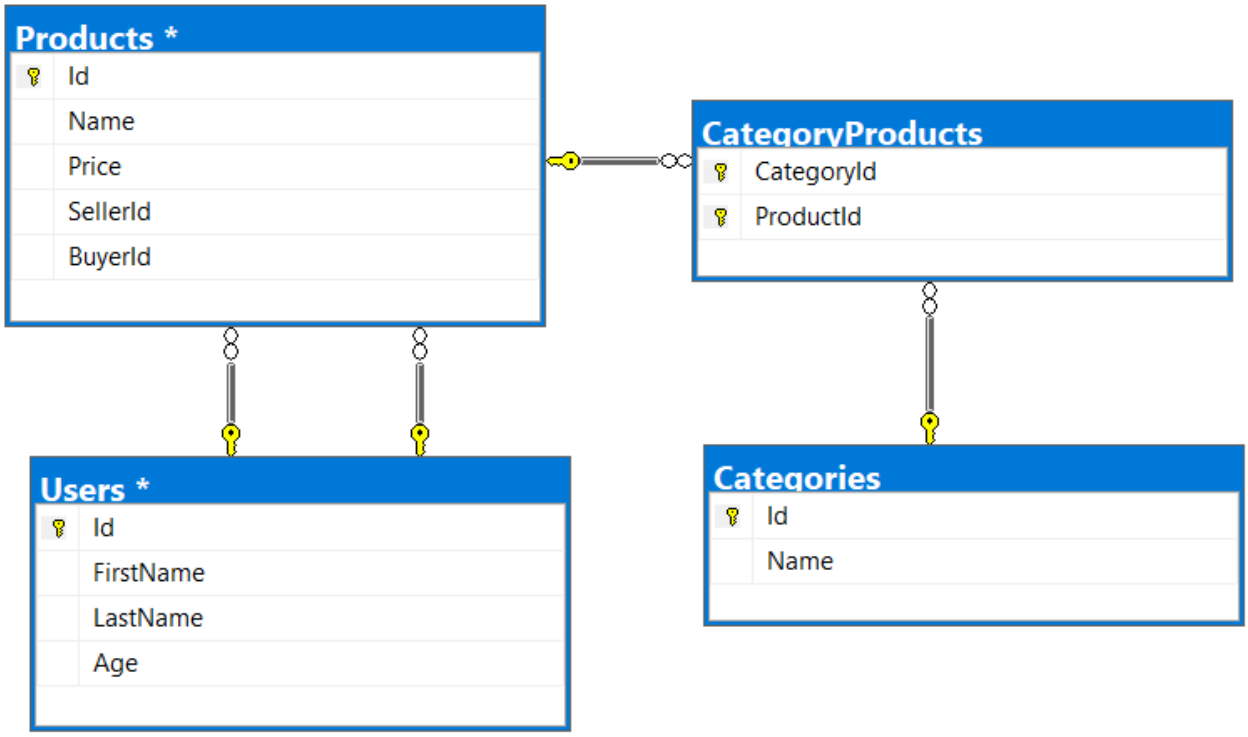
Exercises: XML Processing

This document defines the **exercise assignments** for the "Databases Advanced – EF Core" course @ Software University.

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**, **nam**, **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**

1. 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 string with message `$"Successfully imported {Users.Count}";`

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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 string with 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 in the database. Just skip the record and continue.

Your method should return string with 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 exists, skip the whole entry!

Your method should return string with 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. 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>
```


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```
    <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. 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 **last name**, then by **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. 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>
```


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```
    <name>Garden</name>
    <count>23</count>
    <averagePrice>709.947391304347826086952174</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. 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>
```

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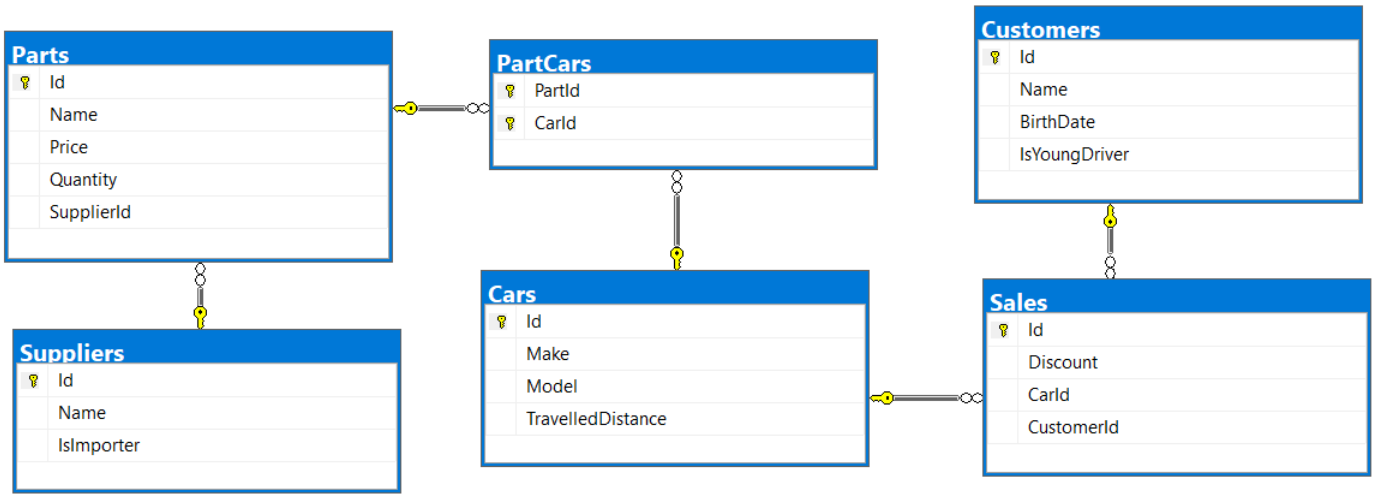
Car Dealer Database

1. Setup Database

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

- **Cars** have **make, model**, 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 **is young driver**
- **Sale** has **car**, **customer** and **discount percentage**

A **price of a car** is formed by **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**

2. 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 string with 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.

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

Your method should return string with 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 exists, skip the part record.

Your method should return string with 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 string with 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 exists, skip whole entity.

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

3. 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. Cars With Distance

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

Get all **cars** with distance 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>
```

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```
  </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. 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 **travelled 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. 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. 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 **travelled distance** and for the **parts** get only **name** and **price** and sort all parts by price (descending). Sort all cars by travelled distance (**descending**) then by model (**ascending**). Select top 5 records.

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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="Master cylinder" price="130.99" />
      <part name="Water tank" price="100.99" />
      <part name="Front Right Side Inner door handle" price="100.99" />
    </parts>
  </car>
  ...
</cars>
```

Query 18. 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="Taina Achenbach" bought-cars="1" spent-money="5588.17" />
  <customer full-name="Johnette Derryberry" bought-cars="1" spent-money="2694.84" />
  <customer full-name="Jimmy Grossi" bought-cars="1" spent-money="2366.38" />
 ...
</customers>
```

Query 19. 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>
```


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