



**AMIT ACADEMY**  
for Computer Education

**Subject – Desktop Application  
Development (VB.NET)**

# **Unit-1**

# **Basic Concepts of Framework**

**AMIT ACADEMY FOR COMPUTER EDUCATION**

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# Introductions about Package Environment

- A software package is a group of computer programs that can be licensed, downloaded or subscribed to as a bundle of related products.
- The products in the package may include executable programs, program documentation and, in some cases, example files that show how the various components work.
- Two of the most common installer formats found in software packages are executable (EXE) files and Microsoft software installer (MSI) files.
- Ex- Microsoft Office, Visual Studio etc...

**Reference Link –**

<https://www.techtarget.com/whatis/definition/software-package>

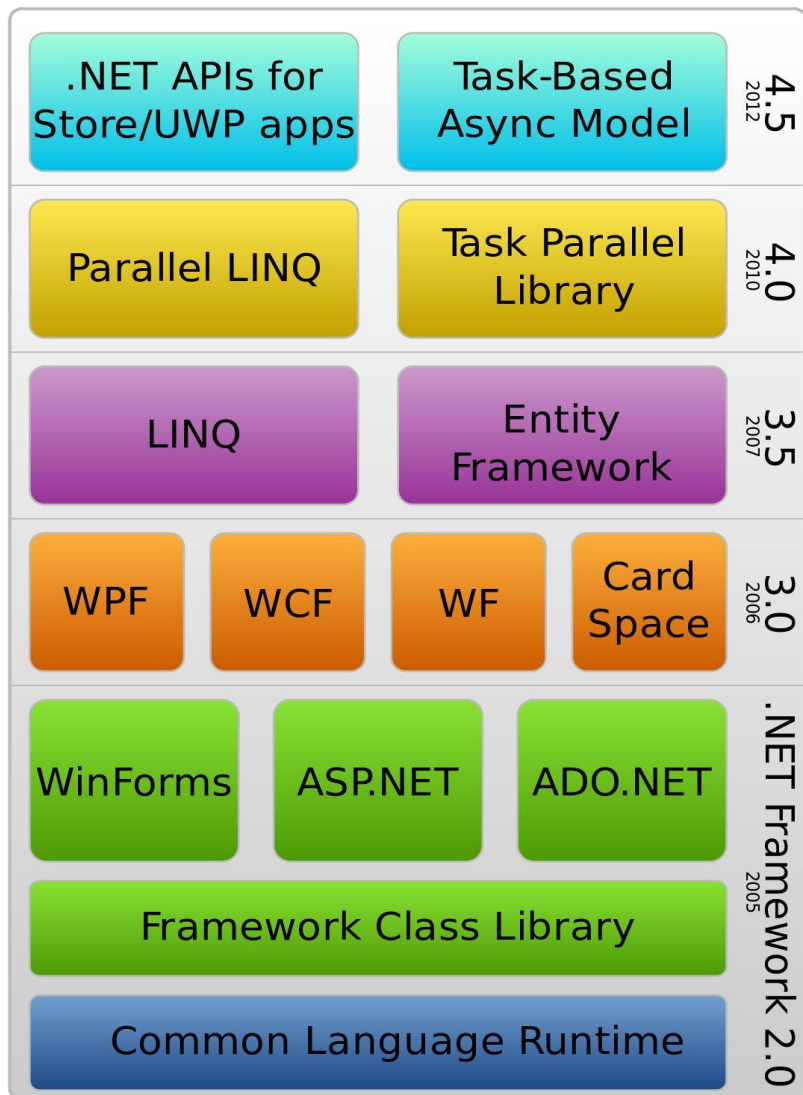
