

# Exercises: JSON Processing

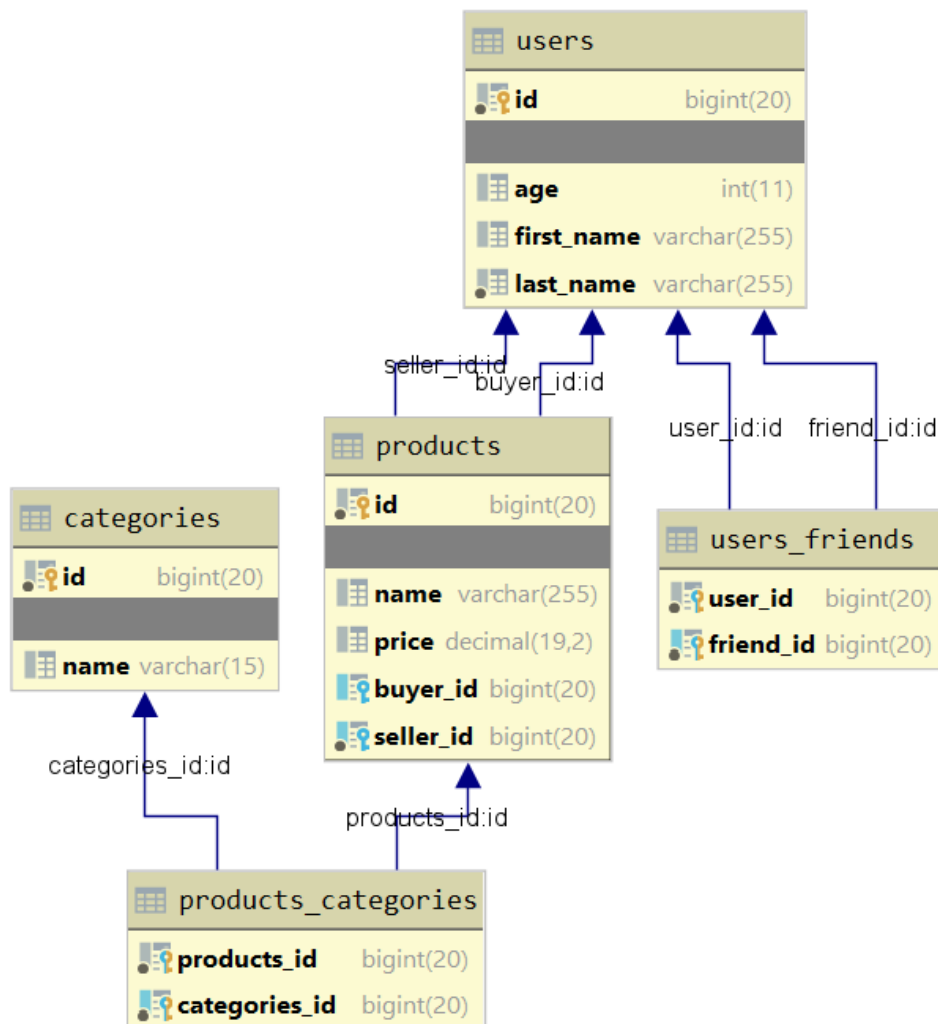
This document defines the exercise assignments for the ["Spring Data" course @ SoftUni](https://softuni.org).

## 1. Products Shop

A products shop holds **users**, **products** and **categories for the products**. Users can **sell** and **buy** products.

- Users have an **id**, **first name** (optional) and **last name** (at least 3 characters) and **age** (optional).
- Products have an **id**, **name** (at least 3 characters), **price**, **buyerId** (optional) and **sellerId** as IDs of users.
- Categories have an **id** and **name** (from 3 to 15 characters)

Using Code First approach create a database following the above description.



Configure the following relations in your models:

- **Users** should have **many products sold** and **many products bought**.
- **Products** should have **many categories**.
- **Categories** should have **many products**.
- **Users** should have **many friends** (i.e. users).

