COMP 3311
Database Management Systems

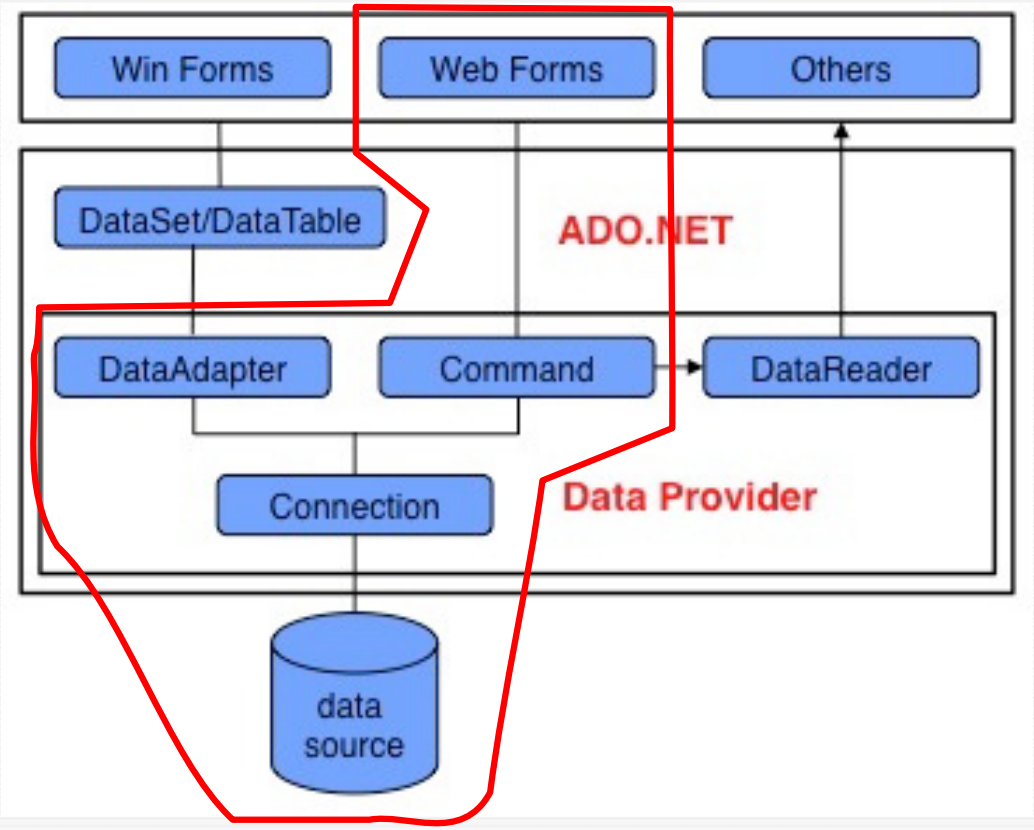
Lab 8

Accessing Oracle Database Using Visual Studio—Part 2

Lab Objectives

- After this lab you should be able to **programmatically**
  - connect to Oracle Database from Visual Studio.
  - retrieve data from an Oracle database table and display it in a web browser.
  - update an Oracle database table through a web browser.