# History of .NET framework

- Microsoft started development on the .NET Framework in the late 1990s originally under the name of **Next Generation Windows Services (NGWS)**. By late 2001 the first beta versions of .NET Framework 1.0 were released. The first version of .NET Framework was released on 13 February 2002, bringing managed code to Windows NT 4.0, 98, 2000, ME and XP.
- Microsoft has released nine more upgrades for .NET Framework, seven of which have been released along with a new version of Visual Studio. Two of these upgrades, .NET Framework 2.0 and 4.0, have upgraded Common Language Runtime (CLR)
- The .NET Framework family also includes two versions for mobile or embedded device use.
- .NET Framework 4.8 was announced as the final version of .NET Framework, with future work going into the rewritten and cross-platform .NET Core platform (later, simply .NET), which shipped as .NET 5 in November 2020. However, .NET Framework 4.8.1 was released in August 2022.

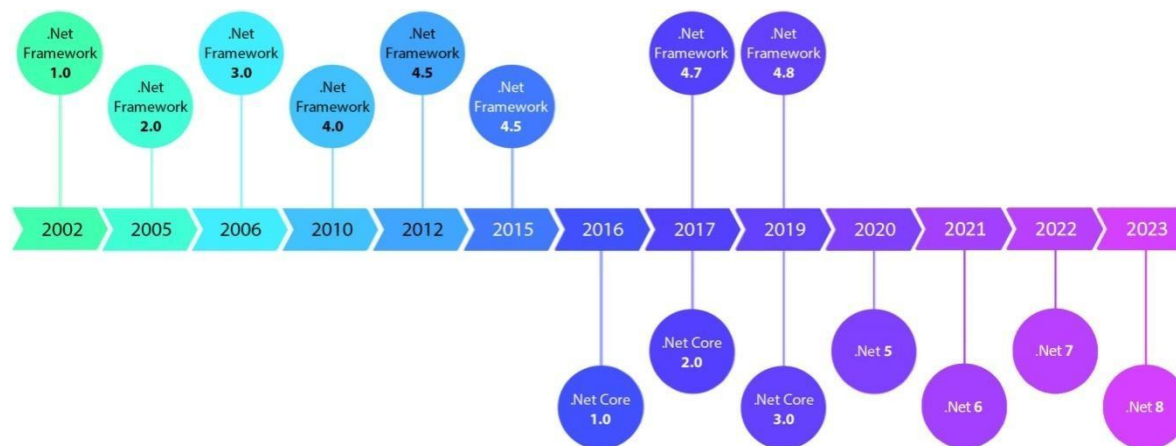
**Reference Link –**

[https://en.wikipedia.org/wiki/.NET\\_Framework\\_version\\_history](https://en.wikipedia.org/wiki/.NET_Framework_version_history)

