

Modern C++ Course



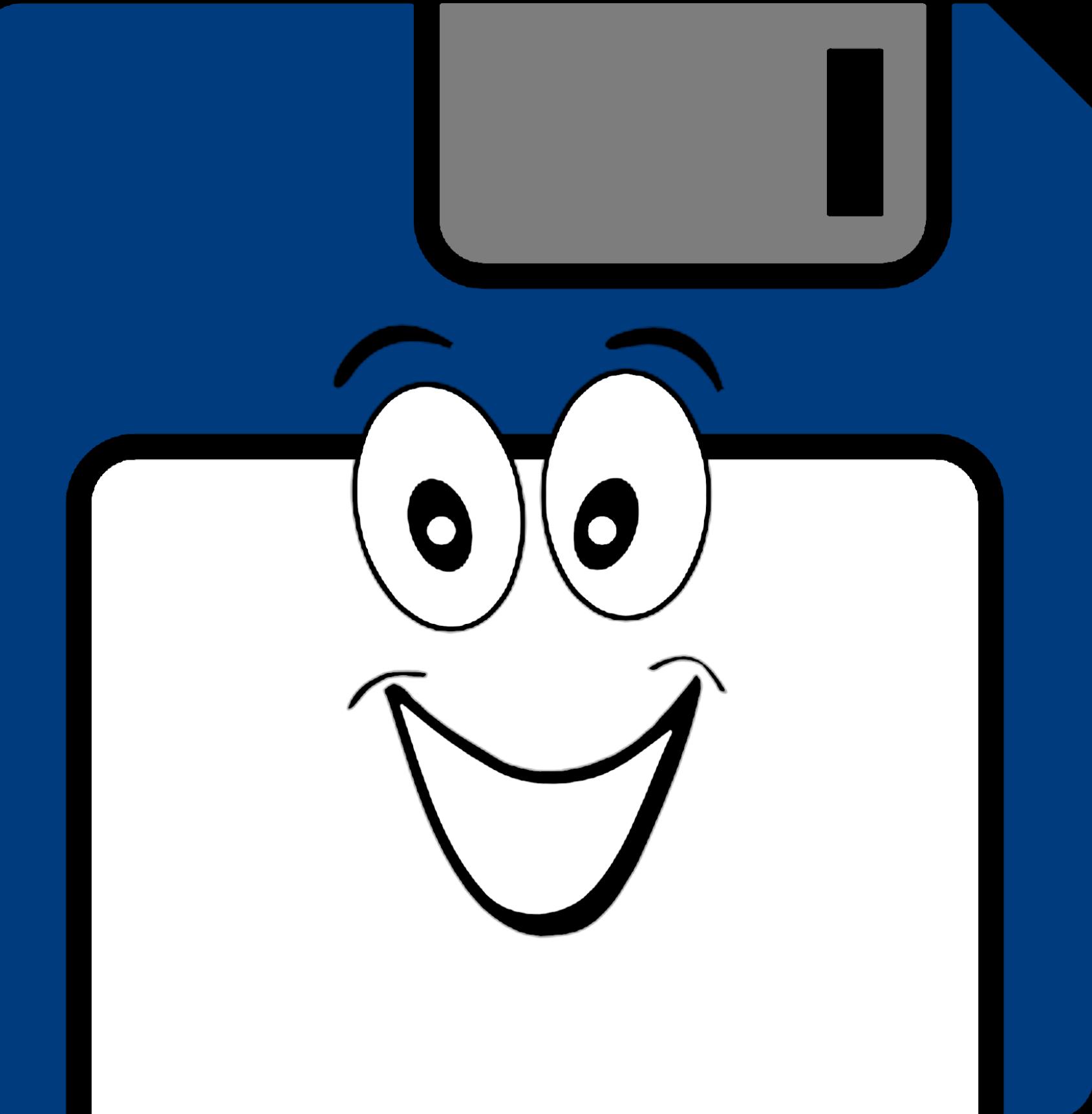
Who am I ?

