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## Module 1: Getting Started

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# Instructor Notes

**Presentation:**  
**60 Minutes**

This module uses multimedia presentations, an instructor-led demonstration, a paper-based practice, lecture, and a hands-on practice to introduce students to the Microsoft® .NET platform and the .NET Framework, and to expose students to the Microsoft Visual Studio® .NET integrated development environment (IDE).

**Lab:**  
**0 Minutes**

There is no lab in this module.

After completing this module, students will be able to:

- Identify components of the .NET platform and the .NET Framework by their functions.
- Explore the Visual Studio .NET development environment.
- Create a basic application based on Microsoft Windows®.

**Required materials**

To teach this module, you need the following materials:

- Microsoft PowerPoint® file 2609A\_01.ppt
- Module 1, “Getting Started”
- Multimedia file 2609\_Intro\_to\_dotNET.htm
- Multimedia file 2609\_Intro\_to\_dotNET\_Framework.htm

**Preparation tasks**

To prepare for this module:

- Read all of the materials for this module.
- Review the multimedia presentations.
- Complete the practices.
- Practice the instructor-led demonstration.

## How to Teach This Module

This section contains information that will help you to teach this module.

This module uses multimedia presentations, an instructor-led demonstration, a paper-based practice, lecture, and a hands-on practice.

## Lesson: Introduction to .NET and the .NET Framework

This section describes the instructional methods for teaching certain topics in this lesson.

- The What Is the .NET Platform topic is an opportunity for you to briefly introduce the .NET platform before you show the multimedia presentation that presents a more in-depth introduction to XML and the components of the .NET platform. Do not present the components in depth; just name them. Concentrate on presenting the benefits of the .NET platform for developers.

### Multimedia: Introduction to .NET

Access and run this multimedia presentation as follows:

#### ► Start the multimedia presentation

1. Open the multimedia file, 2609\_Intro\_to\_dotNET.htm, located in the Powerpnt folder on the Trainer compact disc.
  2. When the multimedia presentation is finished, provide an opportunity for students to ask questions.
- The What Is the .NET Framework? topic is an opportunity for you to briefly introduce the .NET Framework before you show the multimedia presentation, which provides a more in-depth introduction to the components of the .NET Framework.
  - Use the What Is the .NET Framework? slide to help the students visualize where the Framework class library and the common language runtime fit in the .NET Framework, and explain that the .NET Framework runs on an operating system and supports any language that conforms to the common language specification (CLS).
  - Emphasize that developers should choose a development language based on what they want to achieve with their application and what tasks they must accomplish.
  - The multimedia presentation that follows the How the .NET Framework Works topic thoroughly explains how the .NET Framework common language runtime and .NET Framework class library function.
  - Use the How the .NET Framework Works slide to introduce Microsoft Intermediate Language (MSIL), and briefly cover how Visual Studio .NET translates application source code into MSIL. Emphasize that any programming language can be used. Also, introduce the runtime just-in-time (JIT) compilation feature and explain its function. Conclude by explaining that when a client device on the .NET platform launches the .NET-based application, it starts running in the machine language of the client system and can fully integrate and interact with other .NET-based applications and services regardless of the language in which it was developed.

**Multimedia: Introduction to the .NET Framework**

Access and run this multimedia presentation as follows:

**► Start the multimedia presentation**

1. Open the multimedia file, 2609\_Intro\_to\_dotNET\_Framework.htm, located in the Powerpnt folder on the Trainer compact disc.
2. When the multimedia presentation is finished, provide an opportunity for students to ask questions.

## Lesson: Exploring Visual Studio .NET

This section describes the instructional methods for teaching each topic in this lesson.

- This lesson begins with a thorough instructor-led demonstration that guides the students through the most commonly used features of the development environment. Refer to the Demonstration section of these instructor notes for procedures for carrying out the demonstration.
- The demonstration covers most of the programming features of Visual Studio .NET. For the “Programming Features of Visual Studio .NET” topic, use the slide to emphasize that the development environment provides the tools to cover the *entire* scope of development, from design through deployment.
- During your lecture, emphasize the benefits of the programming tools as follows:
  - Stress that although developers may not *need* to use forms to program in .NET, forms do simplify development.
  - Emphasize the data access feature and wizards. In Visual Studio .NET, wizards generate the code so that it is easy to access the code for customization.
- Structure of Visual Studio Solutions and Projects is an important topic. It is the only opportunity in the course to cover the structure of solutions and projects in the development environment and to describe the file extensions that are used. Emphasize that when a project is created in Visual Studio .NET, project files are organized in a larger container called a *solution*, and that a solution usually contains one or more related projects. Define the term *project*, and explain the benefits of using solutions for the developer.
- So that students appreciate the scope of development tasks that are integrated into the development environment, the Development Process topic presents the typical development process for creating applications in Visual Studio .NET. This process is not contained elsewhere in the course, so it is important to cover the process steps in this lesson.

## Lesson: Creating a Windows Application

This section describes the instructional methods for teaching each topic in this lesson.

- In the instructor-led demonstration, you exposed the students to the application templates that appear when creating a project and the Windows Form Designer. This lesson is an opportunity to cover the Windows Form Designer and the Properties window in more depth, to prepare the students for the practice that follows.
- Use the application templates that appear in the slide to explain more thoroughly the available choices and under what circumstances one application template is more appropriate than another template.

## Review

The review questions measure knowledge transfer for topics that are not reinforced by practices but are module objectives. You can use a discussion format to answer the questions so that everyone gets the benefit of knowing the right answers.

## Lab

There is no lab in this module.

## Demonstrations

This module includes one instructor-led demonstration that guides the students through commonly used features of the development environment.

Use the procedures that follow for this demonstration.

### Working in the Development Environment

#### ► Open Visual Studio .NET and use the Start Page

1. Start Visual Studio .NET.
  - Explain that the My Profile pane allows developers who are familiar with previous versions of Microsoft Visual Basic® or Microsoft Visual C++® to customize the development environment so that it is more like previous versions. For this demonstration, do not change the default settings. Mention that this pane appears when Visual Studio .NET is started for the first time and is located on the Start Page thereafter.
  - Cover all the links that appear on the Start Page, such as the What's New and Online Community links.
2. Click **Online Community**. Explain that this pane provides easy access to newsgroups that are related to .NET development.
3. Click **Search Online**. Explain that this pane provides easy access to search the MSDN® Online Library.
4. Click **Get Started**.

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► **Create a new project**

1. On the **Projects** tab, click **New Project**.
2. In the **New Project** dialog box, in the Templates pane, click **Windows Application**.
3. In the **Name** box, type **DemoApplication** and then click **OK**.

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**Note** Explain that a Visual C# Windows Application template provides a single Windows form. The form is named Form1.cs, and it opens in Design view.

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► **Examine Solution Explorer**

1. In Solution Explorer, click **Form1.cs**.  
Point out that the Form1.cs file is provided by the Windows Application template that is used to create the project.
2. Right-click **Solution ‘DemoApplication’ (1 project)**.  
Point out that you can add other projects to the solution in addition to being able to build and debug the solution from this shortcut menu.
3. Right-click **DemoApplication** under the Solution node.  
Point out that the shortcut menu for the project includes options for adding references and other files to the project.

