Compile & Execute

Run your Hello World C++ program locally using the Terminal, Command Prompt, or Visual Studio Code.
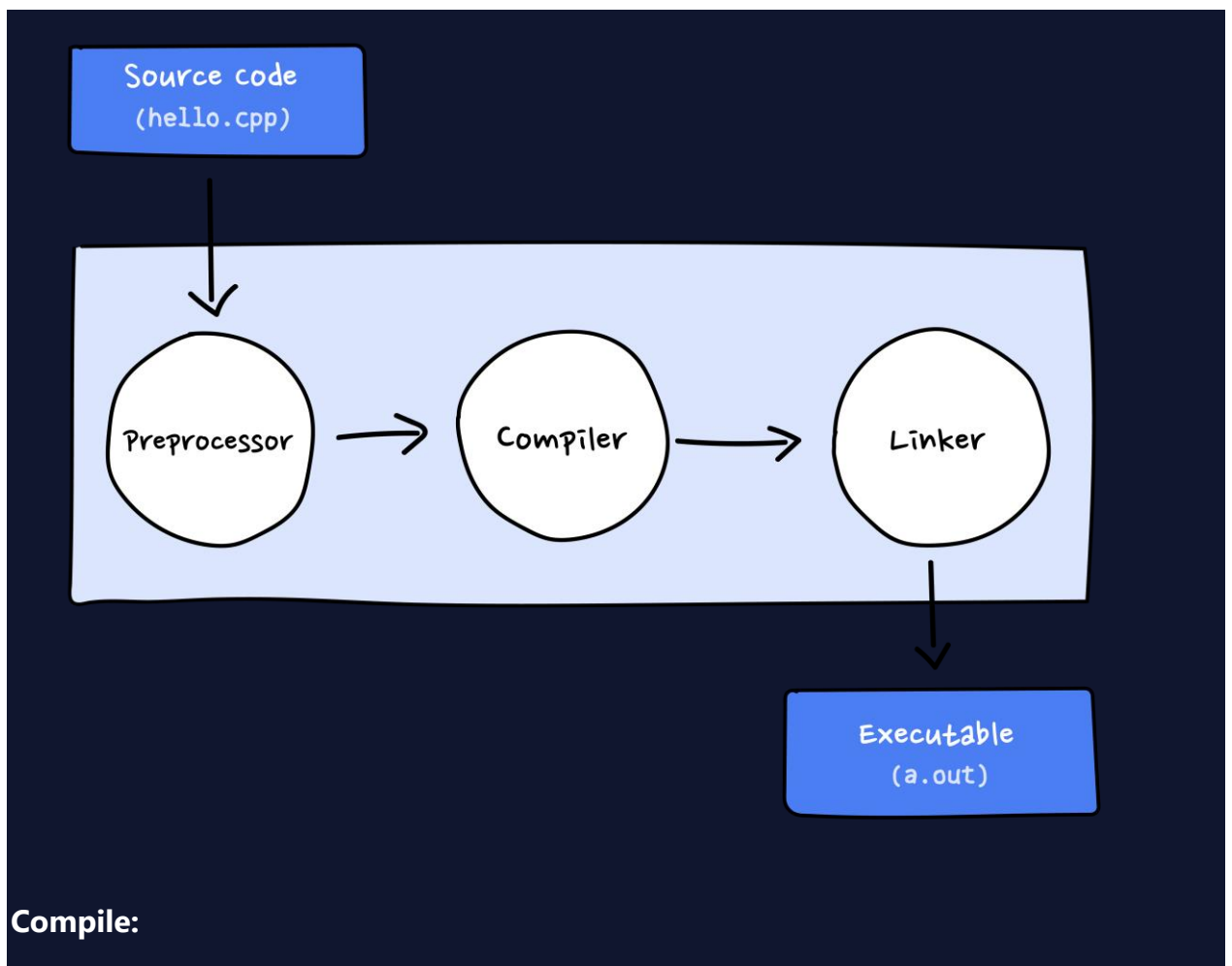
The Process

C++ is a compiled language. That means that to get a program to run, you must first translate it from the human-readable form to something a machine can "understand." That translation is done by a program called a *compiler*.

What you read and write is called *source code* (usually it's in an English-like language like C++), and what the computer executes is called *executable*, *object code*, or *machine code* (a machine language).

Typically C++ source code files are given the suffix:

- **.cpp** (ex: **hello.cpp**) or
- **.h** (ex: **std_lib_facilities.h**).

Compile:

```
g++ hello.cpp -o hello
```

A compiler translates the C++ program into machine language code which it stores on the disk as a file with the extension **.o** (e.g. **hello.o**). A linker then links the object code with standard library routines that the program may use and creates an executable image which is also saved on disk, usually as a file with the file name without any extension (e.g. **hello**).
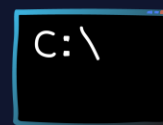
Execute:

```
./hello
```

The executable is loaded from the disk to memory and the computer's CPU (**C**entral **P**rocessing **U**nit) executes the program one instruction at a time.

Running Hello World Locally:

On the Mac, it's called the Terminal. On Windows, it's called the Command Prompt.

Terminal
(Mac)

Command Prompt
(Windows)

Video Tutorials:

- Running Hello World via Terminal **(Mac)**
- Running Hello World via Command Prompt **(Windows)**

> *Note: In the video above, some of the instructions for downloading and installing g++ are outdated.*
>
> > o *At 2:54 in the video, navigate to https://www.msys2.org instead of mingw.org.*
> > o *Under the "Installation" heading, complete steps 1 through 4 to download and install MSYS2. We recommend that you choose the default folder for installation.*

- o *Complete steps 5 through 7 to ensure all packages are up to date and to install `g++`. Be sure to enter the commands exactly!*
- o *To use the tools that you have downloaded and installed, you will need to add them to the `PATH` environment variable. Pick up in the video at 4:17 for instructions on how to do this, but note that the directory you add will be different! If you used the default installation location (`C:\msys64`), the directory you should add to `PATH` is `C:\msys64\mingw64\bin`. If you installed MSYS2 elsewhere, simply add `\mingw64\bin` to your installation location.*

- Using Microsoft Visual Studio Code

Compiling (xkcd)