# .NET framework Version



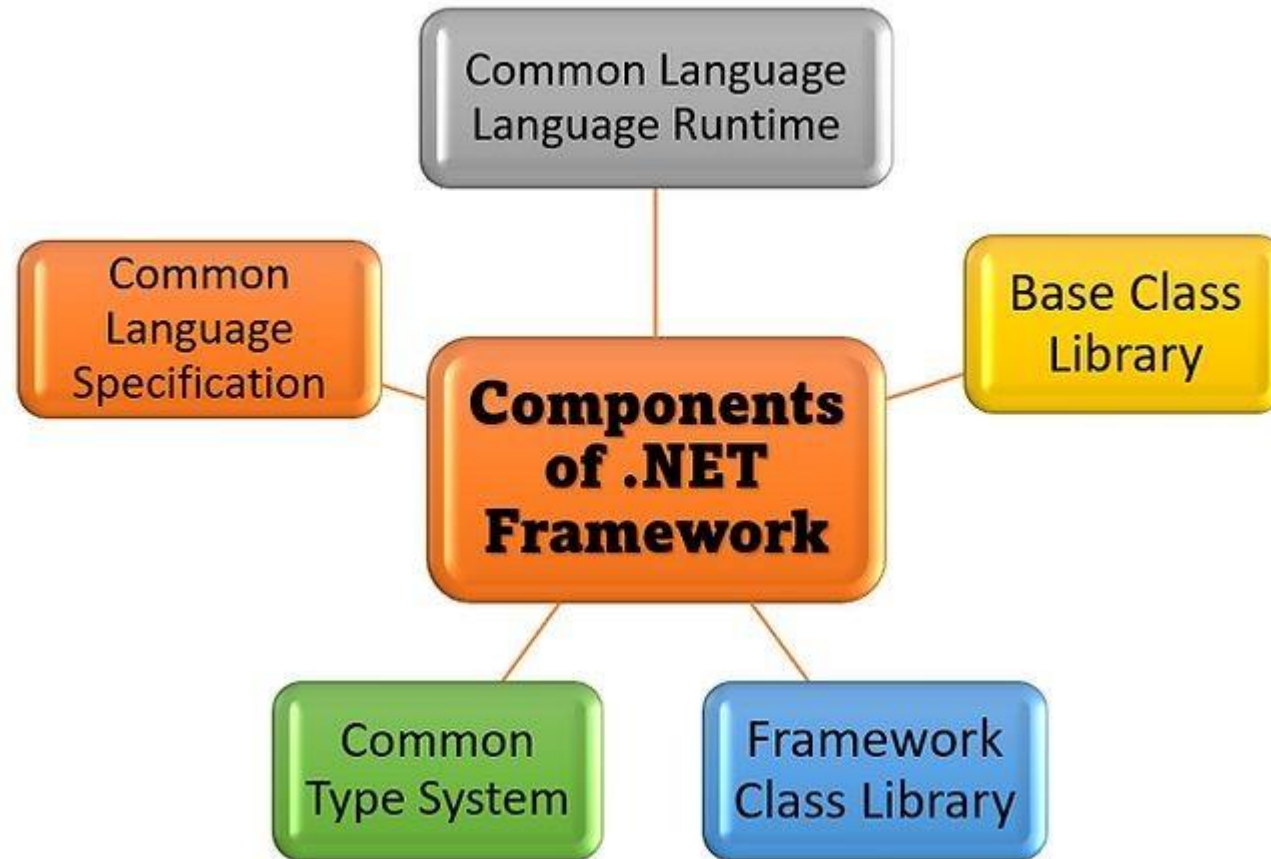
.NET – A unified platform



# What are the Components of .NET Framework?

- The .NET framework is a software development framework from Microsoft. It provides a controlled programming environment where software can be developed, installed and executed on Windows-based operating systems. The principal design features are:
- Interoperability: This allows for .NET-developed programs to access functionalities in programs developed outside .NET.
- Common Runtime Engine: Also known as the common language runtime, this allows programs developed in .NET to exhibit common behaviors in memory usage, exception handling and security.
- Language Independence: Common language infrastructure specifications (CLI) allow for the exchange of data types between two programs developed in different languages.
- Base Class Library: A library of code for most common functions--used by programmers to avoid repetitive rewriting of code.
- Ease of Deployment: There are tools to ensure the ease of installing programs without interfering with previously installed applications.
- Security: Programs developed in .NET are based on a common security model.

# .NET framework Components



# .NET framework Components

## 1. Common Language Runtime (CLR)

- Common Language Runtime (CLR) is an interoperable runtime environment from the .Net framework which provides an environment to run all .Net programs. It helps in converting the source code to native code; It is a two-step process where the source code is first converted to a Microsoft Intermediate Language (MSIL) and then CLR uses JIT compilers to convert MSIL code to native code. There are over 15 language compilers that convert the source code to MSIL code.
- CLR takes care of exception handling, memory, and thread management. CLR contains a Garbage Collector (GC) which takes care of memory management by cleaning up out-of-scope objects from the memory.

