**Databases Advanced Exam – 01 April 2023**

Exam problems for the [Databases Advanced - Entity Framework course @ SoftUni](https://softuni.bg/trainings/3966/entity-framework-core-february-2023).   
Submit your solutions in the **SoftUni Judge** system (delete all **bin**/**obj** and **packages** folders) [here](https://judge.softuni.org/Contests/3932/CSharp-DB-Advanced-Exam-01-April-2023).

Before submitting your solutions in the **SoftUni Judge** system, delete all **bin**/**obj** and **packages** folders. If the **zip** file is still too large, you can delete the **ImportResults**, **ExportsResults** and **Datasets** folders too.

Your task is to create a **database application**, using **Entity Framework Core,** using the **Code First** approach. Design the **domain models** and **methods** for manipulating the data, as described below.

**NOTE:** Don't forget that it's a good practice when implementing a **collection** to write your code orientied towards the **interface**, not the implementation.

**NOTE**: If you want to use AutoMapper, don't forget to go to the **methods** of the **Deserializer** and/or **Serializer** classes, in which you want to use automapping, and initialize the **MapperConfiguration**.

**Boardgames**



* **Project Skeleton Overview**

You are given a **project skeleton**, which includes the following folders:

* **Data** – contains the **BoardgamesContext** class, **Models** folder, which contains the **entity classes** and the **Configuration** class with **connection string**
* **DataProcessor** – contains the **Serializer** and **Deserializer** classes, which are used for **importing** and **exporting** data
* **Datasets** – contains the **.json** and **.xml** files for the import part
* **ImportResults** – contains the **import** results you make in the **Deserializer** class
* **ExportResults** – contains the **export** results you make in the **Serializer** class
* **Model Definition (50 pts)**

The application needs to store the following data:

**Boardgame**

* **Id** – integer, **Primary Key**
* **Name** – text with length **[10…20]** (**required**)
* **Rating** – **double** in range [**1…10.00**] (**required**)
* **YearPublished** – integer in range [**2018…2023**] (**required**)
* **CategoryType** – enumeration of type **CategoryType**, with possible values **(Abstract**, **Children**, **Family**, **Party, Strategy)** (**required**)
* **Mechanics** – text (**string**, **not** an array) (**required**)
* **CreatorId** – **integer**, **foreign key** (**required**)
* **Creator** – **Creator**
* **BoardgamesSellers** – collection of type **BoardgameSeller**

**Seller**

* **Id** – integer, Primary Key
* **Name** – **text** with length **[5…20]** (**required**)
* **Address** – **text** with length **[2…30]** (**required**)
* **Country – text** (**required**)
* **Website** – a **string** (**required**). First four characters are "[**www.**](http://www./)"**,** followed by upper and lower **letters**, **digits** or '**-**' and the last three characters are "**.com**".
* **BoardgamesSellers** – collection of type **BoardgameSeller**

**Creator**

* **Id** – integer, **Primary Key**
* **FirstName** – **text with length [2, 7] (required)**
* **LastName** – **text with length [2, 7] (required)**
* **Boardgames** – collection of type **Boardgame**

**BoardgameSeller**

* **BoardgameId** – integer, **Primary Key**, **foreign key** (**required**)
* **Boardgame** – **Boardgame**
* **SellerId** – integer, **Primary Key**, **foreign key** (**required**)
* **Seller** – **Seller**
* **Data Import (25pts)**

For the functionality of the application, you need to create several methods that manipulate the database. The **project skeleton** already provides you with these methods, inside the **Deserializer** **class**.

**NOTE:** Usage of **Data Transfer Objects** and **AutoMapper** is **optional**.

Use the provided **JSON** and **XML** files to populate the database with data. Import all the information from those files into the database.

You are **not allowed** to modify the provided **JSON** and **XML** files.

**If a record does not meet the requirements from the first section, print an error message:**

|  |
| --- |
| **Error message** |
| Invalid data! |

**XML Import**

**Import Creators**

Using the file "**creators.xml**", import the data from the file into the database. Print information about each imported object in the format described below.

