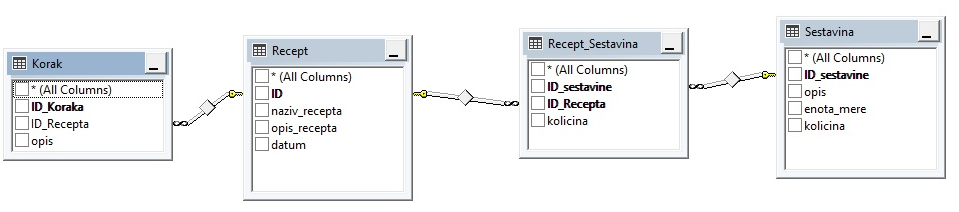
**Recipes :** C# .NET Windows Forms application for example of handling one-to-many relationships, many-to-many relationships, validations and user interfaces connected to SQL Server or Oracle Database with use of SAP Crystal Reports. Created in Visual Studio 2017.

1. Database diagram



Picture 1: Database diagram

Main table of our system is Recipes (Recepti). Other tables are Step (Korak), Recipe\_Ingredient (Recept\_Sestavina) and Ingredient (Sestavina). One recipe can have multiple steps and multiple ingrediens. One step is present at exactly one recipe. Relationship between these two entities is one-to-many. Since one ingredient is present in multile recipes, a relationship between these two entities is many-to-many and involvement of additional table Recipe\_Ingredient is necesary.

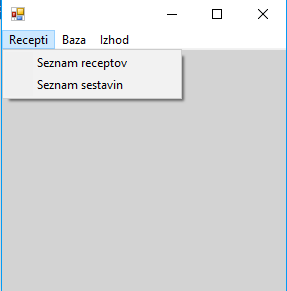
Since each step is unique, Recipe\_ID (ID\_Recepta) is foreign key in table Step. Primary key is Step\_ID (ID\_Koraka).

Relationship between recipes and ingredients is different and consequently primary key of table Recipe\_Ingredient is made by two parts: Recipe\_ID (ID\_Recepta) and Ingredient\_ID (ID\_sestavine).

1. System

System for working with recipes is built by three parts:

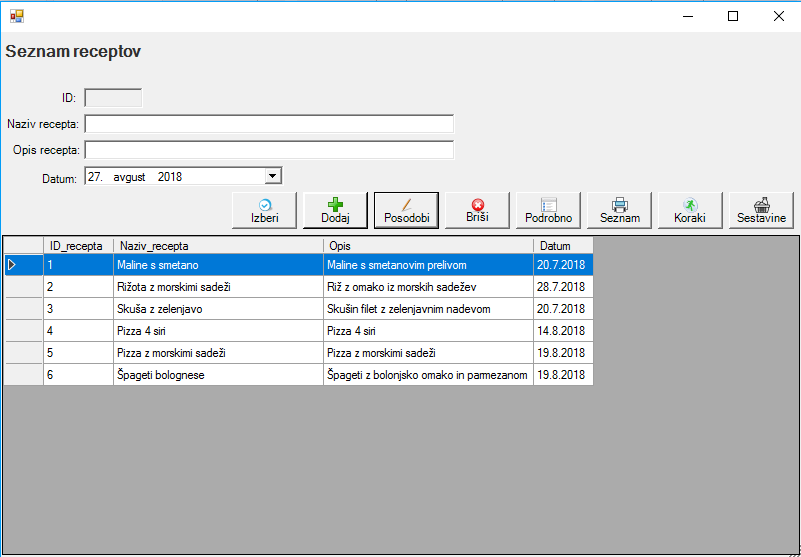
1. list of recipes with possibility of adding, update and delete steps and ingredients,
2. list of ingredients with possibility of add ingredient, change amount of ingredient or delete ingredient from database,
3. Select database – SQL Server or Oracle.



Picture 2: Main menu

* 1. List of recipes

In List of recipes (Seznam receptov) we can manage recipes, their steps and ingredients.



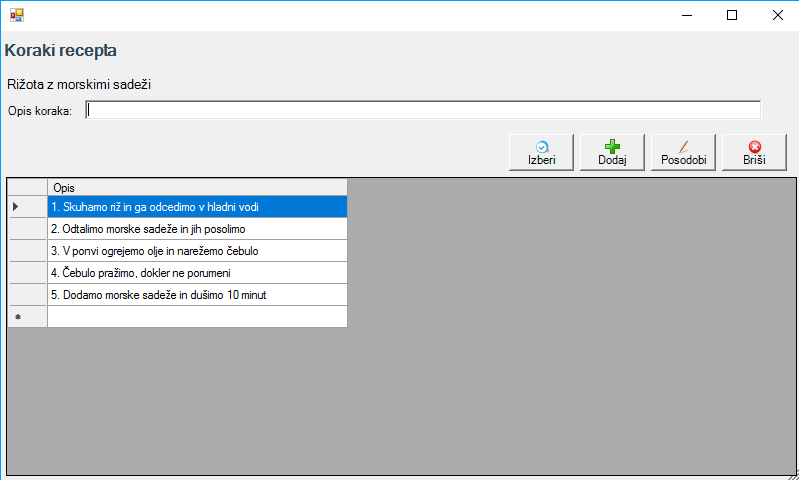
Picture 3: List of recipes

We are able to:

1. Select recipe to edit (Izberi),
2. Add new recipe (Dodaj),
3. Update existing recipe (Posodobi),
4. Delete recipe (Briši),
5. Preview and print recipe with steps and ingredients (Podrobnosti),
6. Preview and print list of recipes (Seznam),
7. Manage steps (Koraki),
8. Manage belonged ingredients (Sestavine).
   * 1. Managing steps

First, we must select recipe from list and then click button Steps (Koraki). After that, we can:

1. Select step (Izberi),
2. Add new step to recipe (Dodaj),
3. Update existing step (Posodobi) or
4. Delete step.

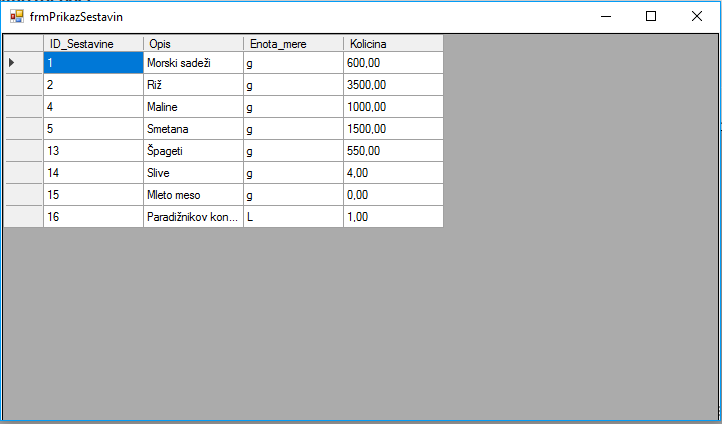


Picture 5: Managing steps

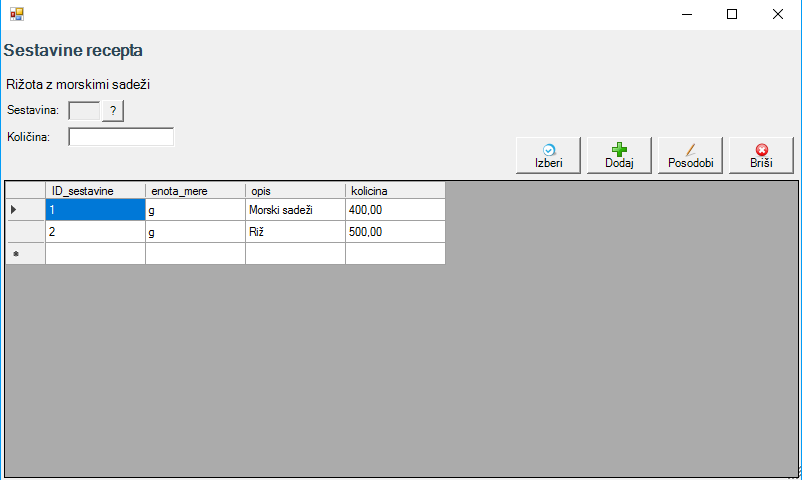
With this tasks we manage one-to-many relationship between entities Recipe and Step.

* + 1. Managing recipe ingredients

After clicking button Ingredients (Sestavine), we get possibility of choosing an ingredient to recipe with available amount with click of the button. If inputted amount is bigger than available amount, we must repeat that task with smaller amount.



Picture 6: Selecting ingredient



Picture 7: Managing recipe ingredients

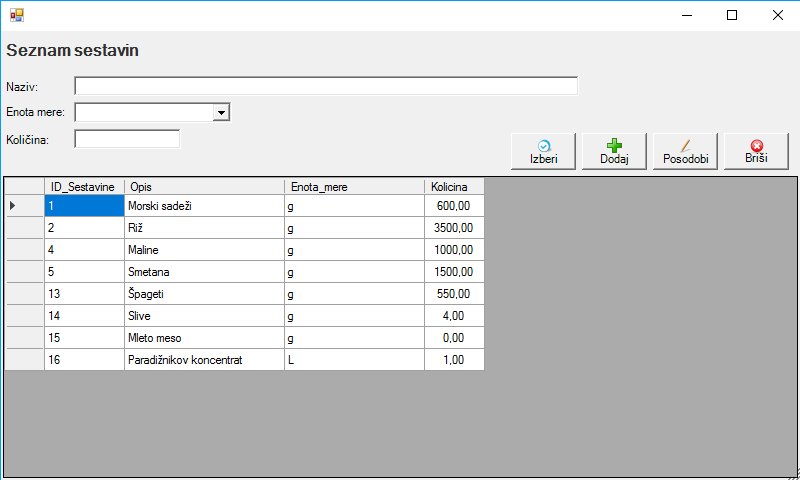
We can:

1. Select ingredient from list and add to recipe ( and Dodaj),
2. Select, change and update amount of existing ingredient (Posodobi) with control of available amount of ingredient or
3. Delete ingredient.

With this sequence of tasks we can handle many-to-many relationship between entities Recipe and Ingredient.

* 1. Handling available ingredients

With click on option List of Ingredients (Seznam sestavin) in main menu we can manage available ingredients and their available amounts. These amounts are dropping consequently when we add ingredient to recipe. We must specify measure unit of ingredient.



Picture 8: Managing available ingredients