## 2. Seed the Database

Import the data from the provided files (**users.json**, **products.json**, **categories.json**).

Import the **users** first. When importing the products, randomly **select the buyer and seller** from the existing users. Leave out some **products** that have **not been sold** (i.e. buyer is null).

Randomly **generate categories** for each product from the existing categories.

## 3. Query and Export Data

Write the below described queries and **export** the returned data to the specified **format**.

### Query 1 – Products in Range

Get all products in a specified **price range** (e.g. 500 to 1000), which have **no buyer**. Order them by price (from lowest to highest). Select only the **product name**, **price** and the **full name of the seller**. Export the result to JSON.

products-in-range.json
<pre>[   {     "name": "TRAMADOL HYDROCHLORIDE",     "price": 516.48,     "seller": "Christine Gomez"   },   {     "name": "Allopurinol",     "price": 518.50,     "seller": "Kathy Gilbert"   },   {     "name": "Parsley",     "price": 519.06,     "seller": "Jacqueline Perez"   },   ... ]</pre>

### Query 2 – Successfully Sold Products

Get all users who have **at least 1 item sold** with a **buyer**. Order them by **last name**, then by **first name**. Select the person's **first and last name**. For each of the **products sold** (products with buyers), select the product's **name, price** and the buyer's **first and last name**.

users-sold-products.json
<pre>[   {     "firstName": "Carl",     "lastName": "Daniels",</pre>

```

    "soldProducts": [
      {
        "name": "Peter Island Continous sunscreen kids",
        "price": 471.30,
        "buyerFirstName": "Anna",
        "buyerLastName": "Parker"
      },
      {
        "name": "Warfarin Sodium",
        "price": 1379.79,
        "buyerFirstName": "Brandon",
        "buyerLastName": "Fuller"
      }
    ]
  },
  ...
]

```

### Query 3 – Categories by Products Count

Get **all categories**. Order them by the **number of products** in each category (a product can be in many categories). For each category select its **name**, the **number of products**, the **average price of those products** and the **total revenue** (total price sum) of those products (regardless if they have a buyer or not).

categories-by-products.json
<pre> [   {     "category": "Sports",     "productsCount": 49,     "averagePrice": 754.327755,     "totalRevenue": 36962.06   },   {     "category": "Adult",     "productsCount": 46,     "averagePrice": 905.283478,     "totalRevenue": 41643.04   },   ... ] </pre>

### Query 4 – Users and Products

Get all users who have **at least 1 product sold**. Order them by the **number of products sold** (from highest to lowest), then by **last name** (ascending). Select only their **first and last name, age** and for each product - **name and price**.

Export the results to **JSON**. Follow the format below to better understand how to structure your data.

## users-and-products.json

```
{
  "usersCount": 35,
  "users": [
    {
      "firstName": "Carl",
      "lastName": "Daniels",
      "age": 59,
      "soldProducts": {
        "count": 10,
        "products": [
          {
            "name": "Finasteride",
            "price": 1374.01
          },
          {
            "name": "Peter Island Continuous sunscreen kids",
            "price": 471.30
          },
          {
            "name": "Warfarin Sodium",
            "price": 1379.79
          },
          {
            "name": "Gilotrif",
            "price": 1454.77
          },
          {
            "name": "Cold and Cough",
            "price": 218.14
          },
          ...
        ]
      }
    },
    {
      "firstName": null,
      "lastName": "Harris",
    }
  ]
}
```

```

    "age": 0,
    "soldProducts":
    {
        "count":9,
        "products":
        [
            {
                "name":"Clarins Paris Skin Illusion - 114 cappuccino",
                "price":811.42
            },
            ...
        ]
    }
},
...
]
}

