

# Practice Class 7

## Objectives

Graphic Interaction Form with BD  
Relational Database Normalization (Normal Forms).

## Assignment 7.1

Introductory note: Following the rules previously defined and advertised on the UC Moodle page, this guide aims to help students in the process of developing the final practical form using the Microsoft Visual Studio .NET tool.

Within the scope of the Database discipline, the way in which the user interacts (via a graphical form) with the SQL Server database for querying and manipulating data will be analyzed. It is recommended that, in the final work, concentrate your efforts on a good and complete implementation of 3 forms.

If you do not have experience with the Visual Studio tool and C# language yet, it is suggested that you recall the work done in practice class number 1. In addition, make use of the complementary material available in Moodle:

- a supporting document with the title "C# .NET & SQL Server".
- a small demo application (see figure below), with code provided in C#, which allows interaction with the Customers table from the Northwind database (from Microsoft).

The screenshot shows a Windows application window titled "Contacts". On the left, there is a list of contacts with columns "ID" and "Company". The list includes entries like ALFKI (Alfreds Futterkiste), ANATR (Ana Trujillo Emparedados y helados), ANTON (Antonio Moreno Taquería), AROUT (Around the Horn), BERGS (Berglunds snabbköp), BLAUS (Blauer See Delikatessen), BLONP (Blondesddsl père et fils), BOLID (Bóldo Comidas preparadas), BONAP (Bon app'), BOTTM (Bottom-Dollar Markets), BSBEV (B's Beverages), CACTU (Cactus Comidas para llevar), CENTC (Centro comercial Moctezuma), CHOPS (Chop-suey Chinese), COMMI (Comércio Mineiro), CONSH (Consolidated Holdings), DRACD (Drachenblut Delikatessen), DUMON (Du monde entier), EASTC (Eastern Connection), ERNSH (Ernst Handel), FAMIA (Familia Arquibaldo), FISSA (FISSA Fabrica Inter. Salchichas S), FOLIG (Folies gourmandes), FOLKO (Folk och få HB), FRANK (Frankenversand), and FRANR (France restauration). On the right, there is a detailed view of the selected contact, "Alfreds Futterkiste". This view includes fields for "ID" (ALFKI), "Company" (Alfreds Futterkiste), "Contact" (Maria Anders), "Address" (Obere Str. 57), "City" (Berlin), "State" ( ), "ZIP" (12209), "Telephone" ( ), "Fax" ( ), and "Country" (Germany). At the bottom right, there are three buttons: "Add", "Edit", and "Delete".

- a) Start by opening the project provided in C# .NET. Make the necessary changes to the sample to use your SQL Server.

- b) With the auxiliary document "C# .NET & SQL Server" check how the interaction of the graphical form with the SQL server database is established to:
- i. List Contacts;
  - ii. Insert a new contact;
  - iii. Update an existing contact;
  - iv. Delete a contact from the database.
- c) Resolve the following small questions in the application provided:
- i. Auto-upload the contact list (currently required: File -> Load Customers);
  - ii. Allow editing of the first element of the list;
  - iii. Resolve the problem of not showing the Telephone and Fax elements.

Note 2: You must follow the response template provided for the next exercises.

## Assignment 7. 2

Consider the scenario of drawing a relational database to support information from published books. Suppose we have the following relationship:

Book (Book\_Title, Author\_Name, Author\_Affiliation, Book\_Type, Price, NumberPages, Editor, Editor\_Address, Year\_Publication)

There are also the following functional dependencies inferred from the semantic analysis of the attributes of the relationship:

Book\_Title, Author\_Name -> Editor, Book\_Type, NumberPages, Year\_Publication  
 Book\_Type, NumberPages -> Price  
 Author\_Name -> Author\_Affiliation  
 Editor -> Editor\_Address

- a) In what normal form is the relationship? Justify.
- b) Normalize the Book relation to 3FN describing the decomposition performed for each intermediate form.

## Assignment 7. 3

Consider the relationship  $R = \{A, B, C, D, E, F, G, H, I, J\}$  with the following functional dependencies  $F = \{ \{A, B\} \rightarrow \{C\}, \{A\} \rightarrow \{D, E\}, \{B\} \rightarrow \{F\}, \{F\} \rightarrow \{G, H\}, \{D\} \rightarrow \{I, J\} \}$ .

- a) What is the key to R?
- b) Decompose R to 2FN.
- c) Decompose R to 3FN.

### Assignment 7.4

Consider the Relationship  $R = \{A, B, C, D, E\}$  with the following functional dependencies  $F = \{ \{A, B\} \rightarrow \{C, D, E\}, \{D\} \rightarrow \{E\}, \{C\} \rightarrow \{A\} \}$ .

- a) What is the key to R?
- b) Decompose R to 3FN.
- c) Decompose R to BCNF.

### Assignment 7.5

Consider the relationship  $R = \{A, B, C, D, E\}$  with the following functional dependencies  $F = \{ \{A, B\} \rightarrow \{C, D, E\}, \{A\} \rightarrow \{C\}, \{C\} \rightarrow \{D\} \}$ .

- a) What is the key to R?
- b) Decompose R to 2FN.
- c) Decompose R to 3FN.
- d) Decompose R to BCNF.