Database Systems – Practical Exam – October 2015

For the tasks you are given a skeleton **("Skeleton.zip").** It contains the solution structure as well as some helpful interfaces. Entity Framework is already referenced so all you need to do is build the solution to get the package from NuGet.

Important: When submitting your solutions to the student's system, make sure you delete the "packages", "bin" and "obj" folders.

Problem 1. Database First (15 points)

You are given a **console HTTP server**, which can process requests and... (hahaha, just kidding, hahaha, you should have seen the look on your face, hahaha, I can't take it, hahaha, so funny, hahaha, can't stop rolling on floor laughing, hahaha!)

Now, seriously, since this is my last official exam for you, let it be easier than the preparation (for real!).

In a pet store, information about different **pets** and **pet products** is held. Each pet has **species** (singular – for example: "Cat", "Dog", etc.), **date and time of birth**, **price**, **color** and **breed** (all except breed is mandatory). Breed is between 5 and 30 symbols long, inclusive. Color can be **black**, **white**, **red** or **mixed**. All species have **name** and **origin country** (both are between 5 and 50 symbols long, inclusive). Country and species names are unique. Pet products have **name** (between 5 and 25 symbols, inclusive), **price**, **category** and one or more **species** for which the product is suitable. Category has **name** and it is between 5 and 20 symbols long, inclusive. Since the application using the database will provide a lot of searching and ordering by pet's price and date and time of birth, make sure you optimize it for these operations.

Design a database schema "**PetStore**" in SQL server to keep the information about **pets**, **colors**, **species**, **countries**, **products** and **categories** **tables**. Ensure data integrity and normalization is fulfilled.

Provide a **SQL script for your database schema** (with the data), a backup (.bak file) from the database and a **simple documentation of the relationships** between the tables. Additionally, provide a **picture of the design diagram** describing your created database.

Problem 2. Stored Procedure (5 points)

Write a stored procedure, which checks if any colors are added to the database and if not, to seed the initial four ones - **black**, **white**, **red** or **mixed.**

Problem 3. Sample Data (15 points)

Use C# to implement an application for generating random sample data in the pet store. Create at least:

- **20 countries** - ensure unique countries are added no matter their count.
- **100 species** – average of 5 species per country, at least 1 per country. Ensure unique species are added, no matter their count.
- **5 000 pets** – add average of 50 pets per species. Price is between $5 and $2500. Color is one of the four available colors and date and time of birth is at least 60 days before now but not before the year 2010.
- **50 categories**
- **20 000 products** – add average of 400 products per category. Each product is suitable for 2 to 10 species. Product price is between $10 and $1000.

* You are free to use an ORM framework by choice or plain ADO.NET.