

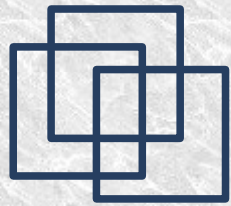
Programming C++

Introduction

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C++ Course

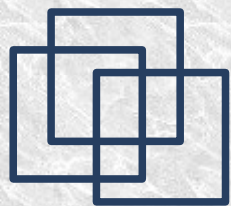
Lecture - 30h

Labs - 30h

Timetable:

Lecture - Thursday 8:30 - 10:45, IMK
lecture room

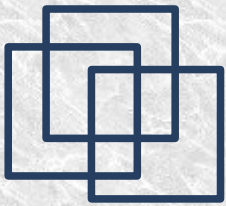
Labs - Monday 8:30 - 10:45, lab. 135



History

It was developed by Bjarne Stroustrup in 1979 at Bell Labs as an enhancement to the C programming language and originally named "C with Classes". It was renamed to C++ in 1983.

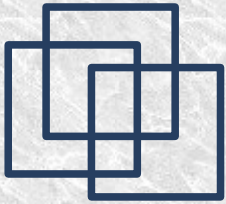
<http://en.wikipedia.org/wiki/C%2B%2B>



History

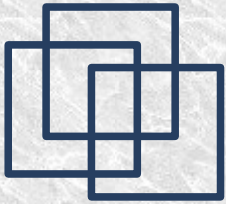
Language standard

After years of work, a joint **ANSI-ISO committee standardized C++ in 1998 (ISO/IEC 14882:1998)**. For some years after the official release of the standard, the committee processed defect reports, and published a corrected version of the C++ standard in **2003**. In **2005**, a technical report, called the "Library Technical Report 1" (often known as TR1 for short) was released. While not an official part of the standard, it gives a number of extensions to the standard library, which are expected to be included in the next version of C++. Support for TR1 is growing in almost all currently maintained C++ compilers.



C++

- C++ is designed to be a statically typed, general-purpose language that is as efficient and portable as C
- multiple programming styles:
 - procedural programming,
 - data abstraction,
 - object-oriented programming,
 - and generic programming



C++

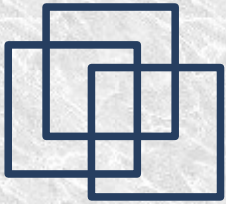
- C++ is designed to give the programmer choice, even if this makes it possible for the programmer to choose incorrectly
- C++ is designed to be as compatible with C as possible, therefore providing a smooth transition from C



C++

The 1998 ANSI/ISO C++ standard consists of two parts:

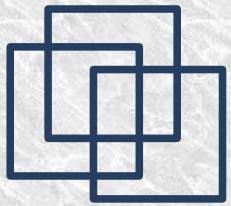
- the core language
- the C++ standard library - it includes most of the **Standard Template Library (STL)**



C++

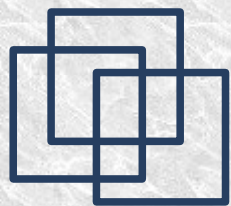
STL provides such useful tools as:

- containers (for example vectors and lists),
- iterators to provide these containers with array-like access
- algorithms to perform operations such as searching and sorting.
- (multi)maps (associative arrays) and (multi)sets
- templates - generic algorithms that work with any container or on any sequence defined by iterators.



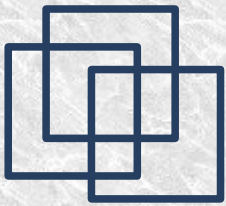
Standards

- **C++0x** is the planned new standard for the C++ programming language.
- C++ Standards Committee aims to introduce the new standard in 2009
- Prefer introduction of new features through the standard library, rather than extending the core language
- <http://en.wikipedia.org/wiki/C%2B%2B0x>