## 2. Base Class Library

- The base class library encapsulates a large number of common functions which can be used by the developers. They are the foundational types and act as the base for all the .NET class libraries. App-specific libraries will be built on top of BCL.
- They are developed with general implementations with a high-performance policy such as low-latency, high throughput, low-memory, and low-CPU usage. Features such as ADO.Net, XML handling, Threading, Security, Diagnosis, etc., are part of the base class library.
- BCL is divided into 2 parts. One is a User-defined class library (which consists of a collection of parts of an application such as dll or exe file) and another is a predefined class library that consists of namespaces.

# .NET framework Components

## 3. Framework Class Library (FCL)

- Framework Class Library is a collection of classes, interfaces, namespace, data, and value types that are used for .Net applications. It is a superset of the base class library. It consists of in-built classes that support base and user-defined data types, input/output and streaming operations, web-client, server, and Windows based GUI applications creation and underlying communication systems.
- The functionality of FCL can be broadly classified into three categories.
- Utility Features,
- Wrapper Around OS functionality, and
- Frameworks
- **Utility features** include different collection classes. For example list, stack, queue, dictionary, etc. It also includes regular expression (regex) classes.
- **Wrapper around OS functionality** includes classes that act as a wrapper to communicate with OS components such as file system, network features, and console application operations.
- **Frameworks** include the technology used to develop ASP.NET web application, Windows Presentation Foundation (WPF), etc.,



# .NET framework Components

## • 4. Common Type System

- The common type system is responsible for declaring, using, and managing types in the CLR. They play a vital role in cross-language integration. CTS ensures type safety, high-performance code execution, and defining rules that language must follow. Also, it offers primitive data types (Boolean, byte, int32, char, uint64).
- All types in .NET are either value and reference types. Value types are data types with the objects directly representing the object's actual value. On the other hand, reference types are objects that are represented by a reference to the object's actual value. When a reference type is assigned to a variable, the original value of the object is getting assigned and no copy is made, unlike value types.
- Value types are stored in the stack while reference types are stored in the managed heap.
- There are 5 categories of type in .NET
- Out of these, Classes and delegates are reference types. Structures and Enumerations are value types. An interface can be either value or reference type based on the class or structure that implements it.

# .NET framework Components

## 5. Common Language Specification

- Common Language Specification (CLS) is a subset of CLR. CLS comes in handy when codes of different programming languages based on the .NET framework are referred to in the same solution. There are many programming languages that have .NET as the background. Example, C#, F#, VB .NET, etc., And every programming language has its own syntax.
- Consider a situation — In C#, we create two methods, one with Pascal casing and another one with camel casing. This code will be accepted. And in the same solution, if a VB. Net project is added and when it refers to the C# project, then it would throw errors.
- To avoid these, at the compilation time, when the source code is converted to MSIL, the code has to comply with the common language specifications. If they do not, then a non-compliant compiler warning will be displayed which serves as a heads up to the developer.

### Reference Link –

- <https://www.thetechplatform.com/post/what-are-the-components-of-net-framework>

# What Is Metadata In .Net?

- Metadata is data about the data or documentation about the information which is required by the users. In data warehousing, metadata is one of the essential aspects.
- Metadata is machine-readable information about a resource, or “data about data.” Such information might include details on content, format, size, or other characteristics of a data source. In .NET, metadata includes type definitions, version information, external assembly references, and other standardized information.

## Metadata is used in .NET by

- Classloader for finding load .NET classes
- CLR for runtime features like security enforcement, authentication, memory layout, and implementation
- Just in Time compilers for compilation of IL code
- Debuggers, object browsers, profilers for integration support

## Reference Link –

- <https://www.spec-india.com/blog/what-is-metadata-in-net>

# Visual Studio Version Details?

C# 1.0 2002	ASP 1996	Visual Studio 2002 7.0
C# 2.0 2005	ASP.NET 2002	Visual Studio 2003 7.1
C# 3.0 2007	ASP.NET MVC 2008	Visual Studio 2005 8.0
C# 4.0 2010	ASP.NET Web Form 2010	Visual Studio 2008 9.0
C# 5.0 2012	ASP.NET Web API, SignalR 2012	Visual Studio 2010 10.0
C# 6.0 2015	ASP.NET 5 2015	Visual Studio 2012 11.0
		Visual Studio 2013 12.0
		Visual Studio 2015 14.0

