# Exercises: XML Processing

This document defines the **exercise assignments** for the [Databases Advanced - Entity Framework course @ SoftUni](https://softuni.bg/trainings/3709/entity-framework-core-june-2022)  
You can check your solutions in [Judge](https://judge.softuni.org/Contests/Practice/Index/1486" \l "0)

# Product Shop Database

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** and **age**(optional).
* Products have an **id**, **name**, **price**, **buyerId**(optional) and **sellerId** as IDs of users.
* Categories have an **id** and **name**.
* Using Entity Framework Code First create a database following the above description.



* **Users** should have **many products sold** and **many products bought**.
* **Products** should have **many categories.**
* **Categories** should have **many products.**
* **CategoryProducts** should **map products** and **categories.**

## Import Data

### Query 1. Import Users

**NOTE**: You will need method public static string ImportUsers(ProductShopContext context, string inputXml) and public StartUp class.

Import the users from the provided file **users.xml**.

Your method should return a string with the message $"Successfully imported {Users.Count}";

### Query 2. Import Products

**NOTE**: You will need method public static string ImportProducts(ProductShopContext context, string inputXml) and public StartUp class.

Import the products from the provided file **products.xml**.

Your method should return a string with the message $"Successfully imported {Products.Count}";

### Query 3. Import Categories

**NOTE**: You will need method public static string ImportCategories(ProductShopContext context, string inputXml) and public StartUp class.

Import the categories from the provided file **categories.xml**.

Some of the names will be null, so you don't have to add them to the database. Just skip the record and continue.

Your method should return a string with the message $"Successfully imported {Categories.Count}";

### Query 4. Import Categories and Products

**NOTE**: You will need method public static string ImportCategoryProducts(ProductShopContext context, string inputXml) and public StartUp class.

Import the categories and products ids from the provided file **categories-products.xml**. If provided category or product id doesn't exist, skip the whole entry!

Your method should return a string with the message $"Successfully imported {CategoryProducts.Count}";

## 2. Query and Export Data

Write the below-described queries and **export** the returned data to the specified **format**. Make sure that Entity Framework generates only a **single query** for each task.

### Query 5. Export Products In Range

**NOTE**: You will need method public static string GetProductsInRange(ProductShopContext context) and public StartUp class.

Get all products in a specified **price range** between 500 and 1000 (inclusive). Order them by price (from lowest to highest). Select only the **product name**, **price** and the **full name** **of the buyer**. Take top **10** records.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **products-in-range.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <Products>  <Product>  <name>TRAMADOL HYDROCHLORIDE</name>  <price>516.48</price>  </Product>  <Product>  <name>Allopurinol</name>  <price>518.5</price>  <buyer>Wallas Duffyn</buyer>  </Product>  <Product>  <name>Parsley</name>  <price>519.06</price>  <buyer>Brendin Predohl</buyer>  </Product>  …  </Products> |

### Query 6. Export Sold Products

**NOTE**: You will need method public static string GetSoldProducts(ProductShopContext context) and public StartUp class.

Get all users who have **at least 1 sold item**. Order them by **the last name**, then by **the first name**. Select the person's **first** and **last name**. For each of the **sold products**, select the product's **name** and **price**. Take top **5** records. 

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **users-sold-products.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <Users>  <User>  <firstName>Almire</firstName>  <lastName>Ainslee</lastName>  <soldProducts>  <Product>  <name>olio activ mouthwash</name>  <price>206.06</price>  </Product>  <Product>  <name>Acnezzol Base</name>  <price>710.6</price>  </Product>  <Product>  <name>ENALAPRIL MALEATE</name>  <price>210.42</price>  </Product>  </soldProducts>  </User>...  </Users> |

### Query 7. Export Categories By Products Count

**NOTE**: You will need method public static string GetCategoriesByProductsCount(ProductShopContext context) and public StartUp class.

Get **all** **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). Order them by the **number of products** (**descending**) then by total revenue.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **categories-by-products.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <Categories>  <Category>  <name>Garden</name>  <count>23</count>  <averagePrice>709.94739130434782608695652174</averagePrice>  <totalRevenue>16328.79</totalRevenue>  </Category>  <Category>  <name>Adult</name>  <count>22</count>  <averagePrice>704.41</averagePrice>  <totalRevenue>15497.02</totalRevenue>  </Category>  ...  </Categories> |

### Query 8. Export Users and Products

**NOTE**: You will need method public static string GetUsersWithProducts(ProductShopContext context) and public StartUp class.

Select users who have **at least 1 sold product**. Order them by the **number of sold products** (from highest to lowest). Select only their **first** and **last name**, **age, count** of sold products and for each product - **name** and **price** sorted by price (descending). Take top **10** records.

Follow the format below to better understand how to structure your data.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **users-and-products.xml** |
| <Users>  <count>54</count>  <users>  <User>  <firstName>Cathee</firstName>  <lastName>Rallings</lastName>  <age>33</age>  <SoldProducts>  <count>9</count>  <products>  <Product>  <name>Fair Foundation SPF 15</name>  <price>1394.24</price>  </Product>  <Product>  <name>IOPE RETIGEN MOISTURE TWIN CAKE NO.21</name>  <price>1257.71</price>  </Product>  <Product>  <name>ESIKA</name>  <price>879.37</price>  </Product>  <Product>  <name>allergy eye</name>  <price>426.91</price>  </Product>  ...  </Users> |

# Car Dealer

## Setup Database

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

* **Cars** have **make, model**, traveled distance in kilometers.
* **Parts** have **a name**, **price** and **quantityPart** **supplier** have **name** and info whether he **uses imported parts.**
* **A customer** has a **name**, **date of birth** and info whether he **is a young driver.**
* **Sale** has **a car**, **customer** and **discount percentage.**

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



* 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.**

## Import Data

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

### Query 9. Import Suppliers

**NOTE**: You will need method public static string ImportSuppliers(CarDealerContext context, string inputXml) and public StartUp class.

