

Dokumentowe bazy danych – MongoDB

Ćwiczenie 2

Odtwórz z backupu bazę `north0`

```
mongorestore --nsInclude='north0.*' ./dump/
```

```
use north0
```

Baza `north0` jest kopią relacyjnej bazy danych `Northwind`

- poszczególne kolekcje odpowiadają tabelom w oryginalnej bazie `Northwind`

zapoznaj się ze strukturą dokumentów w bazie `North0`

```
db.customers.find()
db.orders.find();
db.orderdetails.find();
```

produkty, kategorie, dostawcy

```
db.categories.find().limit(2);
```

- wynik

```
[
  {
    "_id": {"_id": "67eb06a27b1ef941c950fb49"},
    "CategoryID": 1,
    "CategoryName": "Beverages",
    "Description": "Soft drinks, coffees, teas, beers, and ales"
  },
  {
    "_id": {"_id": "67eb06a27b1ef941c950fb4a"},
    "CategoryID": 2,
    "CategoryName": "Condiments",
    "Description": "Sweet and savory sauces, relishes, spreads, and seasonings"
  }
]
```

```
db.products.find().limit(2);
```

- wynik

```
[
  {
    "_id": {"_id": "63a0607abb3b972d6f4e1f50"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 1,
    "ProductName": "Chai",
    "QuantityPerUnit": "10 boxes x 20 bags",
    "ReorderLevel": 10,
    "SupplierID": 1,
    "UnitPrice": 18,
    "UnitsInStock": 39,
    "UnitsOnOrder": 0
  },
  {
    "_id": {"_id": "63a0607abb3b972d6f4e1f51"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 2,
    "ProductName": "Chang",
    "QuantityPerUnit": "24 - 12 oz bottles",
    "ReorderLevel": 25,
    "SupplierID": 1,
    "UnitPrice": 19,
    "UnitsInStock": 17,
    "UnitsOnOrder": 40
  }
]
```

```
}
]
```

```
db.suppliers.find().limit(2);
```

- wynik

```
[
  {
    "_id": {"$oid": "63a05d3cbb3b972d6f4e09f7"},
    "Address": "49 Gilbert St.",
    "City": "London",
    "CompanyName": "Exotic Liquids",
    "ContactName": "Charlotte Cooper",
    "ContactTitle": "Purchasing Manager",
    "Country": "UK",
    "Fax": null,
    "HomePage": null,
    "Phone": "(171) 555-2222",
    "PostalCode": "EC1 4SD",
    "Region": null,
    "SupplierID": 1
  },
  {
    "_id": {"$oid": "63a05d3cbb3b972d6f4e09f8"},
    "Address": "P.O. Box 78934",
    "City": "New Orleans",
    "CompanyName": "New Orleans Cajun Delights",
    "ContactName": "Shelley Burke",
    "ContactTitle": "Order Administrator",
    "Country": "USA",
    "Fax": null,
    "HomePage": "#CAJUN.HTM#",
    "Phone": "(100) 555-4822",
    "PostalCode": "70117",
    "Region": "LA",
    "SupplierID": 2
  }
]
```

Przykład 1

```
db.products.aggregate([
  {
    $match : { }
  },
  //suppliers
  {
    $lookup : {
      from: "suppliers",
      localField: "SupplierID",
      foreignField: "SupplierID",
      as: "Supplier"
    }
  },
  {
    $limit : 2
  }
])
```

