C++ Programming

Getting Started

Before We Begin

- When programming in C++, always keep in mind its C roots
  - It inherits most of its syntax and structure from C
  - Most (but not quite all) C code is valid C++ code; as a result, C++ is not quite a strict superset of C
  - Entire programs in C++ can be written using only regular functions not defined in any class; in other words, classes are not mandatory
- This is absolutely not the right way to write an object-oriented program; use classes, objects, and methods!

Structure of a C++ Program

- The basic elements of a C++ program are
  - The classes (i.e., a notion of Abstract Data Types),
  - The methods (i.e., functions encapsulated in classes), and
  - The data members (i.e., data fields encapsulated in classes)

main. function that bootstrap everything.

Structure of a C++ Program

- Most programs are made up of multiple classes (with methods and data members) and functions
- A main function is required for a program as an entry point to bootstrap the rest of its functionality
  - One main function must exist
  - No more than one can exist in the same program

one and only one.

The Simplest C++ Program

"fantastic!"

```
int main()
{
}
```

C's Hello World is a C++ Program

```
#include <stdio.h>

/* Simple Hello World program. */

int main()
{
   printf("Hello World!\n");
}
```

A More C++-ish Hello World

```
#include <iostream>

// Simple Hello World program.

int main()
{
   std::cout << "Hello World!" << std::endl;
}
```

A Slightly Better More C++-ish Hello World

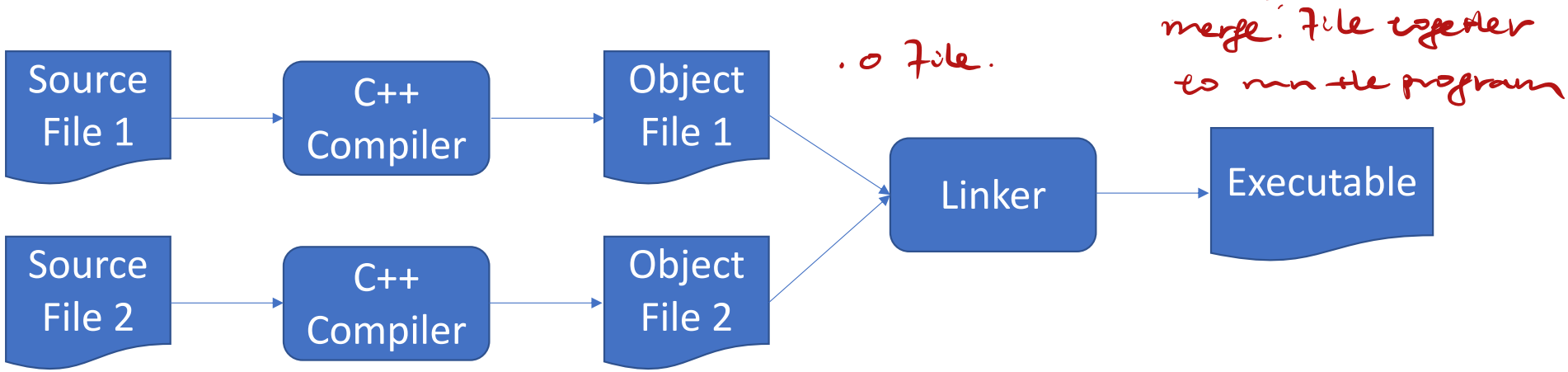
```
#include <iostream>
using namespace std;

// Simple Hello World program.

int main()
{
   cout << "Hello World!" << endl;
}
```

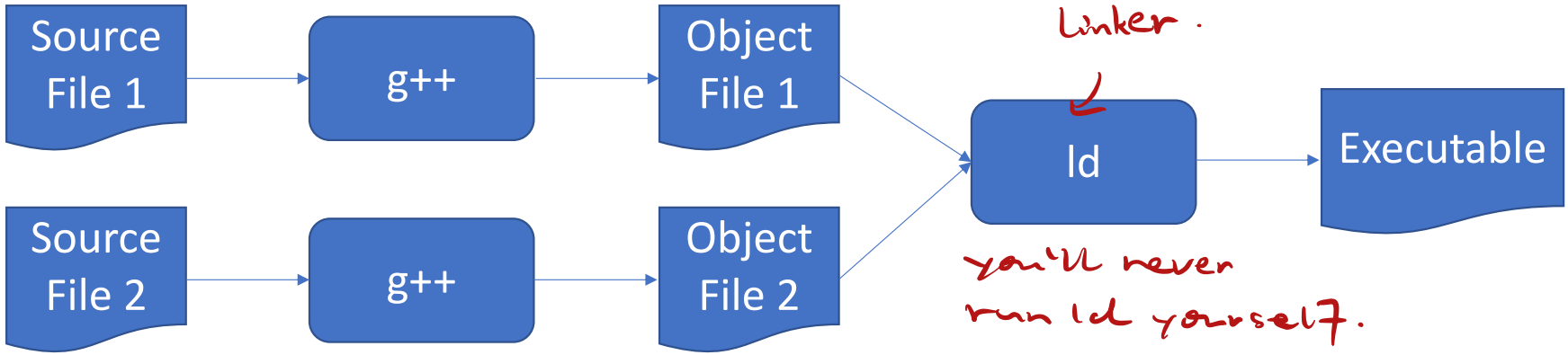
Building C++ Programs

- C++ is a compiled language and so to run a C++ program, its source code must be compiled and linked to produce an executable



Building C++ Programs

- On Linux and most Unix-like systems, things would typically be built using g++ and ld (though sometimes c++ is used instead, and ld is often hidden)



Building C++ Programs

- From a command line, building in one step would look like:

```
> g++ HelloWorld.cpp -o HelloWorld
> ./HelloWorld
```

- Alternatively, you can build and keep the object files and do things in multiple steps like:

```
> g++ -c HelloWorld.cpp
> g++ HelloWorld.o -o HelloWorld
> ./HelloWorld
```