Standards

- BOOST C++ Library
<http://www.boost.org/>



Books

- B. Eckel *“Thinking in C++”*
- Nicolai M. Josuttis *“C++ Standard Library: A Tutorial and Reference”*
- By Stanley B. Lippman, Josée Lajoie, Barbara E. Moo, *“C++ Primer”*
- Margaret A. Ellis, Bjarne Stroustrup, *“The Annotated C++ Reference Manual ”*
- Bjarne Stroustrup, *“The C++ Programming Language: Special Edition (3rd Edition)”*



Hello World

```
#include <iostream>
```

```
int main()
```

```
{
```

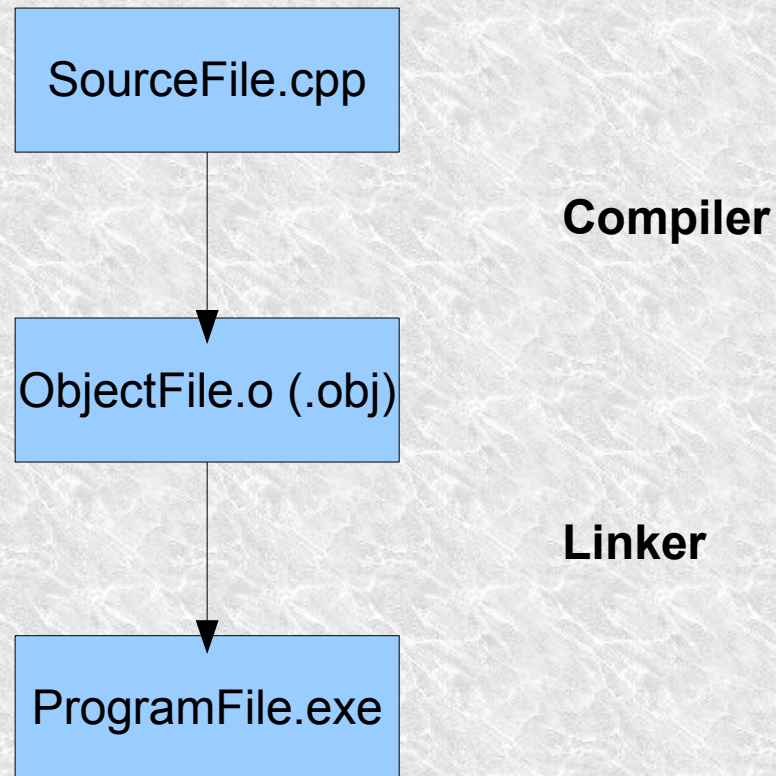
```
    std::cout<<"hello"<<std::endl;
```

```
    return 0;
```

```
}
```



Compilation





Compilation

Mingw compiler:

compiler:

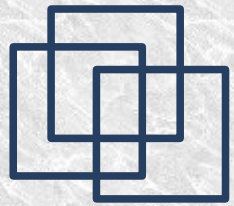
```
g++ -c hello_main.cpp
```

linker:

```
g++ hello_main.o
```

OR

```
g++ hello_main.o -o MyProgram2.exe
```



Compilation

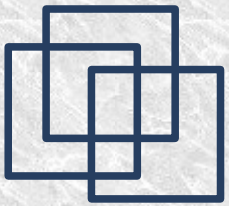
Mingw compiler:

compiler and linker:

```
g++ hello_main.cpp
```

OR

```
g++ hello_main.cpp -o MyProgram3.exe
```



Compilation

Microsoft compiler (Visual Studio):

compiler:

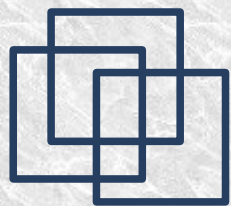
cl /c hello_main.cpp

linker:

cl hello_main.obj

OR

cl hello_main.obj /FeMyProgram.exe



Compilation

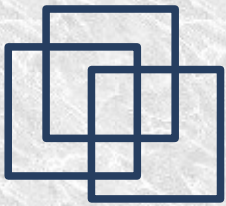
Microsoft compiler (Visual Studio):

compiler and linker:

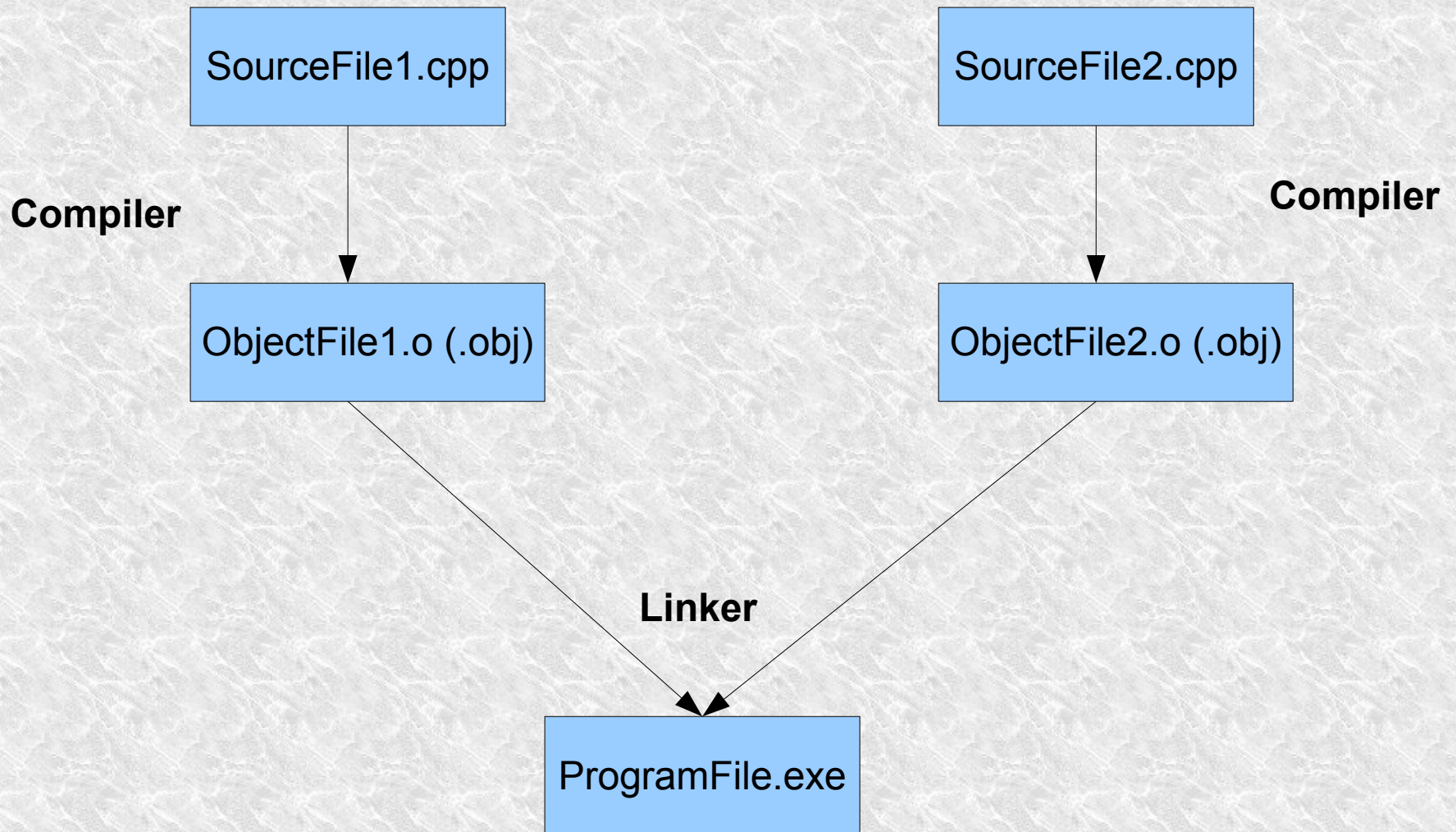
cl hello_main.cpp

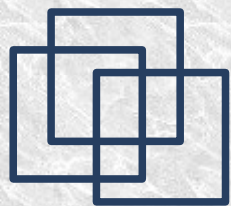
OR

cl hello_main.cpp /FeMyProgram.exe



Compilation





Compilation

Mingw compiler:

compiler:

```
g++ -c MyFunction.cpp
```

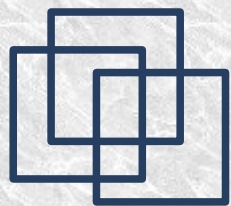
```
g++ -c Example_005_main.cpp
```

linker:

```
g++ MyFunction.o Example_005_main.o
```

OR

```
g++ MyFunction.o Example_005_main.o -o  
MyProgram2.exe
```

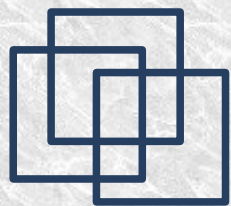


Compilation

Mingw compiler:

compiler and linker:

```
g++ MyFunction.cpp Example_005_main.cpp -o  
MyProgram3.exe
```



Compilation

Microsoft compiler (Visual Studio):

compiler:

```
cl /c MyFunction.cpp
```

```
cl /c Example_005_main.cpp
```

linker:

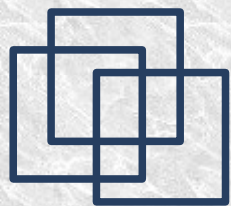
```
cl MyFunction.obj Example_005_main.obj
```

OR

```
cl Example_005_main.obj MyFunction.obj
```

OR

```
cl MyFunction.obj Example_005_main.obj  
/FeMyProgram.exe
```



Compilation

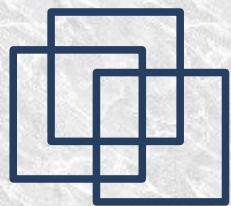
Microsoft compiler (Visual Studio):

compiler and linker:

```
cl Example_005_main.cpp  
MyFunction.cpp
```

OR

```
cl MyFunction.cpp Example_005_main.cpp  
/FeMyProgram.exe
```

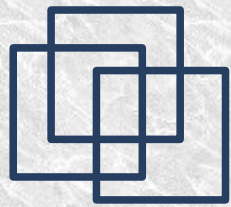


Tools, Compilers

- <http://www.microsoft.com/express/>

The screenshot displays three product cards for Microsoft Express Editions. Each card features a grid icon in the top left corner, the product name and 'Express Edition' label, a descriptive sentence, a 'Learn more' link, and a note about 'Service Pack 1'.

- Visual Basic 2008 Express Edition:** Productivity that is ideal for first time or casual Windows programming. [» Learn more](#). Now with Service Pack 1.
- Visual C# 2008 Express Edition:** A great combination of power and productivity for the Windows developer. [» Learn more](#). Now with Service Pack 1.
- Visual C++ 2008 Express Edition:** Horsepower with a finer degree of control than other Express Editions. [» Learn more](#). Now with Service Pack 1.

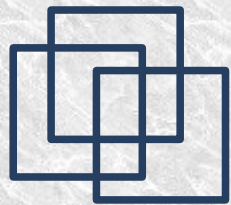


Tools, Compilers

- GNU compiler for Windows
<http://www.mingw.org/>

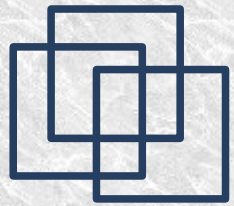
Editors and IDE

- <http://www.bloodshed.net/devcpp.html>
- <http://wxdsgn.sourceforge.net/>
- <http://www.codeblocks.org/>
- <http://www.eclipse.org/cdt/>
- <http://www.netbeans.org/features/cpp/>
- <http://www.ultimatepp.org/>



Tools, Compilers

- Borland C++ Turbo Explorer
<http://www.codegear.pl/turbo/>
- <http://www.turboexplorer.com/>



Tools, Compilers

- Digital Mars Compiler
<http://www.digitalmars.com/>

- Intel Compiler
<http://www.intel.com/cd/software/products/asmo-na/eng/compilers/284132.htm>



Documentation

- <http://msdn.microsoft.com/>
- Local access if installed with Visual Studio