- pole **Supplier** jest tablicą
 - zawiera 1 obiekt
- wynik

```
[
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f50"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 1,
    "ProductName": "Chai",
    "QuantityPerUnit": "10 boxes x 20 bags",
    "ReorderLevel": 10,
    "Supplier": [
      {
        "_id": {"$oid": "63a05d3cbb3b972d6f4e09f7"},
```

```

    "SupplierID": 1,
    "CompanyName": "Exotic Liquids",
    "ContactName": "Charlotte Cooper",
    "ContactTitle": "Purchasing Manager",
    "Address": "49 Gilbert St.",
    "City": "London",
    "Region": null,
    "PostalCode": "EC1 4SD",
    "Country": "UK",
    "Phone": "(171) 555-2222",
    "Fax": null,
    "HomePage": null
  },
  {
    "SupplierID": 1,
    "UnitPrice": 18,
    "UnitsInStock": 39,
    "UnitsOnOrder": 0
  },
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f51"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 2,
    "ProductName": "Chang",
    "QuantityPerUnit": "24 - 12 oz bottles",
    "ReorderLevel": 25,
    "Supplier": [
      {
        "_id": {"$oid": "63a05d3cbb3b972d6f4e09f7"},
        "SupplierID": 1,
        "CompanyName": "Exotic Liquids",
        "ContactName": "Charlotte Cooper",
        "ContactTitle": "Purchasing Manager",
        "Address": "49 Gilbert St.",
        "City": "London",
        "Region": null,
        "PostalCode": "EC1 4SD",
        "Country": "UK",
        "Phone": "(171) 555-2222",
        "Fax": null,
        "HomePage": null
      }
    ],
    "SupplierID": 1,
    "UnitPrice": 19,
    "UnitsInStock": 17,
    "UnitsOnOrder": 40
  }
]

```

- \$unwind
 - pole **Supplier** jest obiektem/dokumentem

```

db.products.aggregate([
  {
    $match : { }
  },
  {
    $lookup : {
      from: "suppliers",
      localField: "SupplierID",
      foreignField: "SupplierID",
      as: "Supplier"
    }
  },
  {
    $unwind : "$Supplier"
  },
  {
    $limit : 2
  }
])

```

- wynik

```

[
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f50"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 1,
    "ProductName": "Chai",

```

```

    "QuantityPerUnit": "10 boxes x 20 bags",
    "ReorderLevel": 10,
    "Supplier": {
      "_id": {"$oid": "63a05d3cbb3b972d6f4e09f7"},
      "SupplierID": 1,
      "CompanyName": "Exotic Liquids",
      "ContactName": "Charlotte Cooper",
      "ContactTitle": "Purchasing Manager",
      "Address": "49 Gilbert St.",
      "City": "London",
      "Region": null,
      "PostalCode": "EC1 4SD",
      "Country": "UK",
      "Phone": "(171) 555-2222",
      "Fax": null,
      "HomePage": null
    },
    "SupplierID": 1,
    "UnitPrice": 18,
    "UnitsInStock": 39,
    "UnitsOnOrder": 0
  },
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f51"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 2,
    "ProductName": "Chang",
    "QuantityPerUnit": "24 - 12 oz bottles",
    "ReorderLevel": 25,
    "Supplier": {
      "_id": {"$oid": "63a05d3cbb3b972d6f4e09f7"},
      "SupplierID": 1,
      "CompanyName": "Exotic Liquids",
      "ContactName": "Charlotte Cooper",
      "ContactTitle": "Purchasing Manager",
      "Address": "49 Gilbert St.",
      "City": "London",
      "Region": null,
      "PostalCode": "EC1 4SD",
      "Country": "UK",
      "Phone": "(171) 555-2222",
      "Fax": null,
      "HomePage": null
    },
    "SupplierID": 1,
    "UnitPrice": 19,
    "UnitsInStock": 17,
    "UnitsOnOrder": 40
  }
]

```

- projekcja
 - tylko wybrane pola z `Supplier`

```

db.products.aggregate([
  {
    $match : { }
  },
  //suppliers
  {
    $lookup : {
      from: "suppliers",
      localField: "SupplierID",
      foreignField: "SupplierID",
      as: "Supplier_tmp"
    }
  },
  {
    $unwind : "$Supplier_tmp"
  },
  {
    $addFields: {
      Supplier: {
        SupplierID: "$SupplierID",
        CompanyName: "$Supplier_tmp.CompanyName",
        Country: "$Supplier_tmp.Country"
      }
    }
  },
  {
    $project: {
      SupplierID: 0,
      Supplier_tmp: 0
    }
  },
])

```

```

    {
      $limit : 2
    }
  })