Gammasoft

Gammasoft aims to make c++ fun again.

About

- Gammasoft is the nickname of Yves Fiumefreddo.
- More than thirty years of passion for high technology especially in development (c++, c#, objective-c, ...).
- Object-oriented programming is more than a mindset.
- more info see my GitHub : <https://github.com/gammasoft71>



Outline

1. Introduction
2. Language Basics
3. Object Oriented Programming (OOP)
4. Core Modern C++
5. Modern C++ Expert
6. Advanced Programming



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Introduction

- What this course is?
- History
- Why using C++?
- References
- C++ development tools



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What this course is?

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- This course aimed at inexperienced developers as well as experienced developers with no knowledge of Modern C++.



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- This course covers concepts from C++98 to C++23, while keeping modern C++ in mind.
- The corresponding C++ version is indicated for each concept and feature.

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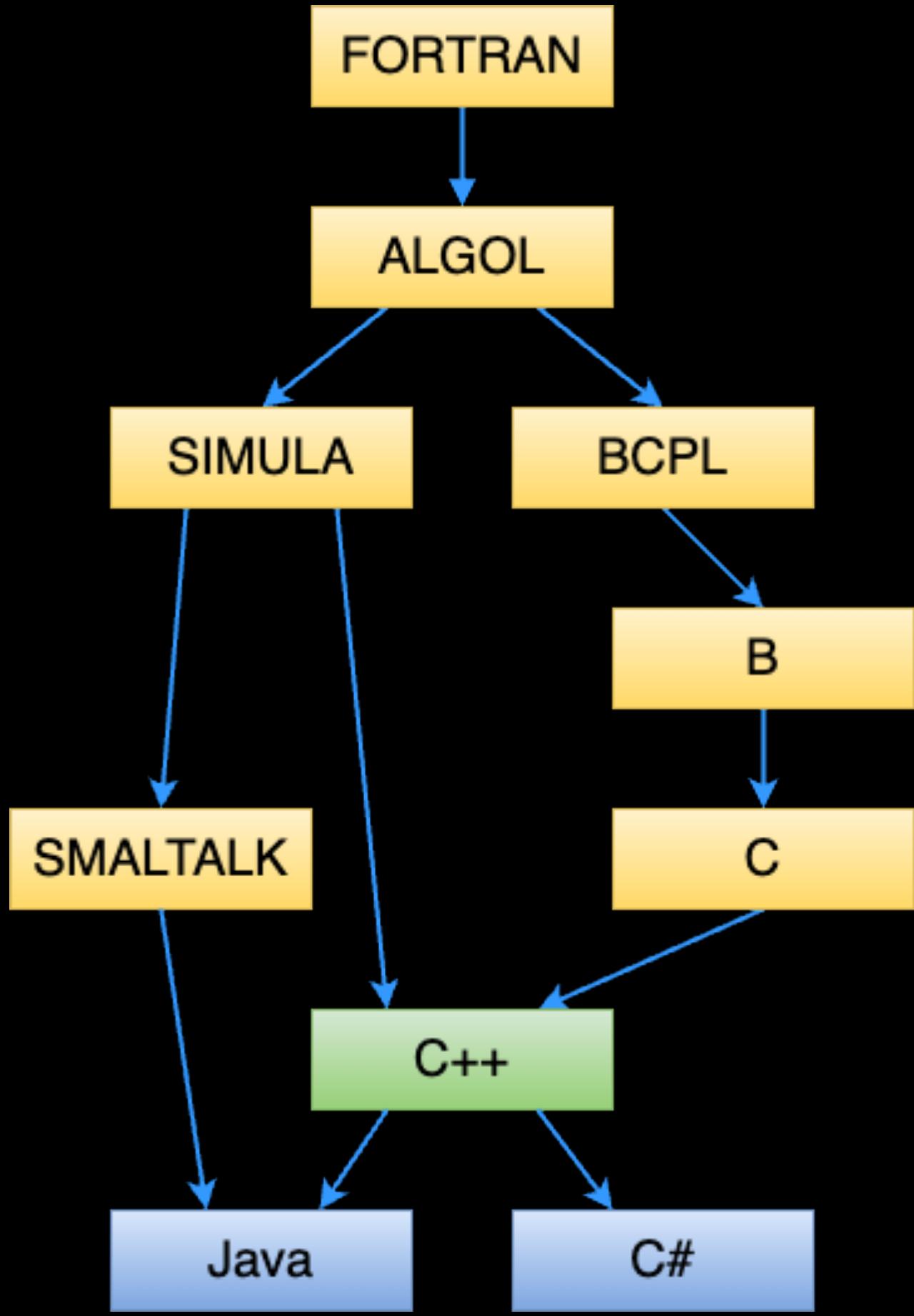
Bjarne Stroustrup

