Universidade de Aveiro, DETI

Base de Dados
Practice Guide Classes

Licenciatura em Engª de Computadores e Informática
Licenciatura em Engª de Automação Industrial
Licenciatura em Engª Computacional
Licenciatura em Engª Informática
Licenciatura em Matemática
Licenciatura em Física

Year: 2024/2025

Practice Class 1

Objectives

Creating workgroups and setting up the desktop
Familiarization with Microsoft SQL Server and Management Studio
Familiarization with Microsoft Visual Studio

Introductory Note

The following working tools will be used in practical classes in the Database discipline: the **Microsoft SQL Server** (>=2016), **Microsoft SQL Server Management Studio,**[1] and **the Microsoft Visual Studio Community**. In Visual Studio we will use the C# language and, in the installation process, they must select the option ".Net Desktop development" to have the option "Windows Forms App (.NET Framework)" when they create a project.

If you do not have a Windows operating system, it is recommended that you use a VirtualBox (https://www.virtualbox.org) or UTM (https://mac.getutm.app) virtualization solution. The operating system and other Microsoft software can be downloaded from https://azureforeducation.microsoft.com/devtools by signing in with the AU user. Alternatively, only the installation of Microsoft SQL Sever (Engine) is possible to do so via Docker (https://docs.docker.com/desktop/install/windows-install/) as documented in https://hub.docker.com/_/microsoft-mssql-server. Note: This option does not exclude the need to install SQL Server Management Studio.

In the first practice lesson, each working group will provide the access credentials to the SQL Server class support server. The groups will be identified by an ID with the following nomenclature: p*X*g*Y*. The *X* represents the number of the practice class and *the Y* the number of the workgroup. For example, group 5 of class P2 will have the following ID: p2g5. Each user has created, by default, a database with the group name on the SQL Server server of the classes. **Students are responsible for the content of their database as well as for backing up (backups).**"

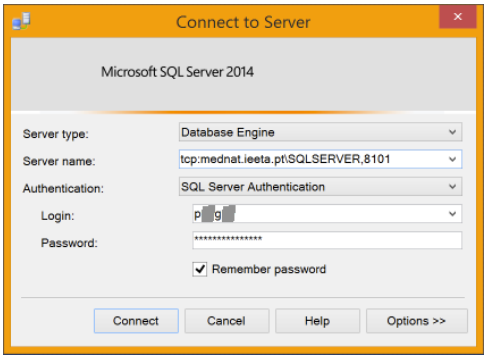
[1] SQL Server Management Studio:
https://learn.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-ver16
SQL Server 2019 Express Edition download (engine + management studio):
https://download.microsoft.com/download/7/c/1/7c14e92e-bdcb-4f89-b7cf-93543e7112d1/SQLEXPRADV_x64_ENU.exe

Assignment 1.1

Start with the Microsoft SQL Server Management Studio tool and connect to your database. In the "Server name" field of the connection window use the following content:

tcp:mednat.ieeta.pt\SQLSERVER,8101

You know the "SQL Server Authentication" method in the "Authentication" field and use your credentials to connect to the server. On the first link you will be asked to change your account password.



Once connected to the SQL Server database engine, do the following:

a) Browse "Object Explorer" until you find your database.
b) See that you can create a table by clicking the right button on the "Tables" item in your database, then selecting the "New Table..." option.
c) Open a command window to interact with the database management system. To do this, click the "New Query" button.
d) Run the following commands in the open window in point c:

```
CREATE TABLE Hello (MsgID INT PRIMARY KEY, MsgSubject VARCHAR(30) NOT NULL);

INSERT INTO Hello Values (1245, 'Ola tudo Bem');
```

e) Check in the "Object Explorer" that a new Hello table has been created in your database containing two columns: MsgID and MsgSubject. A new record (tuple) was also introduced in the table with the contents (1245, 'Ola tudo Bem').

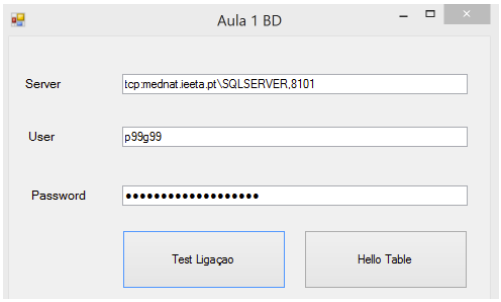
Assignment 1.2

Open Microsoft Visual Studio and create a project of type "Windows Forms Application" (New Project -> Windows Forms App C#).
Check that a Form with the name *Form1* is created by default.cs.

a) Start by dragging objects from the "Toolbox" to your Form1, such as Button, CheckBox, Label, TextBox, ListBox, etc. Arrange them on Form1 to your liking.
b) Run the application in debug mode (Start Debugging (F5)) and see the graphic effect.
c) Change other features of your application, such as the name, dimensions, colors of the objects, etc.

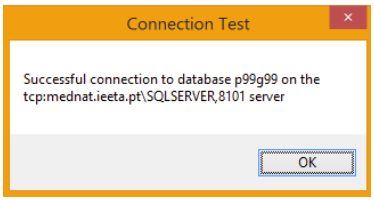
Assignment 1.3

Create an application in Visual Studio with the following visual shape:

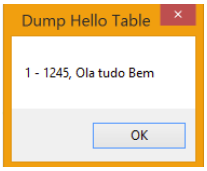


With the help of the two blocks of code below (TestDBConnection and GetTableContent), and without trying to understand the details of the SQL statements, implement the following features:

a) "Test BD Connection"



b) "Hello Table Content"



Note: This tool will be used again in Script 7 (creation of interaction forms with the final job database).

Code blocks:

```
private void TestDBConnection(string dbServer, string dbName, string userName, string userPass)
 {
    SqlConnection CN = new SqlConnection("Data Source = " + dbServer + ";"
          + "Initial Catalog = " + dbName + "; uid = " + userName + ";" + "password = " + userPass + ";Encrypt=false");


    try
    {
       CN. Open();
       if (CN. State == ConnectionState.Open)
       {
          MessageBox.Show("Successful connection to database " + CN. Database + " on the "
                                  + CN. DataSource + " server",  "Connection Test", MessageBoxButtons.OK);
       }
    }
    catch (Exception ex)
    {
       MessageBox.Show("Failed to open connection to database due to the error \r\n" +
                                                          ex. Message, "Connection Test", MessageBoxButtons.OK);
    }


    if (CN. State == ConnectionState.Open)
       CN. Close();
 }
```

```
private string GetTableContent(SqlConnection CN)
{
   string str = "";

   try
   {
      CN. Open();
      if (CN. State == ConnectionState.Open)
      {
         int cnt = 1;
         SqlCommand sqlcmd = new SqlCommand("SELECT * FROM Hello", CN);
         SqlDataReader reader;
         reader = sqlcmd. ExecuteReader();

         while (reader. Read())
         {
            str += cnt. ToString() + " - " + reader. GetInt32(reader. GetOrdinal("MsgID")) +
                                                                                                    ", ";
            str += reader. GetString(reader. GetOrdinal("MsgSubject"));
            str += "\n";
            cnt += 1;
         }
      }
   }
   catch (Exception ex)
   {
      MessageBox.Show(" Failed to open connection to database due to the error \r\n" +
                                                          ex. Message, "Connection Error", MessageBoxButtons.OK);
   }

   if (CN. State == ConnectionState.Open)
      CN. Close();

   return str;
}
```

In the discipline dossier, on the elearning.ua.pt platform, you can find a text file (aula1_codigo.txt).