

Introduction to .NET

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- **Content :**
 - **Introduction to .NET Technology**
 - **Introduction to Web Based Applications**
 - **Introduction to ASP.NET**

Introduction to .NET Technology

What is .NET ?

Microsoft.NET is a Framework

- Microsoft .NET is a Framework which provides a common platform to Execute or, Run the applications developed in various programming languages.
- Microsoft announced the .NET initiative in July 2000.
- The main intention was to bridge the gap in **interoperability** between services of various programming languages.

.NET Framework Objectives

- **The .NET Framework is designed to fulfill the following objectives:**
 - Provide object-oriented programming environment
 - Provide environment for developing various types of applications, such as Windows-based applications and Web-based applications
 - To ensure that code based on the .NET Framework can integrate with any other code

.NET Framework

VB

C++

C#

JScript

...

Common Language Specification

ASP.NET

**Windows
Forms**

ADO.NET

Base Class Library

(CLR) Common Language Runtime

Operating System

Visual Studio 2008

- **The .NET Framework consists of:**
 - **The Common Language Specification (CLS)**

It contains guidelines, that language should follow so that they can communicate with other .NET languages. It is also responsible for Type matching.
 - **The Framework Base Class Libraries (BCL)**

A consistent, object-oriented library of prepackaged functionality and Applications.
 - **The Common Language Runtime (CLR)**

A language-neutral development & execution environment that provides common runtime for application execution .

Common Language Specification

CLS performs the following functions:

- Establishes a framework that helps enable cross-language integration, type safety, and high performance code execution
- Provides an object-oriented model that supports the complete implementation of many programming languages
- Defines rules that languages must follow, which helps ensure that objects written in different languages can interact with each other

.NET Framework Base Class Library

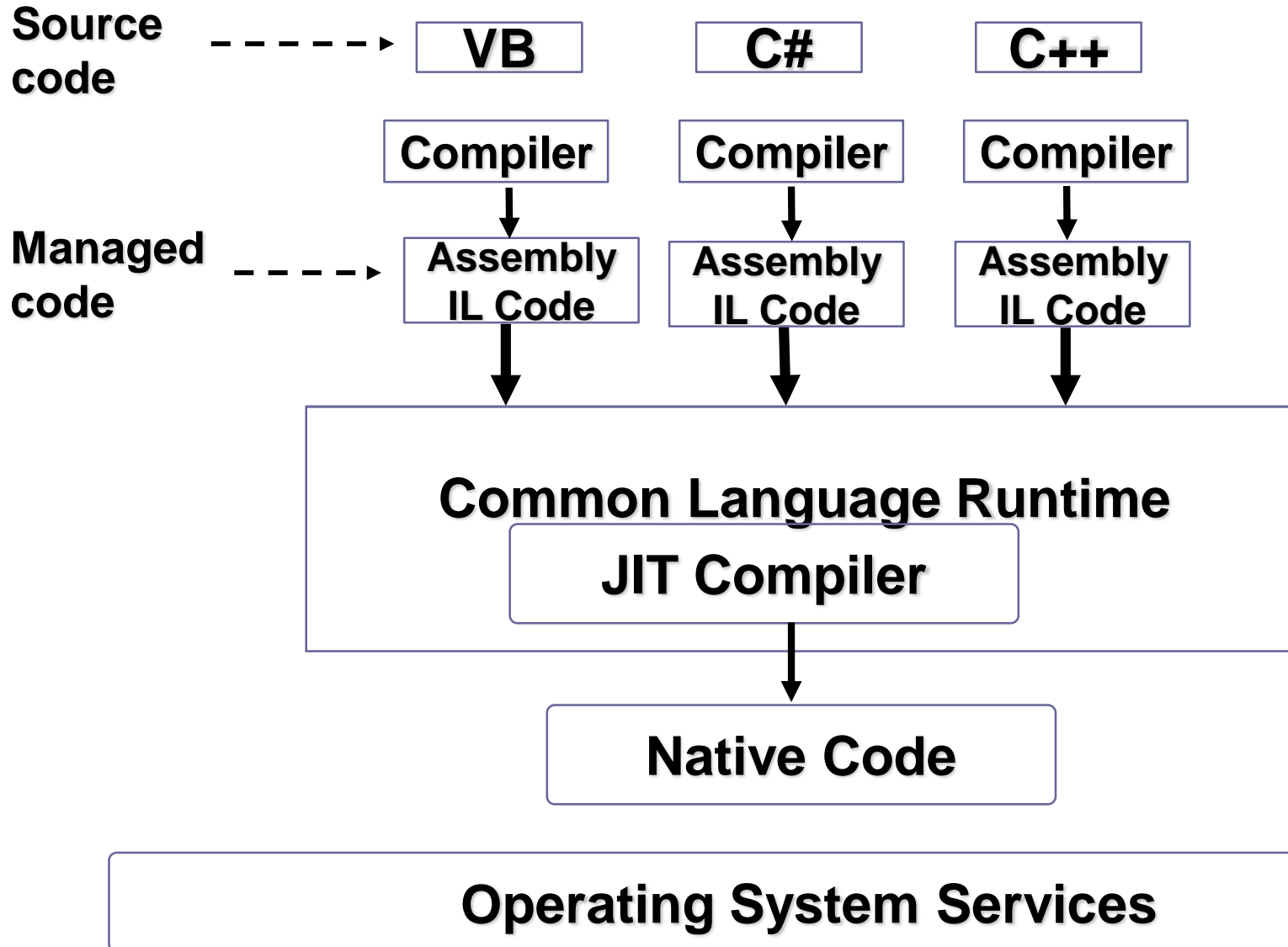
- The Class Library is a comprehensive, object-oriented collection of reusable types
- These class library can be used to develop applications that include:
 - Traditional command-line applications
 - Graphical user interface (GUI) applications
 - Applications based on the latest innovations provided by ASP.NET
 - Web Forms
 - XML Web services



Common Language Runtime (CLR)

- CLR ensures:
 - A common *runtime* environment for all .NET languages
 - Uses *Common Type System (strict-type & code-verification)*
 - Memory allocation and garbage collection
 - Intermediate Language (IL) to native code compiler. Which Compiles MSIL code into native executable code
 - Security and interoperability of the code with other languages
- Over 36 languages supported today
 - C#, VB, Jscript, Visual C++ from Microsoft
 - Perl, Python, Smalltalk, Cobol, Haskell, Mercury, Eiffel, Oberon, Oz, Pascal, APL, CAML, Scheme, etc.

