z") }
{ "name_of_company" : "Bubbles", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2012-04-06T00:00:00Z") }
```

```
> db.partner.find({}, {_id:0}).sort({years_of_coworking:1,name_of_company:-1});
{ "name_of_company" : "Your Lavash", "type" : "Food filler", "years_of_coworking" : ISODate("2000-09-10T00:00:00Z") }
{ "name_of_company" : "BestServe", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2000-09-10T00:00:00Z") }
{ "name_of_company" : "Meater", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-02T00:00:00Z") }
{ "name_of_company" : "Fanta", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "Breader", "type" : "Food filler", "years_of_coworking" : ISODate("2001-04-03T00:00:00Z") }
{ "name_of_company" : "ChemicWorld", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2003-04-06T00:00:00Z") }
{ "name_of_company" : "Baker", "type" : "Food filler", "years_of_coworking" : ISODate("2005-04-03T00:00:00Z") }
{ "name_of_company" : "TechLeader", "type" : "Technical Supplier", "years_of_coworking" : ISODate("2008-09-10T00:00:00Z") }
{ "name_of_company" : "Lobsters", "type" : "Food filler", "years_of_coworking" : ISODate("2010-03-02T00:00:00Z") }
{ "name_of_company" : "Bubbles", "type" : "Chemical Supplier", "years_of_coworking" : ISODate("2012-04-06T00:00:00Z") }
```

Вибірка працівників ресторану з операторами \$or,\$gte,\$lte.


```
> db.worker.find({age:{$gte:new Date('2000-01-01')},restaurant:"5ec06a8161bc856fc9722be3"},{_id:0}).pretty()
{
  "full_name" : "Danilo Mashtaler",
  "age" : ISODate("2000-03-02T00:00:00Z"),
  "telephone" : "099234929",
  "date_of_employment" : ISODate("2014-09-05T00:00:00Z"),
  "restaurant" : "5ec06a8161bc856fc9722be3",
  "position" : "5ec0844261bc856fc9722bee"
}
{
  "full_name" : "Max Gioman",
  "age" : ISODate("2001-01-02T00:00:00Z"),
  "telephone" : "086234929",
  "date_of_employment" : ISODate("2021-04-06T00:00:00Z"),
  "restaurant" : "5ec06a8161bc856fc9722be3",
  "position" : "5ec0844261bc856fc9722bef"
}
{
  "full_name" : "Misha Grainy",
  "age" : ISODate("2002-08-09T00:00:00Z"),
  "telephone" : "024234929",
  "date_of_employment" : ISODate("2018-03-08T00:00:00Z"),
  "restaurant" : "5ec06a8161bc856fc9722be3",
  "position" : "5ec0844261bc856fc9722bf1"
}
```

```
> db.worker.find({$or: [{age:{$lte:new Date('2001-01-01')},date_of_employment:{$gte:new Date('2000-01-01')}}],{_id:0}).pretty()
{
  "full_name" : "Yaroslav Gladi",
  "age" : ISODate("2000-08-08T00:00:00Z"),
  "telephone" : "035234929",
  "date_of_employment" : ISODate("2014-10-10T00:00:00Z"),
  "restaurant" : "5ec06a8161bc856fc9722be1",
  "position" : "5ec0844261bc856fc9722bf0"
}
{
  "full_name" : "Danilo Mashtaler",
  "age" : ISODate("2000-03-02T00:00:00Z"),
  "telephone" : "099234929",
  "date_of_employment" : ISODate("2014-09-05T00:00:00Z"),
  "restaurant" : "5ec06a8161bc856fc9722be3",
  "position" : "5ec0844261bc856fc9722bee"
}
{
  "full_name" : "Vova Deykstra",
  "age" : ISODate("2000-05-02T00:00:00Z"),
  "telephone" : "093334923",
  "date_of_employment" : ISODate("2019-05-02T00:00:00Z"),
  "restaurant" : "5ec06a8161bc856fc9722be1",
  "position" : "5ec0844261bc856fc9722bef"
}
```

Update документів.

Зміна адреси ресторану за назвою, функція update().

12	5ec06a8161bc856fc9722be7	"Kfc"	"Best rest in Lviv"	"Symonenka st."	"2341234"
----	--------------------------	-------	---------------------	-----------------	-----------