ASP.NET Data Access Architecture

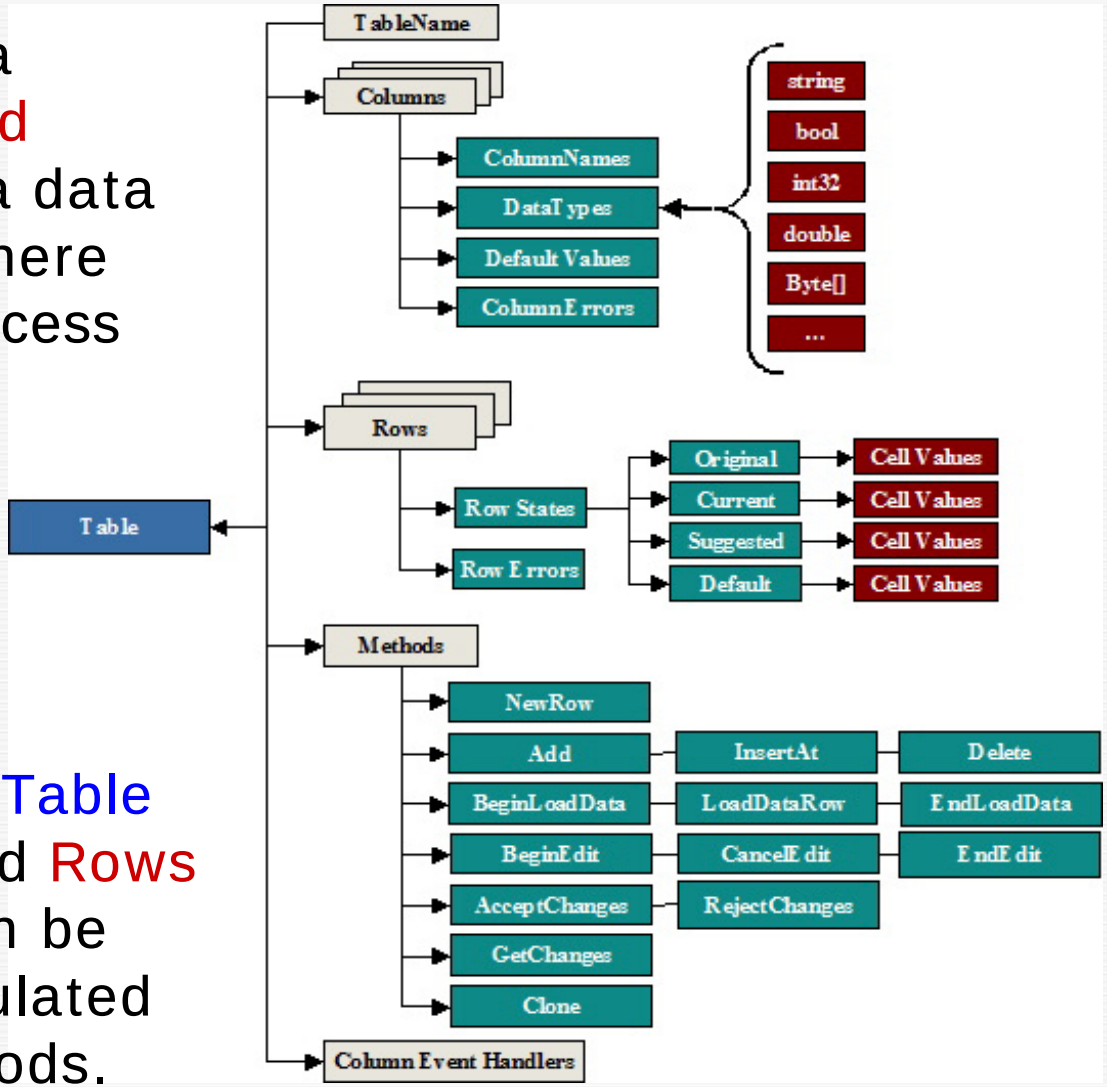


Note: The code that actually accesses Oracle Database is in the class UniversityData.cs inside the App_Code folder.

DO NOT MODIFY THIS CODE!

DataTable

- A DataTable is a data structure used to hold data retrieved from a data source in memory where program code can access and manipulate it.
- A DataTable can hold at most one table.
- A table within a DataTable contains Columns and Rows collections, which can be accessed and manipulated using standard methods.



Prepare The Database

- **Download to the Desktop** the file Lab8Exercise.zip from the Connecting to Oracle Using Visual Studio—Part 2 entry of the Lab Schedule course web page and unzip it.

- Place your insertmyself.sql script file inside the Lab8Exercise folder.

  Note: Your insertmyself.sql script file should insert *only* your tuple into the student table.
  DO NOT insert any tuples for yourself into the enrolls_in table.

- Execute the lab8.sql script file inside the Lab8Exercise folder in SQL Developer.

Open The University Website

- Start Microsoft Visual Studio 2015.
- In the File menu select Open Website... and navigate to the Lab8Exercise folder on the desktop.

IMPORTANT

DO NOT select Open Project/Solution....

- Select the UniversityWebsite folder inside the Lab8Exercise folder.
- Click the Open button.

