COMP 3311
Database Management Systems

Lab 7

Accessing Oracle Database Using Visual Studio—Part 1

Lab Objectives

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

Lab Exercise

- Download the script file lab7.sql, from the Accessing Oracle Database Using Visual Studio—Part 1 entry of the Tutorial and Lab Schedule course webpage and execute it in SQL Developer.
- Follow the lab notes to complete the lab exercise.

Ask for help if you need it!

IMPORTANT NOTE

You cannot access Oracle Database from the M drive using Visual Studio.

Your website folder must be on the local computer.

Start Visual Studio

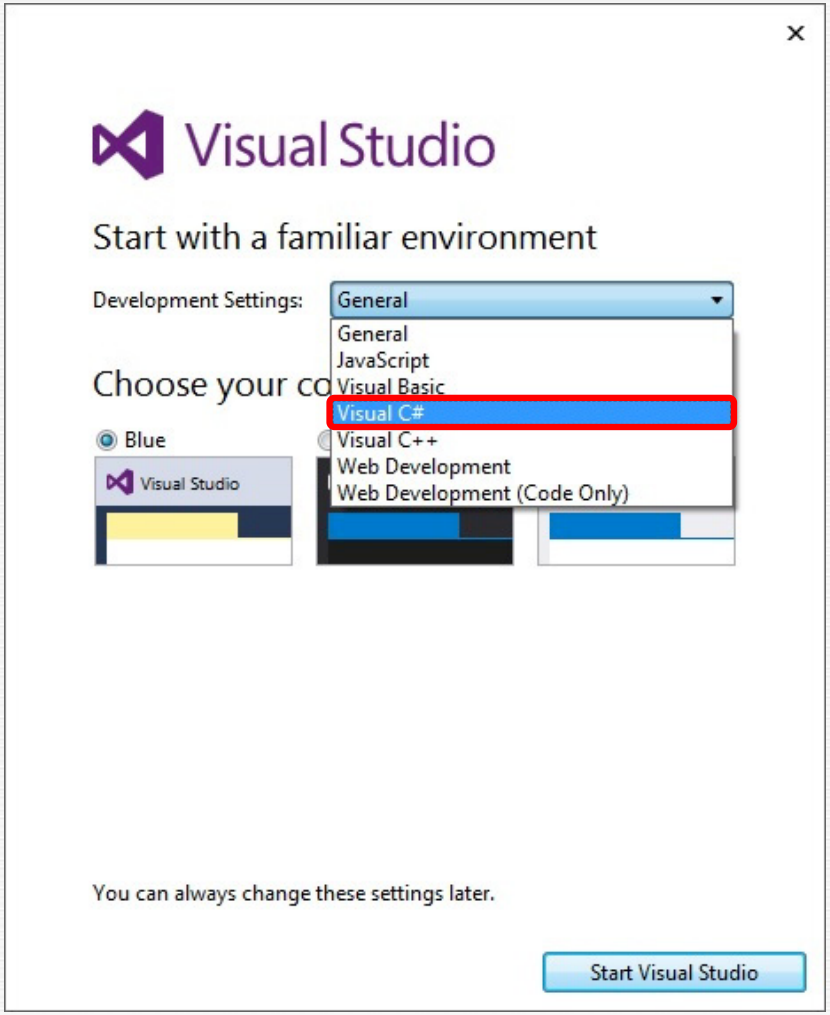
- From the Start menu, find the folder named Microsoft Visual Studio 2015.
- Open the folder and double-click on Microsoft Visual Studio 2015.
- It may take several minutes for Visual Studio to start up. We know it might be hard, but –

BE VERY PATIENT!

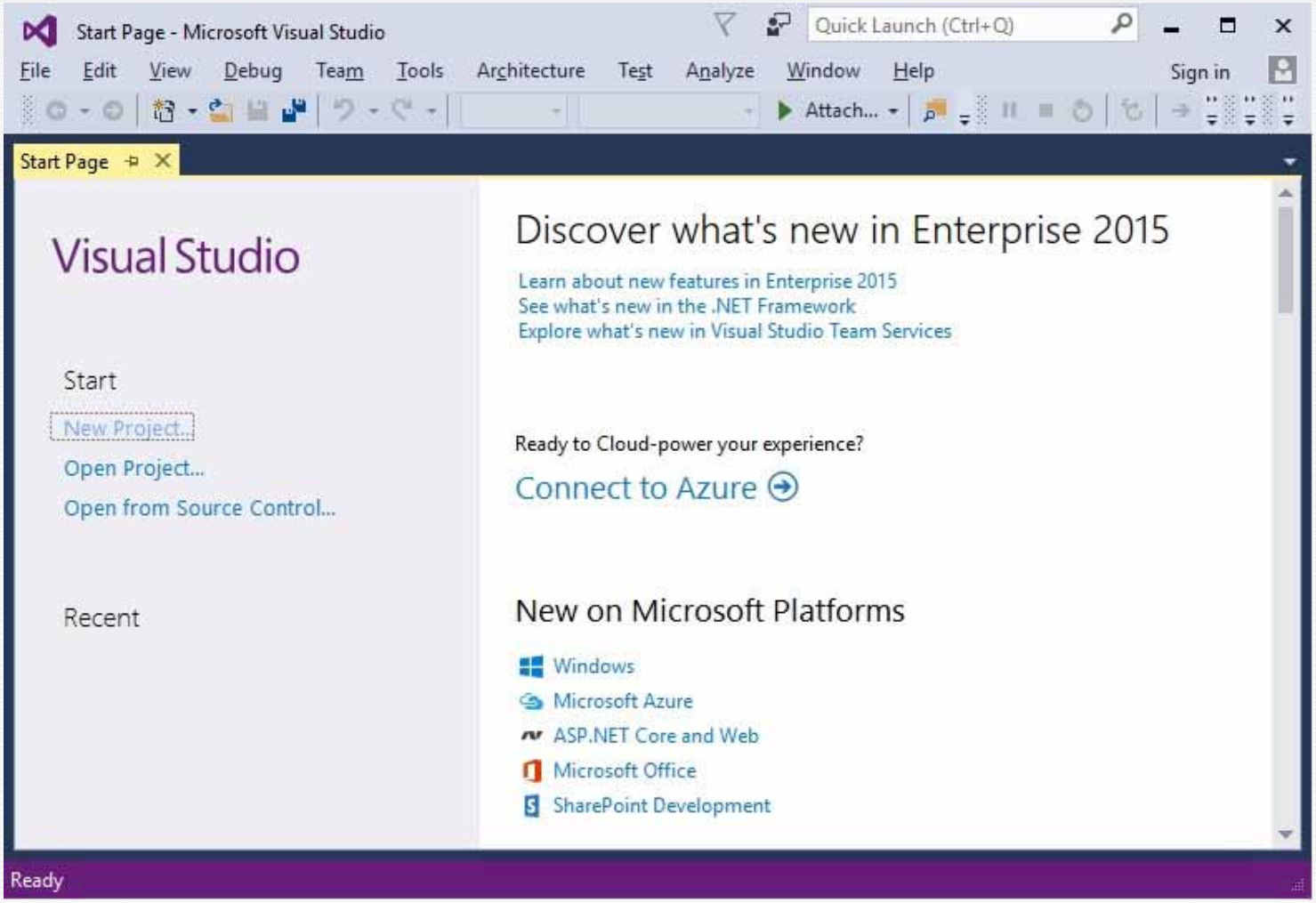
Select the Environment

- When prompted,
  - select Visual C# as the development setting.

    DO NOT SELECT C++ or any other development setting!
  - click the Start Visual Studio button.

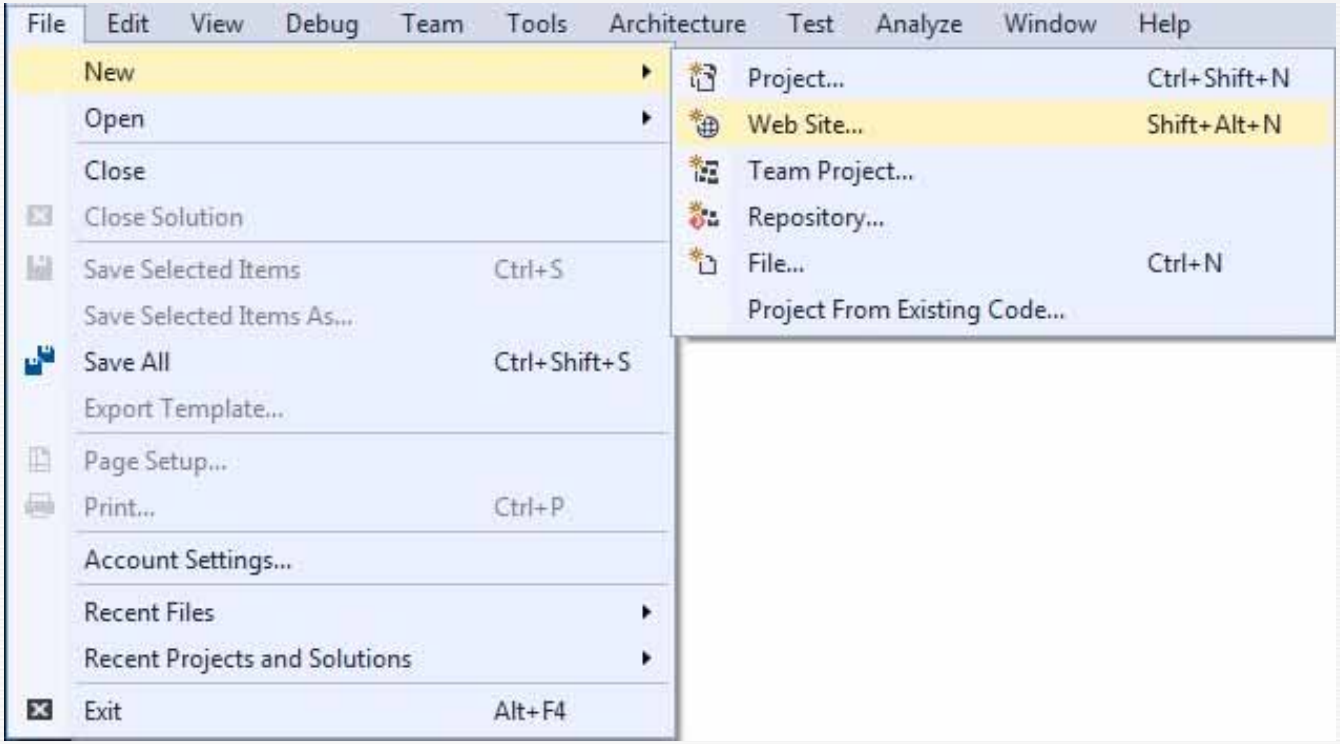


Visual Studio Start Page



Create A Website (1)

- From the File menu, select New→Web Site....

