Microsoft®
.NET

UNIT 1:
INTRODUCTION .NET FRAMEWORK AND C# LANGUAGE

LESSION 1:
.NET FRAMEWORK

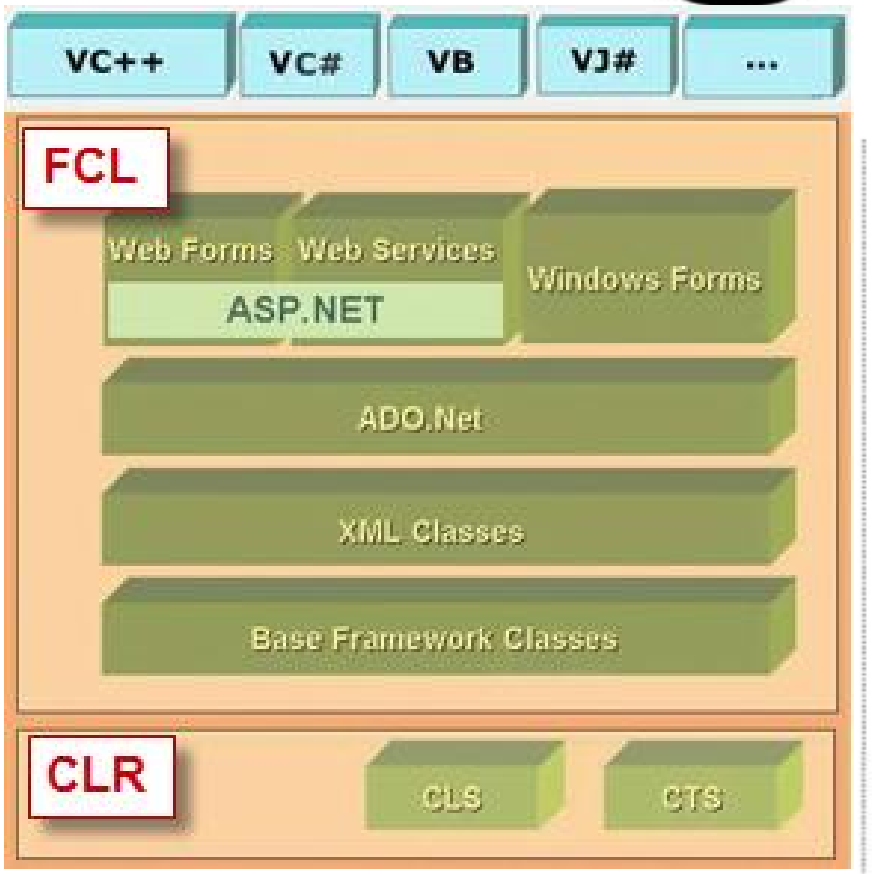
- What is .NET Framework?
- Architecturer

.NET FRAMEWORK

- **What is .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.**

Architecturer

- The .NET framework architecture comprises 2 key components:
  1. The .NET Framework Class Library (FCL) or Base Class Library (BCL)
  2. The Common Language Runtime (CLR)

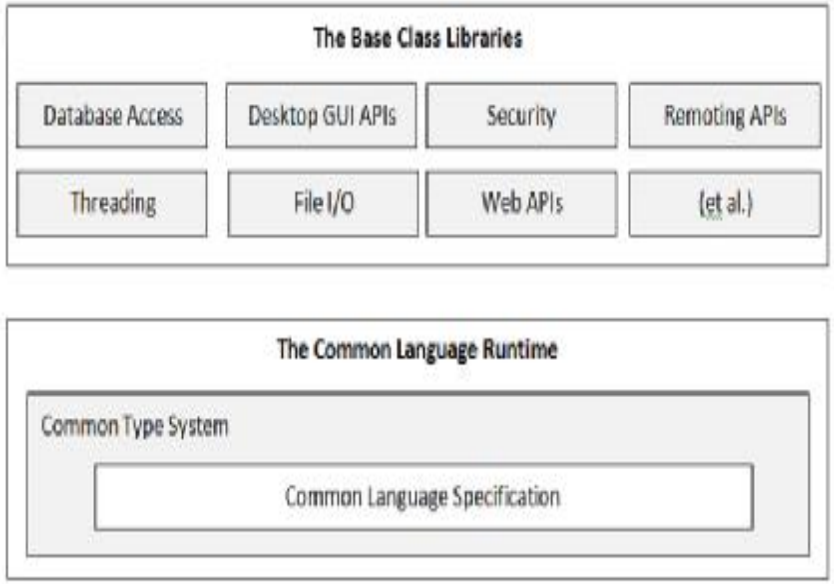


The Base Class Library

- BCL is a huge collection of reusable classes , interfaces, and value types which can be used with any programming language which implements .NET
- All classes implemented in BCL are organized into namespaces