Modifying The Web.config File

- In the Solution Explorer, double-click on the Web.config file.
- Find the line

  <add name="UniversityDatabaseConnectionString ..."
- On this line, find the following:

  ID=comp3311stuXXX;Password=XXXXXXXX

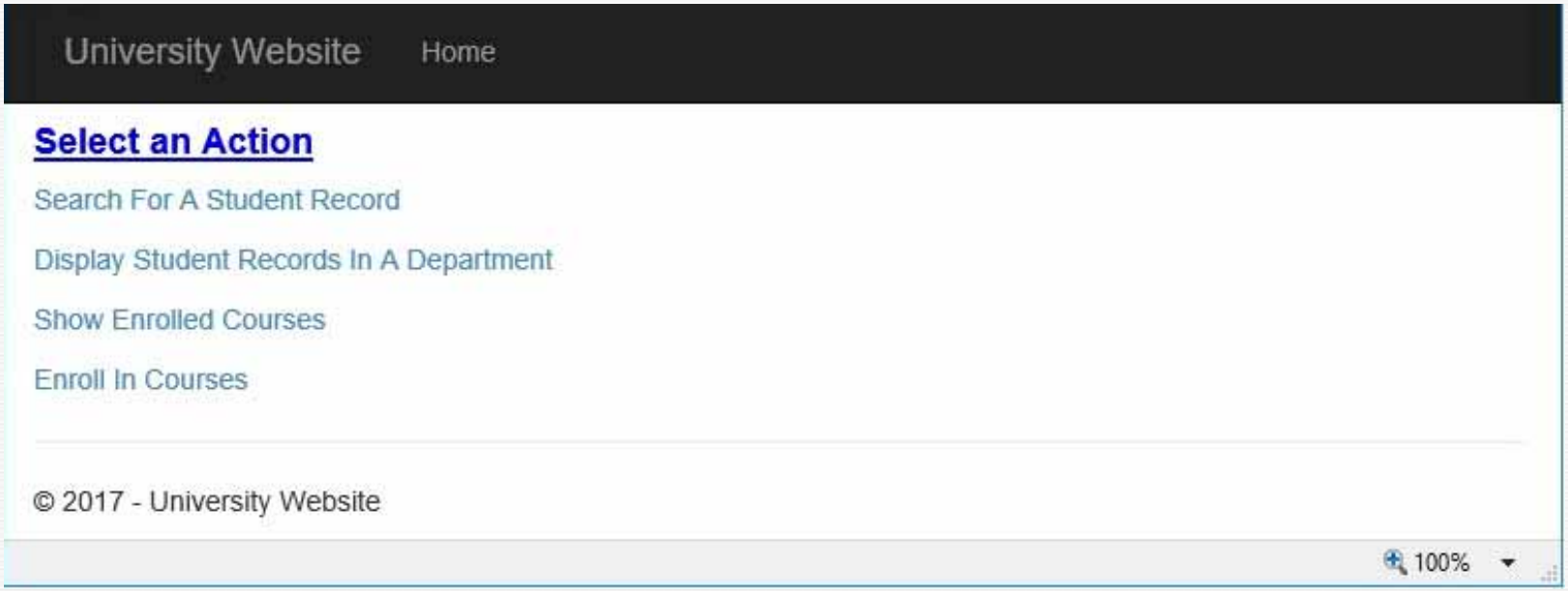
  and replace

  comp3311stuXXX with your Oracle user name

  XXXXXXXX with your Oracle password
- Save and close the Web.config file.

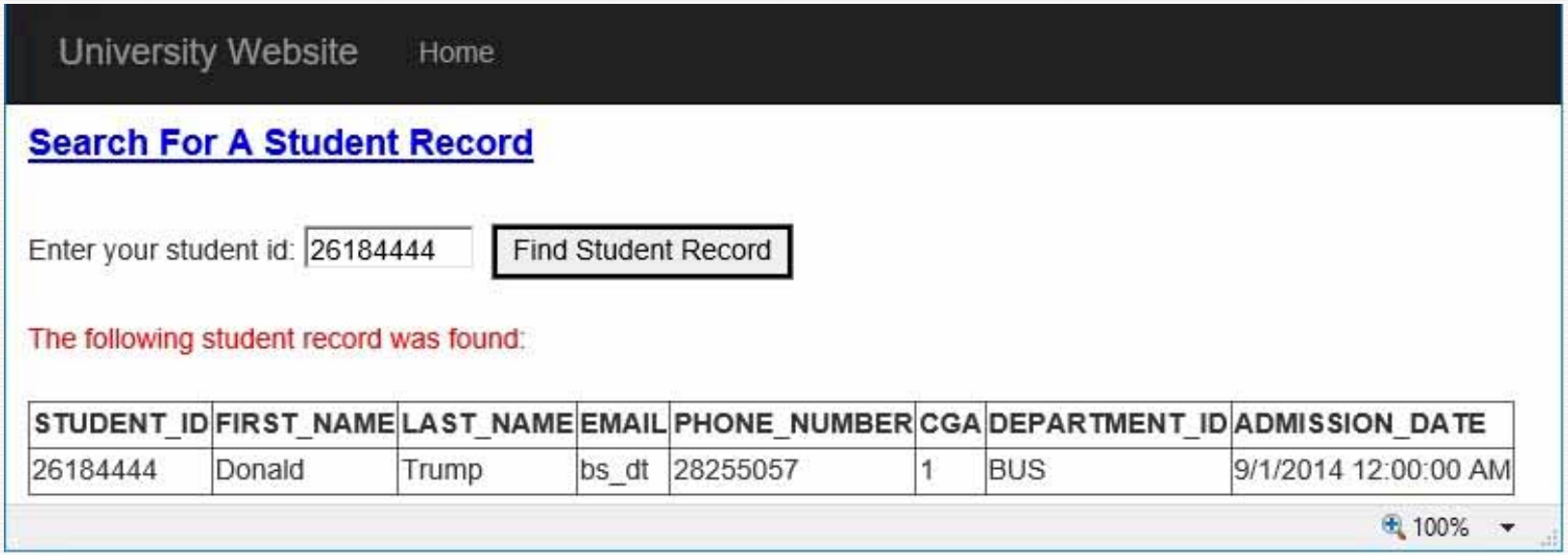
Test the Website (1)