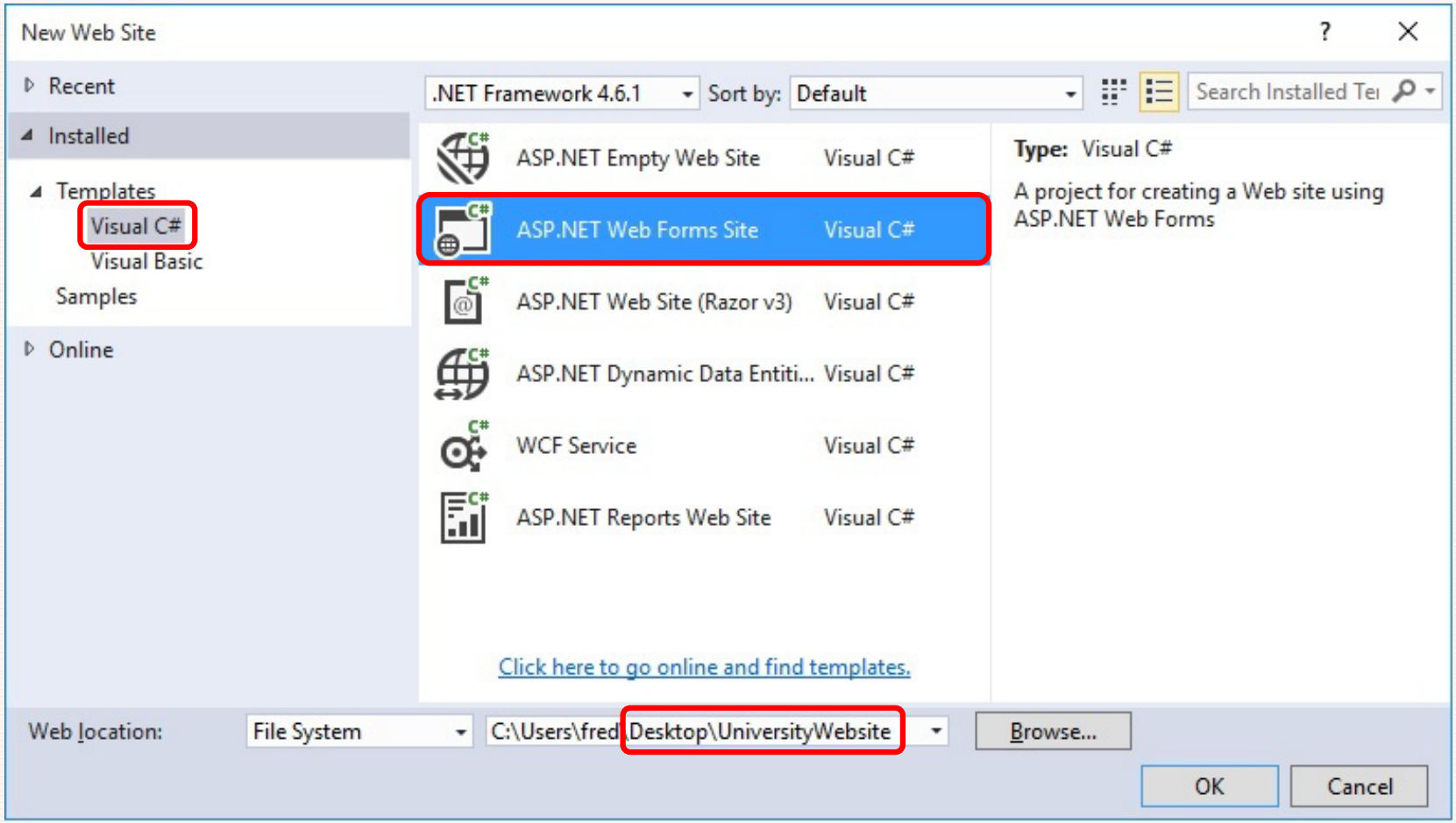


Create A Website (2)

- Make the following selections in the **New Web Site** dialog box (see next slide):
  - in the left pane under the Installed→Templates tab , select Visual C# as the language.
  - in the centre pane, select ASP.NET Web Forms Site.
  - click the **Browse** button and browse to the Desktop.
  - enter ...\Desktop\UniversityWebsite as the website name.
  - click the **OK** button. (**BE PATIENT** while the website is being created.)

Note: Save the UniversityWebsite folder to either the M drive or a USB drive after the lab. DO NOT store it on the local computer as it may be deleted!

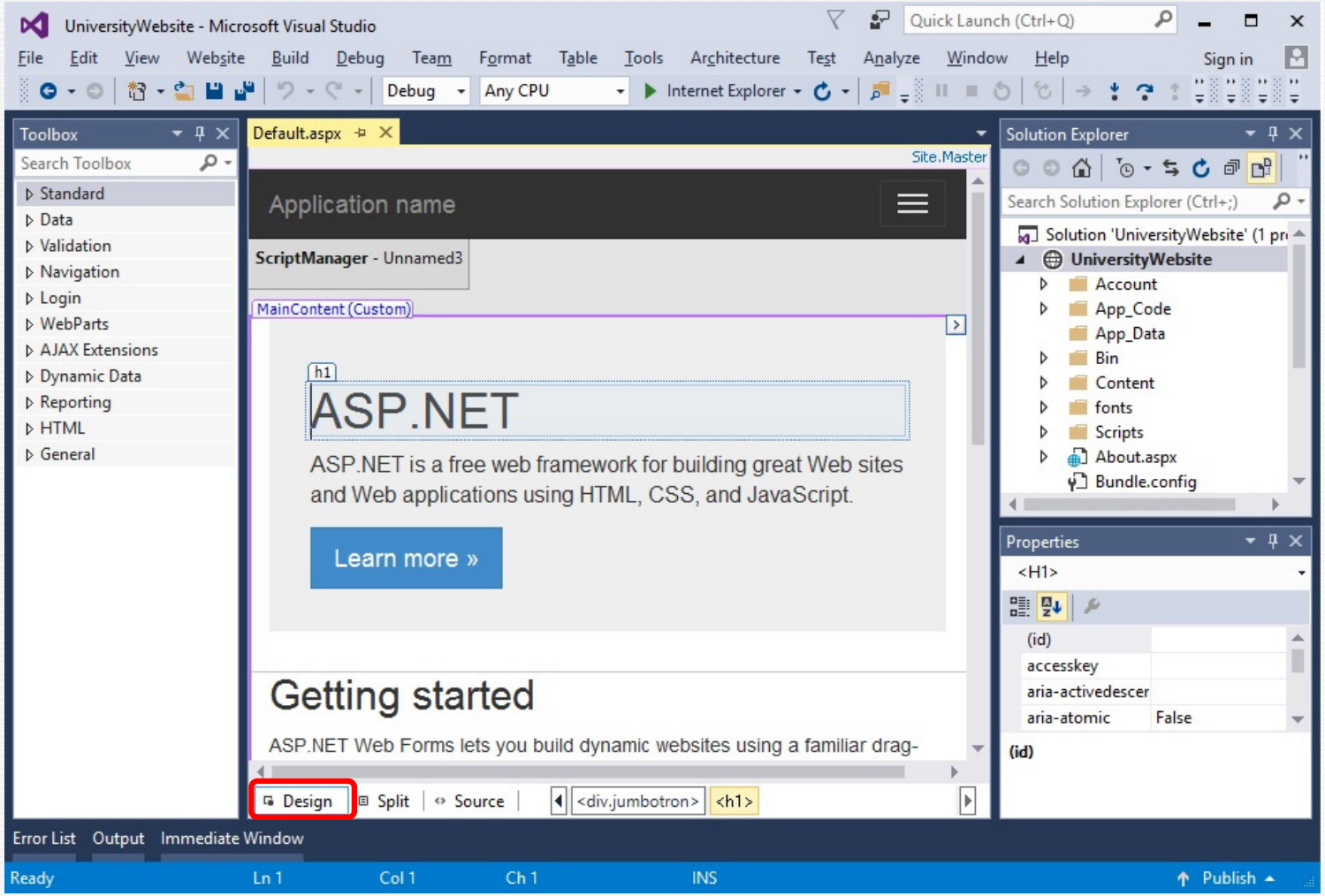
Create A Website (3)



Web Forms

- A web form, which is rendered as a web page, provides the user interface (UI) of a website.
- Visual Studio lets you create web pages by dragging and dropping server controls onto a web form to lay out a web page.
- Properties, methods and events for server controls or for the web page can be set in order to define the web page's behavior, look and feel.
- Web forms are constructed using a combination of HTML, server controls and server code.

Web Form Designer

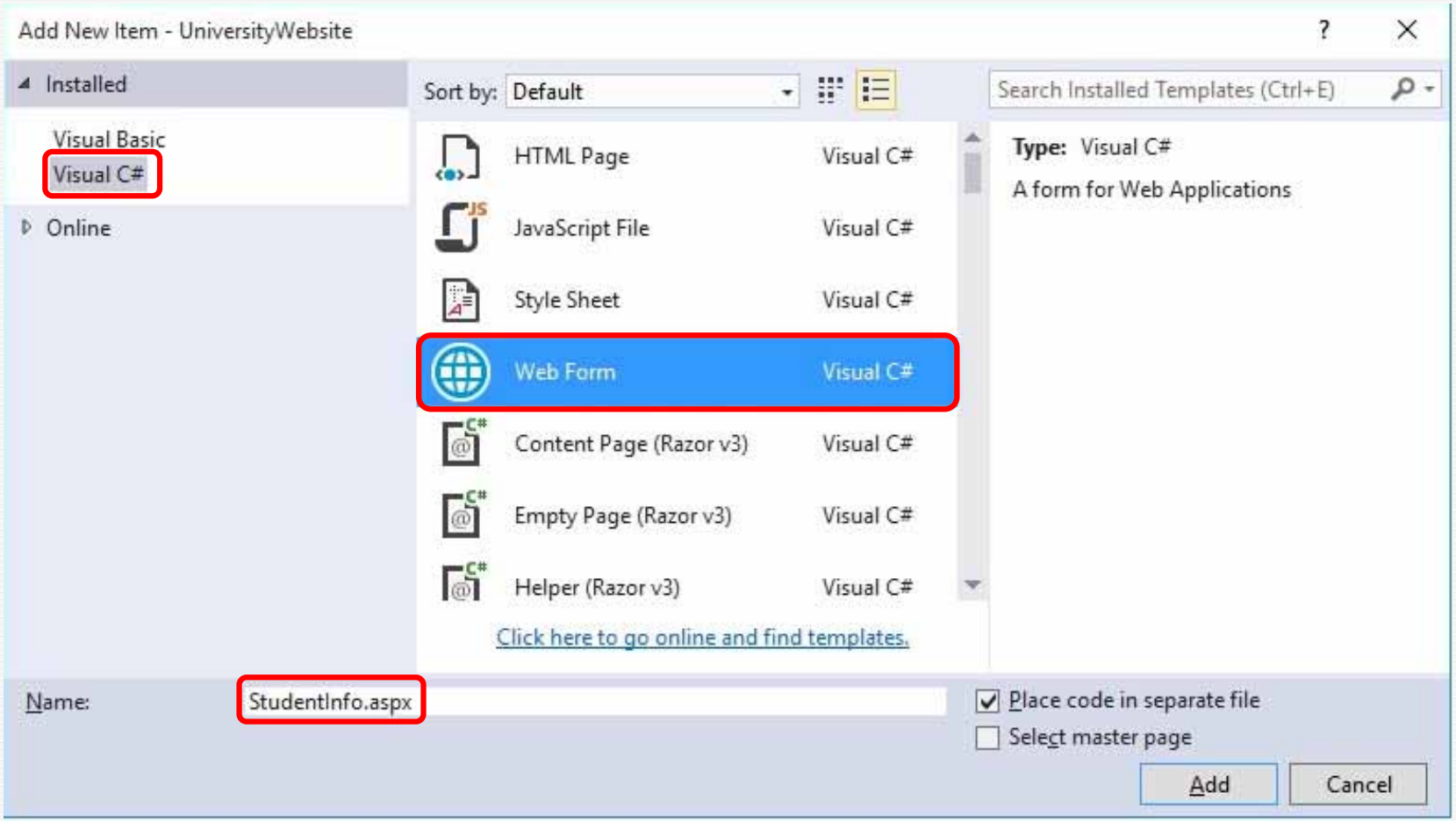


Select the Web Form Designer's Design tab highlighted above.

