

EC447

Fall 2020

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Boston University

Course Components

- Learn to program in C# using the .NET framework class library
- Learn to develop Windows desktop applications using with a graphical user interface
- Investigate how the technologies work
- Complete challenging lab assignments

Visual Studio 2019

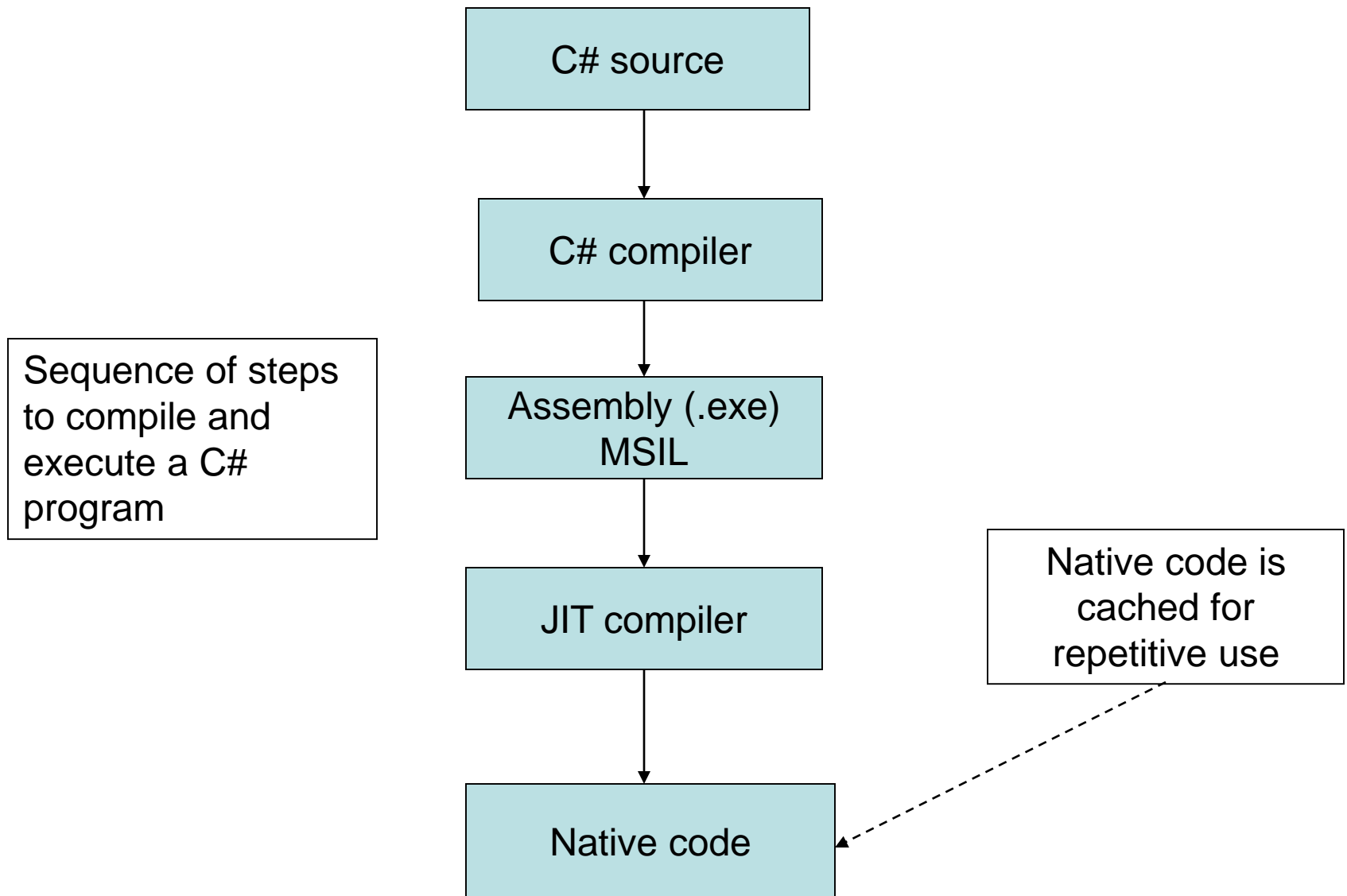
- This course requires VS2019. If you have an older version install the newer version.
- Start on this right away as installation takes time.
- If you have never used Visual Studio there is a distinct learning curve. I will not be teaching the basics and fully expect that you should be able to learn it on your own.
- Don't waste the next week. Get the job done now!
- See Assignment 1 on the course web page for instructions.