- Latest Version of Visual Studio is 2022 IDE

## Download Link –

### Visual Studio 2022

- <https://getintopc.com/software/development/microsoft-visual-studio-2022-all-in-one-free-download-1438315/>

### Visual Studio 2010

- <https://getintopc.com/software/development/download-visual-studio-2010-professional-free-version-1688321/>

### Visual Studio All Version Download Link

- <https://getintopc.com/?s=visual+studio>

# What Is An IDE (Integrated Development Environment)?

- An integrated development environment (IDE) is a software application that helps programmers develop software code efficiently. It increases developer productivity by combining capabilities such as software editing, building, testing, and packaging in an easy-to-use application. Just as writers use text editors and accountants use spreadsheets, software developers use IDEs to make their job easier.

## Why are IDEs important?

- Code editing automation
- Syntax highlighting
- Intelligent code completion
- Refactoring support
- Local build automation
- Compilation
- Testing
- Debugging

## Reference Link –

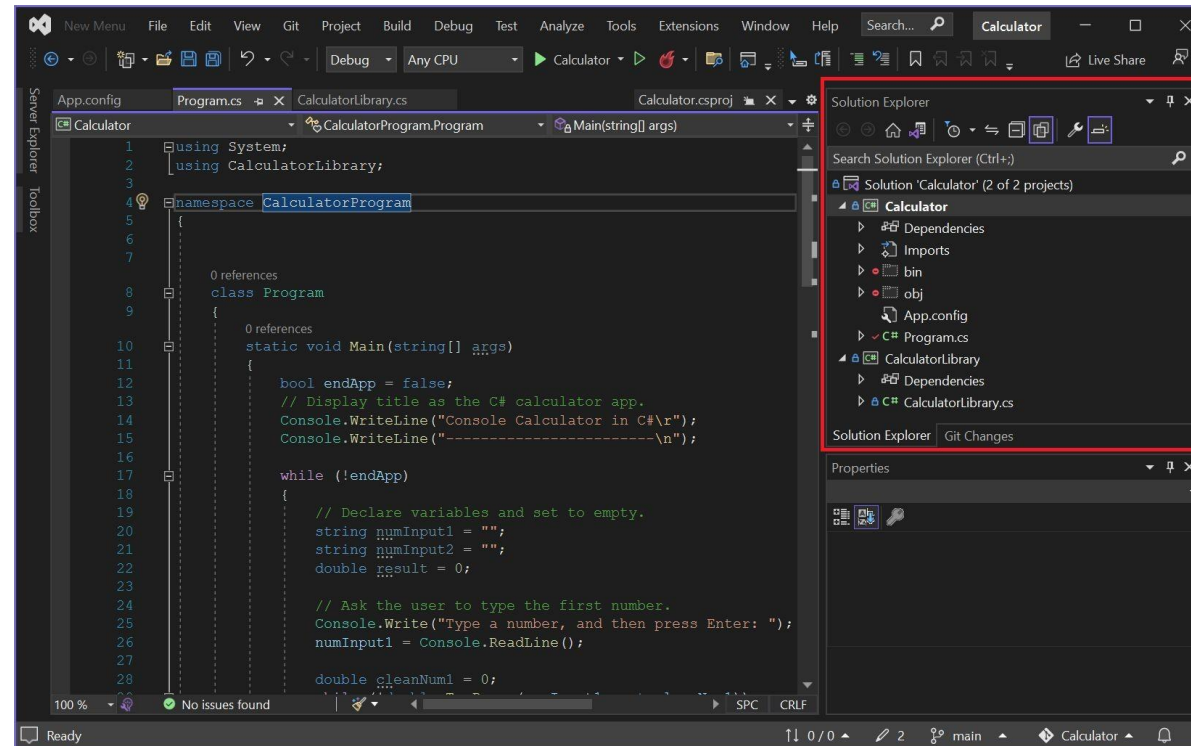
- <https://aws.amazon.com/what-is/ide/>

# Solution Explorer in Visual Studio

- Solution Explorer tool window appears as a pane in the upper-right side of the Visual Studio integrated development environment (IDE). If you don't see the Solution Explorer tool window, you can open it from the Visual Studio menu bar by using **View > Solution Explorer**, or by selecting **Ctrl + Alt + L**