Add a Web Form to the Website (1)

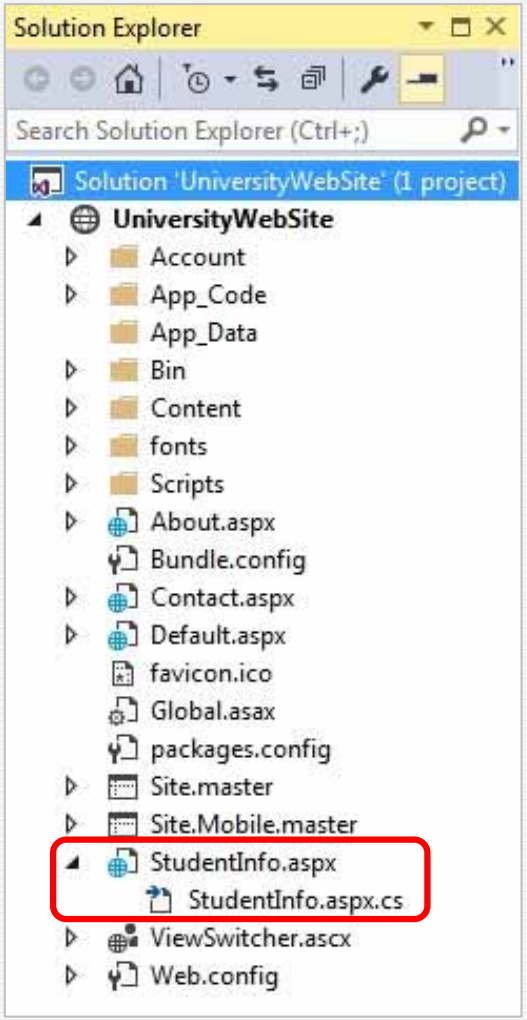
- Close the Default.aspx web form.
- In the Website menu, select Add New Item... .
- Make the following selections in the Add New Item dialog box (shown in the next slide):
  - in the left pane under the Installed tab, select Visual C# as the language.
  - in the centre pane, select Web Form.
  - in the Name textbox, enter StudentInfo.aspx as the name of the web form.
  - check the Place code in separate file checkbox.
  - click the Add button.

Add a Web Form to the Website (2)



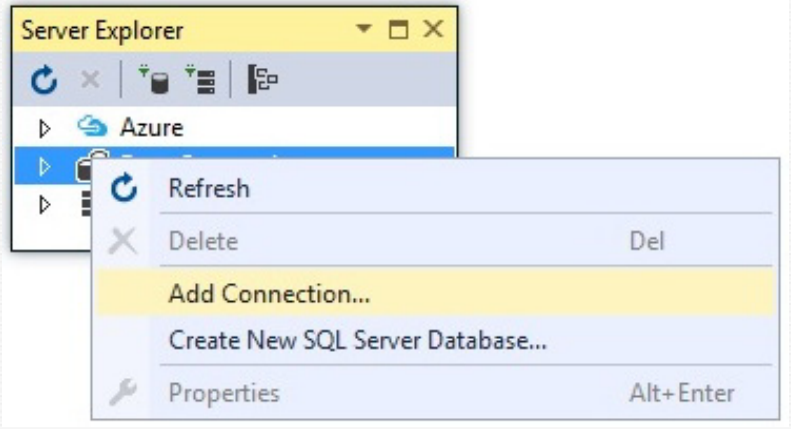
Solution Explorer

- The web form (with extension aspx) is added to the website and appears in the Solution Explorer, shown on the right.
- A C# code-behind file (with extension aspx.cs) is also added (discussed in the next lab).
- The Solution Explorer allows file and resource management including adding, removing, opening, renaming and moving files.



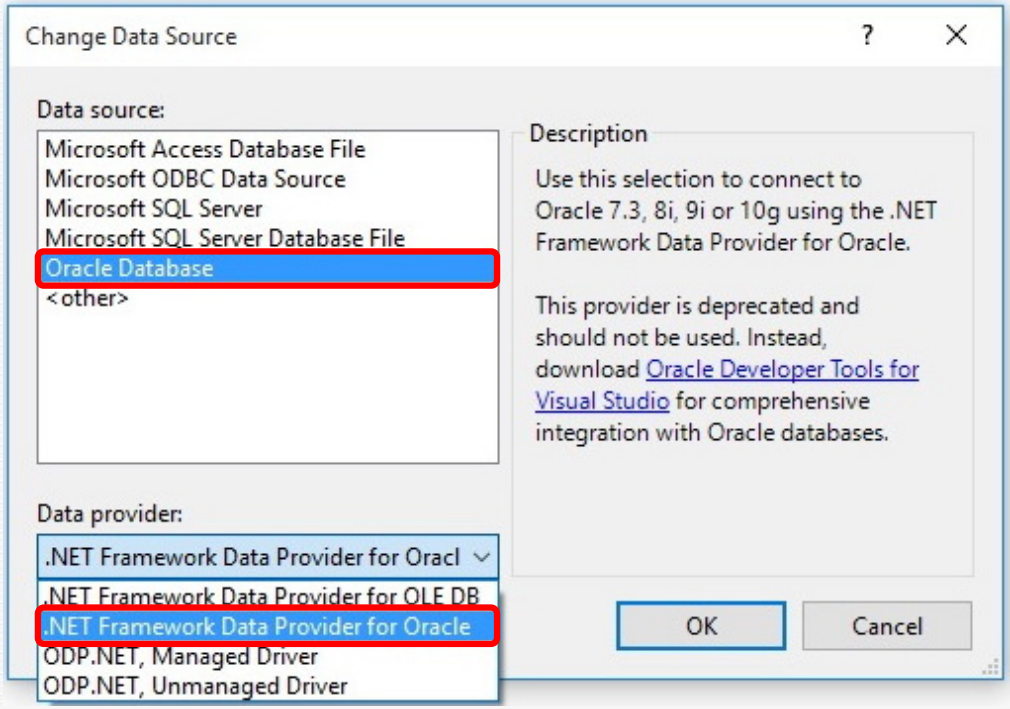
Connect to Oracle Database (1)

- In the View menu, select Server Explorer to open the Server Explorer window.
- Right-click the Data Connections node and select Add Connection ... from the popup menu.



Connect to Oracle Database (2)

- In the **Choose Data Source** dialog box, make the following selections, if not already selected:
  - select Oracle Database.
  - select .NET Framework Data Provider for Oracle from the dropdown list.
  - click the **OK** button.



Connect to Oracle Database (3)

- In the **Add Connection** dialog box, enter or select the following:

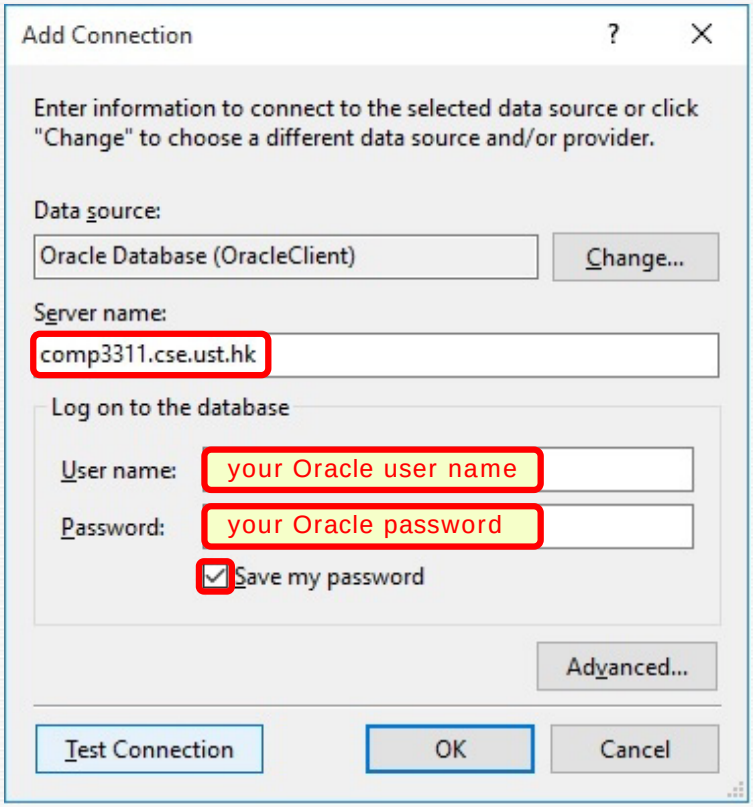
  Server name: comp3311.cse.ust.hk

  User name: your Oracle user name

  Password: your Oracle password

  Save password: check the checkbox

  - click the **Test Connection** button to check if the connection can be made.
  - click the **OK** button.

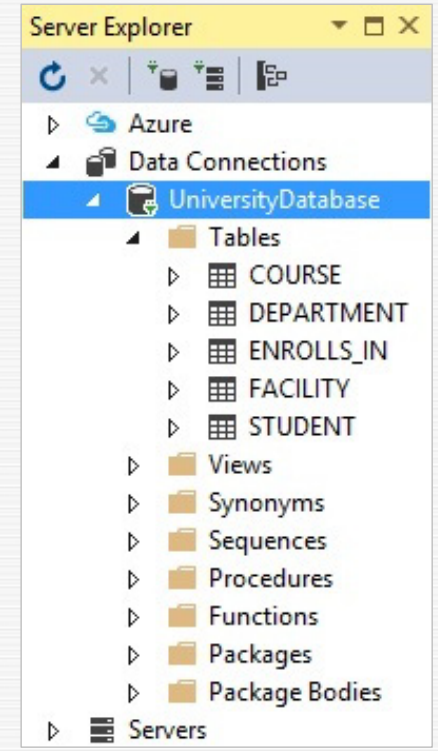


Server Explorer (1)

- Server Explorer is the Visual Studio server management console used to open data connections, log on to servers and explore their databases and system services.
- Server Explorer shows the following nodes.
  - Azure - available Microsoft Azure services.
  - Data Connections - available database connections.
  - Servers - available servers.
- To access Server Explorer, choose Server Explorer in the View menu.