```
> db.restaurant.updateOne({"name":"Kfc"},{$set:{adress:"Prospekt Svobody"}});
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
```

12	5ec06a8161bc856fc9722be7	"Kfc"	"Best rest in Lviv"	"Prospekt Svobody"	"2341234"
----	--------------------------	-------	---------------------	--------------------	-----------

Зміна всіх грамовок, де ціна більша, ніж 130, або к-сть грам менша 300, функція updateMany()

meal

	_id ObjectId	dish String	price Double	gram Double	restaurant Mixed
1	5ec06de361bc856fc9722bec	"Big Mack"	90	300	2
2	5ec06e4361bc856fc9722bed	"Spaghetti"	150	150	"5ec06a8161bc856fc9722bea"
3	5ec0887961bc856fc9722c01	"Soup with fish"	220	200	"5ec06a8161bc856fc9722bdd"
4	5ec0887961bc856fc9722c02	"Pudding"	175	300	"5ec06a8161bc856fc9722bde"
5	5ec0887961bc856fc9722c03	"Salat with fish"	120	110	"5ec06a8161bc856fc9722be2"
6	5ec0887961bc856fc9722c04	"Sushi"	440	320	"5ec06a8161bc856fc9722be3"

```
> db.meal.updateMany({$or:[{"price":{$gt:130}},{"gram":{$lt:300}}]},{$inc: {"gram": 50}});
{"acknowledged": true, "matchedCount": 5, "modifiedCount": 5}
```

meal					
	_id ObjectId	dish String	price Double	gram Double	restaurant Mixed
1	5ec06de361bc856fc9722bec	"Big Mack"	90	300	2
2	5ec06e4361bc856fc9722bed	"Spaghetti"	150	200	"5ec06a8161bc856fc9722bea"
3	5ec0887961bc856fc9722c01	"Soup with fish"	220	250	"5ec06a8161bc856fc9722bdd"
4	5ec0887961bc856fc9722c02	"Pudding"	175	350	"5ec06a8161bc856fc9722bde"
5	5ec0887961bc856fc9722c03	"Salat with fish"	120	160	"5ec06a8161bc856fc9722be2"
6	5ec0887961bc856fc9722c04	"Sushi"	440	370	"5ec06a8161bc856fc9722be3"

Розглянемо колекцію meal_has_product. Це колекція з id-атрибутами meal, product

```
> db.meal_has_product.find()
{ "_id" : ObjectId("5ec16043c3c518b3a946801d"), "meal" : "5ec0887961bc856fc9722c01", "product" : [ "5ec0863661bc856fc9722bfa", "5ec15633c3c518b3a9468013" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a946801e"), "meal" : "5ec06de361bc856fc9722bec", "product" : [ "5ec0863661bc856fc9722bf8", "5ec0863661bc856fc9722bf9" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a946801f"), "meal" : "5ec06e4361bc856fc9722bed", "product" : [ "5ec15633c3c518b3a9468014" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a9468020"), "meal" : "5ec0887961bc856fc9722c02", "product" : [ ] }
{ "_id" : ObjectId("5ec16043c3c518b3a9468021"), "meal" : "5ec0887961bc856fc9722c03", "product" : [ "5ec15633c3c518b3a9468015" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a9468022"), "meal" : "5ec0887961bc856fc9722c04", "product" : [ "5ec0863661bc856fc9722bfa" ] }
```

Колекції meal та product

```
db.meal.find()
{ "_id" : ObjectId("5ec06de361bc856fc9722bec"), "dish" : "Big Mack", "price" : 90, "gram" : 300, "restaurant" : 2 }
{ "_id" : ObjectId("5ec06e4361bc856fc9722bed"), "dish" : "Spaghetti", "price" : 150, "gram" : 200, "restaurant" : "5ec06a8161bc856fc9722bea" }
{ "_id" : ObjectId("5ec0887961bc856fc9722c01"), "dish" : "Soup with fish", "price" : 220, "gram" : 250, "restaurant" : "5ec06a8161bc856fc9722bdd" }
{ "_id" : ObjectId("5ec0887961bc856fc9722c02"), "dish" : "Pudding", "price" : 175, "gram" : 350, "restaurant" : "5ec06a8161bc856fc9722bde" }
{ "_id" : ObjectId("5ec0887961bc856fc9722c03"), "dish" : "Salat with fish", "price" : 120, "gram" : 160, "restaurant" : "5ec06a8161bc856fc9722be2" }
{ "_id" : ObjectId("5ec0887961bc856fc9722c04"), "dish" : "Sushi", "price" : 440, "gram" : 370, "restaurant" : "5ec06a8161bc856fc9722be3" }

