# Entity Framework Core Regular Exam - 3 August 2024

Exam problems for the [Databases Advanced - Entity Framework course @ SoftUni](https://softuni.bg/trainings/4540/entity-framework-core-june-2024).  
Submit your solutions in the **SoftUni Judge** system (delete all **bin**/**obj** and **packages** folders) [here](https://judge.softuni.org/Contests/4802/Entity-Framework-Core-Regular-Exam-3-August-2024).

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.

# Travel Agency



## Project Skeleton Overview

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

1. Data – contains the TravelAgencyContext class, Models folder, which contains the **entity classes** and the **Configuration** class with the **connection string**
2. DataProcessor – contains the Serializer and Deserializerclasses, which are used for **importing** and **exporting** data
3. Datasets – contains the .json and .xml files for the import part
4. ImportResults – contains the **import** results you make in the Deserializer class
5. ExportResults – contains the **export** results you make in the Serializer class

## Model Definition (60 pts)

The application needs to store the following data:

### Customer

* Id– integer, **Primary Key**
* FullName– **text** with length **[4, 60] (required)**
* Email– **text** with length **[6, 50]** **(required)**
* PhoneNumber – text with **length** **13. (required)**
  + All phone numbers **must have the following structure**: a **plus sign** followed by **12 digits**, **without spaces or special characters**:
    - Example -> **+359888555444**
    - HINT -> use **DataAnnotation [RegularExpression]**
* Bookings - a collection of type Booking

### Booking

* Id– integer, **Primary Key**
* **BookingDate – DateTime (required)**
* CustomerId– integer, foreign key **(required)**
* Customer– Customer
* TourPackageId– integer, foreign key **(required)**
* TourPackage– TourPackage

### Guide

* Id– integer, **Primary Key**
* FullName– **text** with length **[4, 60]** (**required**)
* Language– Language enum (English = 0, German, French, Spanish, Russian) **(required)**
* TourPackagesGuides - collection of type TourPackageGuide

### TourPackage

* Id
* PackageName– **text** with length **[2, 40] (required)**
* Description– **text** with **max length 200 (not required)**
* Price– a **positive** decimal value (required)
* Bookings - a collection of type Booking
* TourPackagesGuides - collection of type TourPackageGuide

### TourPackageGuide

* TourPackageId– integer, Primary Key, foreign key (required)
* TourPackage– TourPackage
* GuideId– integer, Primary Key, foreign key (required)
* Guide – Guide

## Data Import (20pts)

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. Usage of DataTransferObjects or **AutoMapper** is **optional**.

To ensure the application's functionality, it is essential to **populate the database with initial data**. Inside the **DbContext class**, you will find a **commented-out section** specifically designed for seeding data.   
**Before applying migrations** and updating the database, please **uncomment this section**.

Use the provided **JSON** and **XML** files to populate the database with data. **Import all the valid information** from the 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 format! |

**If some data appears to be duplicated, do not import the entity, print a duplication data message:**

|  |
| --- |
| **Error message** |
| Error! Data duplicated. |

***Error message and Duplication message will be provided as constants in the skeleton.***

### XML Import

#### Import Customers

Using the file "**customers.xml"**, **import the data from the file** into the database.

Each imported **customer should be validated** and **added to the database if it meets the specified criteria**. The method should **return a string containing information about each import attempt**, formatted as described.