Server Explorer (2)

- In the Server Explorer window,
  - expand the node comp3311.cse.ust.hk.COMP3311STUXXX and then the Tables node[1].
  - right-click on any table and select Show Table Data from the popup menu to view the records in the table as shown below for the department table.



DEPARTMENT: Query...p3311.cse.ust.hk)

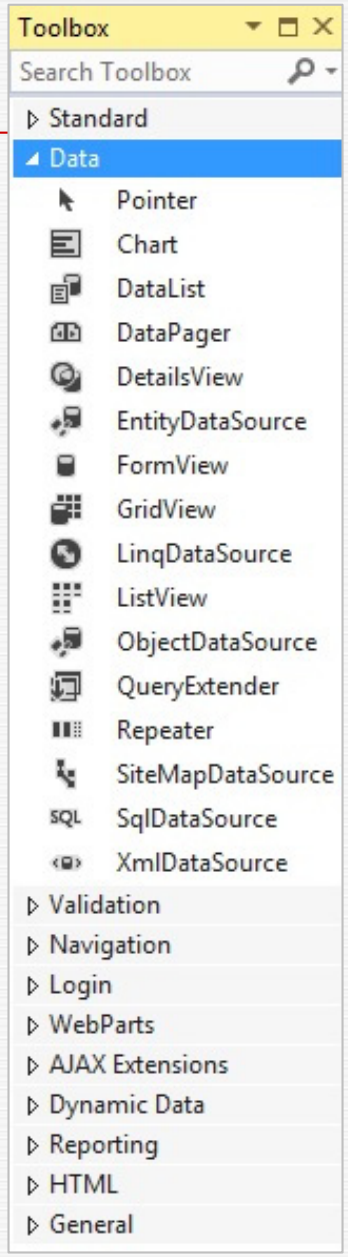
	DEPARTMENT_ID	DEPARTMENT_NAME	ROOM_NUMBER
▶	COMP	Computer Science	3528
	MATH	Mathematics	3461
	ELEC	Electronic Engineering	2528
	BUS	Business	4528
	HUMA	Humanities	1200
*	*NULL*	*NULL*	*NULL*

1 of 5

1. The comp3311.cse.ust.hk.COMP3311STUXXX node has been renamed UniversityDatabase.

Web Server Controls

- A web server control (or simply control) is an object on a web page that executes when the page is requested and that renders HTML markup to the browser.
- Many controls are similar to familiar HTML elements, such as buttons and text boxes.
- Controls can be found in the Toolbox, which can be accessed by selecting Toolbox in the View menu.
  (This lab will only use Data controls.)

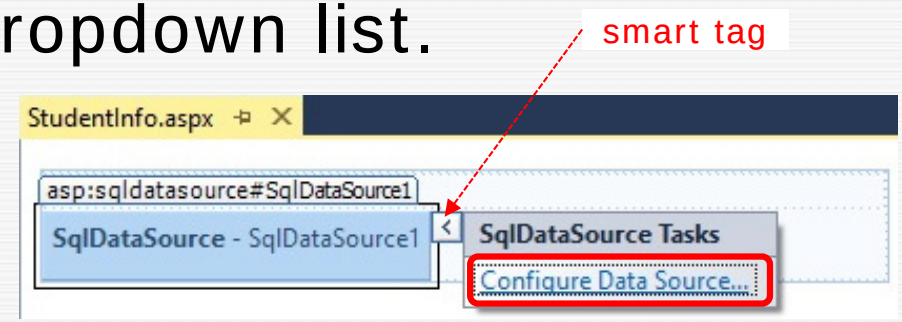


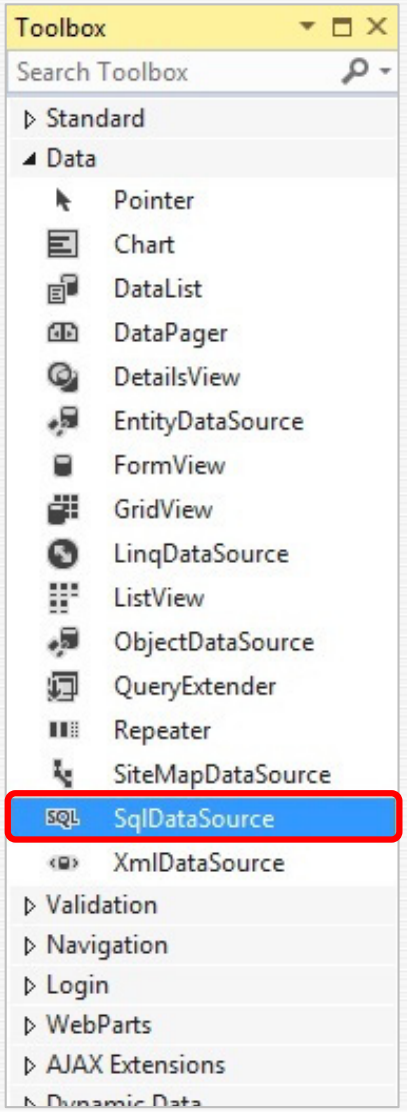
Access Data in a Database (1)

- To access data in an Oracle database from a web form, you need to tell Visual Studio what specific data you want to access (i.e., what is the SQL statement to execute to get the data).
- To access relational databases, Visual Studio provides the SqlDataSource control.
- You tell Visual Studio what data you want to retrieve and from what database by configuring an SqlDataSource control with this information.
- Switch back to the Design view of the StudentInfo.aspx web form.

Access Data in a Database (2)

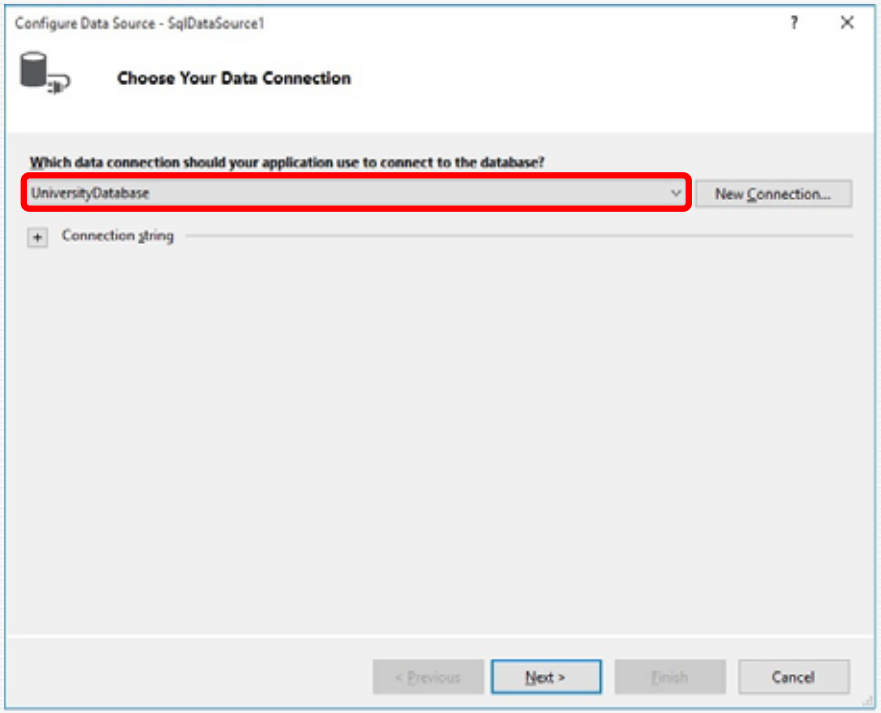
- Place the cursor below the body (div) section of the web form.
- In the Data tab of the Toolbox, double-click the SqlDataSource control to place it in the web form as shown below.
- Select the Configure Data Source... option from the SqlDataSource1 control's smart tag dropdown list.





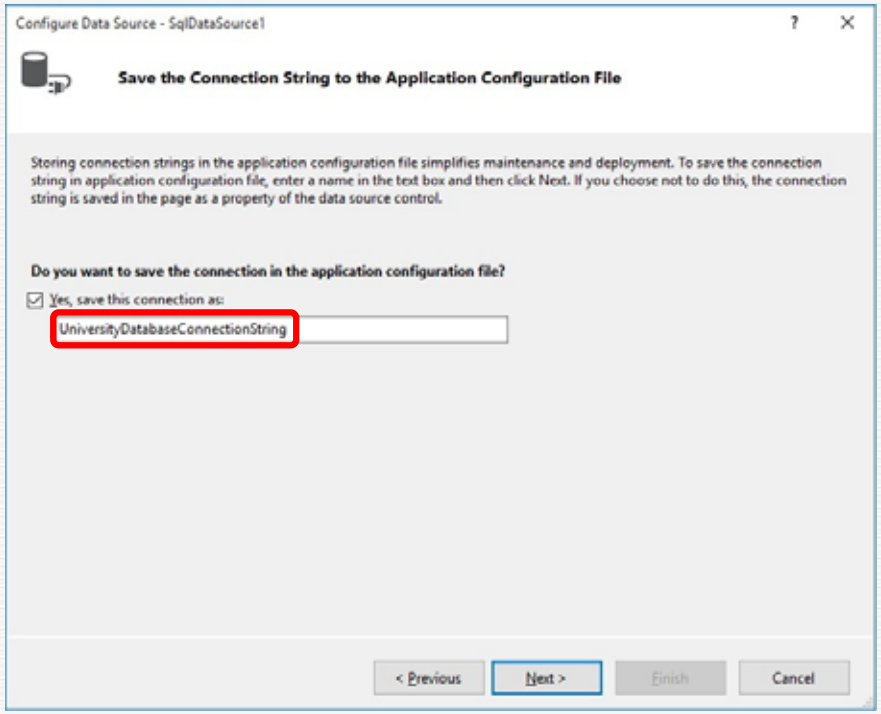
Access Data in a Database (3)

- In the *Choose Your Data Connection* page,
  - select UniversityDatabase from the dropdown list.
  - click the **Next** button.



Access Data in a Database (4)

- In the *Save the Connection String to the Application Configuration File* page,
  - leave the checkbox checked.
  - enter UniversityDatabaseConnectionString.
  - click the **Next >** button.



(The connection string contains information that tells Visual Studio how to connect to a database and, if named, can be reused by other SqlDataSource controls as illustrated later in this lab.)

