# Exercises: JSON Processing

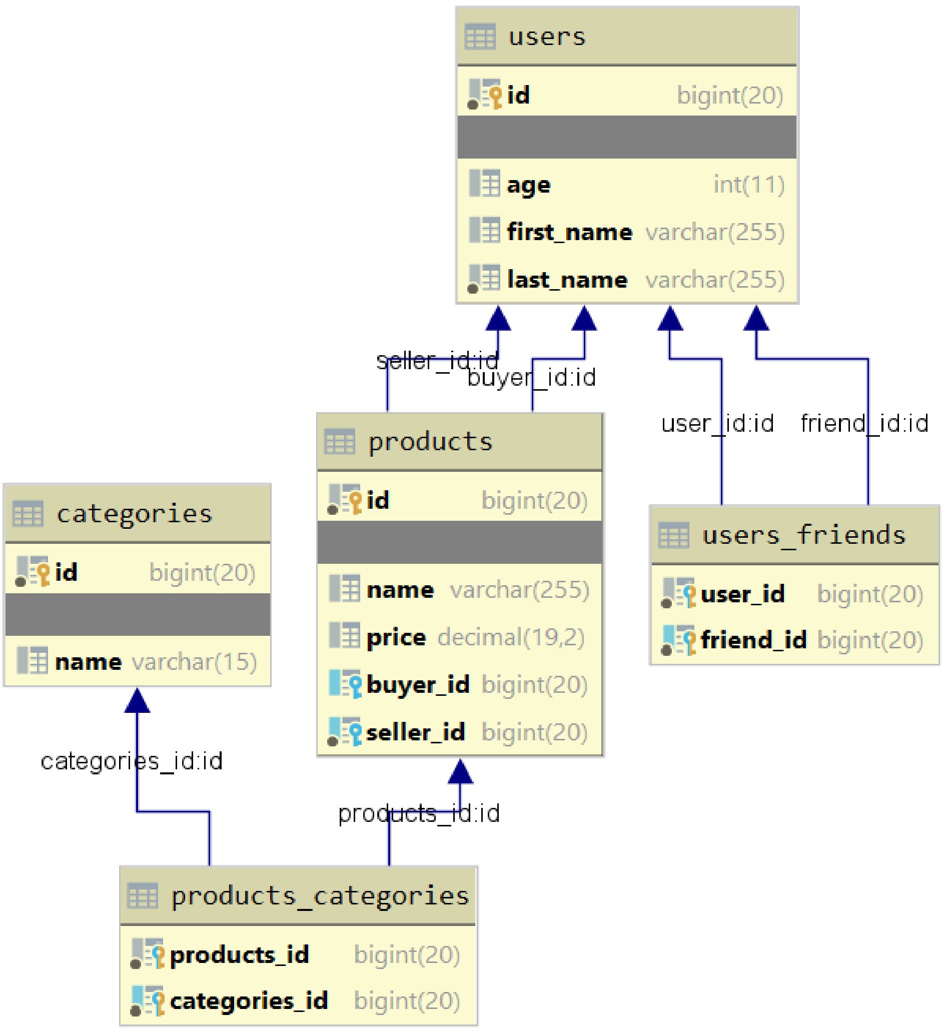
This document defines the exercise assignments for the ["Spring Data" course @ SoftUni](https://softuni.org).

## 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**

```
[
  {
    "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"
  },
  ...
]
```

### 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**

```
[
  {
    "firstName": "Carl",
    "lastName": "Daniels",
    "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**

```
[
  {
    "category": "Sports",
    "productsCount": 49,
    "averagePrice": 754.327755,
    "totalRevenue": 36962.06
  },
  {
    "category": "Adult",
    "productsCount": 46,
    "averagePrice": 905.283478,
    "totalRevenue": 41643.04
  },
  ...
]
```

## 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 Continous 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
                     },
                     ...
                     ]
              }
       },
       ...
]
}
```