Example:

- System
- System.IO
- System.Collections
- System.Data
- System.XML
- etc…

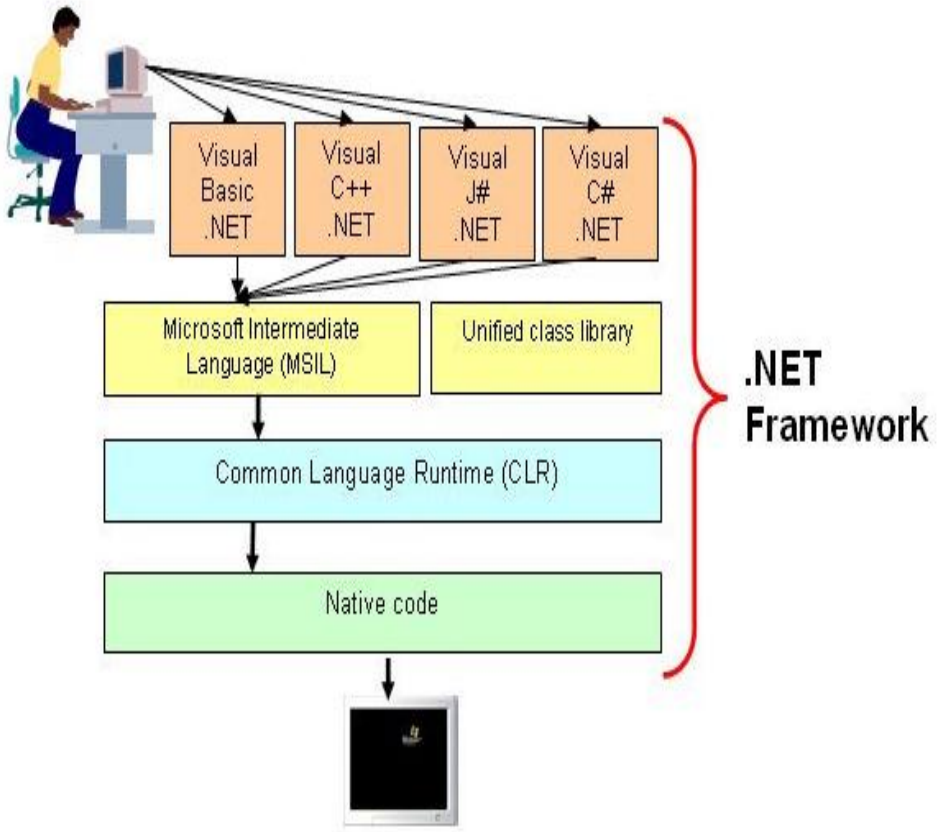


The Base Class Library

- BCL define types that can be used to build any type of software application:
  - ASP.NET: Provides a set of classes to design a website.
  - WCF: Provides a set of classes to design forms for the web pages similar to the HTML forms
  - Web Services: This includes a set of classes to design applications that can be accessed using a standard set of protocols
  - Windows Forms: Provides a set of classes to design forms for windows-based applications
  - ADO.NET: Provides classes to interact with databases.
  - XML Classes: Enables XML manipulation, searching and translations
  - Base Framework Classes: These classes provide basic functionality such as input/output, string manipulation, securitv management, network communication and so on

The common language runtime (CLR)

- The CLR provides the appearance of an application virtual machine so that programmers need not consider the capabilities of the specific CPU that will execute the program



The common language runtime (CLR)