► **Add a new class file to the project**

1. Right-click the project **DemoApplication**, point to **Add**, and then click **Add Class**.
2. In the **Add New Item** dialog box, in the **Name** box, type **Animals.cs** and then click **Open**.  
Point out the new file under the DemoApplication project. Also point out how the file is ready to be edited when it is opened.
3. Close the Animals.cs Code Editor window.

► **Change the properties of the form**

- Drag the handle in the lower right of the form to make the form rectangular.  
Be sure to point out how the **Size** property values are now bold, indicating that they have changed.

► **Add buttons to the form**

1. In the Toolbox, click a **Button** control, and then drag it onto the form.
2. Drag a second button onto the form.

► **Add code to a button**

1. On the form, double-click **Button1**.

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**Note** Point out that the Code Editor opens and that the tab is named **Form1.cs\***.

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2. In the Code Editor, between `Private Sub Button1_Click` and `End Sub`, where the cursor should be currently located, type the following code:

```
MessageBox.Show("Visual C# is awesome!");
```

► **Dynamic Help and Microsoft IntelliSense®**


1. On the **Help** menu, click **Dynamic Help**.  
This step ensures that the Dynamic Help window is visible.
2. Cover the categories of Help available, Contents, Index, and Search.
3. Go to Design view for Form1.cs.
4. Double-click **Button2** on the form.
5. In the Code Editor, between `Private Sub Button2_Click` and `End Sub`, where the pointer should be located, type the following code. Make sure you instruct your students to watch the Dynamic Help window as you type.

```
MessageBox.Show ("Visual Studio .NET makes it all easy!");
```

The students should notice that the Dynamic Help window contents change as you type the line.

6. Delete the line of code that you entered in the preceding step, and then enter the code again. This time, discuss the IntelliSense as you enter the code.

► **Run and test the application**

1. On the standard toolbar, click the **Start** button. 
2. In the **Form1** dialog box, click **Button1**.
3. In the message box, click **OK**.
4. In the **Form1** dialog box, click **Button2**.
5. In the message box, click **OK**.
6. Close **Form1**.

► **Use the Auto Hide feature**

- On the Output window title bar, click the pushpin icon.

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**Note** Demonstrate how the Output window disappears when the mouse pointer is moved away from the window and then opens again when the pointer rests on the **Output** tab.

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► **Undock a window**

1. On the Toolbox title bar, click the pushpin icon.
2. Click the Toolbox title bar and drag the window into the middle of the screen.

► **Dock a window**

1. Click the title bar of the Toolbox and drag the window to the left side of the Visual Studio application window until the pointer is almost at the left edge of the screen.
2. Click the pushpin icon in the Toolbox title bar to enable the Auto Hide feature again.

► **Save a project**

- On the standard toolbar, click the **Save All** button.

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**Note** The location of the solution is set when the solution is created.

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► **Close a solution**

- On the **File** menu, click **Close Solution**.

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**Note** The **Projects** tab of the Start Page will display **DemoApplication** in the list of recent projects when you restart Visual Studio .NET.

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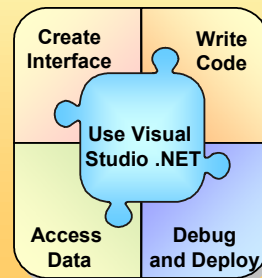
► **Quit Visual Studio**

- On the **File** menu, click **Exit**.



# Overview

- Introduction to .NET and the .NET Framework
- Exploring Visual Studio .NET
- Creating a Windows Application Project



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## Introduction

This module presents the concepts that are central to the Microsoft® .NET Framework and platform and the Microsoft Visual Studio® .NET integrated development environment (IDE). This module also describes how to work in the development environment and explains how to use Visual Studio .NET to create and build applications based on Microsoft .NET.

Although you can use Microsoft Notepad to write applications and compile the applications separately by using the command line, the development environment increases your productivity by centralizing all application development tasks in one tool that provides you with many features, including Microsoft IntelliSense® and Dynamic Help.

## Objectives

After completing this module, you will be able to:

- Identify components of the .NET platform and the .NET Framework by their function.
- Explore the Visual Studio development environment.
- Create an application based on Microsoft Windows®.

# Lesson: Introduction to .NET and the .NET Framework

- What Is the .NET Platform?
- What Is the .NET Framework?
- How the .NET Framework Works

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**Introduction**

In this lesson, a multimedia presentation introduces the concepts that are fundamental to your knowledge of the .NET platform and the .NET Framework.

**Lesson objectives**

After completing this lesson, you will be able to:

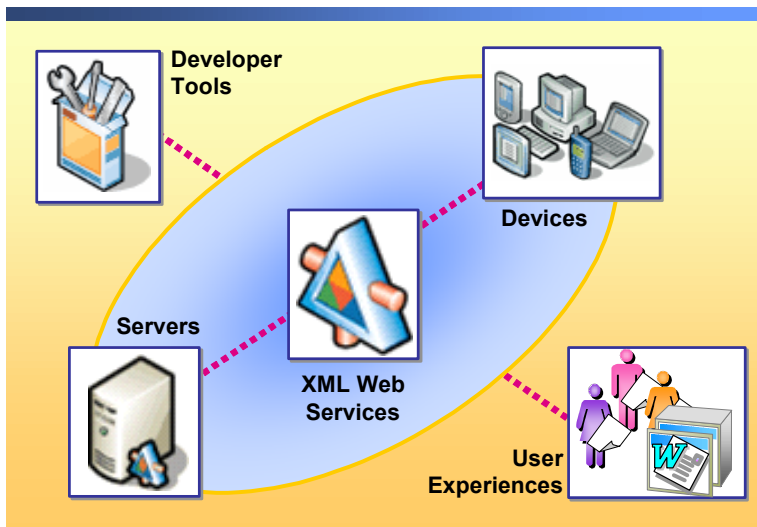
- Identify the components of the .NET platform and the .NET Framework by their functions.
- Explain the function of the .NET Framework class library and the common language runtime.

**Lesson agenda**

This lesson includes the following topics and activities:

- What Is the .NET Platform?
- Multimedia: Introduction to .NET
- What Is the .NET Framework?
- How the .NET Framework Works
- Multimedia: Introduction to the .NET Framework
- Practice: Defining the Elements of .NET

## What Is the .NET Platform?



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### Introduction

The .NET platform provides several core technologies and services that simplify the development of Web-based applications.

### .NET platform components

- Developer tools

Microsoft Visual Studio .NET and the .NET Framework supply a complete solution for developers. Visual Studio .NET provides the development environment for building applications on the .NET Framework. The development environment provides tools that simplify the creation, deployment, and ongoing evolution of secure, scalable, highly available Web applications and XML Web services.

- Devices

Devices are personal computers, laptops, workstations, phones, handheld computers, Tablet PCs, game consoles, and others. A *smart* device can access XML Web services and enable access to data regardless of the location, type, and number of devices in use.

- User experiences

.NET experiences are applications that use XML Web services to allow users to access information across the Internet and from stand-alone applications in an integrated and efficient way.

