Homework assignment 3.
Data storage and processing

1 Introduction

The goal of this assignment is to practice skills related to the following topics:

- Data formats
- LINQ
- Databases and the Entity Framework library
- Multi-project solutions

2 Description of tasks

In this assignment you will write an application that allows to make requests and calculate statistical information on a source dataset (world university rankings). You will first need to move the dataset to a SQL database and then execute requests using Entity Framework and LINQ.

Read all the tasks and requirements first then start to develop the application.

1. Navigate to the World Rankings webpage, browse through university rankings for five different years (2012 - 2016, check the "World University Rankings" menu at the top of the page), study these source datasets carefully. Notice that in 2014 a new column "Broad Impact" was added to the ranking table. Also notice that certain numeric values contain a "+" at the end, for simplicity you can remove it when saving the value to a database.

2. Download datasets (2012 - 2016 world university ratings) so that they can be used in your C# application. You can use a number of approaches:

   - Copy each of the five ranking tables to Excel then save each file in the CSV format. CSV files can then be read from your C# application as normal text files

- Save each table to an excel file, then use a special library to load data from excel into your C# application, check examples on the web.
- Use web requests and download all the data from the C# application directly, then use regular expressions to parse data from HTML.
- Browse the web to find the same datasets in machine-readable formats (JSON, XML), then they can be easily loaded into the application without parsing.

The choice you make won't affect your final grade. If you choose to save information to a file(s), please include them when submitting your solution.

3. Using the code-first approach, design entity classes for the given subject area. Make sure you use split the information into multiple entities so that repetition of data is minimized.

4. Add the Context class to your project, then using Code-First migrations create the database on a local sql server

5. Seed your database with data from the source dataset files (or directly from the web resources). You can first do it in the main program but the final version should perform this operation inside the Seed method.

6. Design the repository class that will contain implementation of the following requests:

   - Complete university ranking table for a given year
   - University rankings for a given year grouped by country. In each group entries should be sorted in descending order of the score.
   - Dynamics for a given university (how a particular university evolved in the rating table from 2012 to 2016)
   - Minimal, maximal and average score of each university over the last five years in descending order of the average score.

7. Design UI of your application to show results of requests from the previous task.

The following requirements also apply:

- Your solution needs to be divided into two or more projects. The most common separation would be UI - Logic (Data)
- The application should have a graphical UI (both Windows Forms and WPF are allowed)

3 Submission

Submit your solution following these steps:

1. Delete "bin", "obj" from each project folder and "packages" (**not the packages.config file**) from the solution folder.
2. Add the whole solution folder to a ZIP archive.
3. Upload the archive to the Canvas LMS in the corresponding section

4 Grading policy

This assignment does not have an exact distribution of points among tasks, it will be graded as a whole depending on the number and quality of completed tasks. An instructor has the option to ask one or two additional questions in case of an unclear grade.

The grade can be lowered in the following cases:

- Inefficient implementation of an algorithm (-1 point)
- Poor programming style (-1 point) (ask your instructor for the definition of "poor")