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.NET Framework: C#

Concepts, Considerations and News

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Topics

.NET Framework Architecture

C# Concepts and IDEs

Comparison with Java

- Similarities and Differences
- Supported in C# but Not in Java
- Supported in Java but Not in C#

LINQ – Language Integrated Query

What's new in C# 6.0

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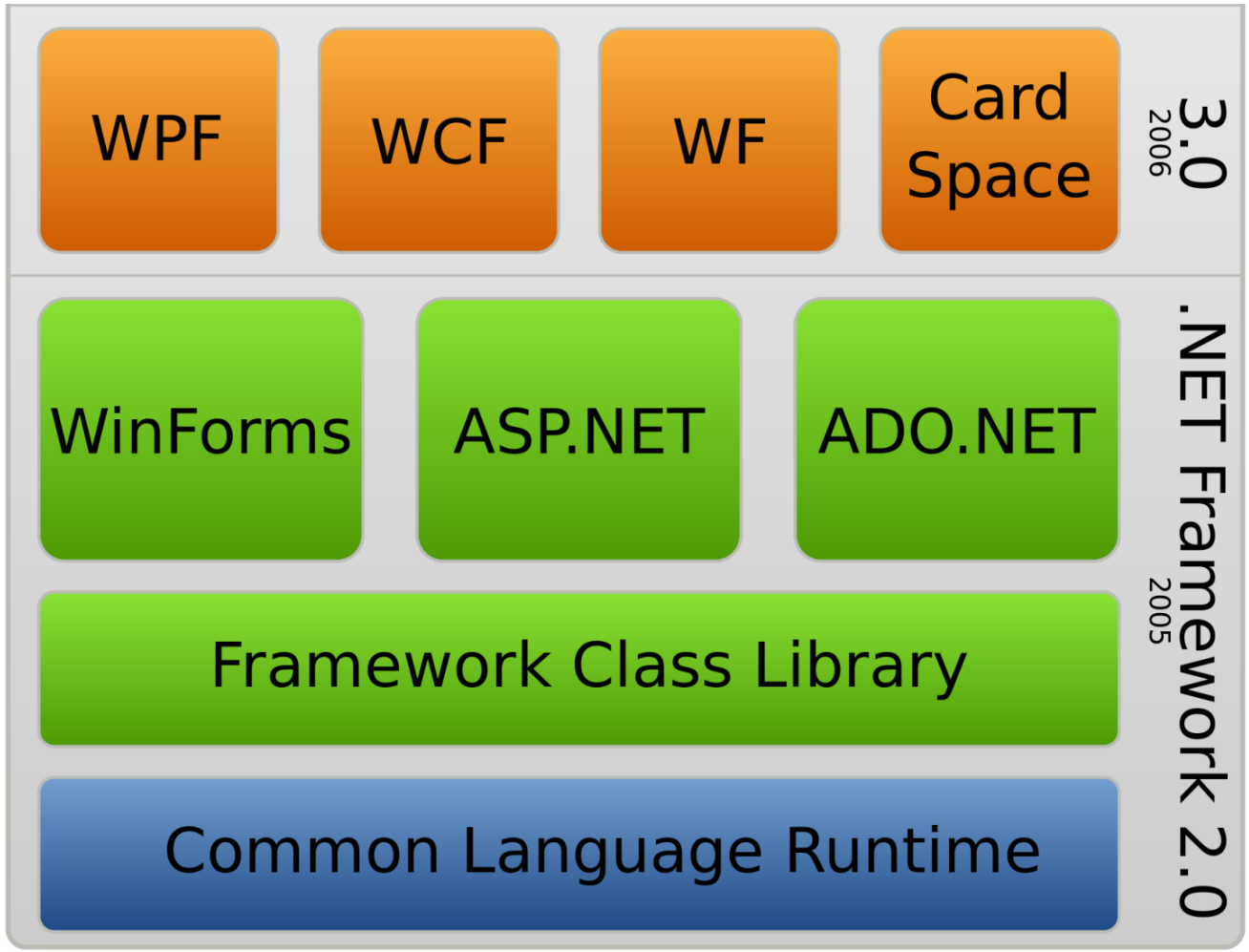
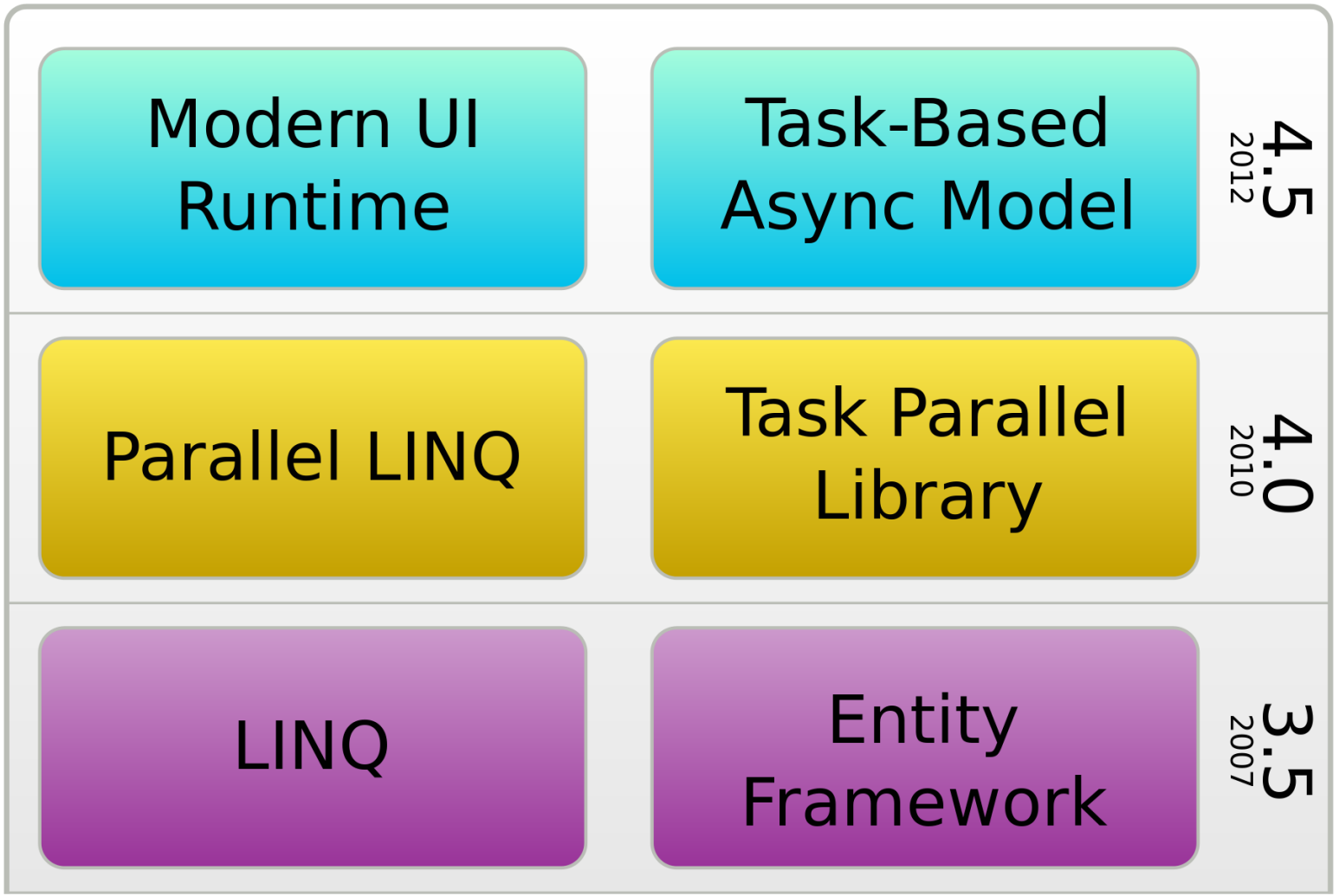
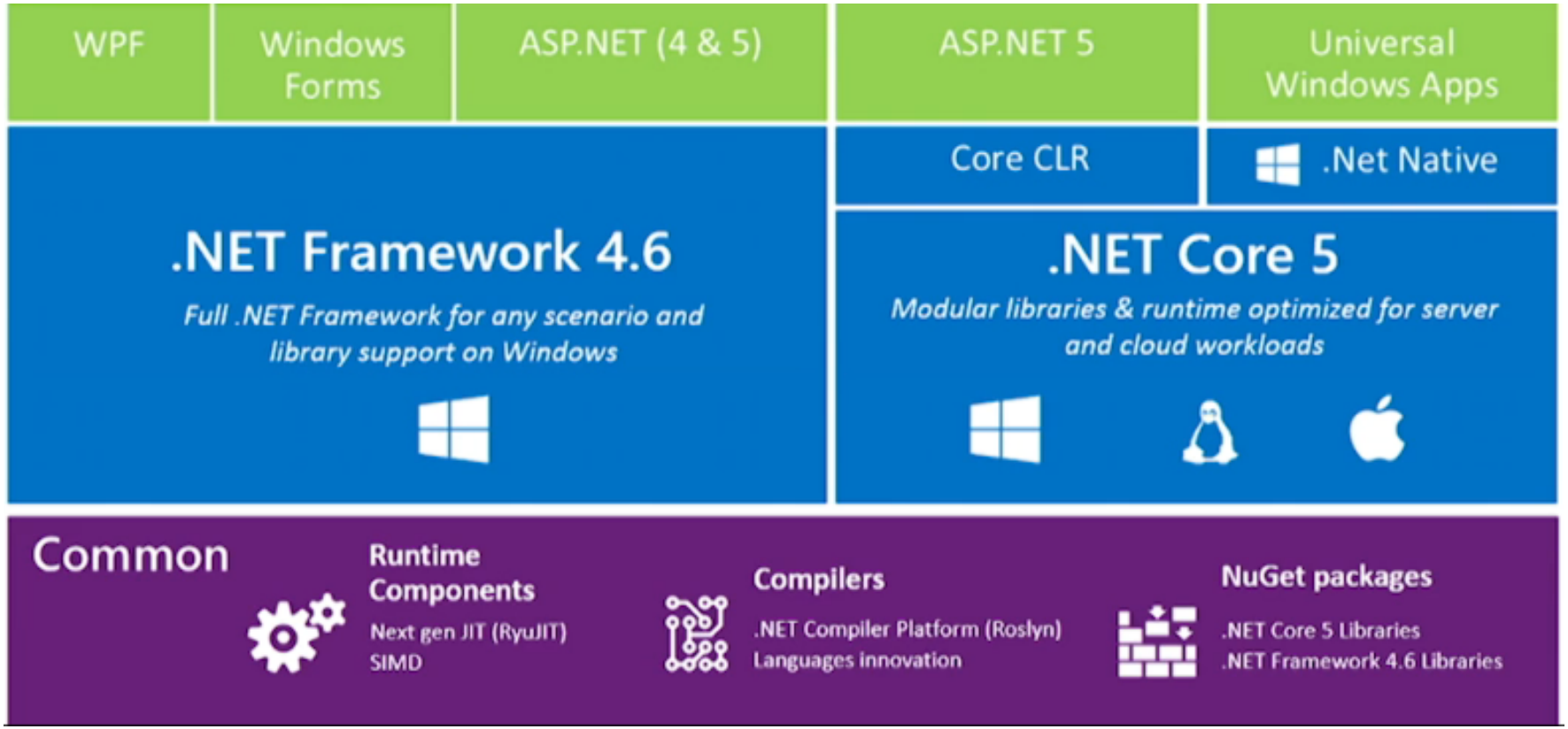
.NET Framework Architecture (2005-2006)