Execution in CLR



Visual Studio 2008 IDE

Microsoft has introduced **Visual Studio.NET**, which is a tool (also called Integrated Development Environment) for developing .NET applications by using programming languages such as **VB, C#, VC++ and VJ#**. etc.

C# (C Sharp)

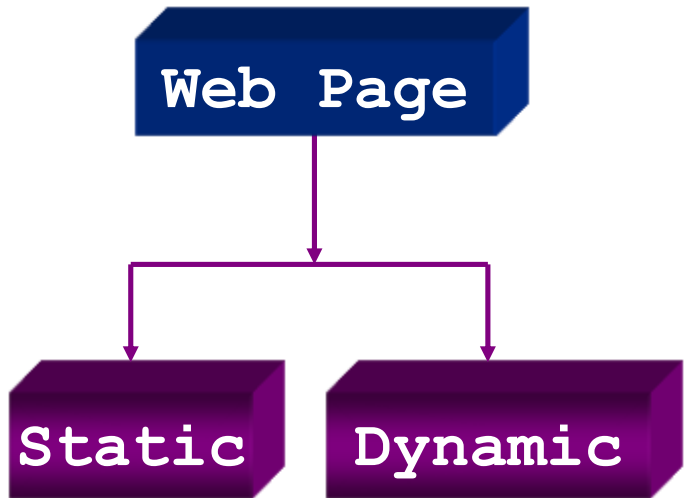
- Microsoft C# (pronounced C Sharp) developed by Microsoft Corporation, USA
- New programming language that runs on the .NET Framework
- C# is simple, modern, type safe, and object oriented
- C# code is compiled as managed code
- Combines the best features of Visual Basic, C++ and Java

C# Features

- Simple
- Modern
- Object-Oriented
- Type-safe
- Versionable
- Compatible
- Secure

Introduction to Web Based Applications

Introducing Web Applications

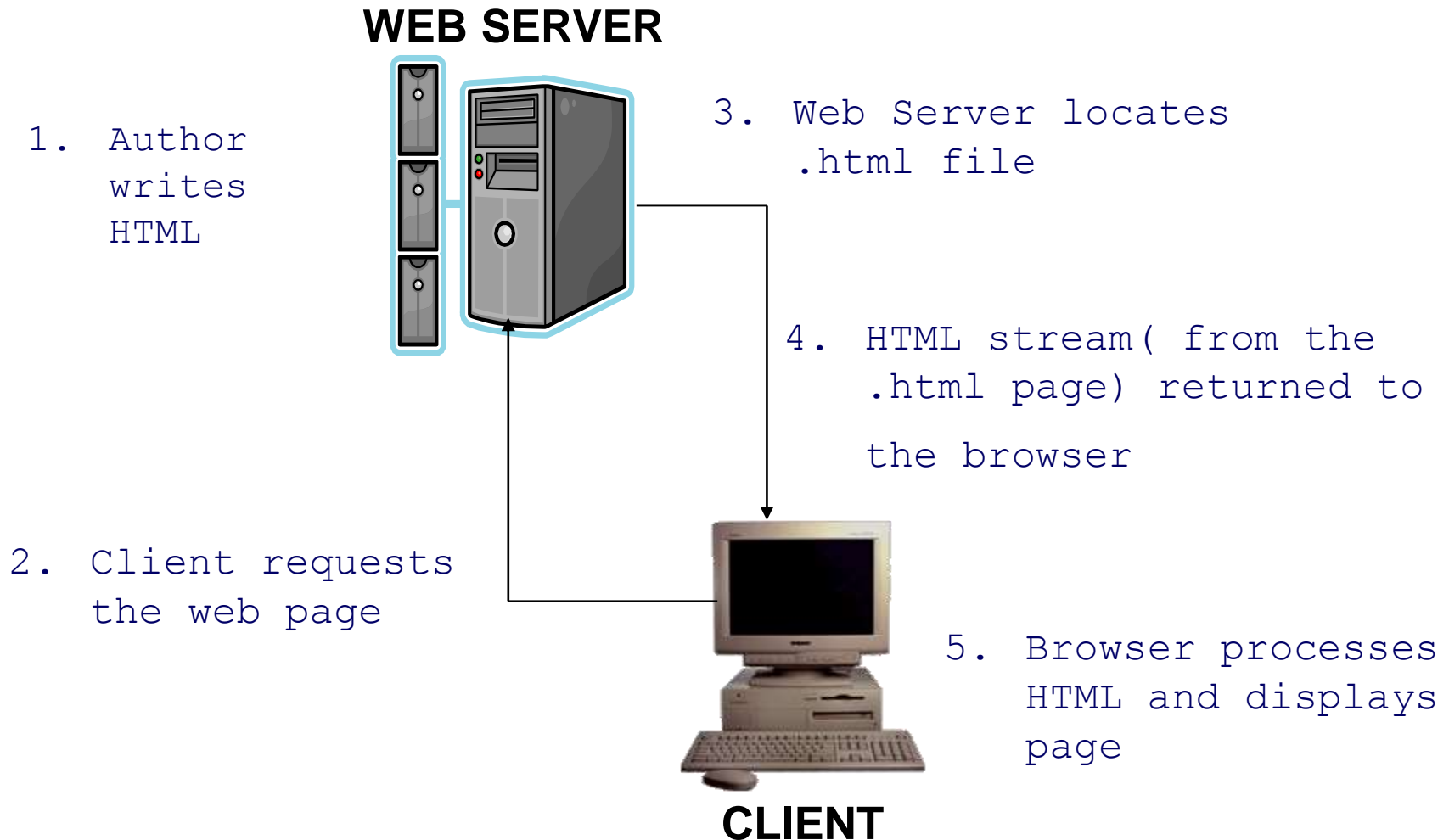


Static web page

- This type of web page consists of HTML code typed directly into text or a web page editor
- It is saved as an **.htm** or **.html** file

- The content (text, images, hyperlinks, and so on) and appearance of a static web page is always the same.
- These web pages do not utilize any database or any other technology that dynamically builds up pages or content at runtime based on their visitors input.