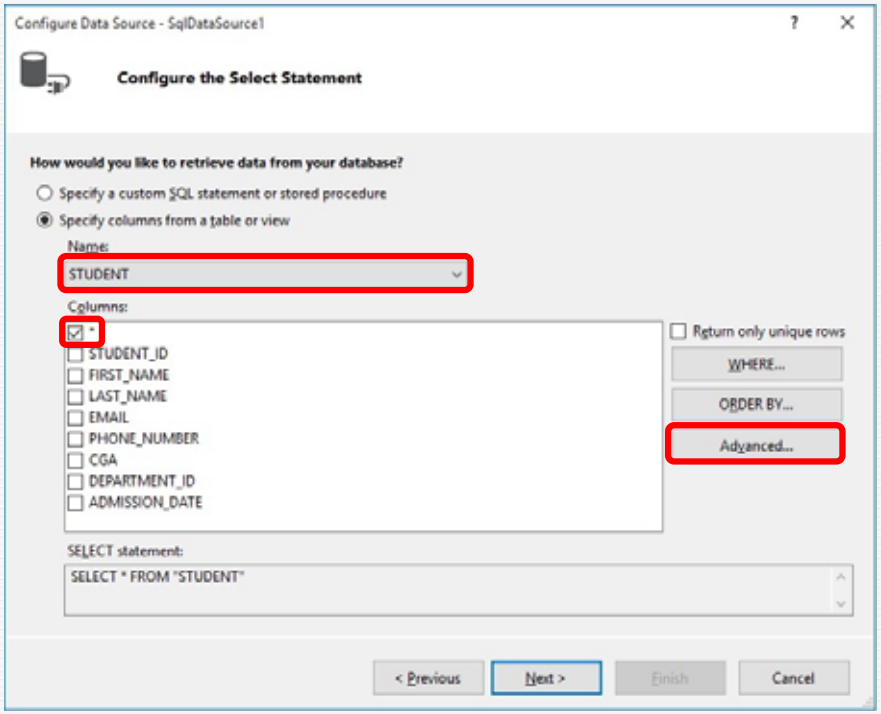
Access Data in a Database (5)

- In the *Configure the Select Statement* page of the *Configure Data Source* wizard, set the select statement for the *student* table to

  SELECT * FROM "STUDENT"

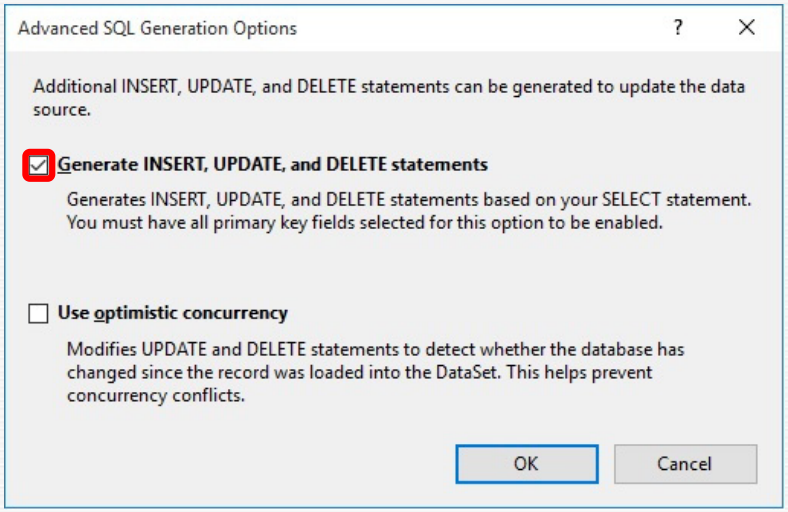
  as follows

  - select the **STUDENT** table in the Name field dropdown list.
  - check the * option in the Columns field.
  - click the **Advanced...** button.



Access Data in a Database (6)

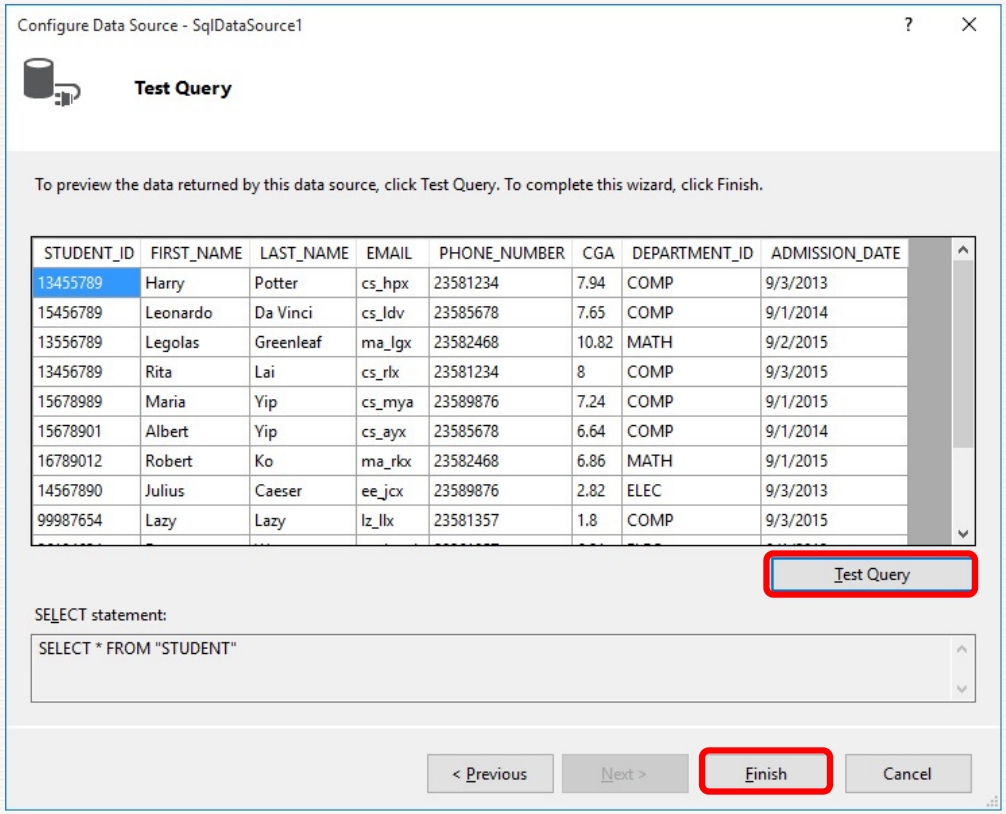
- In the *Advanced SQL Generation Options* page,
  - check the Generate INSERT, UPDATE and DELETE statements checkbox.
  - click the **OK** button.



- In the *Configure the Select Statement* page of the *Configure Data Source* wizard,
  - click the **Next >** button.

Access Data in a Database (7)

- In the *Test Query* page of the *Configure Data Source* wizard,
  - click the **Test Query** button and verify that the query executes as expected as shown in the figure.
  - click the **Finish** button.

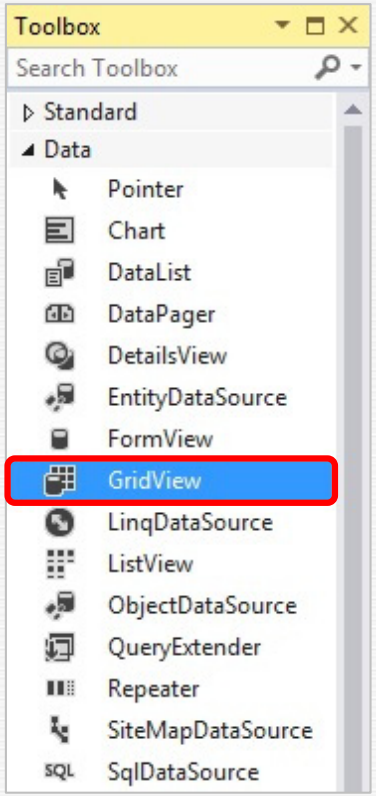


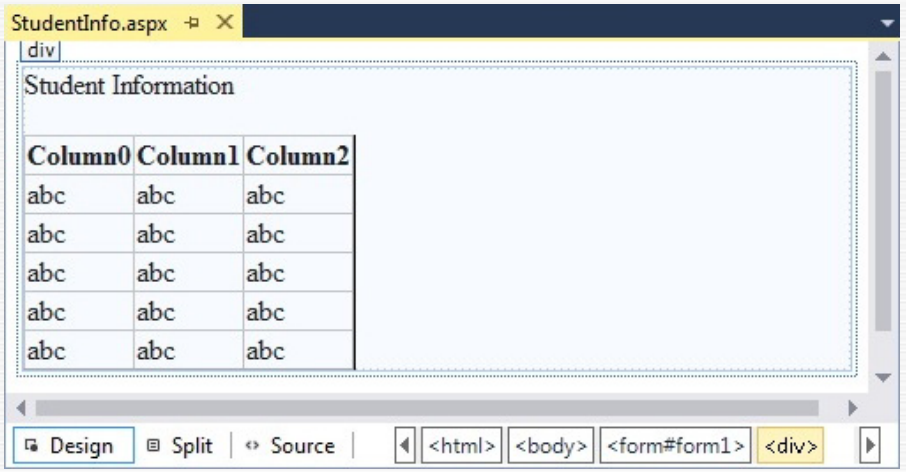
Gridview Control

- A GridView control displays data in a table format, which allows a collection of data (e.g., many rows of a database table) to be displayed on a web page.
- It also provides the capability to sort columns, page through data and edit or delete a single record.
- It does not allow a new record to be inserted.

Display Table Data in A GridView Control

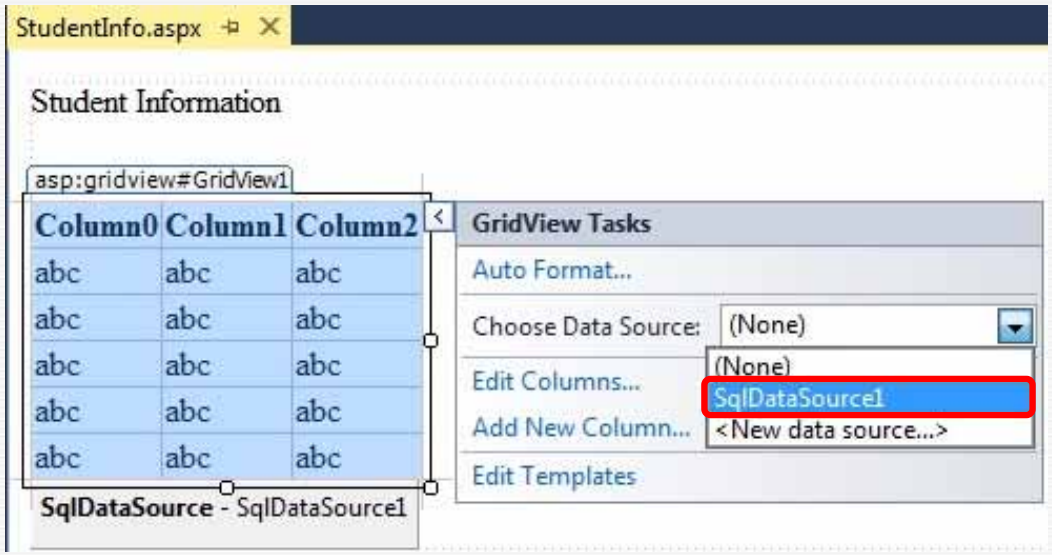
- Place the cursor inside the div section of the web form, type Student Information and enter Return twice.
- In the Data tab of the Toolbox, double-click the GridView control to place it in the web form (see the figures).