.NET Framework Architecture (2007-2012)



.NET Framework Architecture (2014+)



C# Concepts

Interpreted: the interpreter (CLR – Common Language Runtime) executes the program, translating each statement into a sequence of subroutines compiled into machine code.

Multiparadigm

PARADIGM	DESCRIPTION
Imperative	Uses statements that change a program's state
Declarative	Expresses the logic of a computation without describing its control flow
Functional	Treats computation as the evaluation of mathematical functions and avoids changing-state and mutable data
Generic	Algorithms are written in terms of types to-be-specified-later
Object-oriented	Objects are data structures that contain data (attributes) and code (methods)
Component-based	Emphasizes the separation of concerns in respect of the wide-ranging functionality available throughout a given software system

Strongly typed: results in error or compilation refusal if an argument passed to a function does not closely match the expected type.

C# IDEs – Microsoft Visual Studio

Visual Studio Community

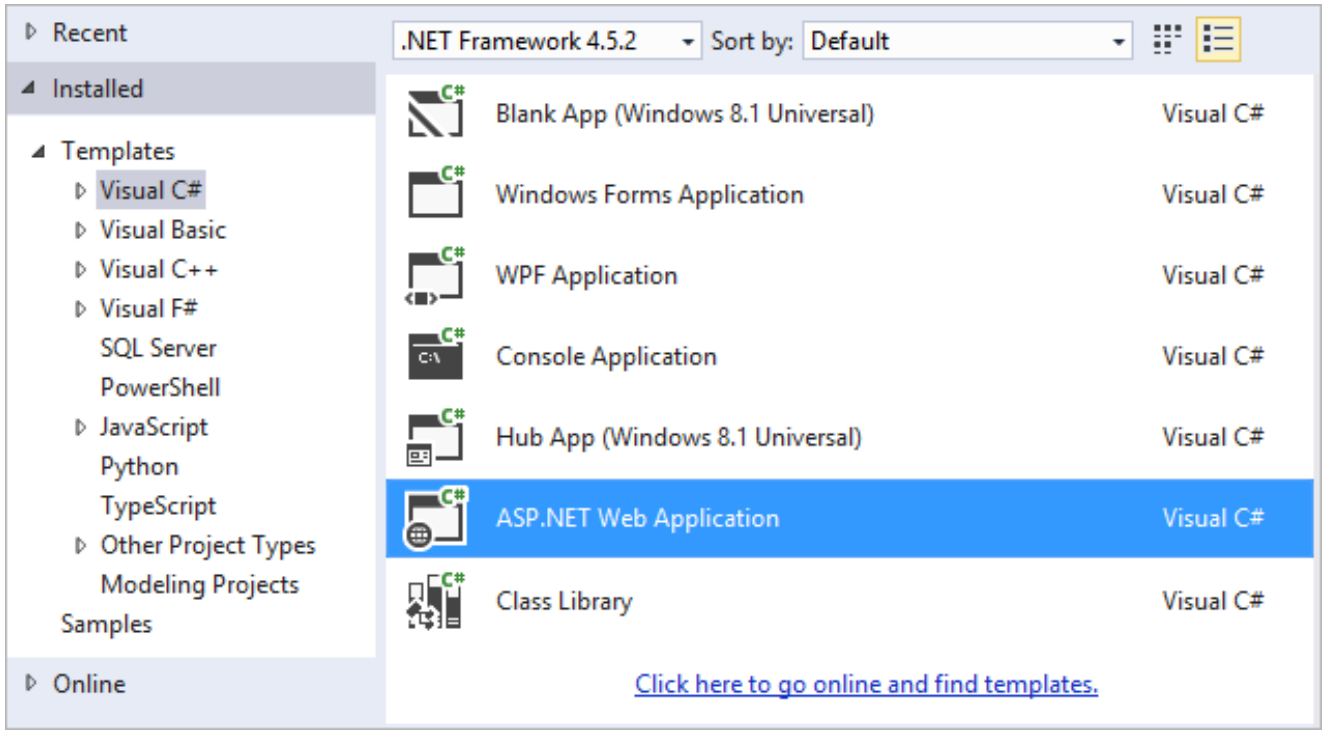
A rich, integrated development environment for creating stunning applications for Windows, Android, and iOS, as well as modern web applications and cloud services