- **Servers**

The .NET Enterprise Server family accelerates the integration of systems, applications, and partners by supporting XML Web services. Support of XML allows enterprises to build on earlier systems rather than replacing them. For example, Microsoft Host Integration Server provides simple access to mainframes and Microsoft BizTalk® Server offers automatic conversions of existing data formats to and from XML.

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**Tip** For information about the .NET Enterprise Server family, see <http://www.microsoft.com/net/products/servers.asp>.

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- **XML Web services**

By using XML Web services, applications can share data and invoke capabilities from other applications without regard to how those applications were built, what operating system or platform they run on, and what devices are used to access them.

**.NET platform benefits  
for developers**

The .NET platform provides several benefits for developers, including:

- **Faster application development**

Developers can create applications by using one of many modern programming languages, greatly increasing the pool of available developer resources in addition to allowing developers the freedom to use the programming language that is most suitable for solving a specific problem.

- **Greater reliability**

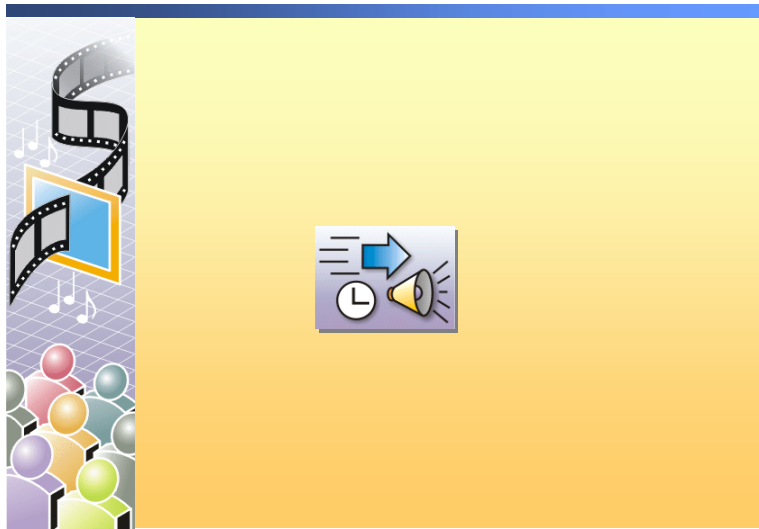
- The .NET platform takes advantage of the power of distributed computing.
- The common language runtime provides for a managed execution environment, which eliminates memory leaks, access violations, and versioning problems.
- The .NET Framework enforces type safety, explicit code sharing, and application isolation, guaranteeing that no application can affect or illegally call another.

- **Based on Web standards**

The use of XML removes barriers to data sharing and software integration. The Simple Object Access Protocol, an XML-based messaging technology standardized by the World Wide Web Consortium (W3C), specifies all the necessary rules for using XML Web services, integrating them into applications and communicating between them.

- .NET has database access capabilities, allowing developers to bring open database connectivity (ODBC)-compliant data stores into their application architecture.

## Multimedia: Introduction to Microsoft.NET



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### Introduction

This multimedia presentation introduces the concepts that are fundamental to the .NET platform and covers the following topics:

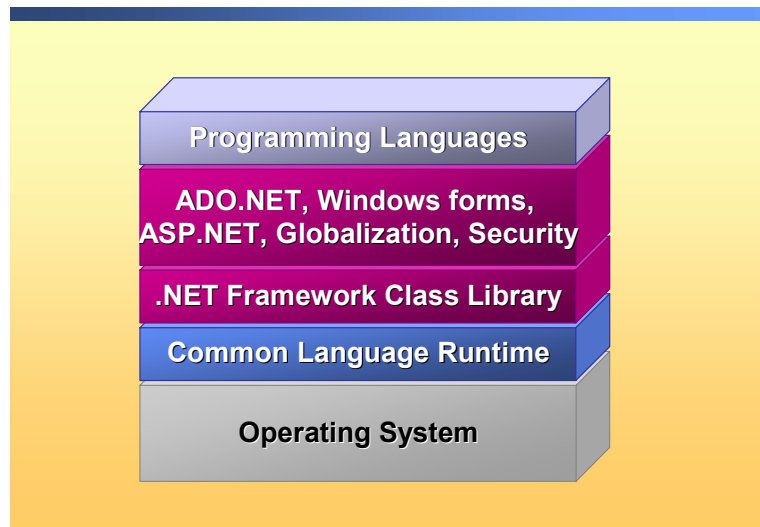
- Traditional client desktop and server communication
- .NET platform use of XML Web services
- .NET platform components
  - XML Web services
  - .NET experiences
  - .NET Devices
  - .NET Servers
  - .NET Developer Tools
    - Visual Studio .NET
    - .NET Framework

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**Note** For your reference, the Introduction to Microsoft .NET.htm multimedia presentation file is located on your student compact disc in the Media folder.

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## What Is the .NET Framework?



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### Introduction

The .NET Framework provides the foundation for building and running .NET-based applications. The .NET Framework consists of two components, the common language runtime and the .NET Framework class library, which run on an operating system. Any language that conforms to the common language specification (CLS) can run on the common language runtime. In the .NET Framework, Microsoft provides support for Microsoft Visual Basic®, Microsoft Visual C++®, Microsoft Visual C#™ (pronounced C sharp), and Microsoft JScript®. Third parties can provide additional languages.

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**Note** Currently, the .NET Framework is built to run on the Microsoft Win32® operating systems.

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### The common language runtime

The common language runtime manages the execution of code and provides services to simplify the development process. The common language runtime provides a robust and secure execution environment, support for multiple languages, and a managed environment where common services, such as garbage collection and security, are automatically provided.



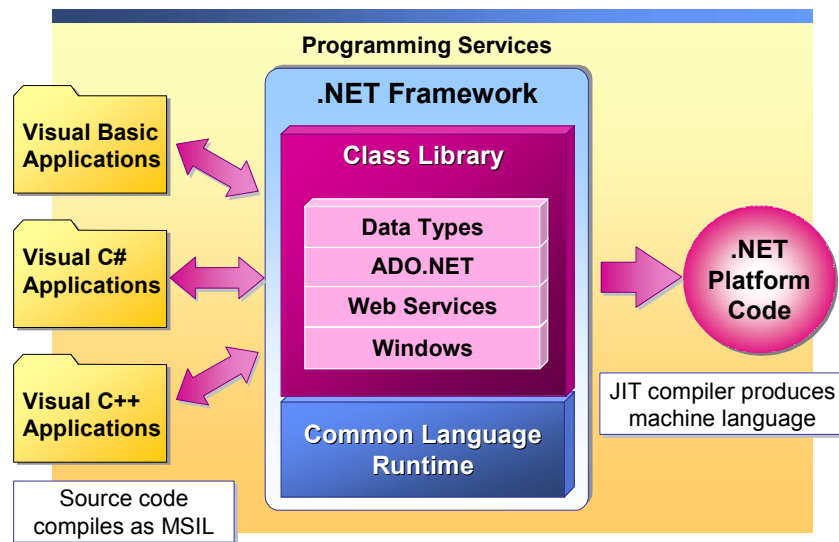
**The .NET Framework class library**

The .NET Framework class library exposes features of the runtime and provides a library of classes that are accessed by all Web, Windows-based, and XML Web service applications.

