- Any interfaces implemented by the type.
- Definitions for each of the type's members.

1.11 .NET NAMESPACES

A library of related classes in .NET is called as a Namespace. The Frame Class Library (FCL) of .NET contains thousands of types, a set of related types is presented to the developer within a single namespace.

For Example: The **System** namespace contains the **Object** base type, from which all other types ultimately derive. In addition, the System namespace contains:

- Types for integers, characters, strings, exception handling, and console I/O.
- As well as a bunch of utility types that convert safely between data types, format data types, generate random numbers, and perform various math functions.

All applications use types from the **System** namespace. To access any platform feature, you need to know which namespace contains the types that provide the facility you want. .NET also enables developers to create their own namespaces containing their own types. There are following main points regarding namespace:

- A namespace is a collection of different classes.
- All applications are developed using classes from the .NET System namespace.
- The namespace with all the built-in functionality is the System namespace. All other namespaces are based on this System namespace.
- From the viewpoint of the runtime, a namespace is just a collection of type names.
- Namespaces provides a way of organizing related classes and other types.
- Namespaces also reduce the conflict of use of same class name, because we can use fully qualified name instead of using namespace plus the class name both are same.

The table below lists some of the standardized and non-standardized namespaces, with a brief description of what the types in that namespace are used for:

(a) Standardized Namespaces

These are the namespaces that are standardized as of the ECMA 335 and ISO/IEC 23271:2006 standards.

Namespace	Purpose of Types
System	• It includes all the basic types used by every application such as String, DateTime, Boolean, etc. • Support for environments such as the console. • Support for Math functions, and base classes for attributes, exceptions, and arrays.

System.Collections	• Managing collections of objects. • Includes the popular collection types such as Stacks, Queues, Hash tables, etc.
System.Diagnostics	• Provides the ability to diagnose applications. • It includes event logging, performance counters, tracing, and interaction with system processes.
System.Globalization	• It provides information such as calendars in use, format patterns for date, currency and numbers.
System.IO	• Enables reading from and writing to different streams, such as files or other data streams. • Also provides a connection to the file system.
System.Net	• It is used for Network communications. • It provides an interface for many of the protocols used on networks, such as HTTP, FTP, and SMTP.
System.Reflection	• It Inspects metadata and late binding to types and their members.
System.Runtime.InteropServices	• Enabling managed code to access unmanaged OS platform facilities, such as COM components and functions in Win32 DLLs. • Provide Interoperability with COM or other native code.
System.Runtime.Remoting	• Accessing types remotely.
System.Runtime.Serialization	• Enabling instances of objects to be persisted and regenerated from a stream.
System.Security	• It helps to protect data and resources. • This namespace allows security to be built into applications based on policy and permissions. • It provides services such as cryptography.
System.Text	• It supports various encodings like ASCII or Unicode. • It also supports regular expressions, and a more efficient mechanism for manipulating strings.
System.Threading	• It facilitates multithreaded programming. • It allows the synchronizing of "thread activities and access to data." • It also synchronizing access to resources.
System.Xml	• Provides support for processing XML schemas and data. • Including reading, writing, schemas, serialization, searching, and transforming.

(b) Non-Standardized Namespaces

These are the namespaces that are not standardized as of the ECMA and/or ISO standards, and are specific to Microsoft implementation. However, even if implementing them is not mandatory, some of them may have been implemented completely or partially by other .NET implementations.

Namespace	Purpose of Types
System.CodeDom	• This library provides the ability to create code and run it, at runtime.
System.ComponentModel	• Provides the ability to implement the run-time and design-time behavior of components and controls. • It contains the infrastructure for implementing attributes and type converters, binding to data sources, and licensing components.
System.Configuration	• Provides the infrastructure for handling configuration data.
System.Data	• It represents the ADO.NET architecture, which is a set of computer software components that can be used by programmers to access data and data services.
System.Deployment	• It allows customization of the applications upgrade when using ClickOnce.
System.DirectoryServices	• It provides easy access to Active Directory from managed code.
System.Drawing	• It is used to manipulate 2D and vector graphics. • It provides support for imaging, printing, and text services. • It is used for Windows Forms applications.
System.EnterpriseServices	• It is used to manage transactions, queued components, object pooling, just-in-time activation, security, and other features to make the use of managed code more efficient on the server.
System.Linq	• It defines interfaces and methods, that lets LINQ providers to be plugged in.
System.Linq.Expressions	• It allows Delegates and expressions to be represented as expression trees, so that the high-level code can be examined and processed at runtime.
stem.Management	• It allows querying for system information, such as: o How much free space is left on the disk.

	o What is the current CPU utilization. o Which database a certain application is connected to, and much more.
System.Media	• It provides the ability to play system sounds and .wav files.
System.Messaging	• It provides the ability to connect to, monitor, and administer message queues on the network and send, receive, or peek messages. • It also named as .NET Remoting. • This namespace is being superseded by Windows Communication Foundation.
System.Resources	• It is used to Manipulate and managing external data resources.
System.ServiceProcess	• It allows the creation of applications that run as a service within Windows.
System.Timers	• It Allows you to raise an event on a specified interval.
System.Transactions	• It provides support for local or distributed transactions.
System.Web	• It provides various web related functionality. • It enables browser-server communication and the creating XML Web services. • Most or all of these libraries are referred to as the ASP.NET architecture.
System.Windows.Forms	• It is used to build Windows GUI applications. • This allows for writing graphical applications for Windows from within managed code. • This system is being superseded by the Windows Presentation Foundation.

1.12 COMMON LANGUAGE RUNTIME

Common Language Runtime (CLR) is the engine available in .Net Framework which provides the runtime environment and various runtime services to the applications. The CLR locates, loads and executes our programs.

The Common Language Runtime consists of components that

- o Loads the IL code of a program into the runtime,
- o Compile the IL code into native code,
- o Execute and manage the code,
- o Enforce security and type safety, and provide thread support and other useful services.