How Are Static Web Pages Served ?



Dynamic web page

- Dynamic Web sites provide its visitors to modify the content of the web page based on their input.
- They utilize databases and other mechanisms that enable to
 - identify their visitors
 - present them with customized greeting messages
 - restructure the content according to user input etc..
- Examples:
 - Online shopping stores,
 - search engines
 - email
 - chat, community portals etc.



Dynamic web page

- Dynamic Web sites make use of “**server-side technology**” .
- Server-side technologies add an extra layer to the static web page that enables the **Web Server** to generate HTML on the fly.
- The web server will first
 - interpret the server-side code present in web pages,
 - generate the appropriate HTML and then
 - send the response to the web browser.

How Are Dynamic Web Pages Served?

WEB SERVER



3. Web Server collects the contents (code + HTML) of the web page and parses the contents to produce HTML.

2. The Web Server searches for the requested page

4. The HTML stream is sent back to the requesting browser

1. The Web browser sends a request



CLIENT

5. Browser processes HTML and displays page

Introduction to ASP.NET

Introduction to ASP.NET

- ASP.NET is part of the Microsoft .NET framework
- ASP.NET is an effective and flexible technology for creating **interactive and dynamic web pages**.
- It is a convergence of two major Microsoft technologies:
 - **Active Server Pages (ASP)**
 - Active Server Pages is Microsoft's server side scripting technology for building dynamic web pages.
 - **.NET Framework**
 - The .NET Framework is a suite of technologies designed by Microsoft where program development takes place.

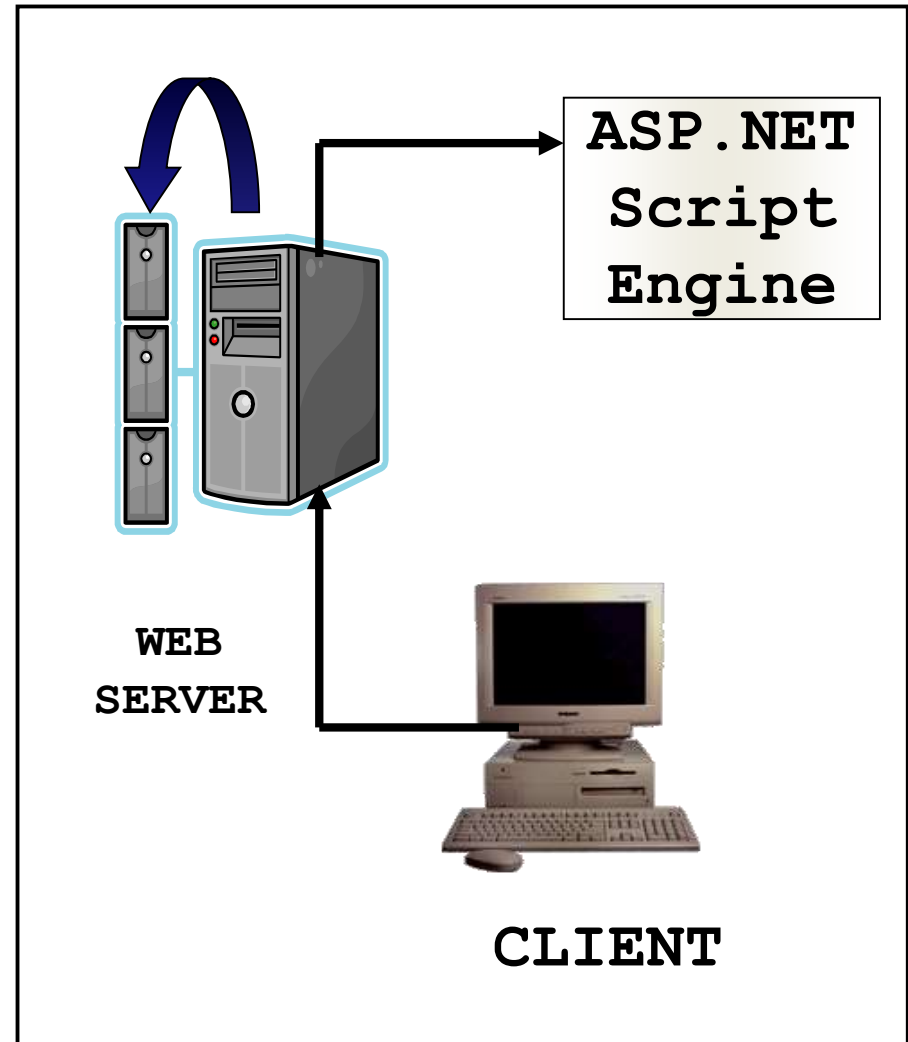
Introduction to ASP.NET

- It is built on .NET Common Language Runtime
- ASP.NET :
 - Provides better user authentication
 - Has better language support.
 - Has a large set of new controls (web controls)
 - Uses compiled code, which increases the performance of the applications
- It is programmable using any of the .NET languages (VB.NET, C#, VJ# etc).
- The ASP.NET pages are saved with the **.aspx** extension.