In addition to base classes, the .NET Framework class library includes:

Element	Description
ADO.NET	Microsoft ADO.NET is the next generation of Microsoft ActiveX® Data Objects (ADO) technology. ADO.NET provides improved support for the disconnected programming model. It also provides rich XML support.
ASP.NET	Microsoft ASP.NET is a programming framework that is built on the common language runtime. ASP.NET can be used on a server to build Web applications. ASP.NET Web Forms provide an easy and powerful way to build dynamic Web user interfaces (UI).
XML Web services	XML Web services are programmable Web components that can be shared among applications on the Internet or the intranet. The .NET Framework provides tools and classes for building, testing, and distributing XML Web services.
User interfaces	The .NET Framework supports three types of user interfaces: <ul style="list-style-type: none"><li>• Web Forms, which work by using ASP.NET.</li><li>• Windows Forms, which run on Win32 client computers.</li><li>• Console applications.</li></ul>

## How the .NET Framework Works



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### Introduction

The common language runtime is the foundation of the .NET Framework.

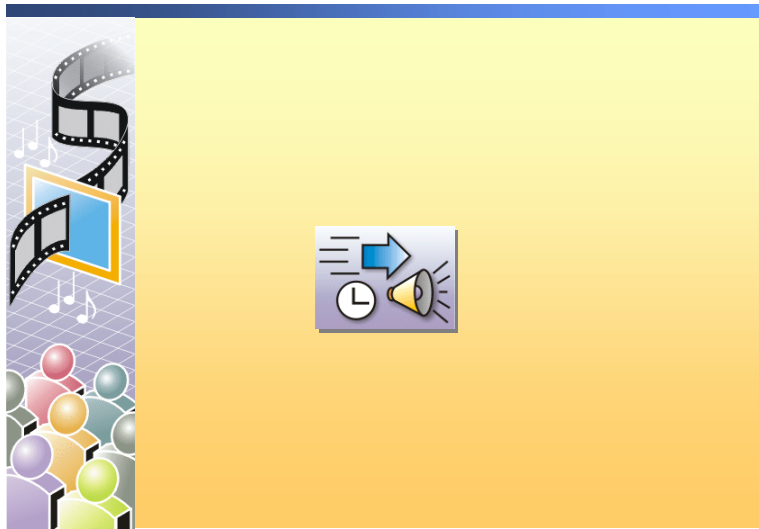
### MSIL

When you compile an application in Visual Studio .NET, it is translated into the runtime's common language, Microsoft Intermediate Language (MSIL). After the application is compiled, the runtime manages the execution of the application.

### JIT compilation

The runtime includes a feature called just-in-time (JIT) compilation that translates the MSIL code into the machine language of the system on which the application will run. When a client device on the .NET platform launches the .NET-based application, it starts running in the machine language of the client system and can fully integrate and interact with other .NET-based applications and services regardless of the language in which it was developed.

## Multimedia: Introduction to the .NET Framework



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### Introduction

This multimedia presentation covers key concepts of the .NET Framework, including:

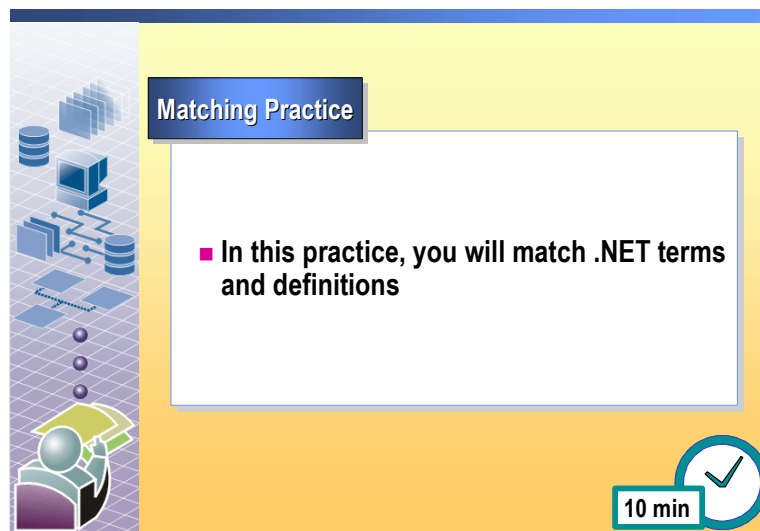
- .NET Framework components
  - .NET Framework class library
  - .NET Framework common language runtime
- Objects in the .NET Framework class library
  - XML Web services
  - User interface classes
  - ASP.NET
  - ADO.NET
- .NET Framework security
- The common language runtime manages the execution of code and provides services to simplify the development process. The multimedia presentation covers the function of the common language runtime in more depth, explaining how the .NET Framework works with the common language runtime.

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**Note** For your reference, the Introduction to the .NET Framework.htm multimedia presentation file is located on your student compact disc in the Media folder.

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## Practice: Defining the Elements of .NET



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Match the following terms with the appropriate definition by drawing a line that connects the term and definition.

Term	Definition
XML Web services	A. Component that periodically checks for objects that are ready to be released from a computer's memory.
Devices	B. CPU-independent set of instructions than can be efficiently turned into CPU-specific code.
.NET experiences	C. Programmable entity that provides a particular element of functionality, such as application logic and is accessible to any number of potentially disparate systems.
.NET Framework	D. Component that contains a collection of reusable types that you can use to develop applications.
.NET Framework class library	E. Programming model of the .NET platform for building, deploying, and running XML Web services and all types of applications—both desktop and Web-based.
Common language runtime	F. Refers to a hand held computer or mobile telephone that can use .NET-based applications.
Garbage collection	G. Component that manages the execution of code and provides services to make the development process easier.
MSIL	H. Services, .NET-based applications, and Web sites that rely on XML Web services to enhance the user experience.

**XML Web services = C, Devices = F, .NET experiences = H, .NET Framework = E, .NET Framework class library = D, Common language runtime = G, Garbage collection = A, MSIL = B**

# Lesson: Exploring Visual Studio .NET

- Programming Features of Visual Studio .NET
- Structure of Visual Studio Solutions and Projects
- The Development Process

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## Introduction

This lesson uses an instructor-led demonstration to present some of the most commonly performed tasks and features of the development environment of Visual Studio .NET and explains the file structure and development cycle of the development environment.