##### Constraints

* **Validation of Customer Entities** - Each customer entity must be validated against the following criteria:
  + **FullName** – Must meet the constraints for the property, described above
  + **Email** – Must meet the constraints for the property, described above
  + **PhoneNumber** - Must meet the constraints for the property, described above
* **Duplication Check** - Before adding a customer to the database**,   
  ensure there are no existing records with the same**:
  + **FullName** OR **Email** OR **PhoneNumber**
* If **any validation error occurs** for a customer entity **or any of the fields match an existing record**, the **customer entity should not be imported**, and the appropriate **error message** or **duplication message should be appended** to the method's output
* **Success Messages**
  + For **each successfully imported customer**, append a **success message** to the output, formatted as **Successfully imported customer - {FullName}**
* **Data Persistence**
  + After processing all customers from the XML file,   
    **add the valid customer entities** to the proper collection
  + **Save the changes** to the database

|  |
| --- |
| **Success message** |
| Successfully imported customer - {**customerFullName**} |

##### Example

|  |
| --- |
| **customers.xml** |
| <?xml version='1.0' encoding='UTF-8'?>  <Customers>  <Customer phoneNumber="+357683444233">  <FullName>Robert Simons</FullName>  <Email>robert.simons@mail.dm</Email>  </Customer>  <Customer phoneNumber="+357183414234">  <FullName>Alice Johnson</FullName>  <Email>alice.johnson@mail.du</Email>  </Customer>  <Customer phoneNumber="+357683444035">  <FullName>John Doe</FullName>  <Email>john.doe@mail.dm</Email>  </Customer>  <Customer phoneNumber="+357600444236">  <FullName>Emma Brown</FullName>  <Email>emma.brown@mail.dm</Email>  </Customer>  …  <Customers> |
| **Output** |
| Successfully imported customer - Donald Sanders  Invalid data format!  Successfully imported customer - Alice Johnson  Successfully imported customer - John Doe  Invalid data format!  Error! Data duplicated.  ... |

Upon **correct import logic**, you should have imported **21 customers**

### JSON Import

#### Import Bookings

Using the file **"**bookings.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 error occurs** for the **booking** entity (**invalid date**), **do not** import any part of the entity and **append an error message** to the **method output**.
  + The **DateTime** **data** in the document will be in the following format: "yyyy-MM-dd"
  + Make sure you use CultureInfo.InvariantCulture
* The **Customers** and **TourPackages** associated with every single Booking will be string values, which **could be matched to already existing records in the database**.

|  |
| --- |
| **Success message** |
| Successfully imported booking – TourPackage: {**tourPackageName**}, Date: {**date.ToString(**"yyyy-MM-dd"**)**} |

##### Example

|  |
| --- |
| **bookings.json** |
| [  {  "BookingDate": "2024-09-21",  "CustomerName": "Donald Sanders",  "TourPackageName": "Horse Riding Tour"  },  {  "BookingDate": "2024-09-22",  "CustomerName": "Donald Sanders",  "TourPackageName": "Sightseeing Tour"  },  {  "BookingDate": "2024-10-01",  "CustomerName": "William Garcia",  "TourPackageName": "Historical Sites"  },  {  "BookingDate": "2024-11-01",  "CustomerName": "William Garcia",  "TourPackageName": "Horse Riding Tour"  },  …  ] |
| **Output** |
| Successfully imported booking. TourPackage: Horse Riding Tour, Date: 2024-09-21  Successfully imported booking. TourPackage: Sightseeing Tour, Date: 2024-09-22  Successfully imported booking. TourPackage: Historical Sites, Date: 2024-10-01  Successfully imported booking. TourPackage: Horse Riding Tour, Date: 2024-11-01  Successfully imported booking. TourPackage: Sightseeing Tour, Date: 2024-09-20  Successfully imported booking. TourPackage: Historical Sites, Date: 2024-12-06  Successfully imported booking. TourPackage: Horse Riding Tour, Date: 2024-09-15  Successfully imported booking. TourPackage: Historical Sites, Date: 2024-09-23  Successfully imported booking. TourPackage: Sunset Cruise, Date: 2024-09-27  Successfully imported booking. TourPackage: Horse Riding Tour, Date: 2024-09-28  Successfully imported booking. TourPackage: Wildlife Safari, Date: 2024-09-29  Successfully imported booking. TourPackage: Sunset Cruise, Date: 2024-09-30  Successfully imported booking. TourPackage: Sightseeing Tour, Date: 2024-10-05  Invalid data format!  **...** |