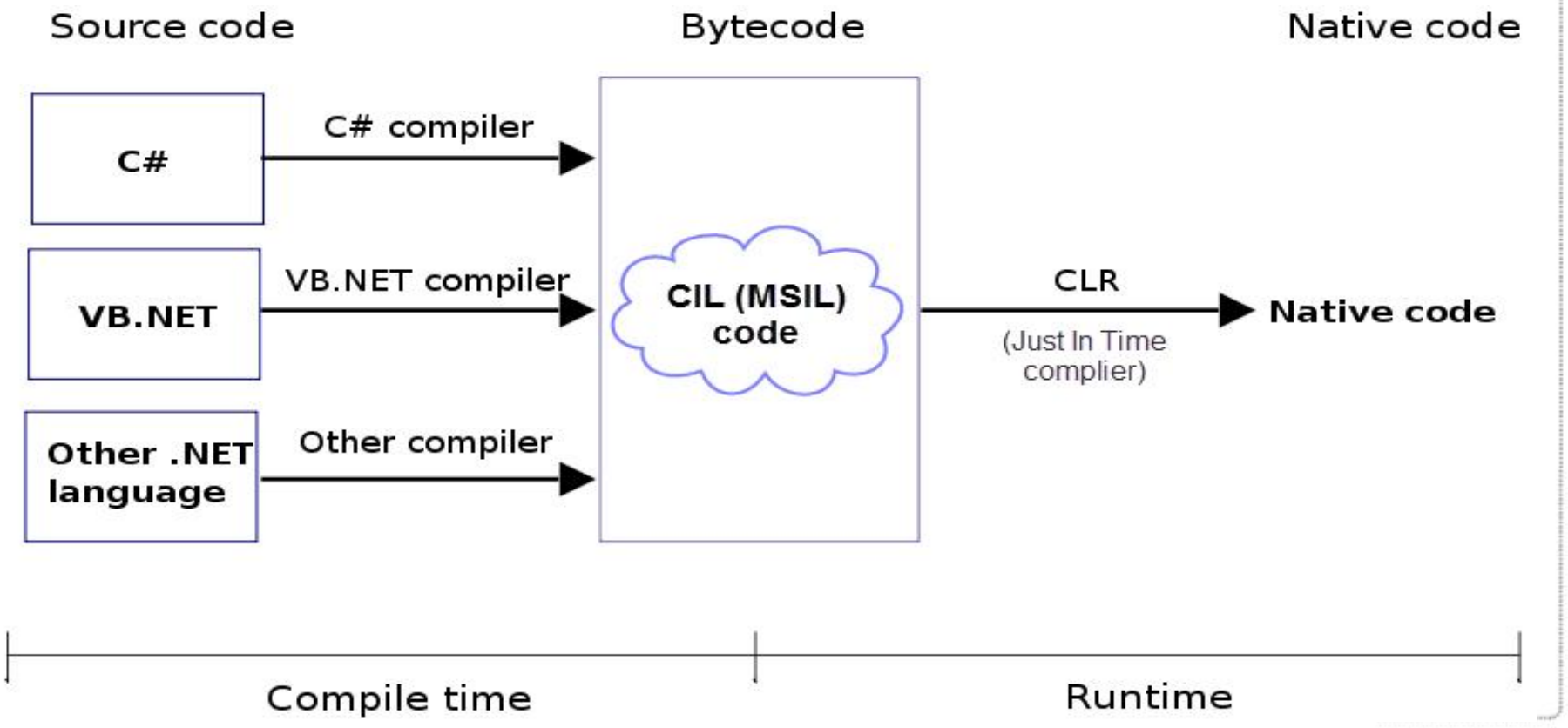
- The common language runtime (CLR) is the backbone of .NET Framework. It performs various functions such as:
  - Memory management
  - Code execution
  - Error handling
  - Code safety verification
  - Garbage collection

The common language runtime (CLR)

- **CLR:**
  - **Common Language Specification (CLS): These are a set of rules that any .NET language should follow to create applications that are interoperable with other languages.**
  - **Common Type System (CTS): Describes how data types are declared, used and managed in the runtime and facilitates the use of types across various languages.**

The common language runtime (CLR)

- CIL (Common Intermediate Language) or Microsoft Intermediate Language (MSIL) or IL



The common language runtime (CLR)