Working of an ASP.NET Application

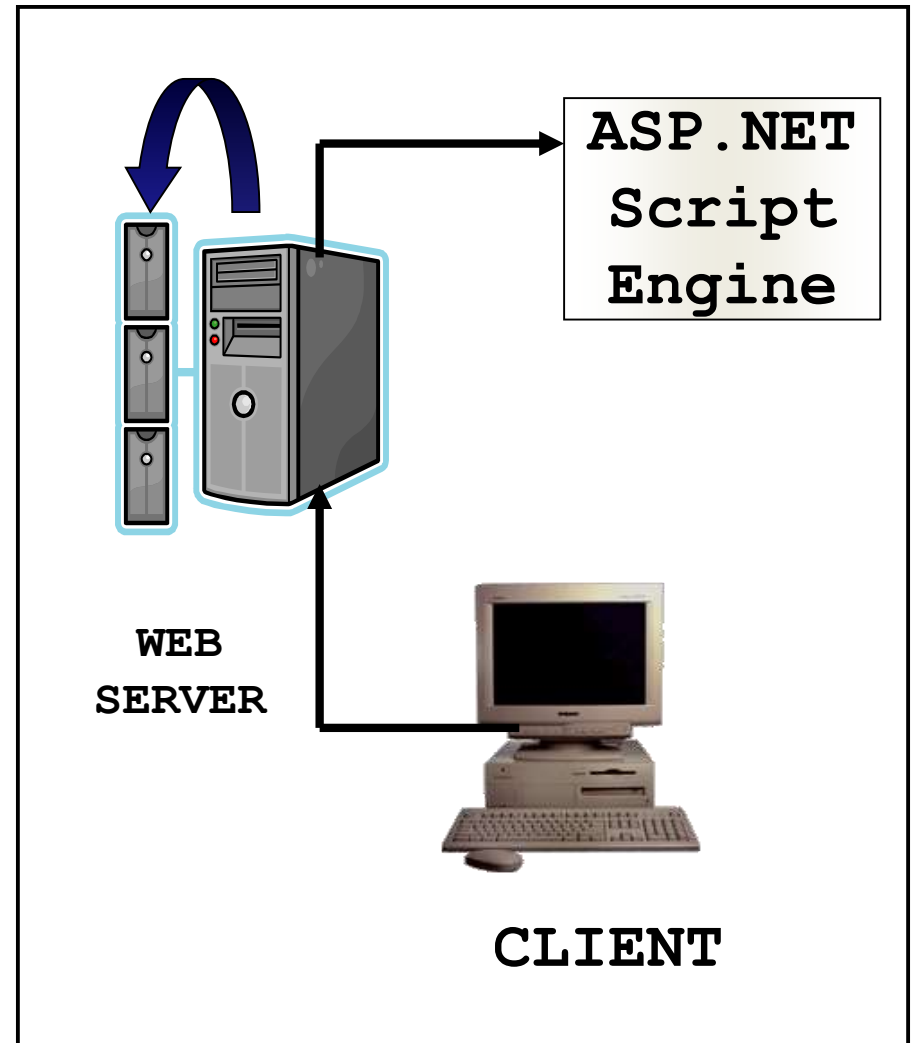
To execute an ASP.NET file, the following steps are followed:

1. A web browser sends a request for an ASP.NET file to the web server by using a URL.
2. The web server receives the request and retrieves the appropriate ASP.NET file from the disk or memory.
3. The web server forwards the file to the ASP.NET script engine for processing.



Working of an ASP.NET Application

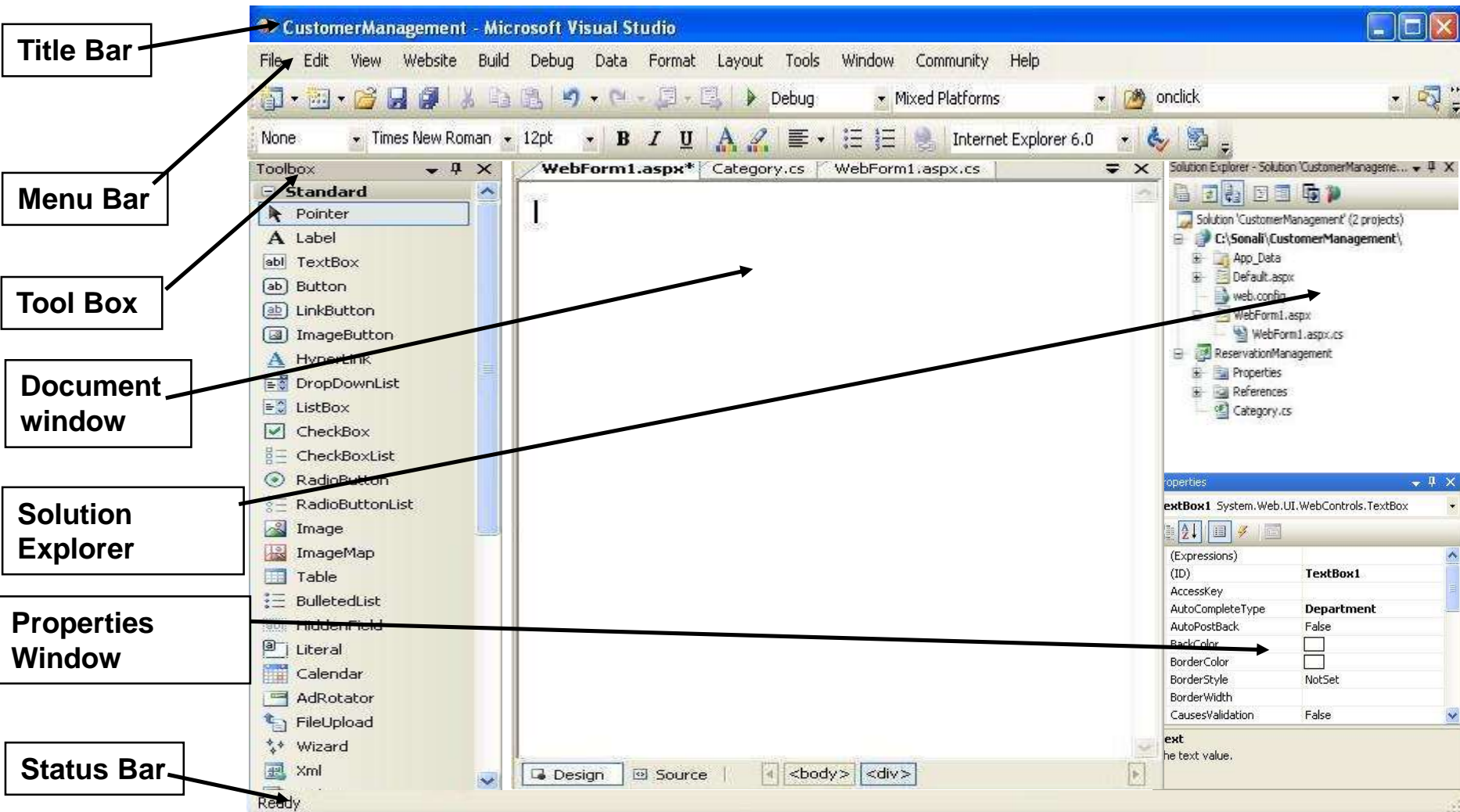
4. The ASP.NET script engine reads the file from top to bottom and executes it.
5. The processed ASP.NET file is generated as an HTML document and the ASP.NET script engine sends the HTML page to the Web server.
6. The Web server then sends the HTML code to the client which interprets the output and displays it.