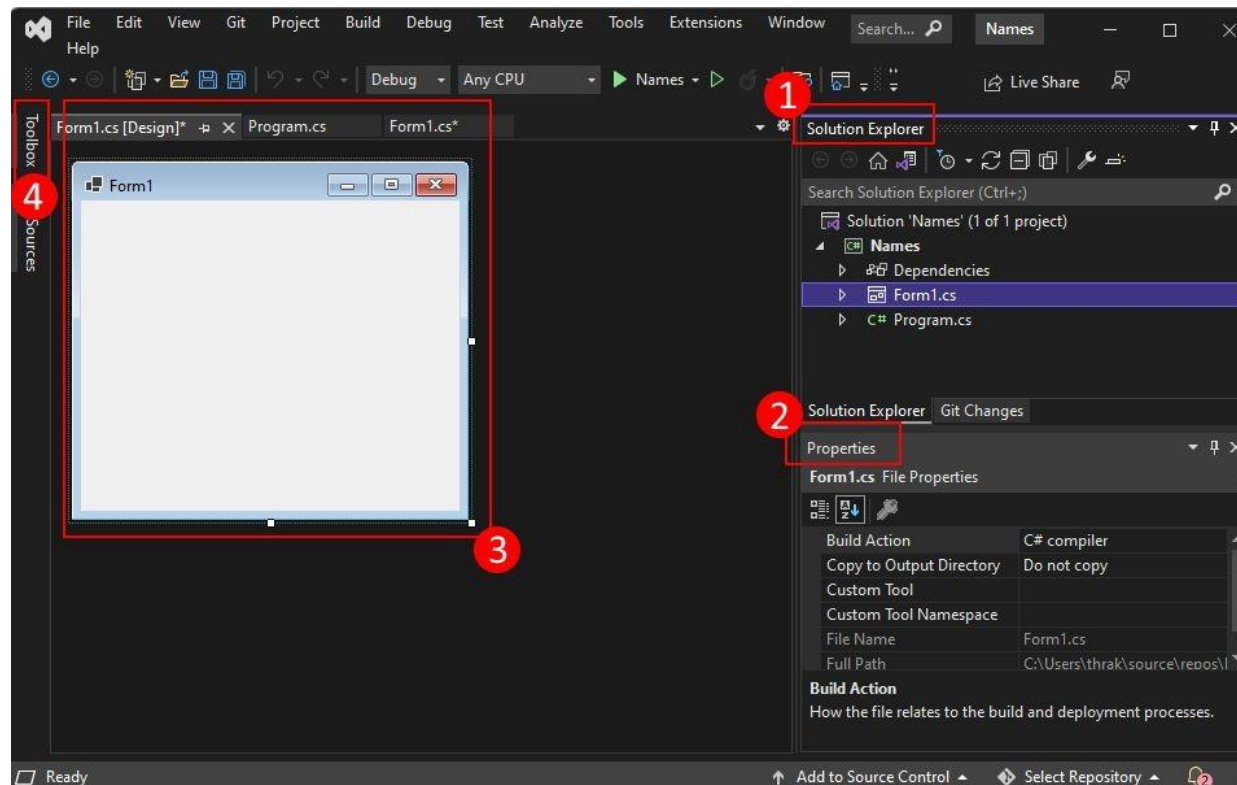
## Reference Link –

- <https://learn.microsoft.com/en-us/visualstudio/ide/use-solution-explorer?view=vs-2022>