- Select Start Debugging in the Debug menu to view the website.
- The homepage of the website, shown below, should be displayed.



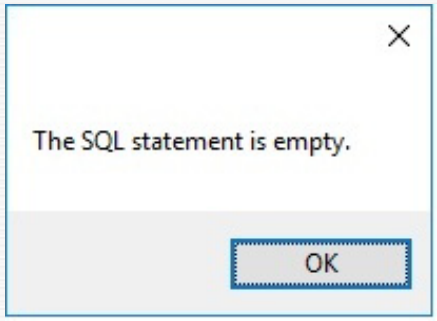
Test the Website (2)

- Click on the Search For A Student Record link and enter a valid student id in the textbox (e.g., 26184444).
- The record of the student should be displayed as shown below.



Test the Website (3)

- If you click on any other link on the homepage and try to search, you will get an error message, shown on the right, indicating that there is no SQL statement defined since the code-behind files are missing the SQL statements required to retrieve data from and/or insert data into the Oracle database.

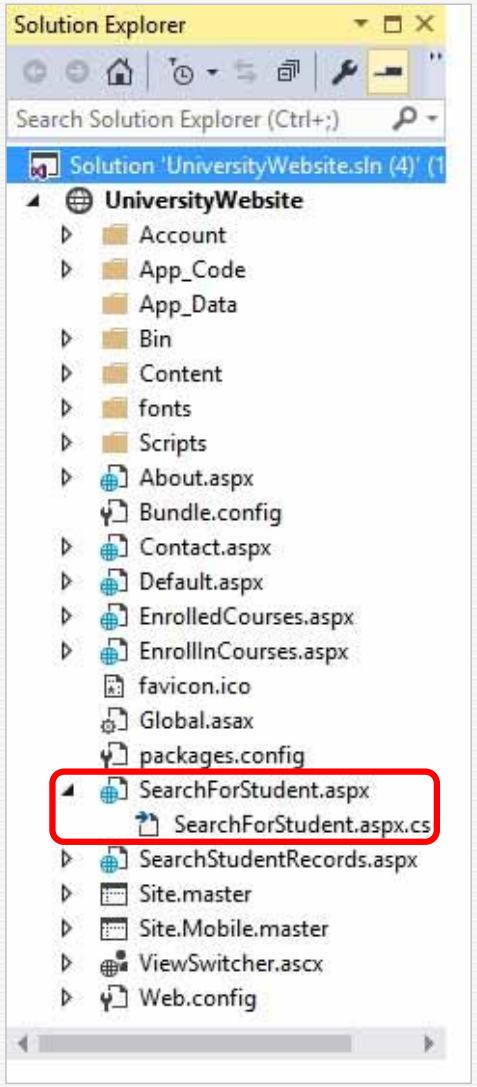


Note: The error message may be hidden behind the browser window.

- Close the browser window.

C# Code-behind File (1)

- The code that processes user input, constructs any required SQL statement to access the database and displays the results, if any, of an SQL statement, is contained in the C# code-behind file of a web form.
- In the Solution Explorer, expand the folder SearchForStudent.aspx.
- Double click on the file SearchForStudent.aspx.cs.