## Lesson objectives

After completing this lesson, you will be able to:

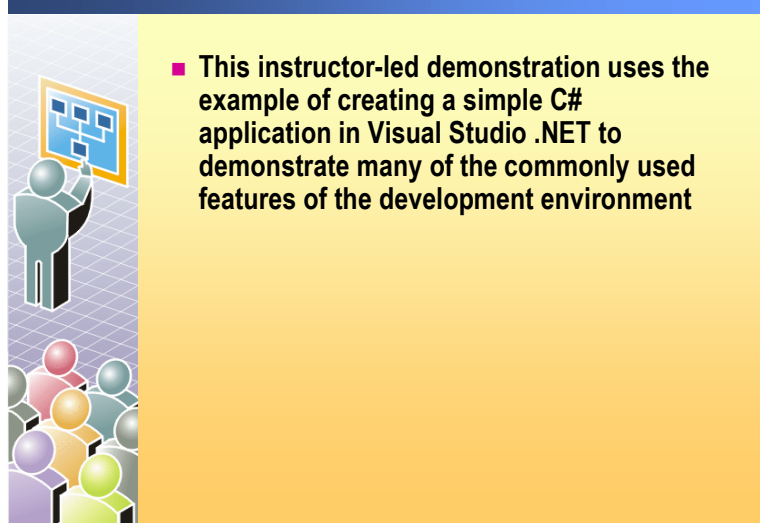
- Identify the programming features of Visual Studio .NET by their functions.
- Describe the structure of solutions and projects in the development environment.
- Determine which programming feature to use to perform a development task.

## Lesson agenda

This lesson includes the following topics and activity:

- Demonstration: Working in the Development Environment
- Programming Features of Visual Studio .NET
- Structure of Visual Studio Solutions and Projects
- The Development Process

## Demonstration: Working in the Development Environment



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This instructor-led demonstration uses the example of creating a simple C# application in Visual Studio .NET to demonstrate many of the commonly used features of the development environment.

Your instructor will demonstrate the following procedures:

► **Open Visual Studio .NET and use the Start Page**

1. Start Visual Studio .NET.
2. Click **Online Community**.
3. Click **Search Online**.
4. Click **Get Started**.

► **Create a new project**

1. On the **Projects** tab, click **New Project**.
2. In the **New Project** dialog box, in the Templates pane, click **Windows Application**.
3. In the **Name** box, type **DemoApplication** and then click **OK**.

► **Examine Solution Explorer**

1. In Solution Explorer, click **Form1.cs**.
2. Right-click **Solution 'DemoApplication' (1 project)**.
3. Right-click **DemoApplication** under the Solution node.

► **Add a new class file to the project**

1. Right-click the project **DemoApplication**, point to **Add**, and then click **Add Class**.
2. In the **Add New Item** window, in the **Name** box, type **Animals.cs** and then click **Open**.
3. Close the **Animals.cs Code Editor** window.

► **Change the size of the form**

- Drag the bottom-right resize handle on the form to make the form rectangular.

► **Add buttons to the form**

1. In the **Toolbox**, click a **Button** control, and then use a drag-and-drop operation to place a button onto the form.
2. Place a second button onto the form.

► **Add code to a button**

1. Double-click **Button1** on the form.
2. In the **Code Editor**, between `Private Sub Button1_Click` and `End Sub`, where the pointer should be located, type the following code:

```
MessageBox.Show("Visual C# is awesome!");
```

► **Use Dynamic Help and IntelliSense**


1. On the **Help** menu, click **Dynamic Help**.  
This step ensures that the **Dynamic Help** window is visible.
2. Choose **Design** view for **Form1.cs**.
3. Double-click **Button2** on the form.
4. In the **Code Editor**, between `Private Sub Button2_Click` and `End Sub`, where the pointer should be located, type the following code, and observe the **Dynamic Help** window as you type:

```
MessageBox.Show ("Visual Studio .NET makes it all easy!");
```

Notice that the **Dynamic Help** contents change as you type the line.

5. Delete the line of code that you entered in the preceding step and then enter the code again. This time, notice how **IntelliSense** functions as you type the code.

**► Run and test the application**

1. On the standard toolbar, click the **Start** button .
2. In the **Form1** dialog box, click **Button1**.
3. In the message box, click **OK**.
4. In the **Form1** dialog box, click **Button2**.
5. In the message box, click **OK**.
6. Close Form1.

**► Use the Auto Hide feature**

- On the Output window title bar, click the pushpin icon.

**► Undock a window**

1. On the Toolbox title bar, click the pushpin icon.
2. Click the Toolbox title bar and drag the window into the middle of the screen.

**► Dock a window**

1. Click the title bar of the Toolbox, and then drag the window to the left side of the Visual Studio application window until the pointer is almost at the left edge of the screen.
2. Click the pushpin icon in the Toolbox title bar to enable the Auto Hide feature again.

**► Save a project**

- On the standard toolbar, click the **Save All** button.

---

**Note** The location of the solution is set when the solution is created.

---

**► Close a solution**

- On the **File** menu, click **Close Solution**.

---

**Note** The **Projects** tab of the Start Page will display **DemoApplication** in the list of recent projects when you restart Visual Studio .NET.

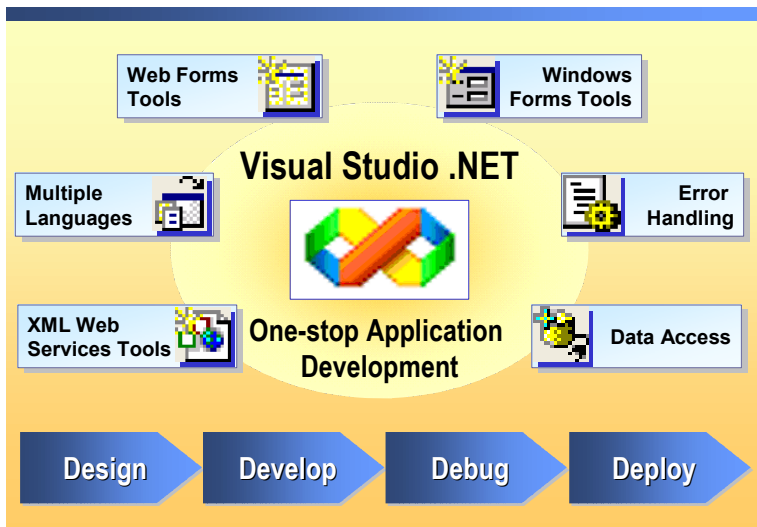
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**► Quit Visual Studio**

- On the **File** menu, click **Exit**.



## Programming Features of Visual Studio .NET



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### Introduction

Visual Studio .NET is an integrated development environment that helps you to quickly design, develop, debug, and deploy .NET-based applications. You can access a common set of tools, designers, and editors from any Visual Studio .NET programming language. You can create Windows Forms and Web Forms applications that integrate data and business logic.

### Programming features

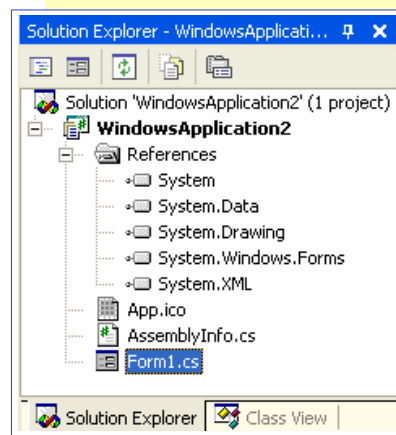
Visual Studio .NET includes the programming features described in the following table.