Advantages of ASP.NET

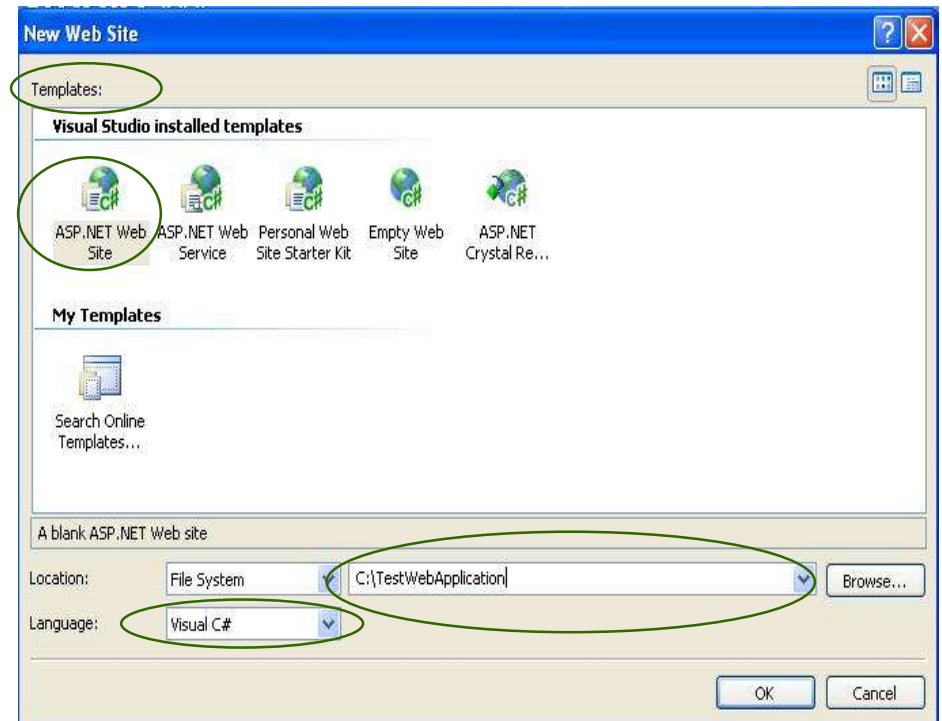
- Easy Programming Model
- Flexible Language Options
- Compiled Execution
- Rich Output Caching
- Web-Farm Session State
- Enhanced Reliability
- Master Pages
- Themes
- Improved Security
- Web Services
- Improved Performance and Scalability

Visual Studio 2008 IDE



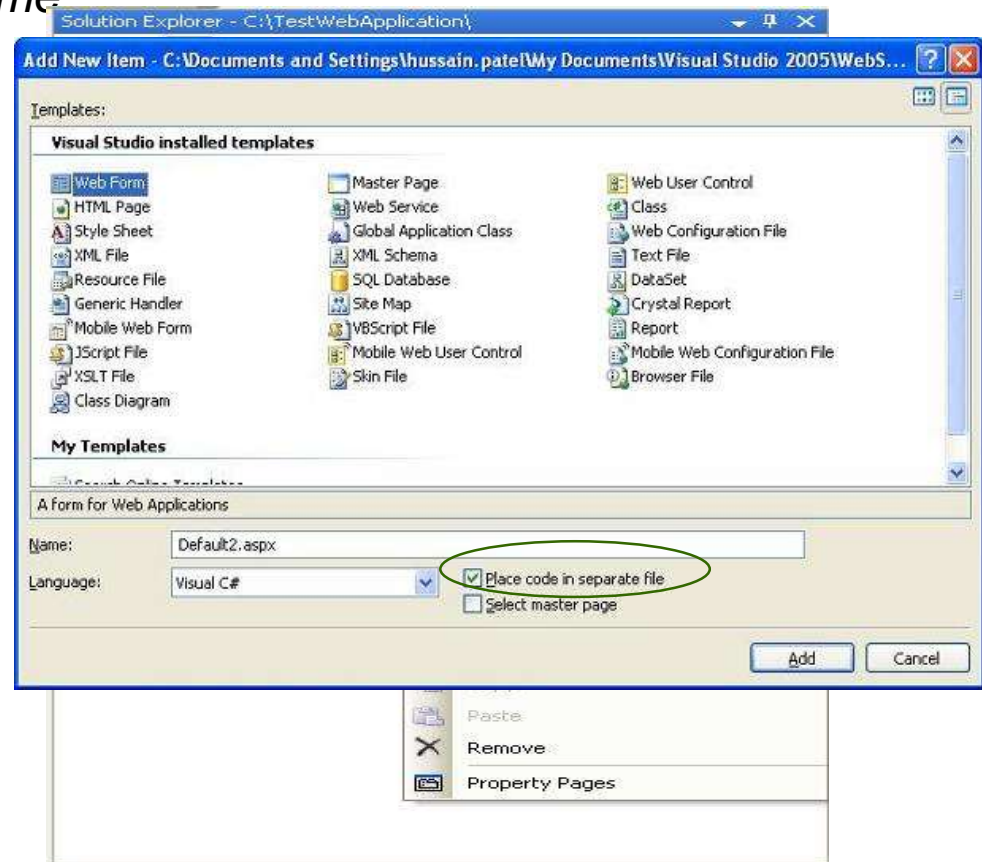
Creating a New Web Application

- To start a new Web Application in VS 2008, Click the *Create Web Site* button on the Start page or Select File > New > Web Site
- The New Web Site allows you to choose:
 - Templates
 - Language for creating an application
 - Location where the application will be created



Creating a New Application (Continued)

- After you create a new Web Application, Default.aspx page is added to this Website. To Rename this page, *Select* the page from the Website node in the *Solution Explorer* > *Right Click* > *Rename*
- Files can be added to the Project, using Solution Explorer:
 - Right click on the project node, in the *Solution Explorer*, and select the option *Add New Item*.
 - The *Add New Item* window will popup.
 - Select the type of file (item) to be added and click on Add.