Configure the GridView Control

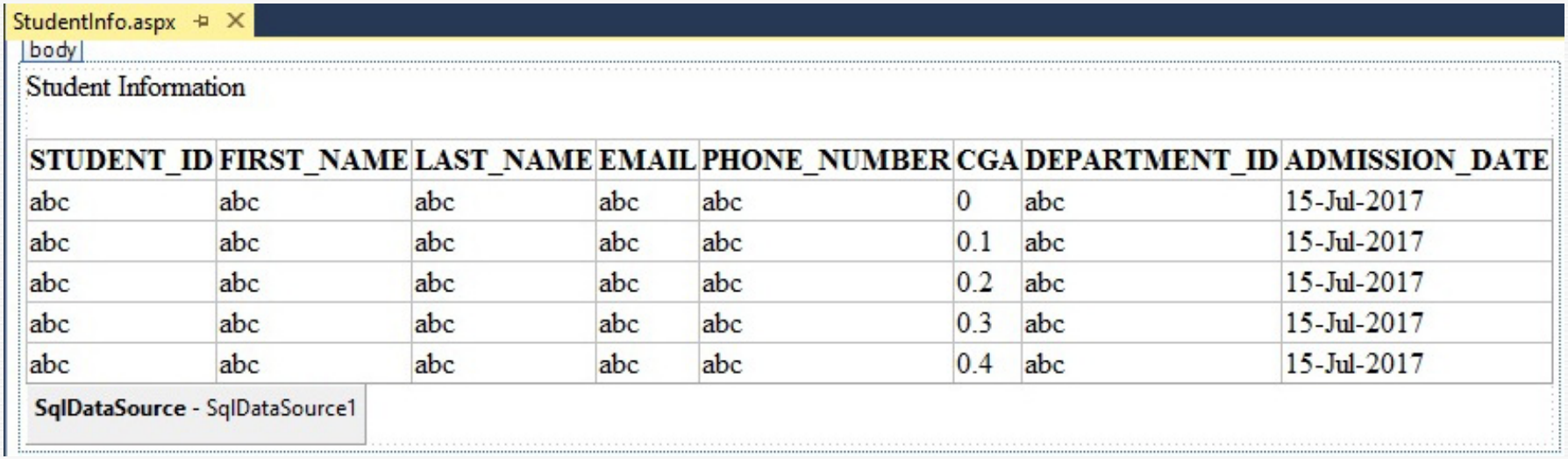
- Select the GridView's smart tag and, in the GridView Tasks dropdown list, for the Choose Data Source option,



  - select SqlDataSource1 from the dropdown list as shown in the figure.
  - Visual Studio will now display the result of the SqlDataSource1's **SELECT** statement in the Gridview control.

Configured GridView Control

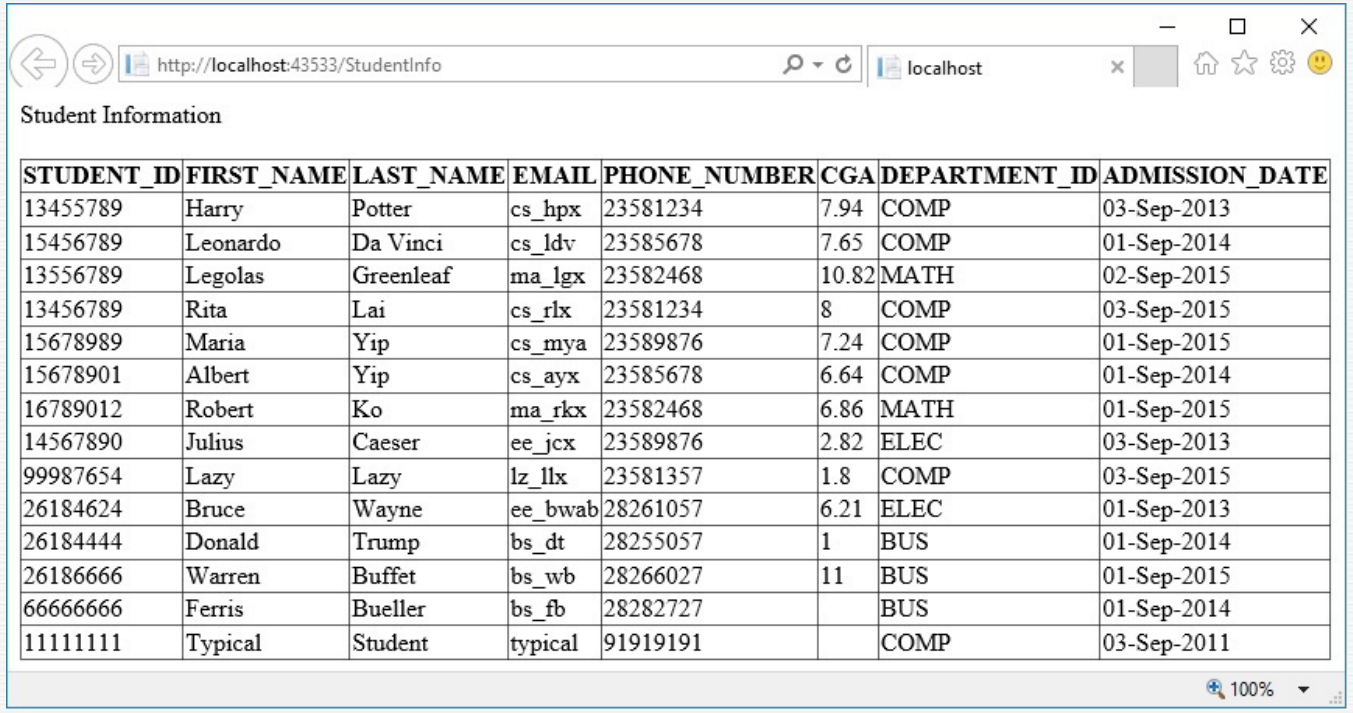
- The Gridview control should look as shown below after configuring it using the SqlDataSource1 control.



STUDENT_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	CGA	DEPARTMENT_ID	ADMISSION_DATE
abc	abc	abc	abc	abc	0	abc	15-Jul-2017
abc	abc	abc	abc	abc	0.1	abc	15-Jul-2017
abc	abc	abc	abc	abc	0.2	abc	15-Jul-2017
abc	abc	abc	abc	abc	0.3	abc	15-Jul-2017
abc	abc	abc	abc	abc	0.4	abc	15-Jul-2017

View the Web Form in a Browser

- To view the web form in a browser, select **Start Debugging** in the **Debug** menu or press the **F5** key. The student data should display as shown below.

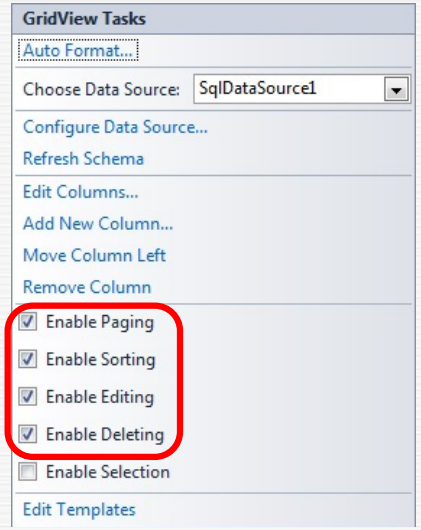


STUDENT_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	CGA	DEPARTMENT_ID	ADMISSION_DATE
13455789	Harry	Potter	cs_hpx	23581234	7.94	COMP	03-Sep-2013
15456789	Leonardo	Da Vinci	cs_ldv	23585678	7.65	COMP	01-Sep-2014
13556789	Legolas	Greenleaf	ma_lgx	23582468	10.82	MATH	02-Sep-2015
13456789	Rita	Lai	cs_rlx	23581234	8	COMP	03-Sep-2015
15678989	Maria	Yip	cs_mya	23589876	7.24	COMP	01-Sep-2015
15678901	Albert	Yip	cs_ayx	23585678	6.64	COMP	01-Sep-2014
16789012	Robert	Ko	ma_rkx	23582468	6.86	MATH	01-Sep-2015
14567890	Julius	Caeser	ee_jcx	23589876	2.82	ELEC	03-Sep-2013
99987654	Lazy	Lazy	lz_llx	23581357	1.8	COMP	03-Sep-2015
26184624	Bruce	Wayne	ee_bwab	28261057	6.21	ELEC	01-Sep-2013
26184444	Donald	Trump	bs_dt	28255057	1	BUS	01-Sep-2014
26186666	Warren	Buffet	bs_wb	28266027	11	BUS	01-Sep-2015
66666666	Ferris	Bueller	bs_fb	28282727		BUS	01-Sep-2014
11111111	Typical	Student	typical	91919191		COMP	03-Sep-2011

- Close the browser window.

Enable Sorting, Paging, Editing and Deleting

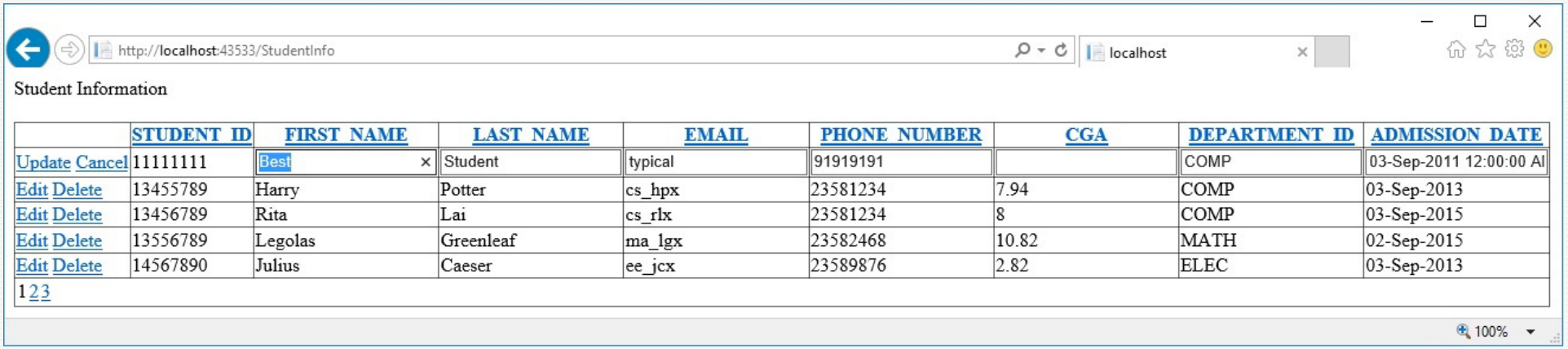
- Click the smart tag of the GridView control and, in the dropdown list, check the checkboxes Enable Sorting, Enable Paging, Enable Editing and Enable Deleting as shown in the figure. (**Do not** check Enable Selection.)