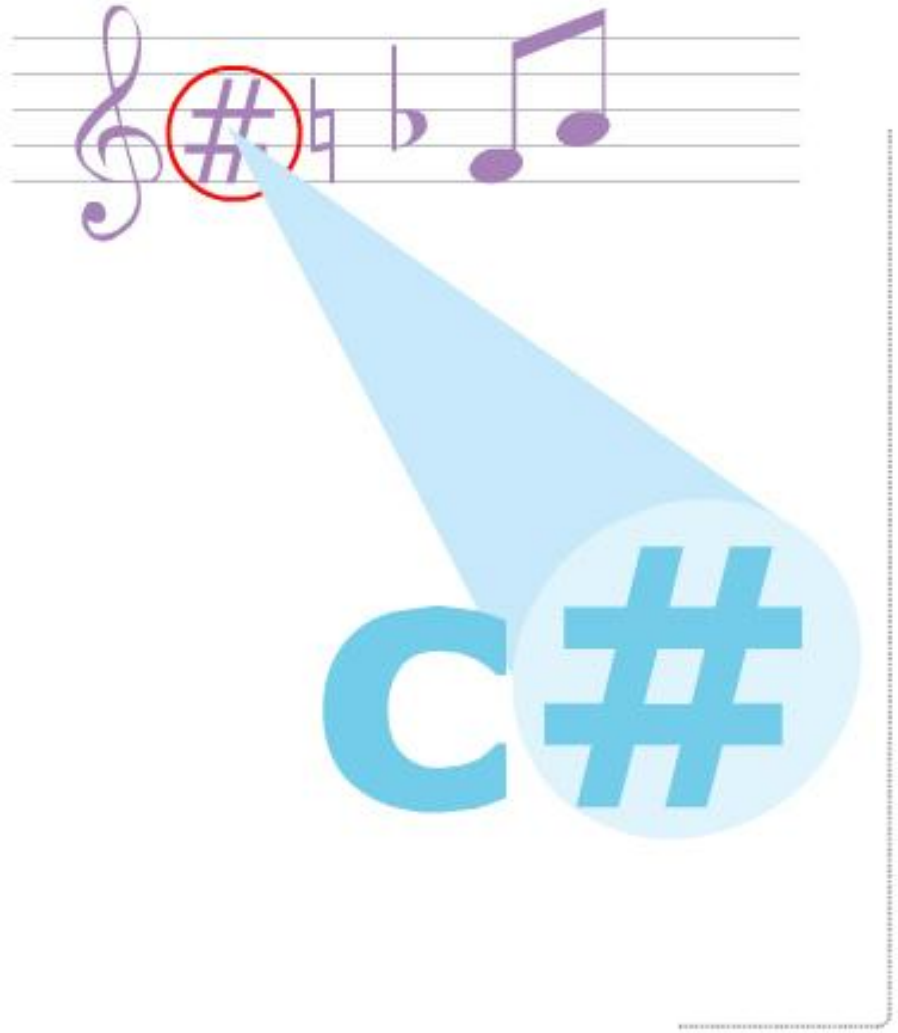
- **Compiling to the Common Intermediate Language:**
  - The compiler for a .NET language takes a source code file and produces an output file called an assembly
  - An assembly is either an executable or a DLL.
  - The code in an assembly isn't native machine code but an intermediate language called the Common Intermediate Language (CIL).
- **Compiling to Native Code and Execution**
  - The executable code in the assembly is compiled to native code by the JIT compiler only as it's needed

LESSION 2:
GETTING STARTED WITH C#

- Introduction to C#
- Visual Studio IDE

Introduction to C#

- C# is a simple and powerful object-oriented language.
- C# can be used to create various types of applications:
  - Web applications
  - Windows graphical user interface (GUI) applications
  - Console-based applications



C# History

Version	.NET Framework	Visual Studio	Features Focus
C# 1.0	Framework 1.0/1.1	Visual Studio .NET 2002	C# basic
C# 2.0	.NET Framework 2.0	Visual Studio 2005	Generics
C# 3.0	.NET Framework 3.0\3.5	Visual Studio 2008	LINQ
C# 4.0	.NET Framework 4.0	Visual Studio 2010	Named and Optional Parameters
C# 5.0	.NET Framework 4.5	Visual Studio2012/2013	Async