```

- wynik

```

[
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f50"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 1,
    "ProductName": "Chai",
    "QuantityPerUnit": "10 boxes x 20 bags",
    "ReorderLevel": 10,
    "Supplier": {
      "SupplierID": 1,
      "CompanyName": "Exotic Liquids",
      "Country": "UK"
    },
    "UnitPrice": 18,
    "UnitsInStock": 39,
    "UnitsOnOrder": 0
  },
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f51"},
    "CategoryID": 1,
    "Discontinued": false,
    "ProductID": 2,
    "ProductName": "Chang",
    "QuantityPerUnit": "24 - 12 oz bottles",
    "ReorderLevel": 25,
    "Supplier": {
      "SupplierID": 1,
      "CompanyName": "Exotic Liquids",
      "Country": "UK"
    },
    "UnitPrice": 19,
    "UnitsInStock": 17,
    "UnitsOnOrder": 40
  }
]

```

- dodaj do wyniku inf. o kategoriach

```

db.products.aggregate([
  {
    $match : { }
  },
  //suppliers
  {
    $lookup : {
      from: "suppliers",
      localField: "SupplierID",
      foreignField: "SupplierID",
      as: "Supplier_tmp"
    }
  },
  //categories
  {
    $lookup : {
      from: "categories",
      localField: "CategoryID",
      foreignField: "CategoryID",
      as: "Category_tmp"
    }
  },
  {
    $unwind : "$Supplier_tmp"
  },
  {
    $unwind : "$Category_tmp"
  },
  {
    $addFields: {
      Supplier: {
        SupplierID: "$SupplierID",
        CompanyName: "$Supplier_tmp.CompanyName",
        Country: "$Supplier_tmp.Country"
      },
      Category: {
        CategoryID: "$CategoryID",

```

```

        CategorynameName: "$Category_tmp.CategoryName",
    }
}
},
{
  $project: {
    SupplierID: 0,
    Supplier_tmp: 0,
    CategoryID: 0,
    Category_tmp: 0
  }
},
{
  $limit : 2
}
})

```

- wynik

```

[
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f50"},
    "Category": {
      "CategoryID": 1,
      "CategorynameName": "Beverages"
    },
    "Discontinued": false,
    "ProductID": 1,
    "ProductName": "Chai",
    "QuantityPerUnit": "10 boxes x 20 bags",
    "ReorderLevel": 10,
    "Supplier": {
      "SupplierID": 1,
      "CompanyName": "Exotic Liquids",
      "Country": "UK"
    },
    "UnitPrice": 18,
    "UnitsInStock": 39,
    "UnitsOnOrder": 0
  },
  {
    "_id": {"$oid": "63a0607abb3b972d6f4e1f51"},
    "Category": {
      "CategoryID": 1,
      "CategorynameName": "Beverages"
    },
    "Discontinued": false,
    "ProductID": 2,
    "ProductName": "Chang",
    "QuantityPerUnit": "24 - 12 oz bottles",
    "ReorderLevel": 25,
    "Supplier": {
      "SupplierID": 1,
      "CompanyName": "Exotic Liquids",
      "Country": "UK"
    },
    "UnitPrice": 19,
    "UnitsInStock": 17,
    "UnitsOnOrder": 40
  }
]

```

Przykład 2

- dostawcy i produkty

```

db.suppliers.aggregate([
  {
    $match : { }
  },
  //products
  {
    $lookup : {
      from: "products",
      localField: "SupplierID",
      foreignField: "SupplierID",
      as: "Products"
    }
  },
  {
    $addFields: {
      Products: {

```

```

        $map: {
          input: "$Products",
          as: "product",
          in: {
            ProductID: "$$product.ProductID",
            ProductName: "$$product.ProductName",
            UnitPrice: "$$product.UnitPrice",
            Discontinued: "$$product.Discontinued",
          }
        }
      }
    },
    {
      $limit : 2
    }
  })