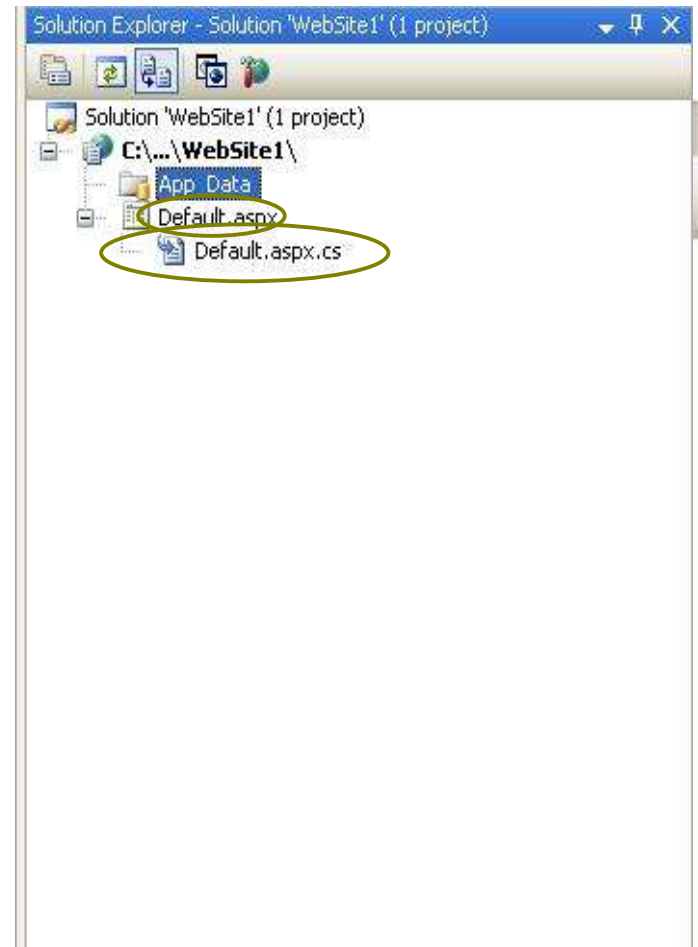


Solution Explorer

- Presents a *tree view structure* of files present in the project.
 - By default a New Website will contain:
 - An App_Data folder
 - A Default.aspx page (including Default.aspx.cs)

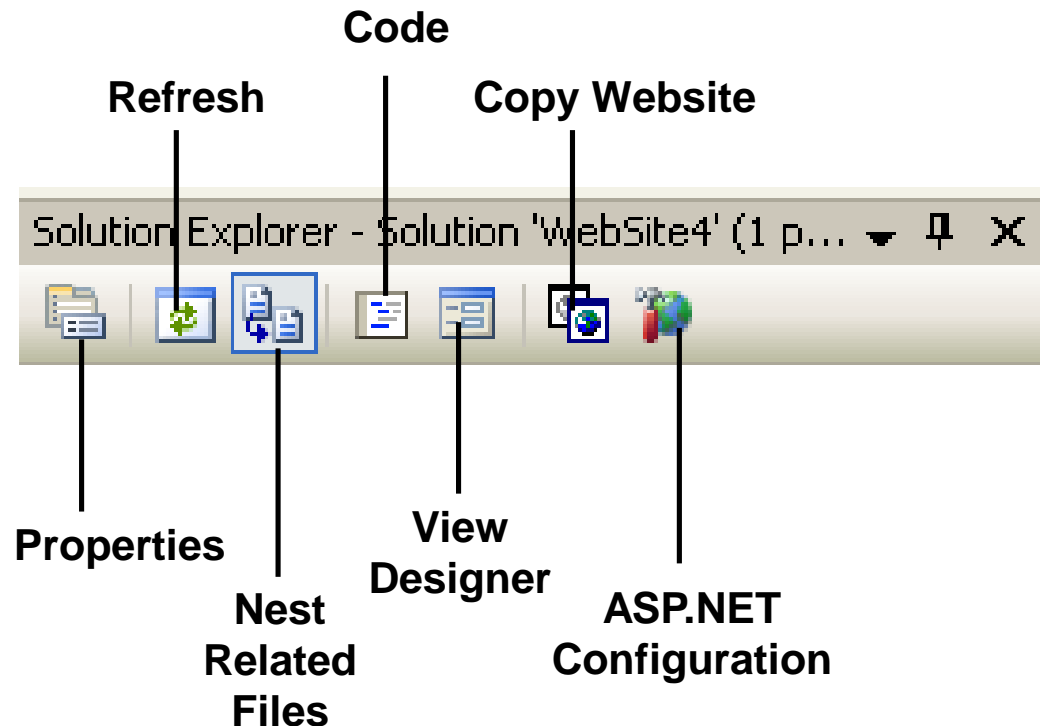
To view Solution Explorer:

- *Select View > Solution Explorer*
- OR
- *Press buttons Ctrl+W,S*



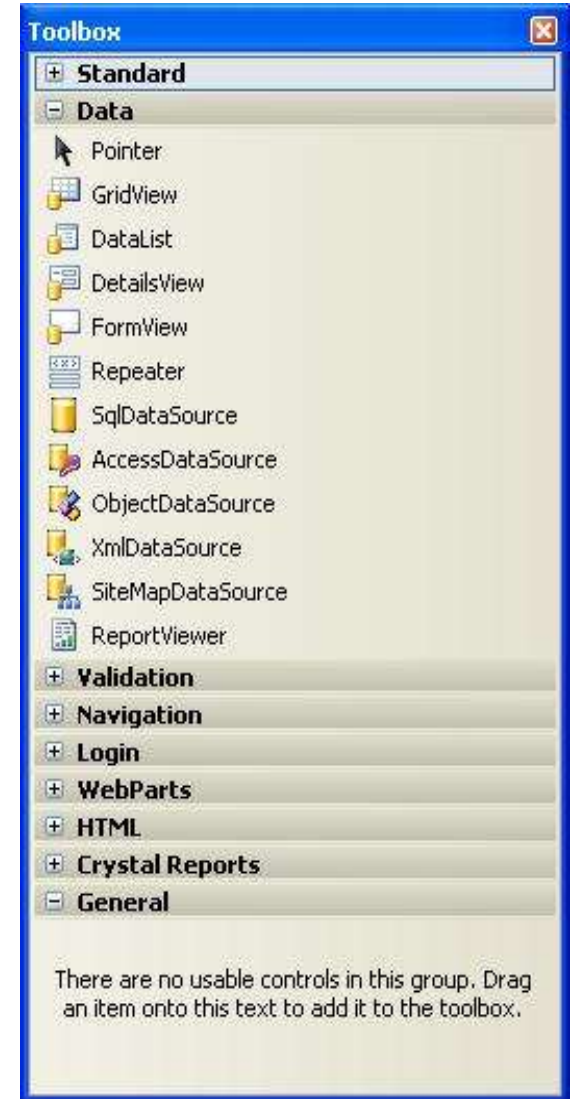
Solution Explorer (Continued)

- The Toolbar at the top of Solution Explorer enables various tasks.



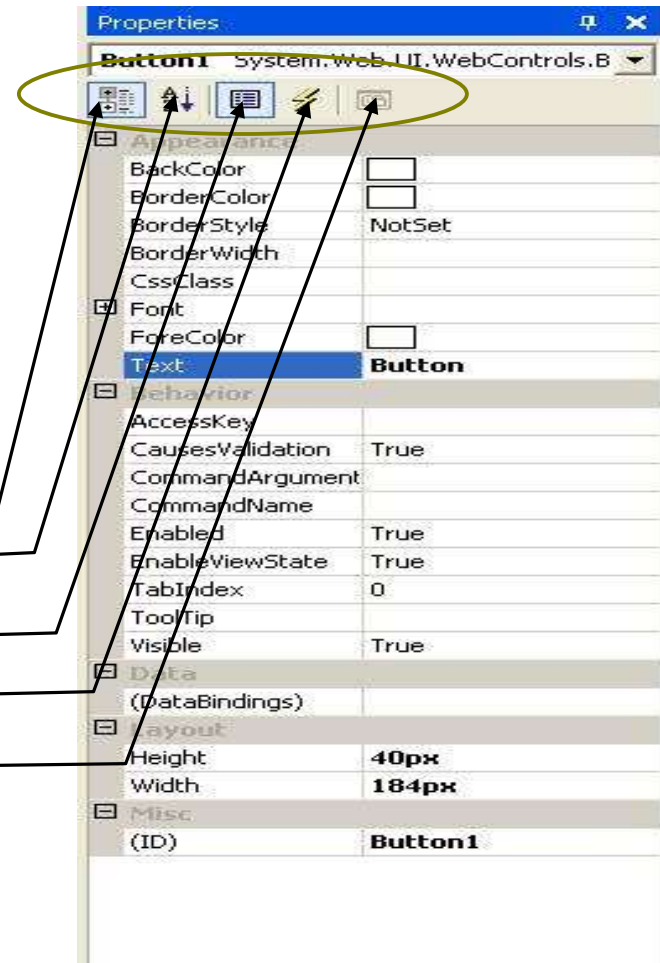
Toolbox

- To add controls in the *Design Window* use *Toolbox*.
- There are various *tool tabs* available in the Toolbox.
 - The controls in the IDE are presented in a hierarchical manner (e.g., Standard Tab, Data Tab, Validation, Navigation, WebParts etc.).
 - Depending on the type of project (application) the *toolbox tabs will vary*.
- To view the tool box:
 - *Select menu View > Toolbox*
 - OR
 - Press buttons *Ctrl+Alt+X* or *Ctrl+W, X*
- You can also view the controls as icons by right-clicking on the toolbox you want to change and deselecting the List View.