- Set the display page size to 5 records for the Gridview as follows:
  - right-click on the GridView control and select Properties from the popup menu.
  - in the **Properties** window, find the PageSize property and set it to 5.

View the Web Form in a Browser

- Viewing the web form in a browser again shows that the student data now displays in pages of 5 records each and can also be edited by selecting the Edit link as shown below.



Note that the STUDENT_ID column cannot be edited since it is the primary key of the student relation.

- Close the browser window.

Configure a Second SqlDataSource Control (1)

- Add a second SqlDataSource control next to or below the SqlDataSource1 control (see slide 42).
- Select the Configure Data Source... option from the SqlDataSource2 control's smart tag dropdown list.
- In the *Choose Your Data Connection* page of the *Configure Data Source* wizard,
  - select UniversityDatabaseConnectionString from the dropdown list.
  - click the **Next** button.

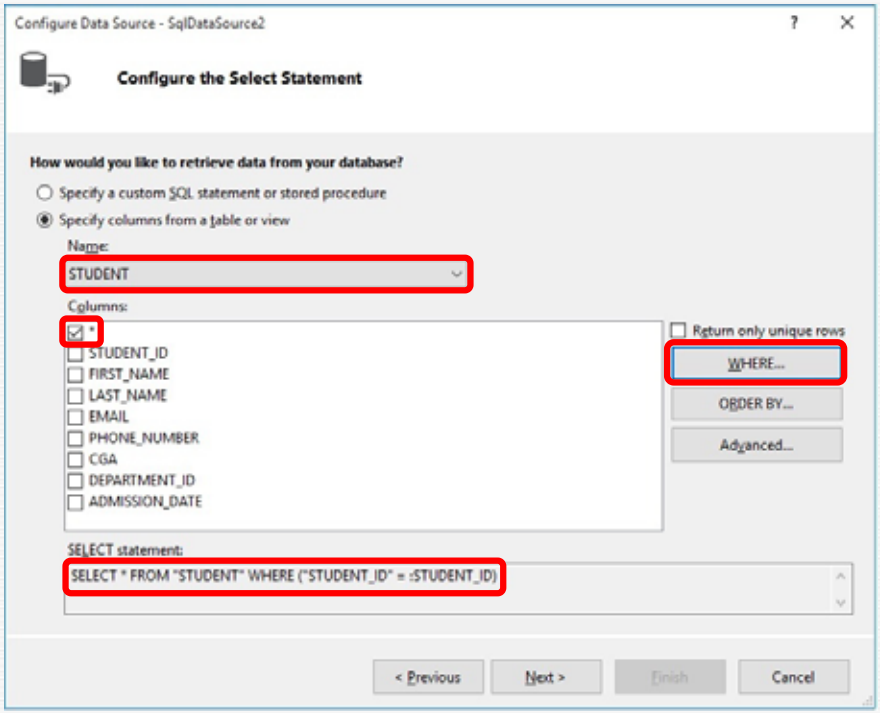
Configure a Second SqlDataSource Control (2)

- In the *Configure the Select Statement* page of the *Configure Data Source* wizard, set the SELECT statement to

  SELECT * FROM “STUDENT” WHERE (“STUDENT_ID” =: STUDENT_ID)

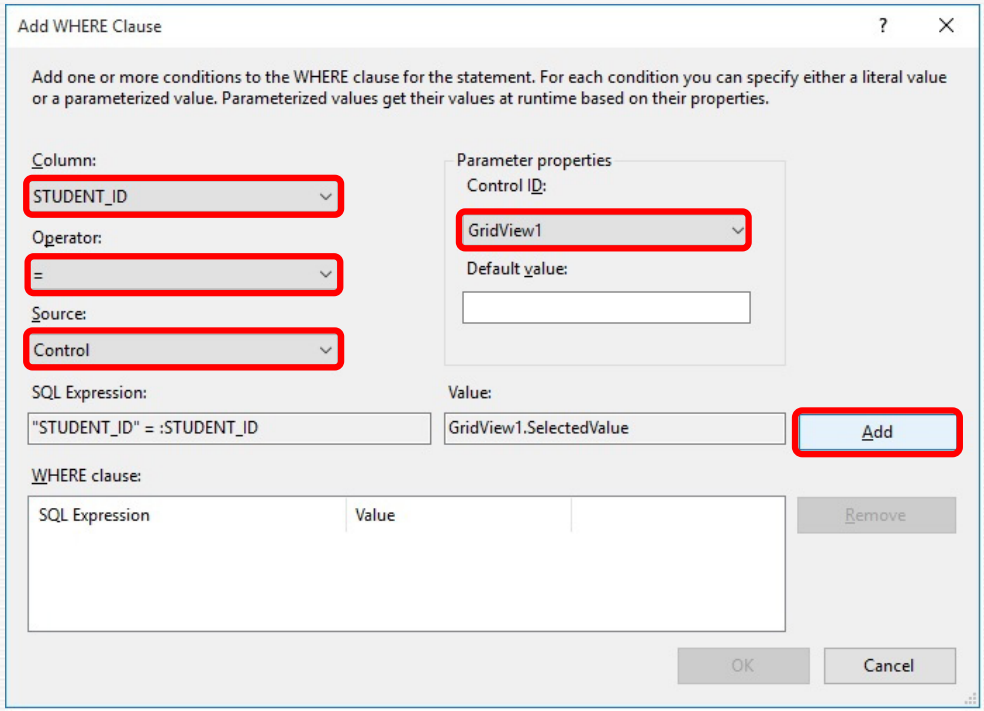
  as follows.

  - Select the STUDENT relation in the Name field dropdown list.
  - Check only the * option in the Columns field.
  - Click the WHERE... button.



Configure a Second SqlDataSource Control (3)

- In the *Add WHERE Clause* page, select STUDENT_ID for the Column field, = for the Operator field, Control for the Source field, GridView1 for the Control ID field and leave the Default value field empty.



- Click the **Add** button.
- Click the **OK** button.

Configure a Second SqlDataSource Control (4)

- In the *Configure the Select Statement* page of the *Configure Data Source* wizard
  - Click the **Advanced...** button and check the checkbox next to the option Generate INSERT, UPDATE, and DELETE statements.
    - Click the **OK** button.
  - Click the **Next >** button.
- In the *Test Query* page of the *Configure Data Source* wizard,
  - Click the **Finish** button.

(If you test the query, a window pops up to ask about the data type for Student ID.)

DetailsView Control

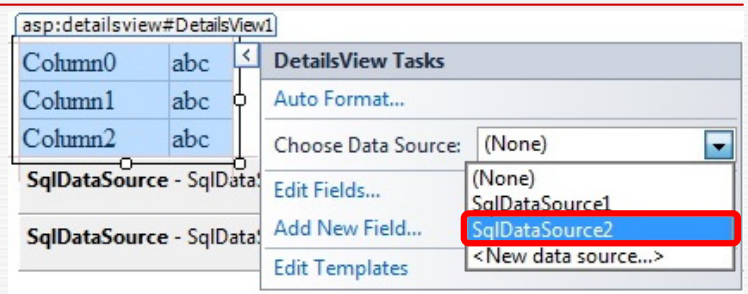
- The GridView control supports editing and deleting data, but does not support inserting new data.
- For inserting new data, a DetailsView control can be used that is bound to a GridView control and shows the details of the record selected in the GridView control.
- The DetailsView control renders a single record at a time as a table and supports inserting, updating and deleting records.

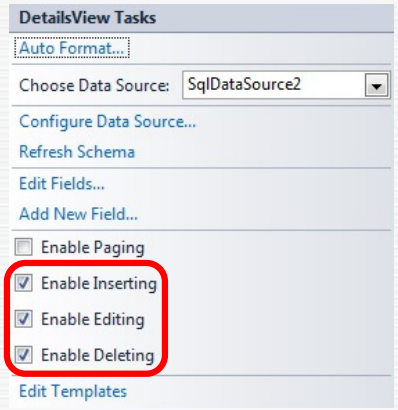
Add a DetailsView Control

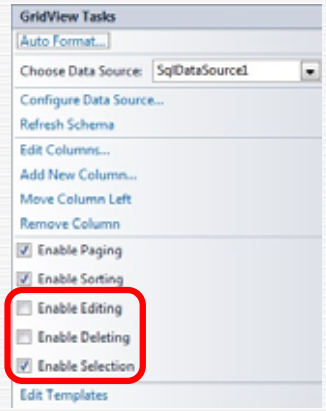
- Place the cursor next to or below the GridView control in the web form and enter Return once.
- In the Data tab of the Toolbox, double-click the DetailsView control to place it in the web form (see slide 43).

Configure the DetailsView Control

- In the DetailsView control's smart tag dropdown list,
  - select SqlDataSource2 in the Choose Data Source option.
  - check the Enable Inserting, Enable Editing and Enable Deleting checkboxes.
- In the GridView control's smart tag dropdown list,
  - uncheck the Enable Editing and Enable Deleting checkboxes.
  - check the Enable Selection checkbox.







