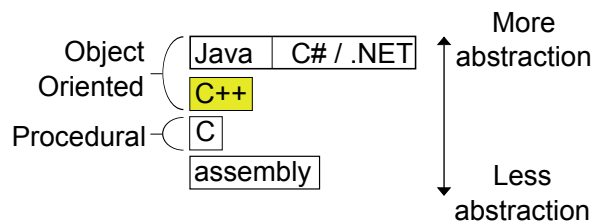


C++ Tutorial

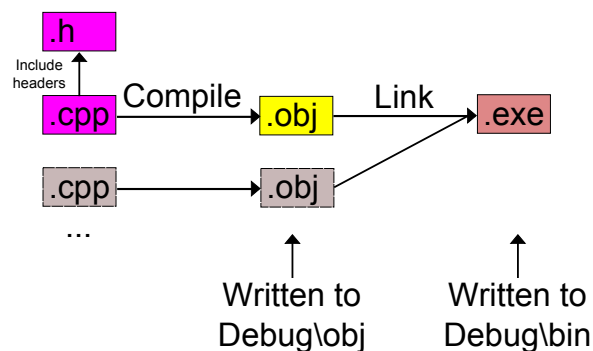
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The Least You Need to Know About C++

- History and place among programming languages.



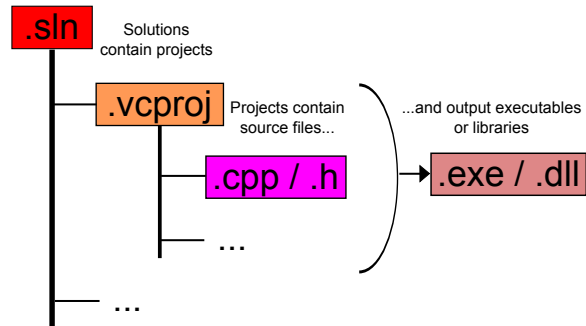
- Low level vs high level.
 - Procedural vs object oriented.
 - Byte code vs native code.
 - C++ in the game and graphics industry.
- Source files, compiling, and linking. Grossly simplified:



- Debug vs release.
- Libraries vs executables.
- Static vs dynamic linking.

- Visual Studio projects and solutions:

- Startup project.



- *Example1HelloWorld*

- `main()`.
- `cout`.
- namespaces.

- *Example2GuessingGame*

- Data types: `char`, `short`, `int`, `float`, `double`, and `bool`.
 - * Signed vs unsigned.
- `cin`.
- Looping with `while`, `do...while`, and `for`.
- Flow control with `if...else`.

- Debugging

- Breakpoints.
- Watching variables.
- Stepping over, stepping into.
- Changing the instruction pointer.

- *Example3ArraysPointersReferences*

- Arrays.
- Pointers.
 - * `new` and `delete`.
 - * `delete` vs `delete []`.
- References.
- Pointers vs references.
- Relationship between pointers and arrays.

- Multidimensional arrays.
- Function calls: pass by value vs pass by reference.
- *Example4ObjectOriented*
 - `classes` vs `C structs`.
 - Constructors and destructors.
 - Encapsulation via `private` members.
 - Reuse via `public` inheritance.
 - Polymorphism via `virtual` and pure `virtual` methods.
- *Example5STL*
 - Templates.
 - `std::string`.
 - `std::vector` - a dynamic array.
 - `std::list` - a doubly linked list.
 - `std::map` - key value pairs, typically implemented with a red black tree.
 - `iterators`
 - Interacting with C functions.
 - Copy constructors and `operator=`.
 - An aside: `const` correctness.
- *Example6FileIO*
 - Streams.
 - `std::ofstream`.
 - `std::ifstream`.
- Closing thoughts
 - Know your tools.
 - Test early, test often.
 - Step through your code in the debugger.
 - Google has an answer to almost every C++ question.

Websites

- C++ FAQ
 - Everything you could possibly want to know about C++ in question and answer form.
- SGI's STL Programmer's Guide

- The first place I turn for STL questions. This site contains both introduction and reference material.
- If you are coming from Java:
 - Moving from Java to C++
 - C++ for Java Programmers
 - Comparing C++ and Java
- If you are coming from C:
 - C++ tutorial for C users

Books

- The C++ Programming Language, 3rd Edition. Bjarne Stroustrup, Addison-Wesley, 1997
 - Bjarne Stroustrup is the creator of C++. This is not an introduction to programming but an introduction to C++ for an experienced programmer.
- Effective C++, 3rd Edition. Scott Meyers, Addison-Wesley, 2005
 - Scott Meyers describes best practices for using C++. If you are going to do C++ at a professional level, this is a must read. In fact, most C++ interview questions will come from this book.