Properties Window

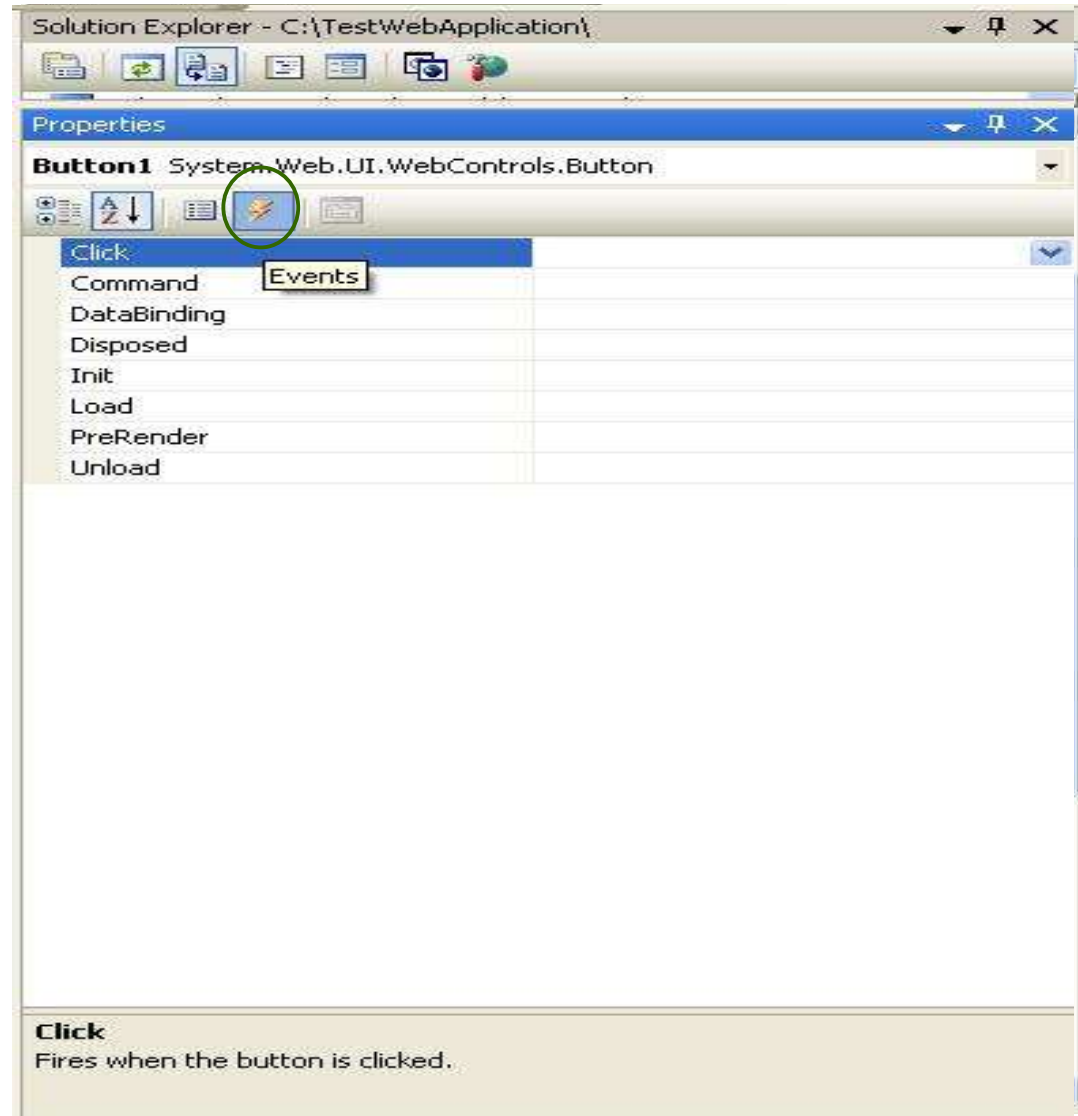
- To *view or change* the *properties* and *events* of a selected control during design use the *Properties Window*
- To configure a control:
 - Click once to select it
 - *Press F4* or Select menu *View > Properties window*
 - Modify the appropriate properties in the window
- There are various options provided for viewing the properties of the selected control, such as:
 - *Categorized view*
 - *Alphabetical view*
 - *Properties view (default)*
 - *Events View*
 - *Property pages*



Adding an Event

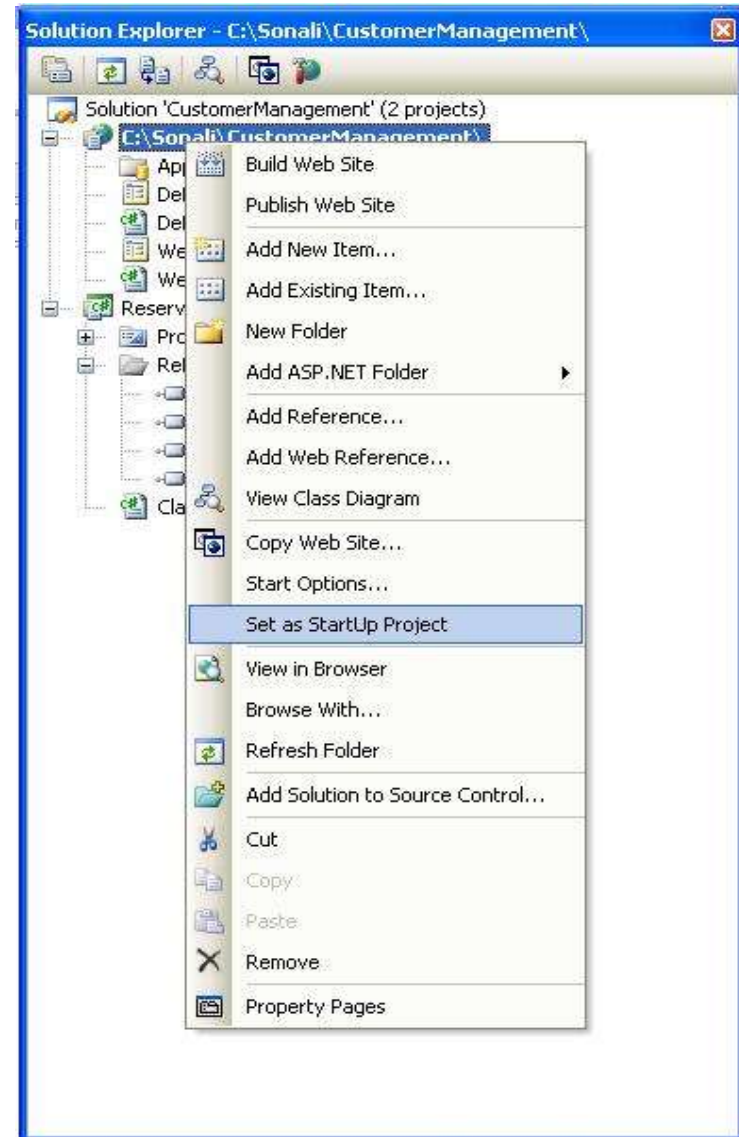
Events can be added to the code in one of three ways:

1. *Double clicking* a *control* in design view
2. *Typing* the code manually
3. Selecting the **Events Icon** and double clicking the required event from the Properties Window



Project Settings

- *Project Settings* can be adjusted using various options in the *Project Properties* menu or by using the *Solution Explorer* window.
 - These settings change based on the type of application developed.
- Setting *Startup Page*:
 - Right Click on the form you want set as the startup page in the *Solution Explorer*.
 - Select option *Set As Start Page*.
- *Startup Project* (In case of multiple projects):
 - Right Click on *Project* to set as startup project in the *Solution Explorer*.
 - Select Option *Set As StartUp Project*.



Resources

- Visual Studio 2008 Website

<http://msdn.microsoft.com/vstudio/>

Questions and Comments