db.product.find()
{ "_id" : ObjectId("5ec0863661bc856fc9722bf8"), "name" : "Bread", "partner" : "5ec085ad61bc856fc9722bf6" }
{ "_id" : ObjectId("5ec0863661bc856fc9722bf9"), "name" : "Meat", "partner" : "5ec085bc61bc856fc9722bf7" }
{ "_id" : ObjectId("5ec0863661bc856fc9722bfa"), "name" : "Fish", "partner" : "5ec0851661bc856fc9722bf5" }
{ "_id" : ObjectId("5ec15633c3c518b3a9468013"), "name" : "Species", "partner" : "5ec0851661bc856fc9722bf5" }
{ "_id" : ObjectId("5ec15633c3c518b3a9468014"), "name" : "Pasta", "partner" : "5ec085bc61bc856fc9722bf7" }
{ "_id" : ObjectId("5ec15633c3c518b3a9468015"), "name" : "Salad", "partner" : "5ec085bc61bc856fc9722bf7" }
{ "_id" : ObjectId("5ec15c95c3c518b3a946801c"), "name" : "Water", "partner" : "5ec0851661bc856fc9722bf5" }
```

Як бачимо, тільки пуддинг не має складу продуктів. Зробимо update, виконавши \$push для масив продуктів.

```
> db.meal_has_product.update({meal: "5ec0887961bc856fc9722c02"}, {$push: {product: "5ec15c95c3c518b3a946801c"}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.meal_has_product.find()
{ "_id" : ObjectId("5ec16043c3c518b3a946801d"), "meal" : "5ec0887961bc856fc9722c01", "product" : [ "5ec0863661bc856fc9722bfa", "5ec15633c3c518b3a9468013" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a946801e"), "meal" : "5ec06de361bc856fc9722bec", "product" : [ "5ec0863661bc856fc9722bf8", "5ec0863661bc856fc9722bf9" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a946801f"), "meal" : "5ec06e4361bc856fc9722bed", "product" : [ "5ec15633c3c518b3a9468014" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a9468020"), "meal" : "5ec0887961bc856fc9722c02", "product" : [ "5ec15c95c3c518b3a946801c" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a9468021"), "meal" : "5ec0887961bc856fc9722c03", "product" : [ "5ec15633c3c518b3a9468015" ] }
{ "_id" : ObjectId("5ec16043c3c518b3a9468022"), "meal" : "5ec0887961bc856fc9722c04", "product" : [ "5ec0863661bc856fc9722bfa" ] }
```

Видалення документів