Bjarne Stroustrup, a Danish computer scientist, is the creator of C++.



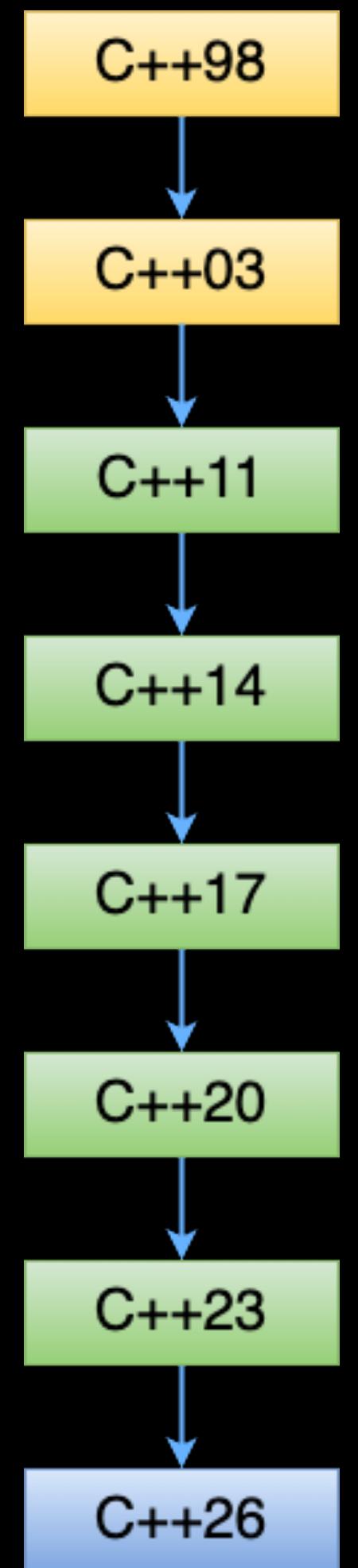
C++ language

- In 1979, Bjarne Stroustrup began work on "**C with Classes**", the predecessor to "C++".
- In 1982, Stroustrup started to develop a successor to "C with Classes", which he named "C++".
- In 1985, the first edition of The C++ Programming Language was released
- In 1998, C++98 was released, standardizing the language



C++ Standards

- 1998 | 14882:1998 | C++98
- 2003 | 14882:2003 | C++03
- 2011 | 14882:2011 | C++11
- 2014 | 14882:2014 | C++14
- 2017 | 14882:2017 | C++17
- 2020 | 14882:2020 | C++20
- 2024 | 14882:2024 | C++23
- TBA | | C++26



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Adapted to large projects



Adapted to large projects

- Statically and strongly typed



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- Object oriented



Adapted to large projects

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- Widely used (and taught)



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- Many available libraries



Adapted to large projects

- Statically and strongly typed
- Object oriented
- Widely used (and taught)
- Many available libraries
- Many available documentations and examples on the net



Fast



Fast

- unlike some other languages (Java, C#, Python, ...) C++ is compiled to native machine code



Fast

- unlike some other languages (Java, C#, Python, ...) C++ is compiled to native machine code
- close to hardware when needed



What we get?



What we get?