Gridview with DetailsView in Web Form

StudentInfo.aspx

body

Student Information

	STUDENT_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	CGA	DEPARTMENT_ID	ADMISSION_DATE
Select	abc	abc	abc	abc	abc	0	abc	16-Jul-2017
Select	abc	abc	abc	abc	abc	0.1	abc	16-Jul-2017
Select	abc	abc	abc	abc	abc	0.2	abc	16-Jul-2017
Select	abc	abc	abc	abc	abc	0.3	abc	16-Jul-2017
Select	abc	abc	abc	abc	abc	0.4	abc	16-Jul-2017

1 2

STUDENT_ID	abc
FIRST_NAME	abc
LAST_NAME	abc
EMAIL	abc
PHONE_NUMBER	abc
CGA	0
DEPARTMENT_ID	abc
ADMISSION_DATE	16-Jul-2017

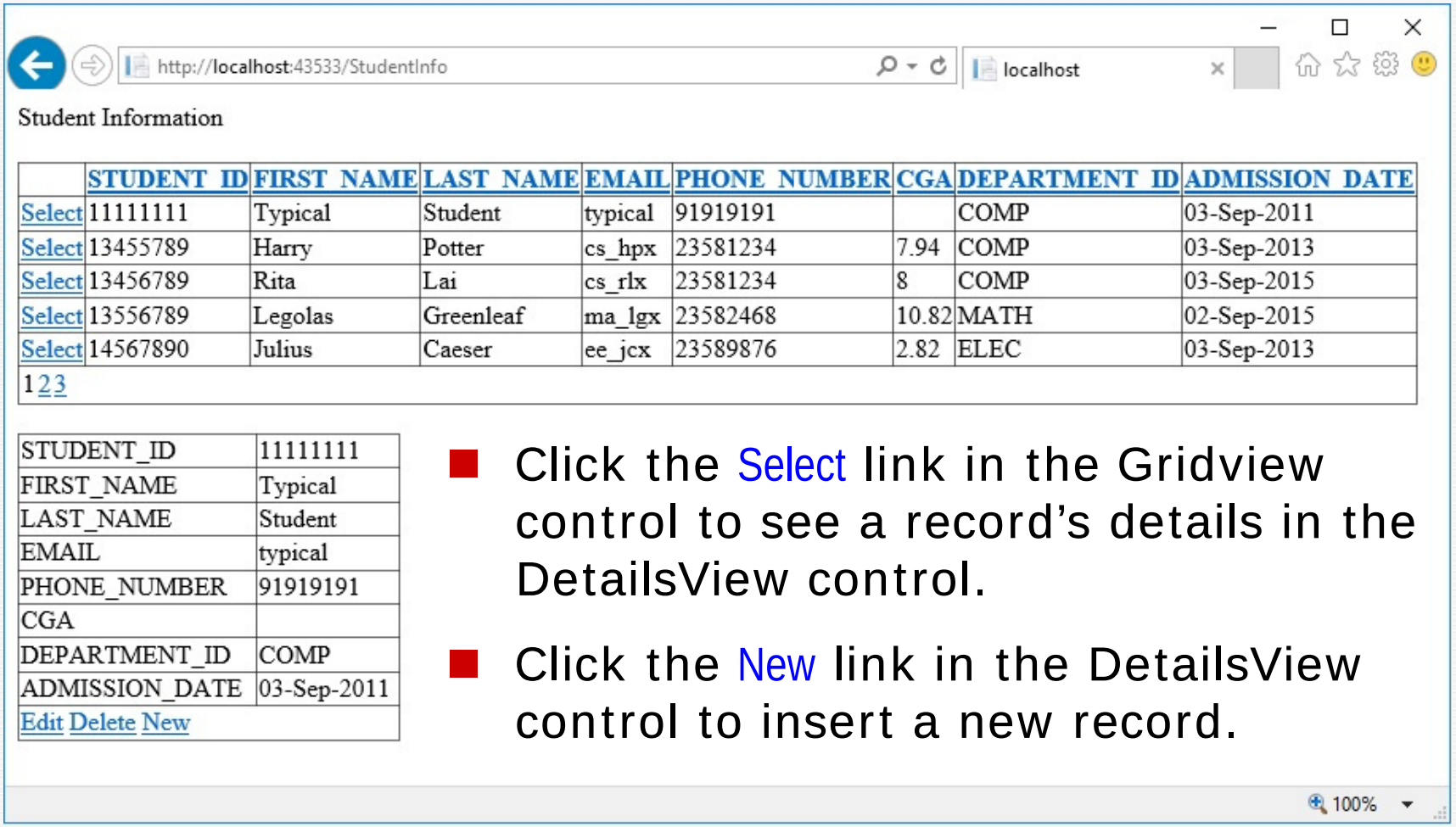
Edit Delete New

SqlDataSource - SqlDataSource1

SqlDataSource - SqlDataSource2

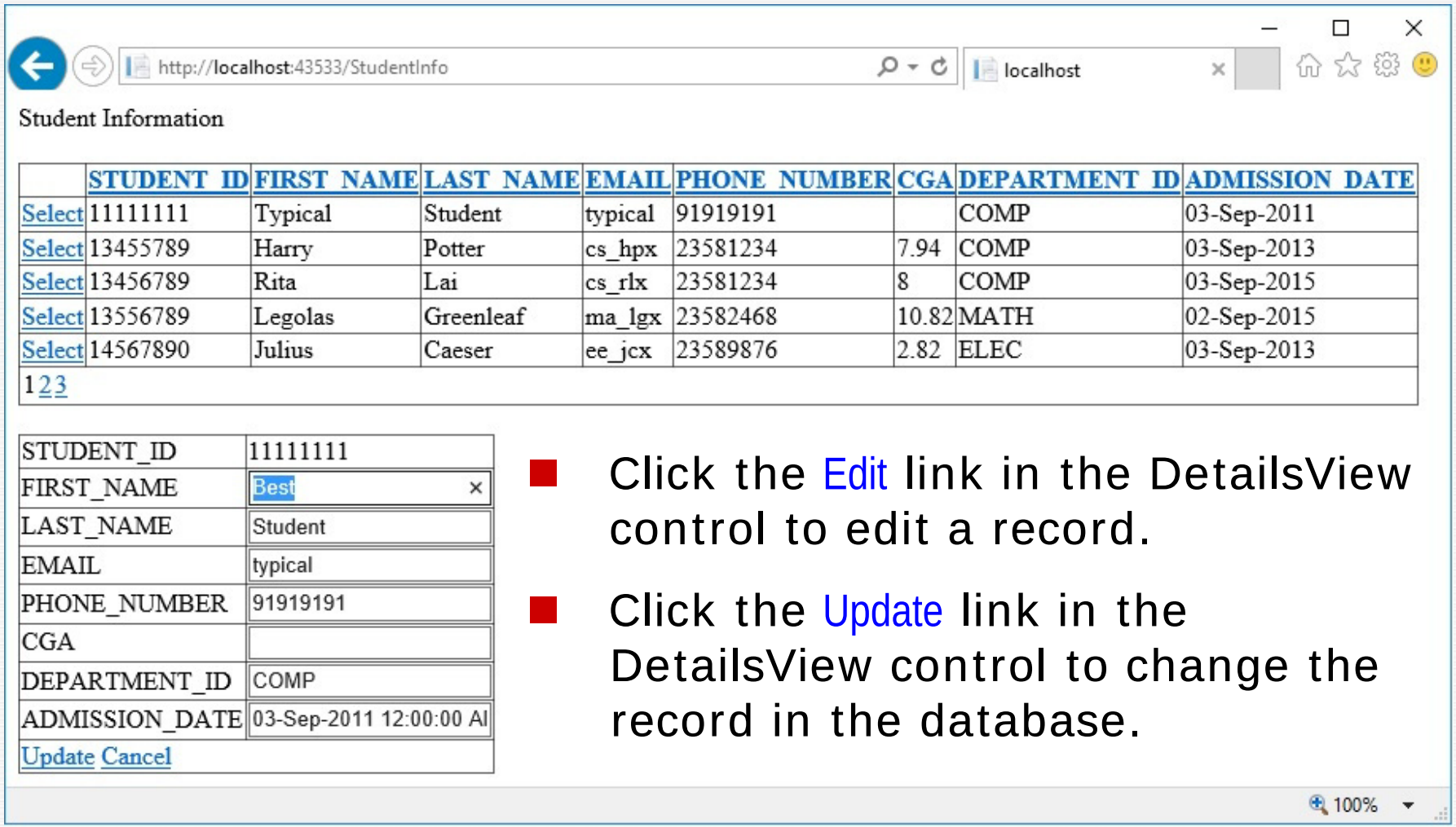
Gridview with DetailsView in a Browser

- View the web form in a browser as shown below.



- Click the Select link in the Gridview control to see a record's details in the DetailsView control.
- Click the New link in the DetailsView control to insert a new record.

Editing a DetailsView in a Browser



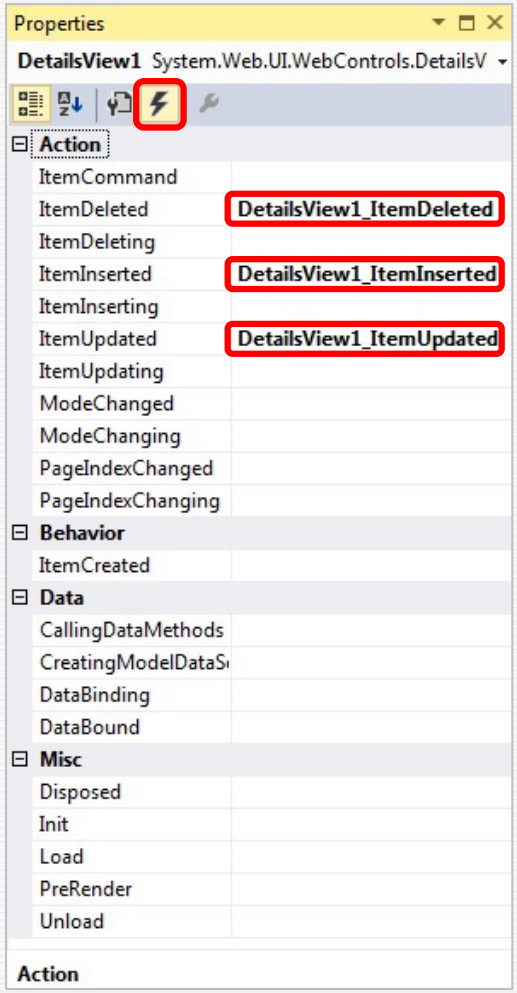
- Click the Edit link in the DetailsView control to edit a record.
- Click the Update link in the DetailsView control to change the record in the database.

Databinding (1)

- When you update, delete or insert a record in the DetailsView control you will notice that the corresponding record is not changed in the GridView control until you go to another page of the control and then return to the previous page.
- To fix this problem you need to rebind (i.e., call the Databind method of) the GridView control whenever you make a change (i.e., update, delete or insert a record) in the DetailsView control.

Databinding (2)

- Right-click on the DetailsView control and select Properties from the popup menu.
- In the **Properties** window, click on the Events icon (the lightning bolt symbol shown at the top in the figure).
- In turn, double-click the properties ItemDeleted, ItemInserted and ItemUpdated in the **Properties** window.
  - You will need to switch back to the StudentInfo.aspx web for to reopen the **Properties** window after each double-click.
- Insert the code GridView1.DataBind(); into each procedure in the code-behind file as shown on the next page.



Databinding (3)

StudentInfo.aspx.cs | StudentInfo.aspx

UniversityWeb | StudentInfo | Page_Load(object sender, EventArgs e)

```
2 references
8   public partial class StudentInfo : System.Web.UI.Page
9   {
        0 references
10      protected void Page_Load(object sender, EventArgs e)
11      {
12
13      }
14
        0 references
15      protected void DetailsView1_ItemInserted(object sender, DetailsViewInsertedEventArgs e)
16      {
17          GridView1.DataBind();
18      }
19
        0 references
20      protected void DetailsView1_ItemUpdated(object sender, DetailsViewUpdatedEventArgs e)
21      {
22          GridView1.DataBind();
23      }
24
        0 references
25      protected void DetailsView1_ItemDeleted(object sender, DetailsViewDeletedEventArgs e)
26      {
27          GridView1.DataBind();
28      }
29  }
```

100 %