**Constraints**

* If there are **any validation errors** for the **creator** entity (such as **invalid first and last names**), **do not** import any part of the entity and **append an error message** to the **method output**.
* If there are **any validation errors** for the **boardgame** entity (such as invalid or null or empty **name**, **publishing year is** invalid, **rating is** invalid), **do not import it (only the boardgame itself, not the whole creator info)** and **append an error message to the method output**.

|  |
| --- |
| **Success message** |
| Successfully imported creator – {creatorFirstName} {creatorLastName} with {**boardgamesCount**} boardgames. |

**Example**

|  |
| --- |
| **creators.xml** |
| <?xml version='1.0' encoding='UTF-8'?>  <Creators>  <Creator>  <FirstName>Debra</FirstName>  <LastName>Edwards</LastName>  <Boardgames>  <Boardgame>  <Name>4 Gods</Name>  <Rating>7.28</Rating>  <YearPublished>2017</YearPublished>  <CategoryType>4</CategoryType>  <Mechanics>Area Majority / Influence, Hand Management, Set Collection, Simultaneous Action Selection, Worker Placement</Mechanics>  </Boardgame>  <Boardgame>  <Name>7 Steps</Name>  <Rating>7.01</Rating>  <YearPublished>2015</YearPublished>  <CategoryType>4</CategoryType>  <Mechanics>Action Queue, Hand Management, Push Your Luck, Set Collection</Mechanics>  </Boardgame>  …  </Boardgames>  </Creator>  …  </ Creators> |
| **Output** |
| Invalid data!  Invalid data!  Invalid data!  Invalid data!  Invalid data!  Invalid data!  Invalid data!  Invalid data!  Invalid data!  Successfully imported creator - Debra Edwards with 4 boardgames.  Invalid data!  Invalid data!  … |

Upon **correct import logic**, you should have imported **19 creators** and **81 boardgames**.

**JSON Import**

**Import Sellers**

Using the file "**sellers.json**", import the data from that file into the database. Print information about each imported object in the format described below.

**Constraints**

* If any validation errors occur (such as invalid **name**, missing or invalid **country, website and/or address**), **do not** import any part of the entity and **append an error message** to the **method output**.
* Take only the unique boardgames.
* If a **boardgame** does **not exist** in the database, **append an error message** to the **method output** and **continue** with the next **boardgame**.

|  |
| --- |
| **Success message** |
| Successfully imported seller - {**sellerName**} with {**boardgamesSellersCount**} boardgames. |

**Example**

|  |
| --- |
| **sellers.json** |
| [  {  "Name": "6am",  "Address": "The Netherlands",  "Country": "Belgium",  "Website": "[www.6pm.com](http://www.6pm.com/)",  "Boardgames": [  1,  105,  1,  5,  15  ]  },  {  "Name": "Asurion, LLC",  "Address": "P.O. Box 234, 38-54",  "Country": "Belgium",  "Website": "[www.asurion-llc.com](http://www.asurion-llc.com/)",  "Boardgames": [  1,  85,  81,  80,  5,  9  ]  },  …  ] |
| **Output** |
| Invalid data!  Invalid data!  Successfully imported seller - Asurion, LLC with 5 boardgames.  Successfully imported seller - Bedsure with 6 boardgames.  Invalid data!  Invalid data!  Invalid data!  ... |

Upon **correct import logic**, you should have imported **11** **sellers** and **59 boardgames**.

* **Data Export (25 pts)**

**Use the provided methods in the Serializer** class**.** Usage of **Data Transfer Objects and AutoMapper** is **optional**.