Upon **correct import logic**, you should have imported **25** **bookings**

## Data Export (20 pts)

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

### XML Export

#### Export All Guides Speaking Spanish Language With All Their Packages

Export **all guides** who speak the **Spanish language** along with **all their associated tour packages**. The exported data should be in **XML format**. Order the **guides by the number of tour packages in descending order**. If two guides have the same number of packages, **order them alphabetically by their full name.**

For each guide**, include all their tour packages**. Order the **tour packages by price in descending order**. If two tour packages have the same price, **order them alphabetically by their name**.

**Data Fields**:

* Guide: Export the full name of the guide and their tour packages
* Tour Package: Export the tour package name, description, and price

**Expected XML Output**:

* The root element should be <Guides>
* Each guide should be represented by a <Guide> element
* All TourPackages should be presented as an array of TourPackage
* Each tour package should be represented by a <TourPackage> element within its associated guide

##### Example

|  |
| --- |
| ExportGuidesWithSpanishLanguageWithAllTheirTourPackages(context) |
| <?xml version="1.0" encoding="utf-16"?>  <Guides>  <Guide>  <FullName>Alex Johnson</FullName>  <TourPackages>  <TourPackage>  <Name>Horse Riding Tour</Name>  <Description>Experience the thrill of a guided horse riding tour through picturesque landscapes. Suitable for all skill levels. Enjoy nature and create unforgettable memories. Duration: 3 hours.</Description>  <Price>199.99</Price>  </TourPackage>  <TourPackage>  <Name>Historical Sites</Name>  <Description>Explore ancient ruins, museums, and landmarks on a guided tour. Learn about the rich history and culture of the area. Ideal for history buffs. Duration: 4 hours.</Description>  <Price>159.99</Price>  </TourPackage>  <TourPackage>  <Name>City Tour</Name>  <Description>Discover the charm of the city with a guided tour. Visit famous landmarks, bustling markets, and hidden gems. Perfect for all ages. Duration: 3 hours.</Description>  <Price>129.99</Price>  </TourPackage>  </TourPackages>  </Guide>  <Guide>  <FullName>Chris Martin</FullName>  <TourPackages>  …  </TourPackages>  …  </Guide>  …  <Guides> |

### JSON Export

#### All Customers That Have Booked Horse Riding Tour Package

Export all customers who have booked the "**Horse Riding Tour**" package. The exported data should be in JSON format and adhere to the following specifications:

* **Selection Criteria**:
  + Select **all customers** who have **at least one booking for the "Horse Riding Tour"** package
  + For each customer, export their **full name** and **phone number**
  + For each booking, export the **tour package name** and the **booking date**
* **Data Fields**:
  + Customer – **FullName**, **PhoneNumber**
  + Booking – **TourPackageName**, **Date**(formatted as "yyyy-MM-dd")
* **Ordering:**
  + Order **customers by the number of bookings (descending)**
  + If two customers have the same number of bookings, **order them alphabetically by their full name**
  + Order the **bookings by date (ascending)**

##### Example

|  |
| --- |
| **ExportCustomersThatHaveBookedHorseRidingTourPackage(context)** |
| [  {  "FullName": "Donald Sanders",  "PhoneNumber": "+357683444233",  "Bookings": [  {  "TourPackageName": "Horse Riding Tour",  "Date": "2024-09-21"  }  ]  },  {  "FullName": "Henry White",  "PhoneNumber": "+357611144251",  "Bookings": [  {  "TourPackageName": "Horse Riding Tour",  "Date": "2024-09-28"  }  ]  },  {  "FullName": "Michael Smith",  "PhoneNumber": "+357683411237",  "Bookings": [  {  "TourPackageName": "Horse Riding Tour",  "Date": "2024-09-15"  }  ]  },  …  ] |