C++ I

Introduction

History

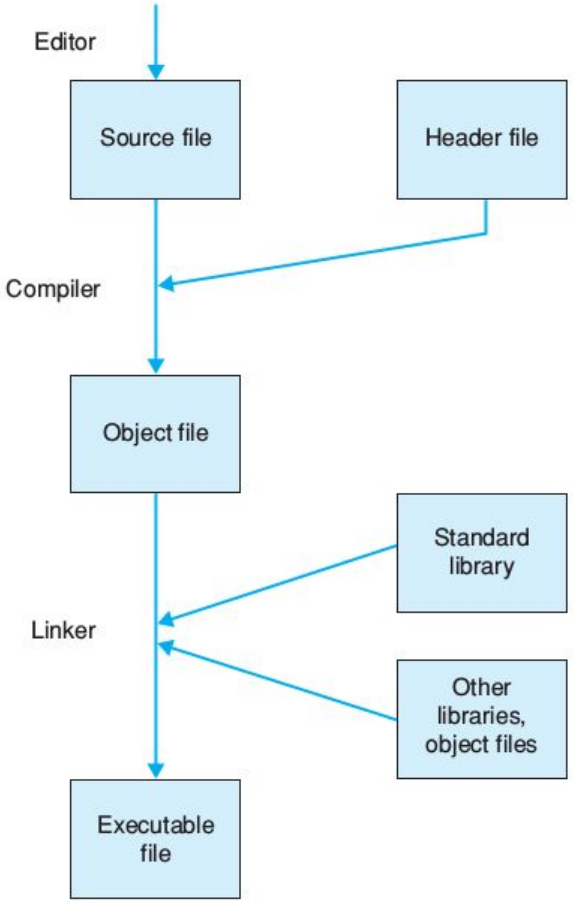
- Development started in the late 70s by Bjarne Stourstrup at Bell Labs (originally C with Classes)
  - C was developed at Bell labs in the late 60s early 70s
  - C++ became the name in 1983
- Designed with a bias toward system programming and embedded, resource-constrained and large systems
  - High performance
- Influenced C#, Java

Characteristics

- Compiled (not interpreted, not run on a virtual machine)
- No languages beneath C++ except assembly language
- It is not a purely object-oriented language, but a hybrid that contains the functionality of the C programming language: Features of C are available in C++ as well
  - Universally usable modular programs
  - Close to the machine, efficient
  - Portable programs for various platforms
- Supports these OOP concepts: data abstraction and encapsulation, inheritance, polymorphism

Developing a c++ Program

- Write the program (*source code*) in a text editor
  - .cpp extension
  - Header files with extension .h
- Compile the source file to create an object file made up of machine code (*module*)
- The *linker* combines the object file with other modules to form an *executable file*
- IDEs combine all these steps into a single task
  - Microsoft Visual Studio



Installing a C++ Compiler

- Windows: Install MinGW (http://www.mingw.org/)
  - Install gcc-core, gcc-g++, binutils
  - Add MinGW ‘ s bin subdir to PATH environment variable
  - Go to command prompt and type g++ -v to see if it’s installed
- Mac: Install XCode

C++ Hello World

- The main() function is analogous to Java's main method
- The # symbol indicates that the line is for the preprocessor (copies the file's code to this position in the source code)
- iostream contains conventions for I/O
- Namespace std contains predefined names
- << means to push to output stream
- endl causes a line feed
- Return 0 ends main with exit code 0

```
1  #include <iostream>
2  using namespace std;
3  int main(){
4      cout << "Enjoy yourself with C++!" << endl;
5      return 0;
6  }
```

Screen output

```
Enjoy yourself with C++!
```

C++ Program with Several Functions

- Prototypes of functions allow for functions to be defined in different orders
- Comment syntax same as in Java

```
1  #include <iostream>
2  using namespace std;
3  void line(), message(); // Prototypes
4  int main(){
5      cout << "Hello! The program starts in main()."
6      << endl;
7      line();
8      message();
9      line();
10     cout << "At the end of main()." << endl;
11     return 0;
12 }
13 void line() {
14     cout << "--------------------------------" << endl;
15 }
16     void message(){
17     cout << "In function message()." << endl;
18 }
```