```

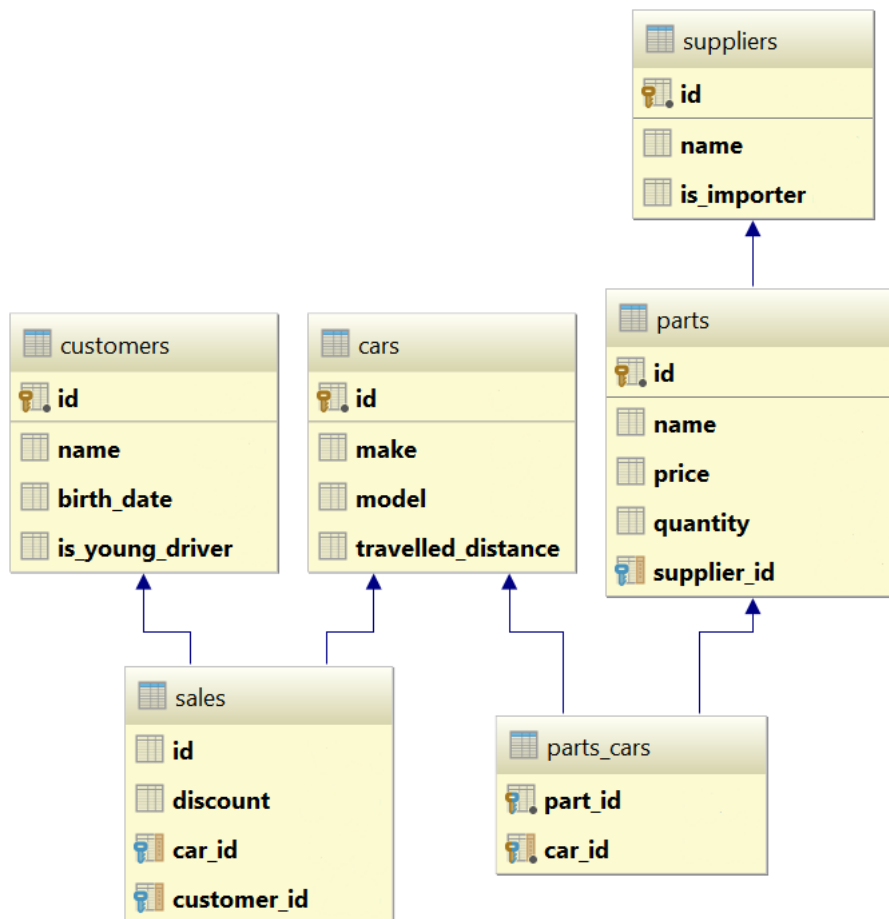
## 4. Car Dealer

A car dealer needs information about cars, their parts, parts suppliers, customers and sales.

- **Cars** have **make, model, and travelled distance** in kilometers.
- **Parts** have **name, price** and **quantity**.
- Part **supplier** have **name** and info whether he **uses imported parts**.
- **Customer** has **name, date of birth** and info whether he/she is a **young driver** (Young driver is a driver that has **less than 2 years of experience**. Those customers get **additional 5% off** for the sale.).
- **Sale** has **car, customer** and **discount percentage**.

A **price of a car** is formed by the **total price of its parts**.

Using Code First approach create a database following the above description.



Configure the following relations in your models:

- A **car** has **many parts** and **one part** can be placed in **many cars**
- **One supplier** can supply **many parts** and each **part** can be delivered by **only one supplier**
- In **one sale**, only **one car** can be sold
- Each **sale** has **one customer** and a **customer** can buy **many cars**

## 5. Car Dealer Import Data

Import data from the provided files (**suppliers.json**, **parts.json**, **cars.json**, **customers.json**).

First import the **suppliers**. When importing the **parts**, set to each part a **random supplier** from the already imported suppliers. Then, when importing the cars add **between 10 and 20 random parts** to each car. Then import **all customers**. Finally, import the **sales records** by **randomly** selecting a **car**, **customer** and the amount of **discount to be applied** (discounts can be 0%, 5%, 10%, 15%, 20%, 30%, 40% or 50%).

## 6. Car Dealer Query and Export Data

Write the below described queries and **export** the returned data to the specified **format**.