# Form in Visual Studio

- Add forms to your project with Visual Studio. When your app has multiple forms, you can choose which is the startup form for your app, and you can display multiple forms at the same time.
- **Reference Link –**
- <https://learn.microsoft.com/en-us/dotnet/desktop/winforms/forms/how-to-add?view=netdesktop-7.0>

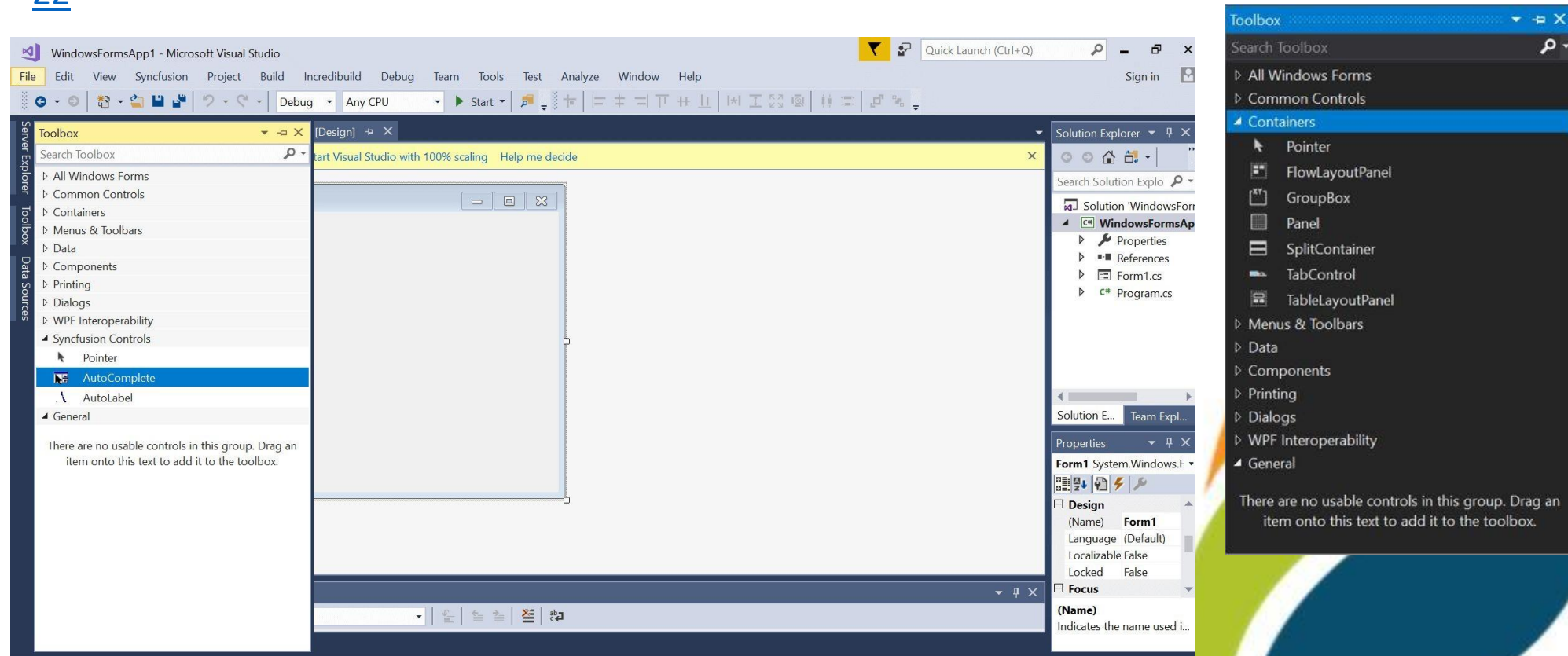


# Toolbox in Visual Studio

- The **Toolbox** window displays controls that you can add to Visual Studio projects. To open **Toolbox**, choose **View > Toolbox** from the menu bar, or press **Ctrl+Alt+X**.