C# - featurers

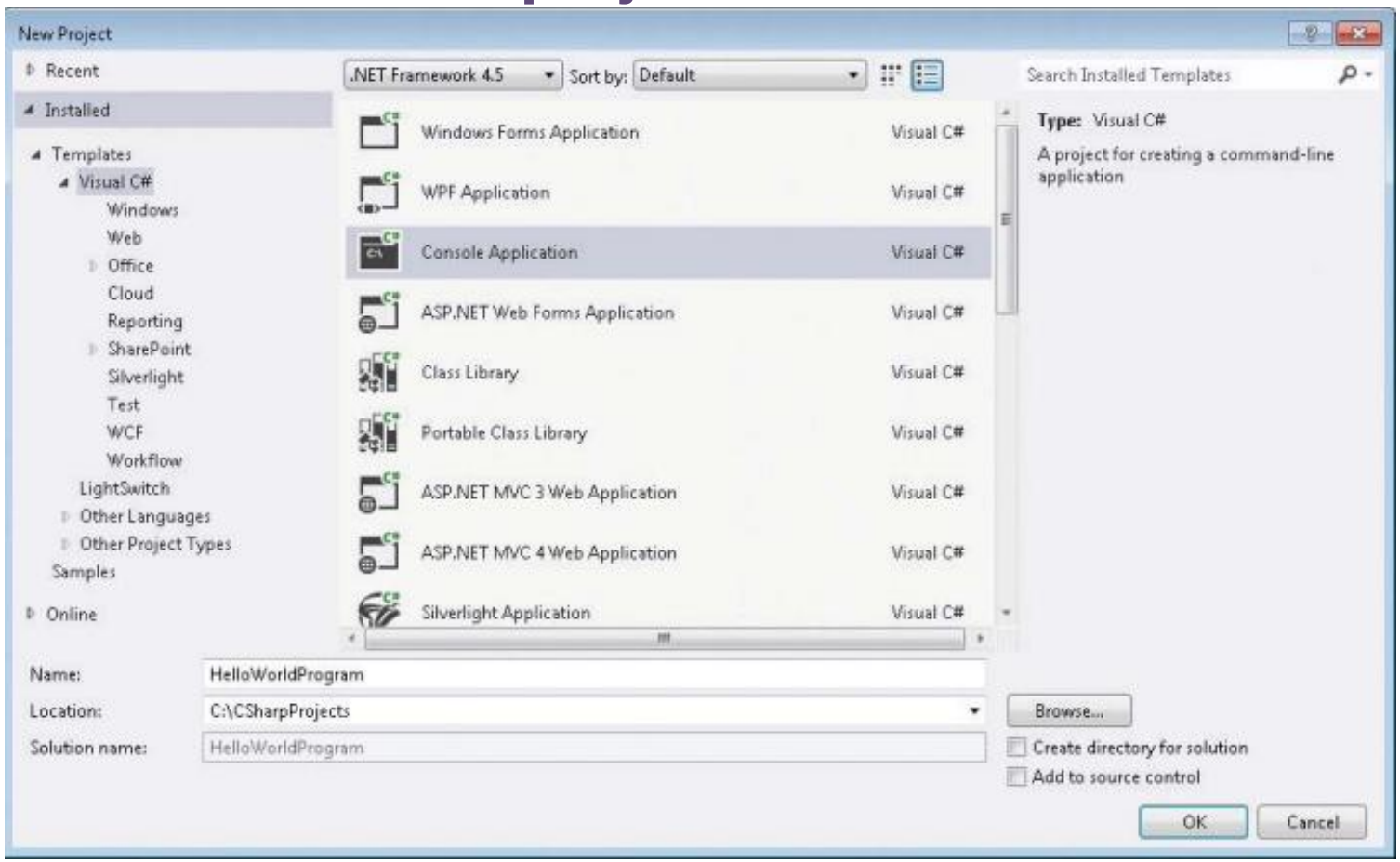
- Provide familiarity to programmers coming from C or C++ background
- Allow to write applications that target both desktop and mobile devices

Setup Development Enviroment

- **.NET Framework:**
  - **If you have the Windows operating system, the .NET framework might already be installed in your PC**
- **Integrated Development Environment (IDE):**
  - **An IDE is a tool that helps you write your programs.**
  - **Visual Studio is an IDE provided by Microsoft to write the code in languages such as C#, F#,VB.NET, etc.**
  - **Use Visual Studio 2010/2012/2013 based on the C# version you want to work with.**
  - **Visual Studio is a licensed product, so you must buy a license for commercial use. However, Visual Studio Express is free for learning purpose**

First C# Program

- **Create a console project**



First C# Program


```
using System;
namespace HelloWorldApplication
{
   class HelloWorld
   {
      static void Main(string[] args)
      {
         /* my first program in C# */
         Console.WriteLine("Hello World");
         Console.ReadKey();
      }
   }
}
```

- **Complie and Run C# program:**
  - **Press Ctrl + F5 or**
  - **click the "Debug" menu -> "Start Without Debugging“**
  - **Click Run or F5**

COMMENTS

- Single-line comments begin with two forward slashes (//)
- Multi-line comments begin with a forward slash followed by an asterisk /*) and end with an asterisk followed by a forward slash (*/)
- XML comments begin with three forward slashes (///), used for methods, class

Remember

- A solution file may consist of one or more projects

  The solution file ends with .sln extension.
- C# is case sensitive.
- The program execution starts at the Main method
- Unlike Java, program file name could be different from the class name