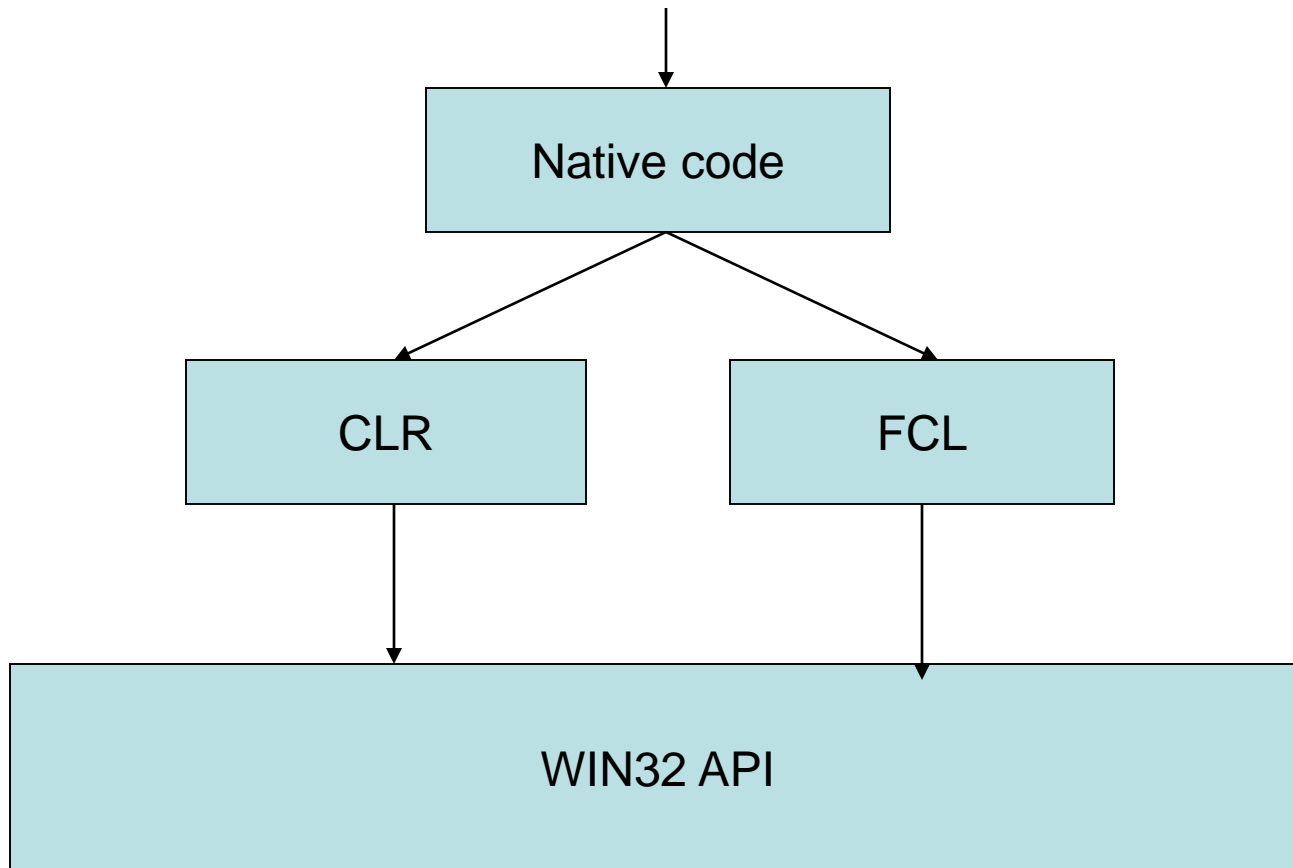
The .NET Technology Elements

- Supports multiple programming languages
- Provides a common intermediate language and JIT compilation
- Supports *managed* code for reliability
- Makes extensive use of a *framework class library*
- Include client and server side technologies
- Is highly object oriented
- Uses standards such as XML

The .NET Framework

- The platform for building and running applications
- Common language runtime, CLR
 - Managed applications
 - Garbage collection
- Framework class library, FCL
- Common intermediate language, CIL (MSIL)
- Metadata (eliminates the need for header files)
- Just in time compiling, JIT





Metadata

- Provides a description of a module
- Includes types defined in the module
 - Classes, structs, enumerations, etc.
- Documents methods
- Fields
- Properties
- External references
- Allows use of a module without type libraries etc.
- ILDASM program can be used to display metadata
- Also eliminates the need for header files

Common Intermediate Language

- Uses a stack based architecture
- Machine independent
- Small instruction set
- *Meta* type operations (directives)

Assemblies

- A group of one or more files (modules) grouped together
- Fundamental unit of security
- Supports versioning
- Can contain compiled modules from multiple languages
- Contains a *manifest*
- Only assemblies can be executed, not modules

Framework Class Library

- Replaces use of the WIN32 API
- Includes functionality of MFC (older programming library using C++)
- Includes classes for general use such as container classes
- Over 7,000 types in the library
- Divided into functional groupings using *namespaces*
- Used by all .NET languages
 - Makes switching languages easier

Hello World in C#

```
using System;  
class MyApp  
{  
    static void Main ()  
    {  
        Console.WriteLine ("Hello, world");  
    }  
}
```