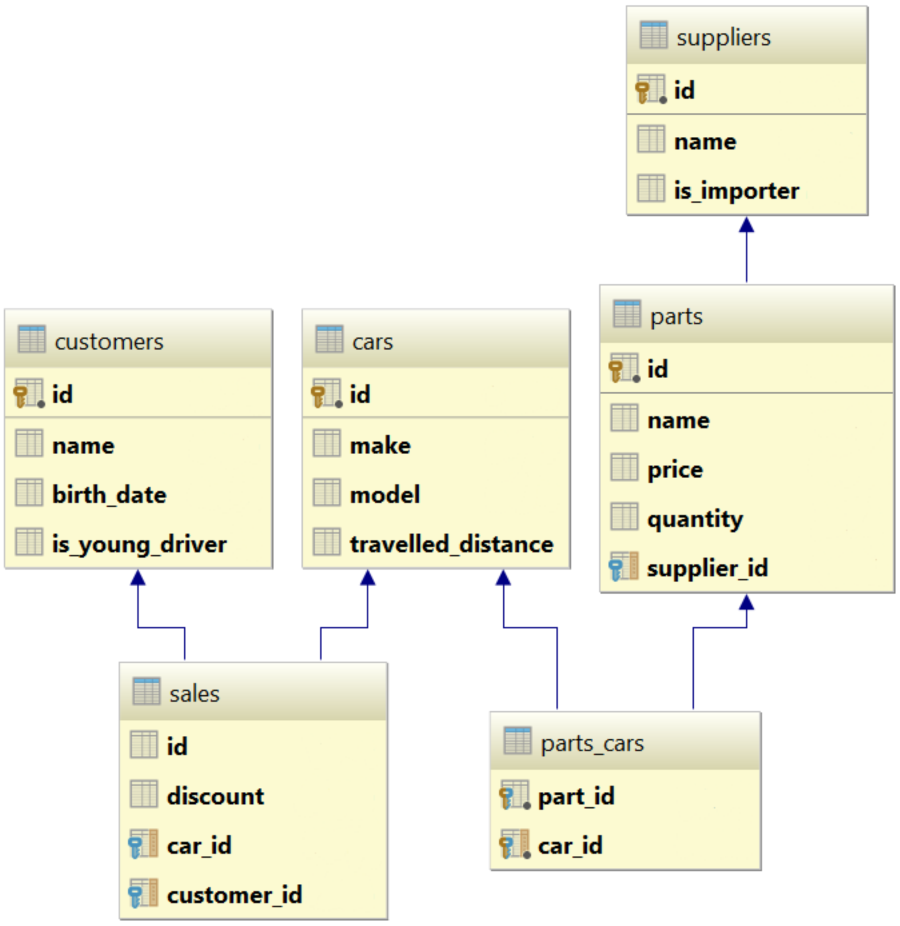
## 4. Car Dealer

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**

```
[
  {
    "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": [],
  },
  ...
]
```

## 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**

```
[
  {
    "Id": 117,
    "Make": "Toyota",
    "Model": "Camry Hybrid",
    "TravelledDistance": 954775807,
  },
  {
    "Id": 112,
    "Make": "Toyota",
    "Model": "Camry Hybrid",
    "TravelledDistance": 92275807,
  },
...
]
```

## 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**

```
[
  {
    "Id": 2,
    "Name": "Agway Inc.",
    "partsCount": 6
  },
  {
    "Id": 4,
    "Name": "Airgas, Inc.",
    "partsCount": 5
  },
  ...
]
```

## 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**

```
[
  {
    "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",
        "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**

```
[
  {
    "fullName": "Hipolito Lamoreaux",
    "boughtCars": 5,
    "spentMoney": 8360.48
  },
  {
    "fullName": "Francis Mckim",
    "boughtCars": 4,
    "spentMoney": 7115.50
  },
  {
    "fullName": "Johnette Derryberry",
    "boughtCars": 4,
    "spentMoney": 5337.72
  },
...
]
```

## 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**

```
 [
  {
    "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
  },
  ...
]
```