Feature	Description
Windows Forms Designer	A graphical design surface enables you to quickly create the user interface for an application. You can drag or draw controls onto this surface.
Tools for Windows Forms	A Windows Forms Designer, a Windows Application template, essential project references, and starter code are provided to help you create standard Windows Forms applications.
Tools for Web Forms	A Web Forms Designer, an ASP.NET Web Application template, essential project references, and starter code are provided to help you build Web Forms applications in which the primary user interface is a browser.

*(continued)*

Feature	Description
Tools for XML Web services	An ASP.NET Web services template is provided that constructs a Web application project structure on a development Web server and a Visual Studio solution file on your local computer.
Multiple language support	All of the .NET platform programming languages, including Visual C#, are integrated into the development environment.
Data access	Components for creating applications that share data, visual database tools for accessing data, and a robust set of ADO.NET classes make it easy to work with all types of data.
Error handling	Debugging tools with cross-language support help you to find and fix errors in your code, and you can use structured exception classes to build error handling into your application.
Wizards	Wizards help you to quickly complete common and perhaps complex tasks. Each page of a wizard helps you set options, configure settings, and customize projects.

## Structure of Visual Studio Solutions and Projects



### ■ Solution

- A container for the projects and solution items that can be built into an application
- A solution usually contains one or more related projects

### ■ Project

- A container within a solution to logically manage, build, and debug the project items that make up your application

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### Introduction

Solution Explorer allows you to view files and perform file management tasks in a solution or a project. A single Visual Basic .NET solution and its projects appear in a hierarchical list that provides updated information about the status of your solution, projects, and files.

### Terms and definitions

When you create a project in Visual Studio .NET, project files are organized in a larger container called a *solution*. A solution usually contains one or more related projects.

A *project* is a container in a solution that you can use to logically manage, build, and debug the project items that make up your application.

### Solution benefits

Solutions allow you to concentrate on the project or set of projects that are required to develop and deploy your application, instead of having to focus on the details of managing the objects and files that define them.

A solution allows you to:

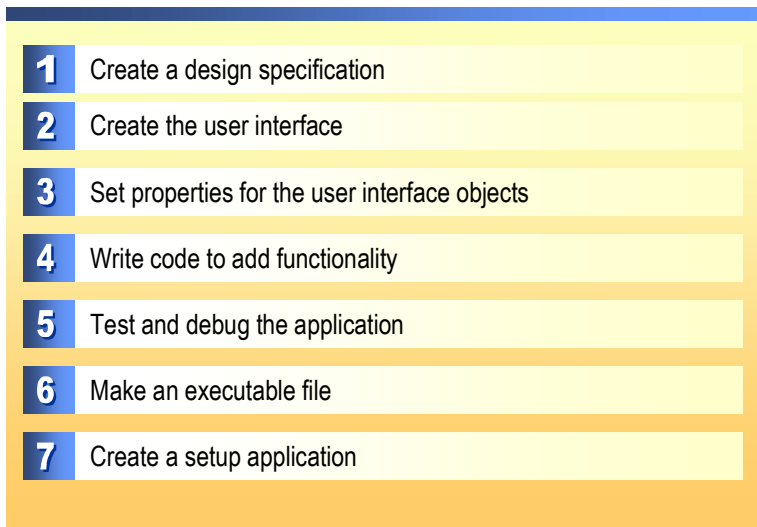
- Work on multiple projects in the same instance of the development environment.
- Work on items, settings, and options that apply to a group of projects.
- Manage miscellaneous files that are opened outside the context of a solution or project.
- Use Solution Explorer, which is a graphical view of your solution, to organize and manage all of the projects and files that are required to design, develop, and deploy an application.

**Solution and project files**

Visual Studio .NET supports many file types and their associated file extensions. The following table describes some common file types that are specific to .NET-based applications.

Extension	Name	Description
.sln	Visual Studio solution	Organizes projects, project items, and solution items in the solution by giving the environment references to their locations on disk.
.suo	Solution user options	Records all of the options that you may associate with your solution so that each time you open the solution, it includes any customizations that you made.
.cs	Visual C# project	Represents forms, user controls, classes, and module files that belong to a single-project solution. Any files that are not based on a programming language have their own extension. For example, a Crystal Report file has the extension .rpt, and a text file has the extension .txt.
.csproj	Visual C# projects	Represents forms, user controls, classes, and module files that belong to a multiple-project solution. This extension allows you to differentiate between files written in Visual C# and other .NET-compatible languages.
.aspx .asmx .asax	Web project items	Web project items include Web-specific files such as .aspx for Web Forms, .asmx for XML Web services, and .asax for global application classes. Web projects also use the .cs file extension for classes and modules.

## The Development Process



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### Introduction

Visual Studio .NET contains everything you need to build your own applications from start to finish. To create the user interface, you place controls from the Toolbox on a form, then you customize the controls by setting properties. After that, you write code to define what your program will do. Finally, you can save, run, and compile your program so others can use it.

### Creating an application in Visual Studio .NET

Creating an application in Visual Studio .NET involves seven basic steps:

1. Create a design specification.

The design specification is the blueprint that you use when you create an application. Before writing any code, take time to design the application you will create. Although Visual Studio .NET provides tools to help you quickly develop an application, having a clear understanding of the user needs and initial feature set will help you be more efficient in your development efforts. Planning the design will also help you save time by minimizing the potential for rewriting code because of a poor or nonexistent design specification.

2. Create the user interface.

To create the interface for your application, first place controls and objects on a form by drawing or painting them in the Windows Forms Designer. You can look at other applications, such as Microsoft Excel or Microsoft Word, for ideas on how to design the interface. For information about interface design, see *Microsoft Windows User Experience* published by Microsoft Press®.

3. Set properties for the user interface objects.

After you add objects to a form, you can set their properties in the Properties window or in the Code Editor.

4. Write code to add functionality.

After you set the initial properties for the form and its objects, you can add code that runs in response to events. Events occur when various actions are performed on a control or object. For example, the **Click** event of a command button occurs when the user clicks it with the mouse. For most applications, you must also write code to add business logic and to access data.

5. Test and debug the application.

Testing and debugging is not a one-time step but something that you do iteratively throughout the development process. Each time you make a major change in steps 2, 3, or 4, you must run a debug build of the application and ensure that it is working as expected. Visual Studio .NET provides debugging tools for finding and fixing errors in your application.

6. Make an executable file.

After completing the project, create a release build of the project. Creating a release build compiles the various files that make up the program into a stand-alone executable file called an *assembly*.

7. Create a setup application.

To run your application, the user usually needs other files, such as any dynamic-link library (DLL) files that you used to create your application. Visual Studio provides the Setup Wizard, which automates the creation of the setup program and ensures that the user has all of the necessary files.

# Lesson: Creating a Windows Application Project

- What Is an Application Template?
- How to Use the Windows Forms Designer
- How to Use the Properties Window

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**Introduction** This lesson prepares you for creating your first basic Windows application.