```
> db.position.find()
{ "_id" : ObjectId("5ec14de1c3c518b3a946800a"), "position" : "Barist", "salary" : 20000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800b"), "position" : "Cleaner", "salary" : 4000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800c"), "position" : "Technolog", "salary" : 15000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800d"), "position" : "Clerk", "salary" : 30000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800e"), "position" : "Administrator", "salary" : 40000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800f"), "position" : "Applicator", "salary" : 13000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468010"), "position" : "Cook", "salary" : 30000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468011"), "position" : "Officient", "salary" : 15000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468012"), "position" : "Director", "salary" : 50000 }
> db.position.deleteOne({position:"Barist"});
{ "acknowledged" : true, "deletedCount" : 1 }
> db.position.find()
{ "_id" : ObjectId("5ec14de1c3c518b3a946800b"), "position" : "Cleaner", "salary" : 4000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800c"), "position" : "Technolog", "salary" : 15000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800d"), "position" : "Clerk", "salary" : 30000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800e"), "position" : "Administrator", "salary" : 40000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800f"), "position" : "Applicator", "salary" : 13000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468010"), "position" : "Cook", "salary" : 30000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468011"), "position" : "Officient", "salary" : 15000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468012"), "position" : "Director", "salary" : 50000 }
> db.position.deleteMany({salary:{$lte:20000}});
{ "acknowledged" : true, "deletedCount" : 4 }
> db.position.find()
{ "_id" : ObjectId("5ec14de1c3c518b3a946800d"), "position" : "Clerk", "salary" : 30000 }
{ "_id" : ObjectId("5ec14de1c3c518b3a946800e"), "position" : "Administrator", "salary" : 40000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468010"), "position" : "Cook", "salary" : 30000 }
{ "_id" : ObjectId("5ec14e14c3c518b3a9468012"), "position" : "Director", "salary" : 50000 }
```

Видаляємо всі записи з колекції restaurant, описи яких починаються з заданої букви.

restaurant					
	_id ObjectId	name String	description String	adress String	telephone String
1	5ec06a8161bc856fc9722bdc	"Korona"	"Best rest in Lviv"	"Doroshenka st."	"0932342010"
2	5ec06a8161bc856fc9722bdd	"Galytskyi Dvir"	No field	"Chmelnyckogo st."	" +380932342010"
3	5ec06a8161bc856fc9722bde	"Zora"	"Best rest in Lviv"	"Saharova st."	"0932421043"
4	5ec06a8161bc856fc9722bdf	"Nova Galaxy"	No field	"Mickelangelo st."	" +380931421043"
5	5ec06a8161bc856fc9722be0	"Bescyd"	"Best rest in Lviv"	"Maksimenka st."	"2334402"
6	5ec06a8161bc856fc9722be1	"Romantic"	""	"Derevyana st."	"2379201"
7	5ec06a8161bc856fc9722be2	"Mom's Spaghetti"	""	"Maxymovycha st."	"2304020"
8	5ec06a8161bc856fc9722be3	"Friends"	"Best zone in Lviv"	"Novovolynska st."	"24023021"
9	5ec06a8161bc856fc9722be4	"Zakarpattia"	No field	"Tymoshenka st."	"2134123"
10	5ec06a8161bc856fc9722be5	"Twister"	"Best place in Lviv"	"Volodymyra Velykoho "	"123423"
11	5ec06a8161bc856fc9722be6	"Wood"	""	"Novotroicka st."	"23421342"
12	5ec06a8161bc856fc9722be7	"Kfc"	"Best rest in Lviv"	"Prospekt Svobody"	"2341234"
13	5ec06a8161bc856fc9722be8	"Macdonalds"	""	"Naukova st."	""
14	5ec06a8161bc856fc9722be9	"Shawerma"	"Best rest in Lviv"	"Pasichna st."	"03920123"

```
> db.restaurant.remove({"description":/B\\w+/i});
WriteResult({ "nRemoved" : 7 })
```

🏠 restaurant					
	_id ObjectId	name String	description String	adress String	telephone String
1	5ec06a8161bc856fc9722bdd	"Galytskyy Dwir"	No field	"Chmelnyckogo st."	" +380932342010"
2	5ec06a8161bc856fc9722bdf	"Nova Galaxy"	No field	"Mickelangelo st."	" +380931421043"
3	5ec06a8161bc856fc9722be1	"Romantic"	""	"Derevyana st."	"2379201"
4	5ec06a8161bc856fc9722be2	"Mom's Spaghetti"	""	"Maxymovycha st."	"2304020"
5	5ec06a8161bc856fc9722be4	"Zakarpattya"	No field	"Tymoshenka st."	"2134123"
6	5ec06a8161bc856fc9722be6	"Wood"	""	"Novotroicka st."	"23421342"
7	5ec06a8161bc856fc9722be8	"Macdonalds"	""	"Naukova st."	""
8	5ec06a8161bc856fc9722bea	"DesertWorld"	""	"Dvirceva st."	"23428439"

Встановлюю індекс для атрибуту name колекції restaurant

```
> db.restaurant.ensureIndex({"name":1})
{
  "createdCollectionAutomatically" : false,
  "numIndexesBefore" : 1,
  "numIndexesAfter" : 2,
  "ok" : 1
}
```

І використовуючи курсор виведемо назви ресторанів

```
> var cursor = db.restaurant.find()
> while(cursor.hasNext()){
... restaurant = cursor.next();
... print(restaurant["name"]);
... }
Galytskyy Dwir
Nova Galaxy
Romantic
Mom's Spaghetti
Zakarpattya
Wood
Macdonalds
DesertWorld
```

Висновок: я здобув практичних навичок створення та обробки бази даних типу NoSQL на прикладі СУБД MongoDB.