**JSON Export**

**Export Sellers With Most Boardgames**

Select the **top** **5 sellers** that have **at least one boardgame** that **their year of publishing** is greater or equal to the **given year** and **their rating** is smaller or equal to the **given rating. Select** them with their **boardgames** who meet the **same criteria** (their year of publishing is greater or equals the given year and the rating is smaller or equal to the given rating). For each **seller**, export their **name, website** and their **boardgames.** For each **boardgame**, export their **name**, **rating, mechanics** and **category** type**.** Order the **boardgames** by **rating** (**descending**), then by **name** (**ascending**). Order the **sellers** by **all** **boardgames** (meeting above condition) **count** (**descending**), then by **name** (**ascending**).

**NOTE**: You **may** need to **call** **.ToArray()** function **before the selection** in order to **detach entities from the database** and **avoid runtime errors** (**EF Core bug**).

**Example**

|  |
| --- |
| **Serializer.ExportSellersWithMostBoardgames(context, year, rating)** |
| [  {  "Name": "Bedsure",  "Website": "[www.bedsure.com](http://www.bedsure.com/)",  "Boardgames": [  {  "Name": "The Fog of War",  "Rating": 9.65,  "Mechanics": "Grid Movement, Hand Management, Rock-Paper-Scissors, Time Track, Variable Player Powers",  "Category": "Strategy"  },  {  "Name": "Capital Lux",  "Rating": 7.58,  "Mechanics": "Grid Movement, Tile Placement",  "Category": "Abstract"  },  {  "Name": "King's Road",  "Rating": 7.48,  "Mechanics": "Card Drafting, End Game Bonuses, Memory, Set Collection, Simultaneous Action Selection",  "Category": "Strategy"  },  {  "Name": "Imperial Struggle",  "Rating": 7.19,  "Mechanics": "Card Drafting, Dice Rolling, Drafting, Set Collection, Simultaneous Action Selection",  "Category": "Family"  },  {  "Name": "Nerdy Inventions",  "Rating": 7.1,  "Mechanics": "Hand Management, Pattern Building",  "Category": "Abstract"  },  {  "Name": "Star Wars: Rebellion",  "Rating": 6.19,  "Mechanics": "Action Queue, Modular Board",  "Category": "Abstract"  }  ]  **},**  **…**  **]** |

**XML Export**

**Export Creators with Their Boardgames**

Export all **creators** that have created at least **one** boardgame. For each **creator**, export their **name** and **boardgames count**. For each **boardgame**, export their **full** **name** and **year of publishing.** Order the **boardgames** by **name** (**ascending**). Order the **creators** by **boardgames count** (**descending**), then by **name** (**ascending**).

**NOTE**: You **may** need to **call** **.ToArray()** function **before the selection,** in order to **detach entities from the database** and **avoid runtime errors** (**EF Core bug**).

**Example**

|  |
| --- |
| **Serializer.ExportCreatorsWithTheirBoardgames(context)** |
| <?xml version="1.0" encoding="utf-16"?>  <Creators>  <Creator BoardgamesCount="6">  <CreatorName>Cade O'Neill</CreatorName>  <Boardgames>  <Boardgame>  <BoardgameName>Bohnanza: The Duel</BoardgameName>  <BoardgameYearPublished>2019</BoardgameYearPublished>  </Boardgame>  <Boardgame>  <BoardgameName>Great Western Trail</BoardgameName>  <BoardgameYearPublished>2018</BoardgameYearPublished>  </Boardgame>  <Boardgame>  <BoardgameName>Indulgence</BoardgameName>  <BoardgameYearPublished>2021</BoardgameYearPublished>  </Boardgame>  <Boardgame>  <BoardgameName>Risk Europe</BoardgameName>  <BoardgameYearPublished>2018</BoardgameYearPublished>  </Boardgame>  <Boardgame>  <BoardgameName>The Grimm Forest</BoardgameName>  <BoardgameYearPublished>2022</BoardgameYearPublished>  </Boardgame>  <Boardgame>  <BoardgameName>Whitehall Mystery</BoardgameName>  <BoardgameYearPublished>2023</BoardgameYearPublished>  </Boardgame>  </Boardgames>  </Creator>  …  </Creators> |