Visual Studio Enterprise

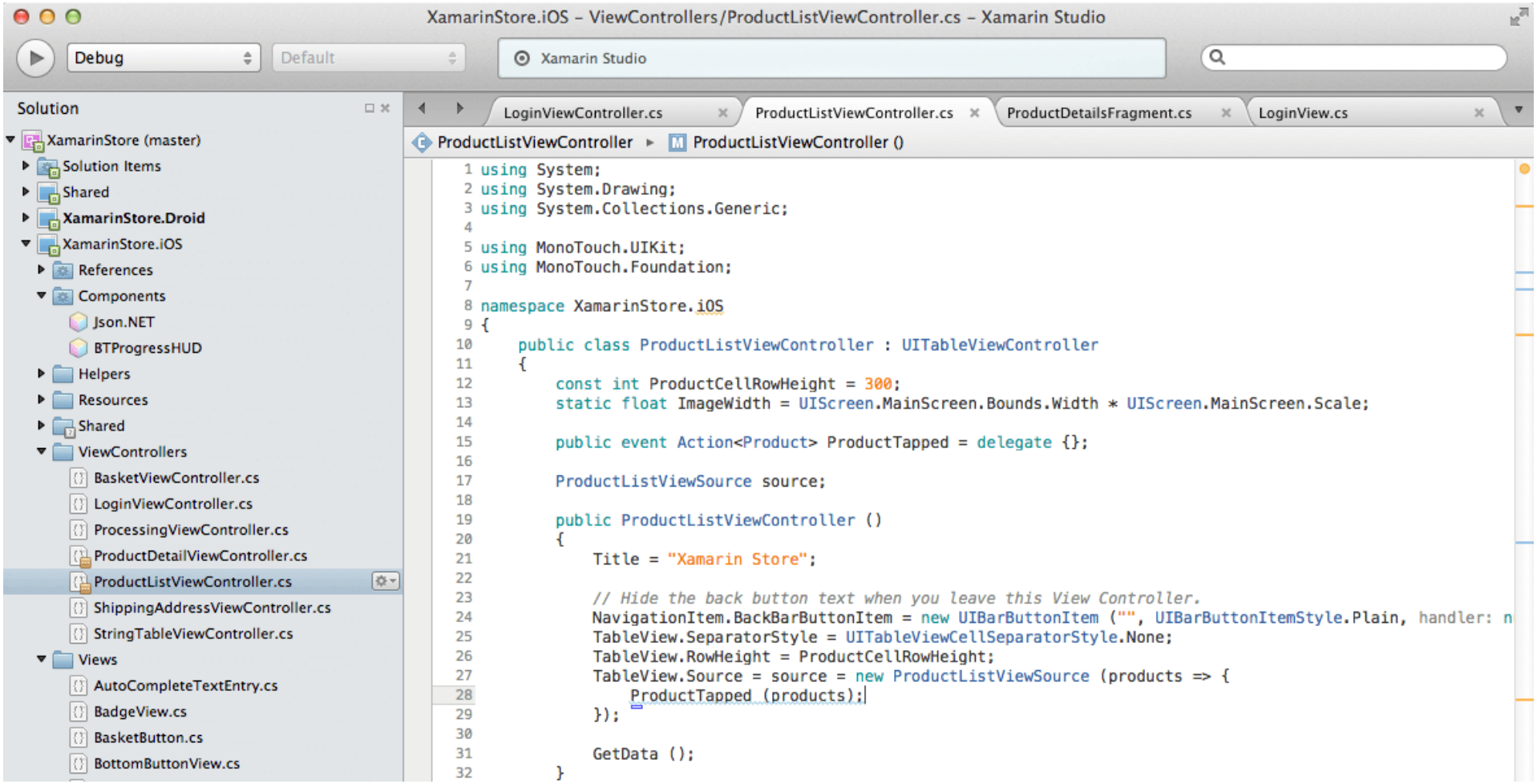
Enterprise-grade solution with advanced capabilities for teams working on projects of any size or complexity, including advanced testing and DevOps.

Visual Studio Code

Code editing redefined. Build and debug modern web and cloud applications. Code is free and available on your favorite platform — Windows, Mac OS X, or Linux.



C# IDEs – Mono Develop – Xamarin Studio



Comparison with Java: Similarities

- All Objects are References
- Garbage Collection
- Both C# and Java are Type-Safe Languages
- Both C# and Java Are "Pure" Object-Oriented Languages
- Single Inheritance
- Built-in Thread and Synchronization Support
- Formal Exception Handling
- Built-in Unicode Support

Comparison with Java: Differences

- Formal Exception Handling
  - Why does Java clearly differentiate between Exceptions and RuntimeExceptions?
  - Requiring a throws list in a method definition clearly signals to the client developer what exceptions he may catch.
  - With C#, the only way for the developer to know which Exceptions may be thrown is by manually inspecting documentation, pop-up help, code or code comments.

- Java Will Run on "Any" Operating System
  - There are some issues with Java running on memory-constrained devices.
  - C# is also compiled to an intermediate language, called MSIL, but it is only supported in a few operating systems.

Comparison with Java: Differences

- C# and Java Language Interoperability
  - Any language targeted to the CLR in Visual Studio .NET can use, subclass, and call functions only on managed CLR classes built in other languages.

