Introduction to C++

Context

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- Context
- Tools
- Language basics
  - variables
  - flow of control
  - operators
- Templates
- Pointers, polymorphism, and memory management

- Modern C++

Why C++?

- **C++ is a general purpose language**
  - Different kinds of applications
  - Different platfoms
- **C++ emphasizes power and performance**
  - The fastest possible code
  - The most control over speed and memory use
- **C++ is popular**
  - #1 language for open source projects
  - #1 language for college students -- even for their personal projects
  - Specialized libraries are widely available

- **BUT….**
  - Isn't it really hard?

Modern C++

- **The Standard Library provides built in capabilities you can use "out of the box"**
  - String class
  - Collections (linked list, stack, queue etc)
  - Smart pointers that handle memory management for you
  - File and Screen IO
- **Managing memory yourself is "old-school"**
- **So is pointer arithmetic for string or array work**

- **Modern C++looks a lot like C# or Java**
  - But faster!

C++ First?

- 20 years ago C++ was a popular first programming language
- C# and Java are much easier than “old school” C++
- Modern C++ is not too hard for beginners
- If you know C# or Java, you can learn C++ quickly
- If you know old school C++, learning modern C++ may be harder
- If you don’t know any programming languages yet, you can learn C++ as a first language

C++/CLI

- **Specialized variants of C++ are popular**
  - Draw on a well understood syntax
  - Work with existing libraries
  - Leverage existing tools
- **C++/CLI is a variant that makes managed code**
  - Like C#, or VB.NET
  - Excellent for wrappers around native libraries so they can be called from .NET
  - Has a few extra pieces of syntax to support CLR concepts
  - Out of scope here
- **Learning C++ means you essentially know C++/CLI too**

C++0x

- **C++ as a language belongs to no person or company**
- **There is a standard that defines the language**
  - A standards committee updates it from time to time
  - C++ 98, C++03
  - New version will probably be C++11 or C++12
- **Compiler vendors implemented a lot of it in advance**
  - Visual Studio 2010 supports all the library changes, and almost all the language changes, already
- **In this material, when syntax or library features from C++0x are used, they'll be highlighted for you**

Summary

- **C++ is a powerful language used by millions of developers**
- **C++ has a reputation for being difficult**
  - But it doesn't have to be
- **Modern C++ is clean and simple**
  - The Standard Library does a lot of work for you