## Reference Link –

- <https://learn.microsoft.com/en-us/visualstudio/ide/reference/toolbox?view=vs-2022>



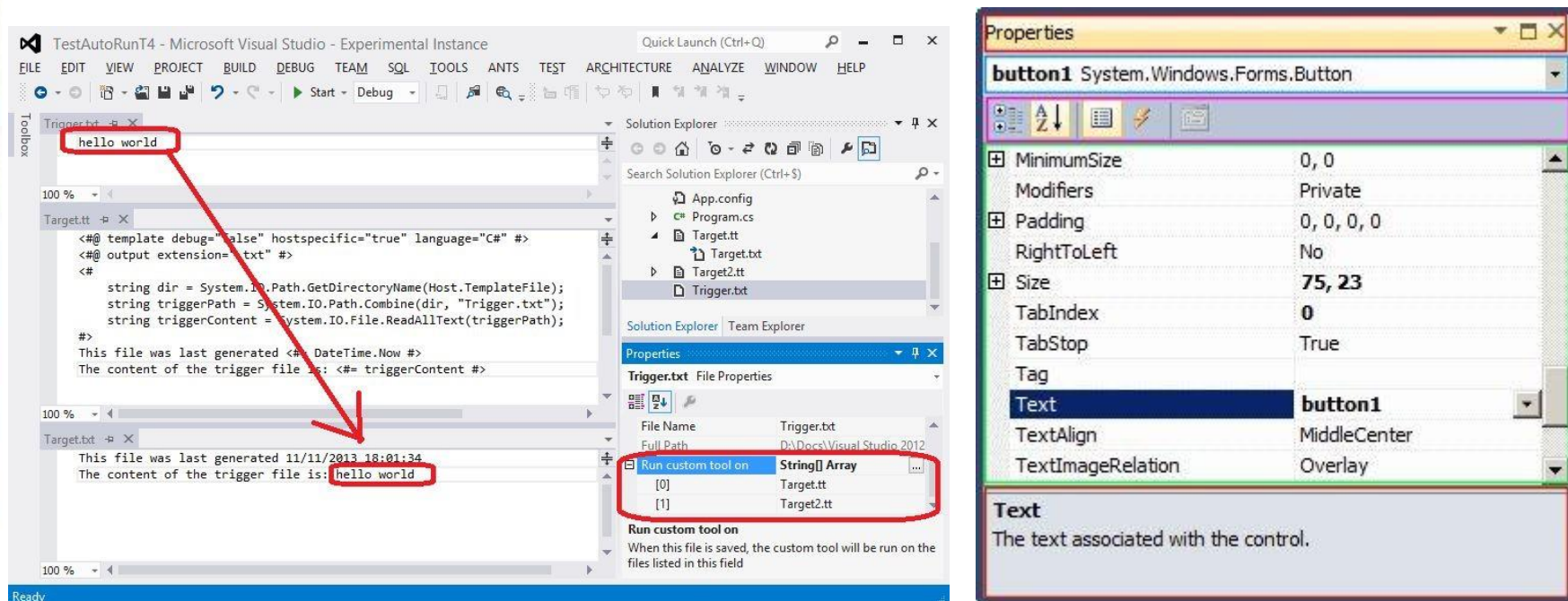


# Properties Windows in Visual Studio

- The **Properties** window is used to display properties for objects selected in the two main types of windows available in the Visual Studio integrated development environment (IDE). These two types of windows are:
- Tool windows such as Solution Explorer, Class View, and Object browser
- Document windows containing such editors and designers as the forms designer, XML editor, and HTML editor

## Reference Link –

- <https://learn.microsoft.com/en-us/visualstudio/ide/reference/toolbox?view=vs-2022>



# Visual Studio 2010 Installation Video



- <https://www.youtube.com/watch?v=CUae8Ai54OY>
- <https://www.youtube.com/watch?v=6BIGuJPQaYk>