```

- wynik

```

[
  {
    "_id": {"$oid": "63a05d3cbb3b972d6f4e09f7"},
    "Address": "49 Gilbert St.",
    "City": "London",
    "CompanyName": "Exotic Liquids",
    "ContactName": "Charlotte Cooper",
    "ContactTitle": "Purchasing Manager",
    "Country": "UK",
    "Fax": null,
    "HomePage": null,
    "Phone": "(171) 555-2222",
    "PostalCode": "EC1 4SD",
    "Products": [
      {
        "ProductID": 1,
        "ProductName": "Chai",
        "UnitPrice": 18,
        "Discontinued": false
      },
      {
        "ProductID": 2,
        "ProductName": "Chang",
        "UnitPrice": 19,
        "Discontinued": false
      },
      {
        "ProductID": 3,
        "ProductName": "Aniseed Syrup",
        "UnitPrice": 10,
        "Discontinued": false
      }
    ],
    "Region": null,
    "SupplierID": 1
  },
  {
    "_id": {"$oid": "63a05d3cbb3b972d6f4e09f8"},
    "Address": "P.O. Box 78934",
    "City": "New Orleans",
    "CompanyName": "New Orleans Cajun Delights",
    "ContactName": "Shelley Burke",
    "ContactTitle": "Order Administrator",
    "Country": "USA",
    "Fax": null,
    "HomePage": "#CAJUN.HTM#",
    "Phone": "(100) 555-4822",
    "PostalCode": "70117",
    "Products": [
      {
        "ProductID": 4,
        "ProductName": "Chef Anton's Cajun Seasoning",
        "UnitPrice": 22,
        "Discontinued": false
      },
      {
        "ProductID": 5,
        "ProductName": "Chef Anton's Gumbo Mix",
        "UnitPrice": 21.35,
        "Discontinued": true
      },
      {
        "ProductID": 65,
        "ProductName": "Louisiana Fiery Hot Pepper Sauce",
        "UnitPrice": 21.05,
        "Discontinued": false
      }
    ]
  }
]

```

```

        "ProductID": 66,
        "ProductName": "Louisiana Hot Spiced Okra",
        "UnitPrice": 17,
        "Discontinued": false
    }
},
"Region": "LA",
"SupplierID": 2
}
]

```

Przykład 3

- zamówienia

```

db.orders.aggregate(
{
    $match : { }
},
//customers
{
    $lookup : {
        from: "customers",
        localField: "CustomerID",
        foreignField: "CustomerID",
        as: "Customer"
    }
},
{
    $unwind : "$Customer"
},
{
    $project : {
        "Customer._id": 0,
        "Customer.ContactName": 0,
        "Customer.ContactTitle": 0,
        "Customer.City": 0,
        "Customer.Country": 0,
        "Customer.Address": 0,
        "Customer.PostalCode": 0,
        "Customer.Region": 0,
        "Customer.Phone": 0,
        "Customer.Fax": 0
    }
},
//employees
{
    $lookup : {
        from: "employees",
        localField: "EmployeeID",
        foreignField: "EmployeeID",
        as: "Employee"
    }
},
{
    $unwind : "$Employee"
},
{
    $project : {
        "Employee._id": 0,
        "Employee.Title": 0,
        "Employee.TitleOfCourtesy": 0,
        "Employee.BirthDate": 0,
        "Employee.HireDate": 0,
        "Employee.Address": 0,
        "Employee.PostalCode": 0,
        "Employee.City": 0,
        "Employee.Region": 0,
        "Employee.Country": 0,
        "Employee.HomePhone": 0,
        "Employee.Extension": 0,
        "Employee.Photo": 0,
        "Employee.Notes": 0,
        "Employee.ReportsTo": 0,
        "Employee.PhotoPath": 0
    }
},
//shippers
{
    $lookup : {
        from: "shippers",
        localField: "ShipVia",

```



```

        foreignField: "ShipperID",
        as: "Shipper"
    }
  },
  {
    $unwind : "$Shipper"
  },
  {
    $project : {
      "Shipper._id": 0,
      "Shipper.Phone": 0
    }
  },
  //orderdetails
  {
    $lookup : {
      from: "orderdetails_tmp",
      localField: "OrderID",
      foreignField: "OrderID",
      as: "Orderdetails"
    }
  },
  {
    $project : {
      "Orderdetails._id": 0,
      "Orderdetails.OrderID": 0
    }
  },
  {
    $project : {
      "CustomerID": 0,
      "EmployeeID": 0,
      "ShipVia": 0
    }
  },
  {
    $out : "orders_tmp"
  }
}
)