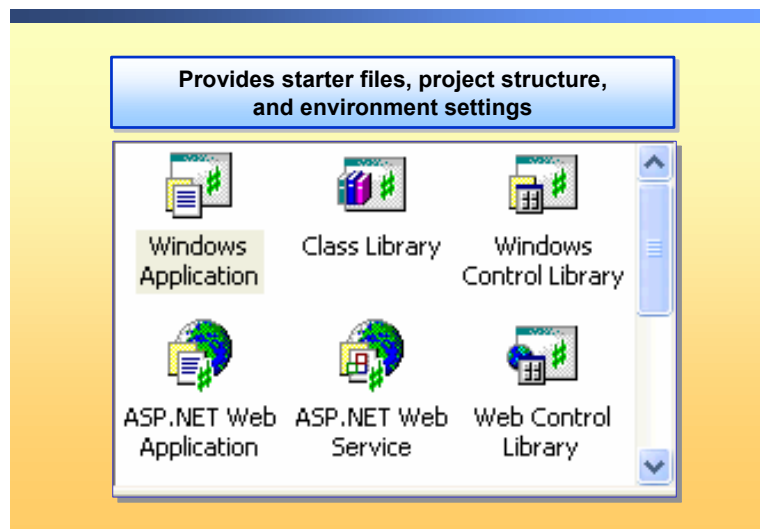
**Lesson objectives** After completing this lesson, you will be able to:

- Start a Visual C# project based on the Windows Application template.
- Explore Windows Forms Designer.
- Explore the Properties window.
- Create a basic Windows application.

**Lesson agenda** This lesson includes the following topics and activity:

- What Is an Application Template?
- How to Use the Windows Forms Designer
- How to Use the Properties Window
- Practice: Creating a Basic Windows Application

## What Is an Application Template?



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### Introduction

Visual Studio .NET offers several application templates to support the development of different kinds of applications and components. Before you start a new project, you must choose the type of template that you want to use.

### Definition

An *application template* provides starter files and a project structure and contains the basic project objects and the environment settings you need to create the type of application that you want to build.

### Examples of application templates

Two of the most commonly used templates are the Windows Application and the ASP.NET Web Application templates.

- Windows Application template

This template provides the tools, structure, and starter code for a standard Windows-based application. It automatically adds the essential project references and files to use as a starting point for your application.

- ASP.NET Web Application template

This template is used to create an ASP.NET Web application on a computer that has Microsoft Internet Information Services (IIS) version 5.0 or later installed. The template creates the basic files that the server requires to help you start designing your application.



## Creating a Windows Application project

When you start a new Microsoft Visual C# .NET project, one of the first steps is to choose an application template.

To create a Windows Application project in Visual Studio .NET:

1. Start Visual Studio .NET.
2. On the Get Started pane, click **New Project**.

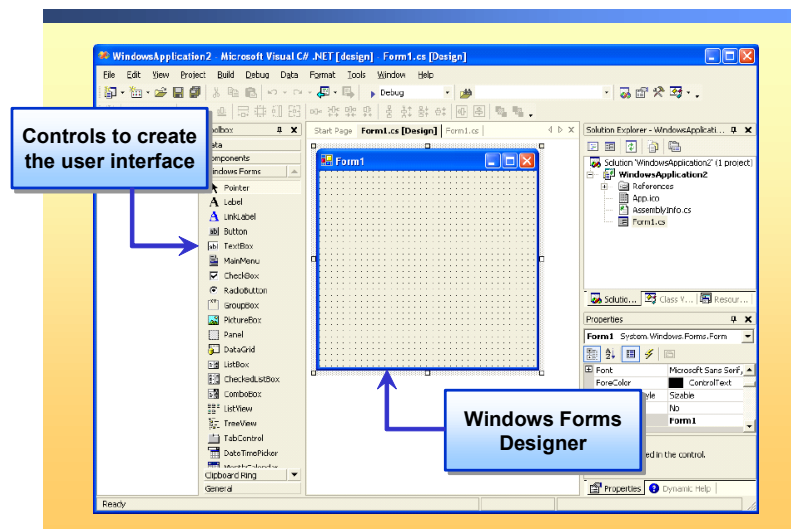
– or –

On the **File** menu, point to **New**, and then click **Project**.

3. In the Project Types pane, click **Visual C# Projects**. In the Templates pane, click **Windows Application**.
4. In the **Name** field, type a unique project name that indicates the purpose of the application.
5. In the **Location** field, type the directory in which you want to save your project, or click the **Browse** button to browse to it.
6. Click **OK**.

The Windows Forms Designer opens and displays Form1 of the project that you created.

## How to Use the Windows Forms Designer



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### Introduction

When you start a project in Visual C# .NET, the Windows Forms Designer opens in Design view, showing Form1 of the project. You place controls from the Toolbox on the form to create the user interface for a window used in your application.

### Elements of a form

The default form contains the basic elements that most forms use: a title bar, a control box, and **Minimize**, **Maximize**, and **Close** buttons.

### Viewing a form

To view a form in Design view:

- In Solution Explorer, double-click the form.
- OR —
- In Solution Explorer, click the form, and then, on the toolbar, click **View Designer**.

### Creating the user interface

You create the user interface objects for your application by adding controls from the Toolbox to a form. The Toolbox is initially located on the left side of the development environment. There are several tabs for different categories of controls, such as **Windows Forms** and **Data**.

### Toolbox controls

The Toolbox contains a variety of controls that you can use to add images labels, buttons, list boxes, scroll bars, menus, and geometric shapes to a user interface. Each control that you add to a form becomes a programmable user interface object in your application. These objects are visible to the user when the application runs and operate like the standard objects in any Windows-based application.

**Closing and opening the Toolbox**

To close and open the Toolbox:

1. To close the Toolbox, in the upper-right corner of the Toolbox, click **Close**.
2. To open the Toolbox, on the **View** menu, click **Toolbox**.
3. To keep the Toolbox open, on the Toolbox title bar, click the pushpin.

**Hiding and reopening the Toolbox**

To hide and reopen the Toolbox:

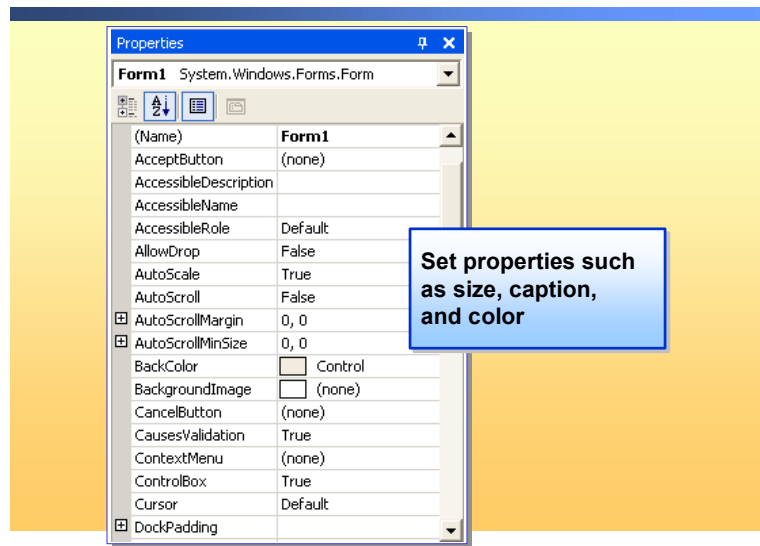
1. To hide the Toolbox, on the Toolbox title bar, click the pushpin.
2. To reopen the Toolbox when it is hidden, on the **View** menu, click **Toolbox**.