Import the suppliers from the provided file **suppliers.xml**.

Your method should return a string with the message $"Successfully imported {suppliers.Count}";

### Query 10. Import Parts

**NOTE**: You will need method public static string ImportParts(CarDealerContext context, string inputXml) and public StartUp class.

Import the parts from the provided file **parts.xml**. If the supplierId doesn't exist, skip the record.

Your method should return a string with the message $"Successfully imported {parts.Count}";

### Query 11. Import Cars

**NOTE**: You will need method public static string ImportCars(CarDealerContext context, string inputXml) and public StartUp class.

Import the cars from the provided file **cars.xml**. Select unique car part ids. If the part id doesn't exist, skip the part record.

Your method should return a string with the message $"Successfully imported {cars.Count}";

### Query 12. Import Customers

**NOTE**: You will need method public static string ImportCustomers(CarDealerContext context, string inputXml) and public StartUp class.

Import the customers from the provided file **customers.xml**.

Your method should return a string with the message $"Successfully imported {customers.Count}";

### Query 13. Import Sales

**NOTE**: You will need method public static string ImportSales(CarDealerContext context, string inputXml) and public StartUp class.

Import the sales from the provided file **sales.xml**. If car doesn't exist, skip whole entity.

Your method should return a string with the message $"Successfully imported {sales.Count}";

## Query and Export Data

Write the below-described queries and **export** the returned data to the specified **format**. Make sure that Entity Framework generates only a **single query** for each task.

### Query 14. Export Cars With Distance

**NOTE**: You will need method public static string GetCarsWithDistance(CarDealerContext context) and public StartUp class.

Get all **cars** with a distance of more **than** 2,000,000. Order them by make, then by model alphabetically. Take top 10 records.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **cars.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <cars>  <car>  <make>BMW</make>  <model>1M Coupe</model>  <travelled-distance>39826890</travelled-distance>  </car>  <car>  <make>BMW</make>  <model>E67</model>  <travelled-distance>476830509</travelled-distance>  </car>  <car>  <make>BMW</make>  <model>E88</model>  <travelled-distance>27453411</travelled-distance>  </car>  ...  </cars> |

### Query 15. Export Cars from make BMW

**NOTE**: You will need method public static string GetCarsFromMakeBmw(CarDealerContext context) and public StartUp class.

Get all **cars** from make **BMW** and **order them by model alphabetically** and by **traveled distance descending**.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **bmw-cars.xml** |
| <cars>  <car id="7" model="1M Coupe" travelled-distance="39826890" />  <car id="16" model="E67" travelled-distance="476830509" />  <car id="5" model="E88" travelled-distance="27453411" />  ...  </cars> |

### Query 16. Export Local Suppliers

**NOTE**: You will need method public static string GetLocalSuppliers(CarDealerContext context) and public StartUp class.

Get all **suppliers** that **do not import parts from abroad**. Get their **id**, **name** and **the number of parts they can offer to supply**.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **local-suppliers.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <suppliers>  <suplier id="2" name="VF Corporation" parts-count="3" />  <suplier id="5" name="Saks Inc" parts-count="2" />  ...  </suppliers> |

### Query 17. Export Cars with Their List of Parts

**NOTE**: You will need method public static string GetCarsWithTheirListOfParts(CarDealerContext context) and public StartUp class.

Get all **cars along with their list of parts**. For the **car** get only **make, model** and **traveled distance** and for the **parts** get only **name** and **price** and sort all parts by price (descending). Sort all cars by traveled distance (**descending**) then by the model (**ascending**). Select top 5 records.

**Return**the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **cars-and-parts.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <cars>  <car make="Opel" model="Astra" travelled-distance="516628215">  <parts>  <part name="Welded assembly" price="1020.99" />  <part name="Fuel filter" price="162.99" />  <part name="Fascia" price="100.34" />  </parts>  </car>  ...  </cars> |

### Query 18. Export Total Sales by Customer

**NOTE**: You will need method public static string GetTotalSalesByCustomer(CarDealerContext context) and public StartUp class.

Get all **customers** that have bought **at least 1 car** and get their **names**, **bought cars** **count.** and **total spent money** on cars. **Order** the result list **by total spent money descending**.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **customers-total-sales.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <customers>  <customer full-name="Hai Everton" bought-cars="1" spent-money="2544.67" />  <customer full-name="Daniele Zarate" bought-cars="1" spent-money="2014.83" />  <customer full-name="Donneta Soliz" bought-cars="1" spent-money="1655.57" />  ...  </customers> |

### Query 19. Export Sales with Applied Discount

**NOTE**: You will need method public static string GetSalesWithAppliedDiscount(CarDealerContext context) and public StartUp class.

Get all **sales** with information about the **car**, **customer** and **price** of the sale **with and without discount**.

**Return** the list of suppliers **to XML** in the format provided below.

|  |
| --- |
| **sales-discounts.xml** |
| <?xml version="1.0" encoding="utf-16"?>  <sales>  <sale>  <car make="BMW" model="M5 F10" travelled-distance="435603343" />  <discount>30.00</discount>  <customer-name>Hipolito Lamoreaux</customer-name>  <price>707.97</price>  <price-with-discount>495.58</price-with-discount>  </sale>  ...  </sales> |