- C# Is a More Complex Language than Java
  - *It seems as if Java was built to keep a developer from shooting himself in the foot.*
  - *It seems as if C# was built to give the developer a gun but leave the safety turned on.*
  - *And it seems as if when C++ was built, they just handed the programmer a fully loaded bazooka with an open-ended license to use it.*

Supported in C# but Not in Java

- Types
  - var, as, struct, decimal, sbyte, string, uint, ulong, ushort
- Blocks
  - checked, unchecked
- Modifiers
  - explicit, extern, implicit, in, out, ref, virtual
- Accessors:
  - get, set
- Memory
  - stacalloc, unsafe, fixed, sizeof

Supported in Java but Not in C#

- Native
  - Indicates that a method is implemented using JNI (Java Native Interface).
- Transient
  - Used to indicate that a field should not be serialized.
- Synchronized
  - A strategy for preventing thread interference and memory consistency errors.
- Throws
  - Tells that a method can throw a specific exception or *any other exception that extends it*.

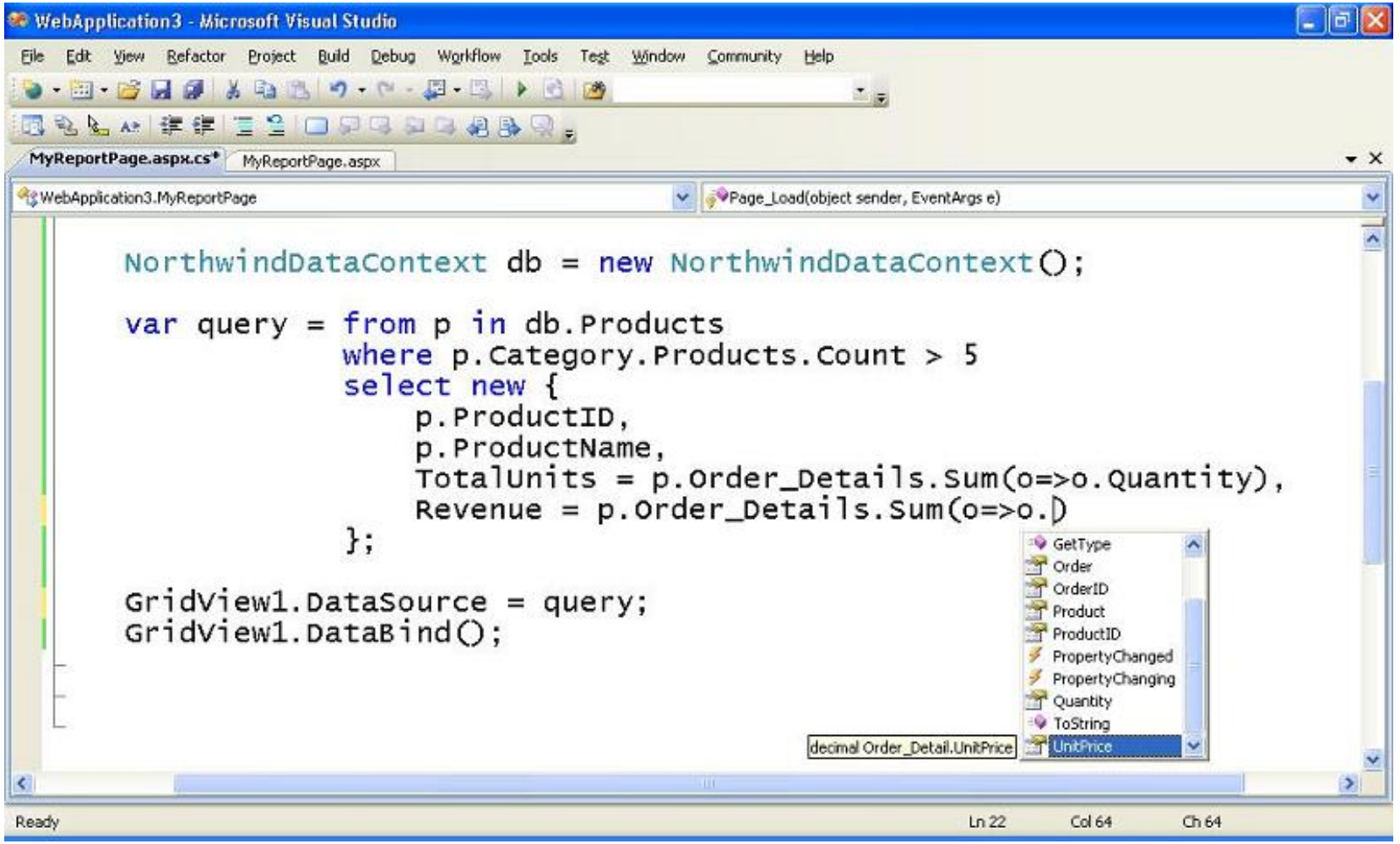
LINQ – Language Integrated Query

- Is a Microsoft .NET Framework component that **adds native data querying capabilities** to .NET languages.