```

```
db.orders_tmp.find().limit(2);
```

• wynik

```

[
  {
    "_id": {"$oid": "63a060b9bb3b972d6f4e1fc6"},
    "Customer": {
      "CustomerID": "VINET",
      "CompanyName": "Vins et alcools Chevalier",
      "Country": "France"
    },
    "Employee": {
      "EmployeeID": 5,
      "LastName": "Buchanan",
      "FirstName": "Steven"
    },
    "Freight": 32.38,
    "OrderDate": {"$date": "1996-07-04T00:00:00.000Z"},
    "OrderID": 10248,
    "Orderdetails": [
      {
        "UnitPrice": 14,
        "Quantity": 12,
        "Discount": 0,
        "product": {
          "ProductID": 11,
          "ProductName": "Queso Cabrales",
          "QuantityPerUnit": "1 kg pkg."
        },
        "TotalValue": 168
      },
      {
        "UnitPrice": 9.8,
        "Quantity": 10,
        "Discount": 0,
        "product": {
          "ProductID": 42,
          "ProductName": "Singaporean Hokkien Fried Mee",
          "QuantityPerUnit": "32 - 1 kg pkgs."
        },
        "TotalValue": 98
      }
    ]
  }
]

```

```

    },
    {
      "UnitPrice": 34.8,
      "Quantity": 5,
      "Discount": 0,
      "product": {
        "ProductID": 72,
        "ProductName": "Mozzarella di Giovanni",
        "QuantityPerUnit": "24 - 200 g pkgs."
      },
      "TotalValue": 174
    }
  ],
  "RequiredDate": {"$date": "1996-08-01T00:00:00.000Z"},
  "ShipAddress": "59 rue de l'Abbaye",
  "ShipCity": "Reims",
  "ShipCountry": "France",
  "ShipName": "Vins et alcools Chevalier",
  "ShipPostalCode": "51100",
  "ShipRegion": null,
  "ShippedDate": {"$date": "1996-07-16T00:00:00.000Z"},
  "Shipper": {
    "ShipperID": 3,
    "CompanyName": "Federal Shipping"
  }
},
{
  "_id": {"$oid": "63a060b9bb3b972d6f4e1fc7"},
  "Customer": {
    "CustomerID": "TOMSP",
    "CompanyName": "Toms Spezialitäten",
    "Country": "Germany"
  },
  "Employee": {
    "EmployeeID": 6,
    "LastName": "Suyama",
    "FirstName": "Michael"
  },
  "Freight": 11.61,
  "OrderDate": {"$date": "1996-07-05T00:00:00.000Z"},
  "OrderID": 10249,
  "Orderdetails": [
    {
      "UnitPrice": 18.6,
      "Quantity": 9,
      "Discount": 0,
      "product": {
        "ProductID": 14,
        "ProductName": "Tofu",
        "QuantityPerUnit": "40 - 100 g pkgs."
      },
      "TotalValue": 167.4
    },
    {
      "UnitPrice": 42.4,
      "Quantity": 40,
      "Discount": 0,
      "product": {
        "ProductID": 51,
        "ProductName": "Manjimup Dried Apples",
        "QuantityPerUnit": "50 - 300 g pkgs."
      },
      "TotalValue": 1696
    }
  ],
  "RequiredDate": {"$date": "1996-08-16T00:00:00.000Z"},
  "ShipAddress": "Luisenstr. 48",
  "ShipCity": "Münster",
  "ShipCountry": "Germany",
  "ShipName": "Toms Spezialitäten",
  "ShipPostalCode": "44087",
  "ShipRegion": null,
  "ShippedDate": {"$date": "1996-07-10T00:00:00.000Z"},
  "Shipper": {
    "ShipperID": 1,
    "CompanyName": "Speedy Express"
  }
}
]

```