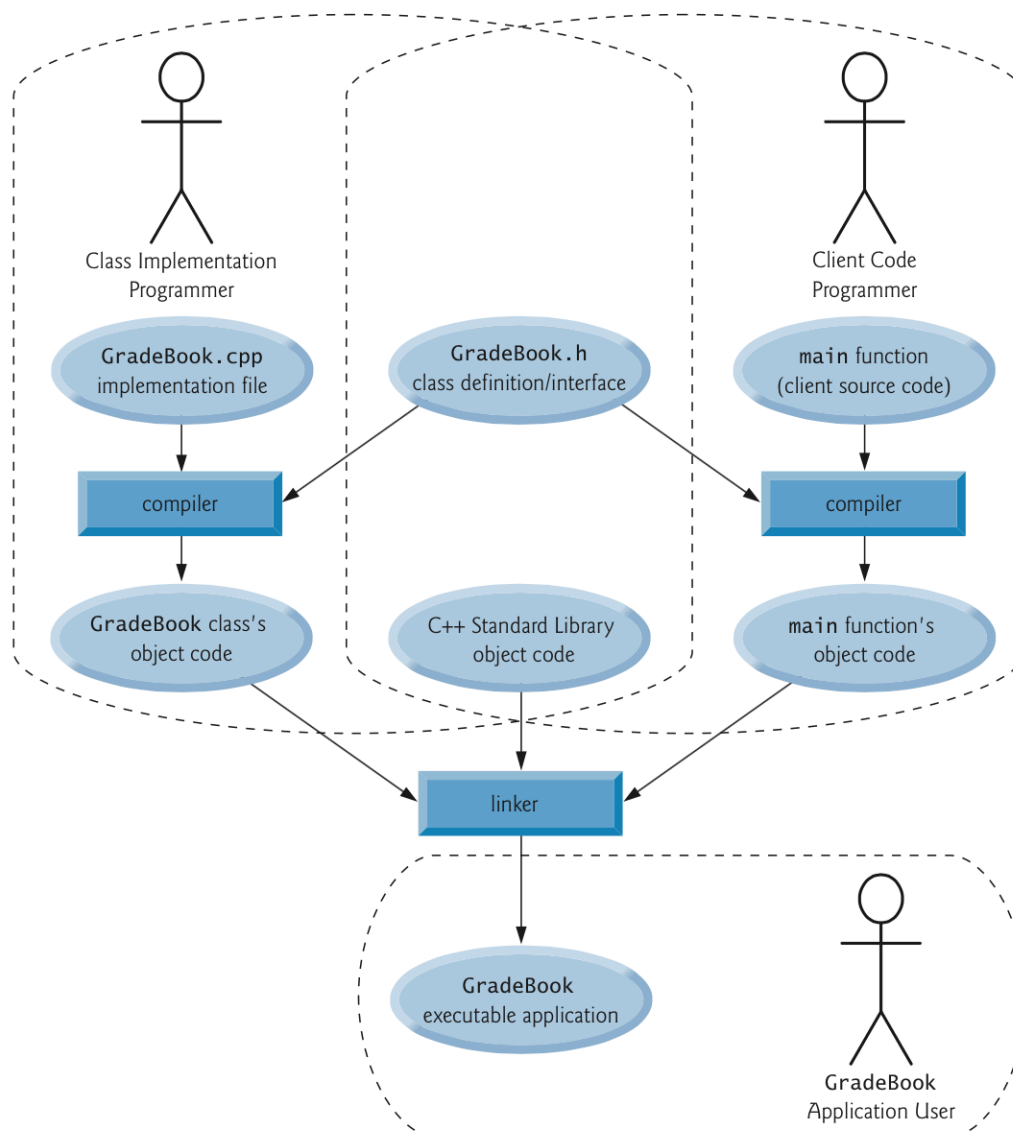




## The Compilation and Linking Process

The Compilation and Linking Process results in an executable application, the diagram below illustrates that process.



A class's interface and implementation will be created and compiled by one programmer and used by a separate programmer who implements the client code that uses the class.

A class-implementation programmer responsible for creating a reusable GradeBook class creates the header **GradeBook.h** and the source-code file **GradeBook.cpp** that **#includes** the header, then compiles the source-code file to create GradeBook's object code.

To hide the class's member-function implementation details, the class-implementation programmer would provide the client-code programmer with the header GradeBook.h (which specifies the class's interface and data members) and the GradeBook object code (i.e., the machine-language instructions that represent GradeBook's member functions). The client-code programmer is not given GradeBook.cpp, so the client remains unaware of how GradeBook's member functions are implemented.

The client code needs to know only GradeBook's interface to use the class and must be able to link its object code. Since the interface of the class is part of the class definition in the GradeBook.h header, the client-code programmer must have access to this file and must **#include** it in the client's source-code file. When the client code is compiled, the compiler uses the class definition in GradeBook.h to ensure that the main function creates and manipulates objects of class GradeBook correctly.

To create the executable GradeBook application, the last step is to link

1. the object code for the main function (i.e., the client code),
2. the object code for class GradeBook's member-function implementations and
3. the C++ Standard Library object code for the C++ classes (e.g., string) used by the class-implementation programmer and the client-code programmer.

The linker's output is the executable GradeBook application that instructors can use to manage their students' grades. Compilers and IDEs typically invoke the linker for you after compiling your code.

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