### Query 1 – Ordered Customers

Get all **customers**, ordered by their **birthdate in ascending order**. If two customers are born on the same date, **first print those, who are not young drivers** (e.g. print experienced drivers first). **Export** the list of customers to **JSON** in the format provided below.

ordered-customers.json
<pre>[   {     "Id": 29,     "Name": "Louann Holzworth",     "BirthDate": "1960-10-01T00:00:00",     "IsYoungDriver": false,     "Sales": [],   },   {     "Id": 28,     "Name": "Donnetta Soliz",     "BirthDate": "1963-10-01T00:00:00",     "IsYoungDriver": true,     "Sales": [],   },   ... ]</pre>

## Query 2 – Cars from Make Toyota

Get all **cars** from make **Toyota** and **order them by model alphabetically** and then by **travelled distance descending**.  
Export the list of **cars to JSON** in the format provided below.

toyota-cars.json
<pre>[   {     "Id": 117,     "Make": "Toyota",     "Model": "Camry Hybrid",     "TravelledDistance": 954775807,   },   {     "Id": 112,     "Make": "Toyota",     "Model": "Camry Hybrid",     "TravelledDistance": 92275807,   },   ... ]</pre>

## Query 3 – Local Suppliers

Get all **suppliers** that **do not import parts from abroad**. Get their **id, name** and the **number of parts** they can offer to supply. Export the list of suppliers to JSON in the format provided below.

local-suppliers.json
<pre>[   {     "Id": 2,     "Name": "Agway Inc.",     "partsCount": 6   },   {     "Id": 4,     "Name": "Airgas, Inc.",     "partsCount": 5   },   ... ]</pre>

### Query 4 – Cars with Their List of Parts

Get all **cars** along with their list of **parts**. For the **car** get only **make**, **model** and **travelled distance**. For the **parts** get only the **name** and the **price**. **Export** the list of **cars** and their **parts** to **JSON** in the format provided below.

cars-and-parts.json
<pre>[   {     "car": {       "Make": "Opel",       "Model": "Omega",       "TravelledDistance": 2147483647,     },     "parts": [       {         "Name": "Front Left Side Outer door handle",         "Price": 999.99       },       {         "Name": "Gudgeon pin",         "Price": 44.99       },       {         "Name": "Oil pump",         "Price": 100.19       },       {         "Name": "Transmission pan", </pre>



```

        "Price": 106.99
      }
    ]
  },
  {
    "car": {
      "Make": "Opel",
      "Model": "Astra",
      "TravelledDistance": 9223372036854775807
    },
    "parts": [
      {
        "Name": "Overflow tank",
        "Price": 1200.99
      },
      ...
    ]
  },
  ...
]

```

### Query 5 – Total Sales by Customer

Get all **customers** that have bought **at least 1 car** and get their **names**, **count of cars bought** and **total money spent** on cars. **Order** the result list **by total money spent in descending order** then by **total cars bought** again in **descending** order. Export the list of customers to JSON in the format provided below.

customers-total-sales.json
<pre> [   {     "fullName": "Hipolito Lamoreaux",     "boughtCars": 5,     "spentMoney": 8360.48   },   {     "fullName": "Francis Mckim",     "boughtCars": 4,     "spentMoney": 7115.50   },   {     "fullName": "Johnette Derryberry",     "boughtCars": 4,     "spentMoney": 5337.72   } ] </pre>

```
},  
...  
]
```

## Query 6 – Sales with Applied Discount

Get all **sales** with information about the **car**, the **customer** and the **price** of the sale **with and without discount**.  
Export the list of sales to JSON in the format provided below.

sales-discounts.json
<pre>[   {     "car": {       "Make": "Peugeot",       "Model": "405",       "TravelledDistance": 92036854775807     },     "customerName": "Donnetta Soliz",     "Discount": 0.3,     "price": 1402.53,     "priceWithDiscount": 981.771   },   {     "car": {       "Make": "Mercedes",       "Model": "W124",       "TravelledDistance": 2147647     },     "customerName": "Carri Knapik",     "Discount": 0.2,     "price": 254.96999999999997,     "priceWithDiscount": 203.97599999999997   },   ... ]</pre>