C# Code-behind File (2)

- In the C# code-behind file for the SearchForStudent.aspx web form, first the student id value is obtained from the textbox.
- Next, an SQL statement is constructed, as a string named sql, in which the student id value is used.
- Then, the string sql is passed to the procedure myWebsiteData.GetData, which contains the code required to access the Oracle database and the result is assigned to a DataTable for display in a GridView.

```
protected void btnFindAvailabelCourses_Click(object sender, EventArgs e)
{
    // Hide the search result message.
    lblResultMessage.Visible = false;
    gvStudentRecord.Visible = false;
    string studentId = txtStudentID.Text.Trim();

    if ((studentId != "") && (studentId.Length == 8))
    {
        //*************************************************
        // TODO: Construct the SELECT statement to find the  *
        //       student record with the specified studentId.*
        //*************************************************
        string sql = "select * from student where student_id='" + studentId + "'";

        // Execute the SQL statement and place the result in a datatable.
        dtCourse = myWebsiteData.GetData(sql);

        // Fill the GridView from the datatable and bind
        // the search result to the GridView control.
        gvStudentRecord.DataSource = dtCourse;
        gvStudentRecord.DataBind();

        // Display a no result message if nothing was retrieved from the database.
        if (gvStudentRecord.Rows.Count == 0)
        {
            lblResultMessage.Text = "The student record was not found.";
        }
        else
        {
            gvStudentRecord.Visible = true;
            lblResultMessage.Text = "The following student record was found:";
        }
    }
    else
    {
        lblResultMessage.Text = "Please enter a valid student id.";
    }
    lblResultMessage.Visible = true;
}
```

Complete C# Code-behind Files (1)

- The missing SQL statements are marked by TODO comments.
- There are four TODOs (i.e., four SQL statements to construct) as follows.
  - SeachStudentRecords.aspx.cs — 1 TODO
  - EnrollInCourses.aspx.cs — 2 TODOs
  - EnrolledCourses.aspx.cs — 1 TODO

DO NOT modify any of the other code in the code-behind files or any other files! In particular, do not modify the web forms. We cannot help you if you have changed these files. In this case the best thing to do is to start over.

Complete C# Code-behind Files (2)

- Most of the SQL statements that you need to complete require values that are input through a TextBox control on a web form.
- The values input through a TextBox control have already been assigned to variables in the C# code-behind files whose names should make the values they hold obvious.
- You will need to use these variables to construct your SQL statements.

Complete C# Code-behind Files (3)

- Consider, as an example, the code on slide 12 which retrieves the record of a student with a specified student id.
- There is a TextBox control on the web form for inputting the student id value (see slide 9).
- In the code-behind file the value of the student id input through the TextBox control is assigned to a variable named studentID (see slide 12).

Complete C# Code-behind Files (4)

- The SQL statement to retrieve the student record is then constructed and assigned to the variable sql as follows:

```
string sql = "select * from student where student_id='" + studentID + "'";
```

1. Since the type of the student_id attribute is varchar2, you need to put single quotes around the value of the studentID variable so that the SQL statement will look like

   ```
   select * from student where student_id='26184444'
   ```

   if the value of studentID is 26184444.

2. Note that the C# string concatenation operator is +.

Complete C# Code-behind Files (5)

- In the website, if your SQL statement has an error in it, then when you try to execute it, you will get a popup message indicating that an Oracle error occurred as shown on slide 10.
- The message will not indicate where in your SQL statement the error occurred, making debugging it very difficult.
- Therefore, before trying to execute an SQL statement in Visual Studio, it is highly recommended that you first “debug” it in SQL Developer using appropriate values for any variables.

Using Visual Studio on Your Computer

- A free version of Visual Studio, Visual Studio Community (Windows only) can be downloaded from

  https://www.visualstudio.com/en-us/downloads/download-visual-studio-vs.aspx

- To access Oracle Database you also need to download and install Oracle Data Access Components (ODAC) for Windows from

  http://www.oracle.com/technetwork/topics/dotnet/utilsoft-086879.html

- After installing ODAC, you need to configure the client to use TNS resolving with the following information

database server:	dbsvr1.cse.ust.hk
service name:	comp3311.cse.ust.hk
SID:	comp3311
port number:	1521

- The Oracle Database server can only be accessed within the HKUST network. To access it from outside the HKUST network, you need to use the UST VPN.

  http://itsc.ust.hk/apps/vpn/