- Can be used to **extract and process data** from arrays, enumerable classes, XML documents, relational DBs and third-party data sources.

- Defines a set of **method names** and **translation rules** used by the compiler to translate fluent-style queries into expressions using these method names, lambda expressions and anonymous types.

LINQ – Language Integrated Query



What's new in C# 6.0

- Static Types as using
- String Interpolation
- Dictionary Initializers
- Auto-Property Initializers
- nameof expression
- Await in catch/finally Block

- Null Conditional Operator & Null Propagation
- Expression Bodied Function & Property
- Static Using with Extension Methods
- Exception Filtering

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References

C# and Java: Comparing Programming Languages

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LINQ – Language Integrated Query

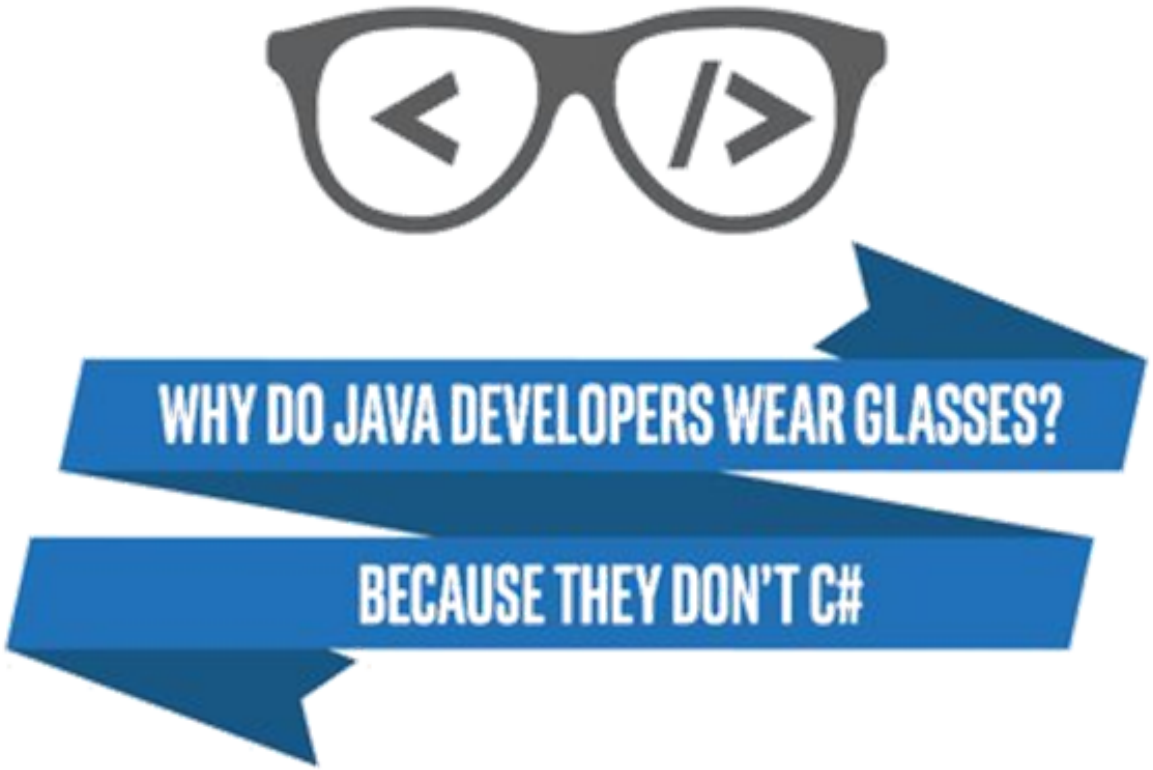
https://msdn.microsoft.com/en-us/library/bb308959.aspx

https://en.wikipedia.org/wiki/Language_Integrated_Query

What's new in C# 6.0

http://www.codeproject.com/Tips/1023426/Whats-New-in-Csharp

https://channel9.msdn.com/Events/Visual-Studio/Connect-event-2014/116


WHY DO JAVA DEVELOPERS WEAR GLASSES?
BECAUSE THEY DON'T C#