**Moving the Toolbox**

To move the Toolbox:

1. Right-click the Toolbox title bar, and then click **Floating**.
2. Drag the Toolbox to the desired location.

## How to Use the Properties Window



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### Introduction

The Properties window lists the property settings for the selected form or control that you can modify while you create or edit the application. A property describes a characteristic of an object, such as size, caption, or color.

### Terms and definitions

A *form* is made up of various controls. You can modify the style and function of forms and controls by changing various attributes of these controls. These attributes are referred to as *properties*.

### Opening the Properties window

To open the Properties window:

- If the Properties window is not visible, click **Properties Window** on the **View** menu, or press F4.

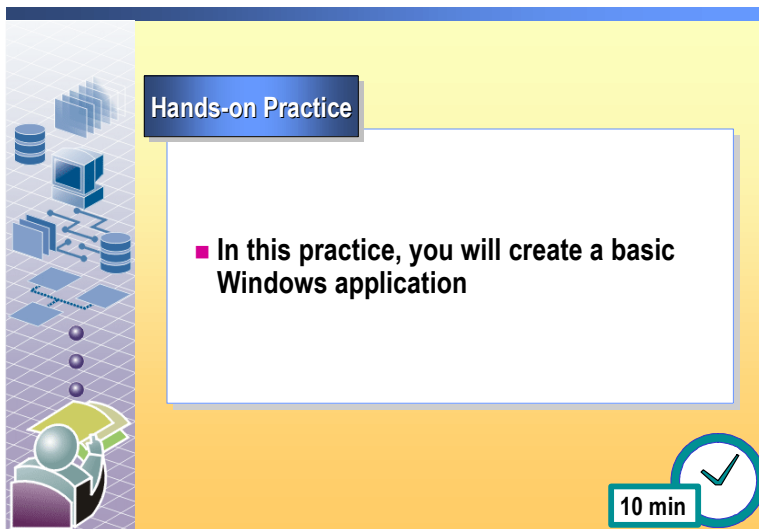
### Viewing properties

Some controls, documents, and forms display a large number of properties in the Properties window. This can make it difficult to locate the property that you want to set. The Properties window allows you to view the properties for a form or control in a categorized view instead of an alphabetic view.

To view properties:

1. To view the properties by category, click the **Categorized** button in the Properties window.  
The properties for the selected form or control will be separated into the categories that are defined by the control.
2. To view the properties in a category, expand the category node. To hide the properties in a category, collapse the category node.
3. To view the properties alphabetically, click the **Alphabetic** button in the Properties window.

## Practice: Creating a Basic Windows Application



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In this practice, you will create a basic Windows application.

Tasks	Detailed steps
1. Start Visual Studio .NET.	<ul style="list-style-type: none"> <li>■ Start a new instance of Visual Studio .NET.</li> </ul>
2. Create a new project. Project Type: <b>Visual C#</b> Template: <b>Windows Application</b> Name: <b>SimpleWindowsApplication</b>	<ul style="list-style-type: none"> <li>a. On the <b>Start Page</b>, click <b>New Project</b>.</li> <li>b. In the <b>New Project</b> window, under <b>Project Types</b>, click <b>Visual C# Projects</b>.</li> <li>c. Under <b>Templates</b>, click <b>Windows Application</b>.</li> <li>d. In the <b>Name</b> box, type <b>SimpleWindowsApplication</b> and then click <b>OK</b>.</li> </ul>
3. Change the Text property of Form1 to <b>SimpleApplication</b> and then change the size of the form. Width = <b>400 pixels</b> Height = <b>200 pixels</b>	<ul style="list-style-type: none"> <li>a. On the <b>View</b> menu, click <b>Properties Window</b>.</li> <li>b. In the Properties window, in the <b>Text</b> property box, type <b>SimpleApplication</b>.</li> <li>c. In the <b>Size</b> property box, type <b>400,200</b> and then press ENTER.</li> </ul>
4. Add a Label control to Form1. Locate this label on the form at position <b>20,20</b> . Change this label to be <b>350</b> pixels wide and <b>130</b> pixels high.	<ul style="list-style-type: none"> <li>a. Click the <b>Toolbox</b>.</li> <li>b. Drag a <b>Label</b> control from the Toolbox to the Form.</li> <li>c. In the Properties window, in the <b>Location</b> property box type <b>20,20</b> and then press ENTER.</li> <li>d. In the <b>Size</b> box, type <b>350,130</b> and then press ENTER.</li> </ul>

Tasks	Detailed steps
5. Change the <b>Text</b> property of the label to <b>Hello World</b> and then change the font size to <b>40 points</b> .	<ul style="list-style-type: none"><li>a. In the <b>Text</b> property field, type <b>Hello World</b></li><li>b. Expand the <b>Font</b> property, in the <b>Size</b> field type <b>40</b> and then press ENTER.</li></ul>
6. Change the <b>TextAlign</b> property of the label to <b>MiddleCenter</b> .	<ul style="list-style-type: none"><li>▪ Change the <b>TextAlign</b> property to <b>MiddleCenter</b>.</li></ul>
7. Run the application.	<ul style="list-style-type: none"><li>▪ On the standard toolbar, click the <b>Start</b> button.</li></ul>
8. Close the application, save all changes, and then quit Visual Studio .NET.	<ul style="list-style-type: none"><li>a. Close the SimpleApplication window.</li><li>b. On the standard toolbar, click the <b>Save All</b> button.</li><li>c. On the <b>File</b> menu, click <b>Exit</b>.</li></ul>

# Review

- Introduction to .NET and the .NET Framework
- Exploring Visual Studio .NET
- Creating a Windows Application Project

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1. Complete the following statement:

When you create a project in Visual Studio .NET, \_\_\_\_\_ files are organized in a larger container called a \_\_\_\_\_.

**When you create a project in Visual Studio .NET, project files are organized in a larger container called a solution.**

2. Draw a line to match the following file extensions with the correct description.

Extension	Description
.cs	A. Organizes projects, project items, and solution items in the solution.
.sln	B. Records all of the options that you may associate with your solution.
.aspx	C. Represents forms, user controls, classes, and module files that belong to a single-project solution.
.suo	D. Represents forms, user controls, classes, and module files that belong to a multiple-project solution.
.csproj	E. Represents a Web project item.

**.cs = C, .sln = A, .aspx = E, .suo = B, .csproj = D**

3. Complete the following statement:

An \_\_\_\_\_ provides starter files and a project structure and contains the basic project objects and the environment settings that you need to create the type of application that you want to build.

**An application template provides starter files and a project structure and contains the basic project objects and the environment settings that you need to create the type of application that you want to build.**

4. What must be installed on a client computer to run .NET-based applications?

**The .NET runtime must be installed on a client computer to run .NET-based applications.**

5. What is one advantage of programming by using the .NET Framework versus using a traditional development environment?

**The .NET Framework allows the developer to write code in one operating system and then to deploy the application on other computers running other operating systems.**