- The most powerful language



What we get?

- The most powerful language
- The most complicated one



What we get?

- The most powerful language
- The most complicated one
- The most error prone?



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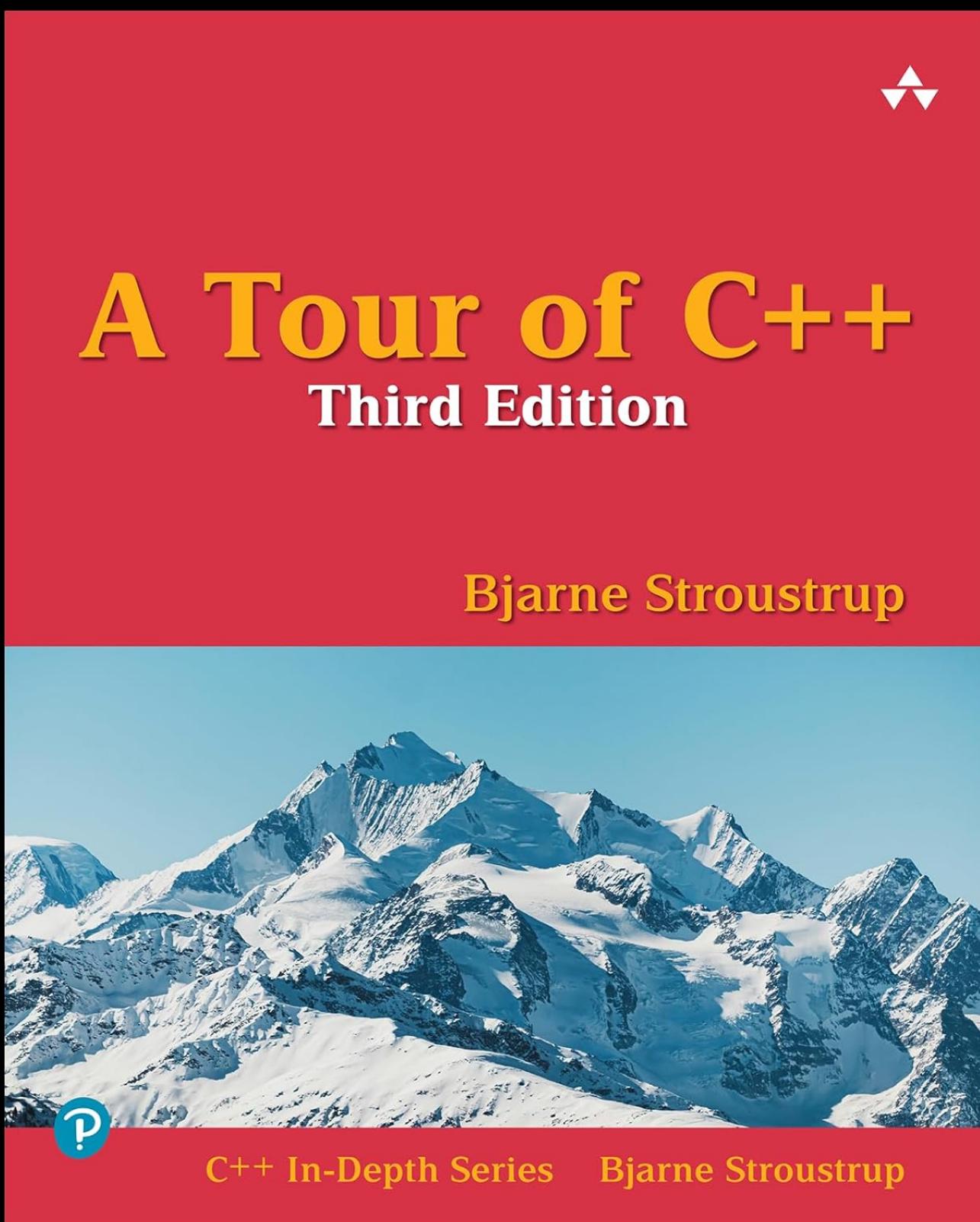
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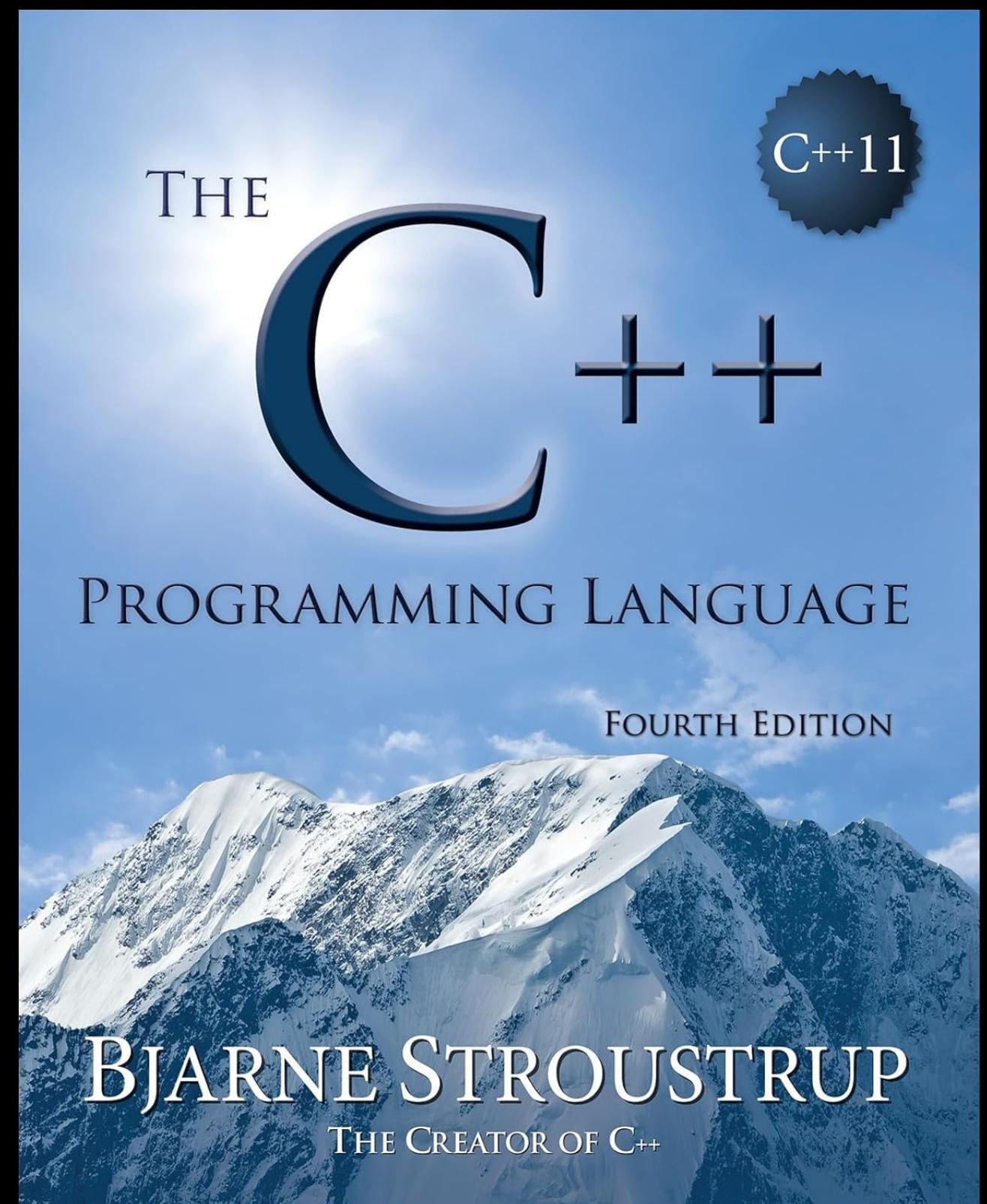
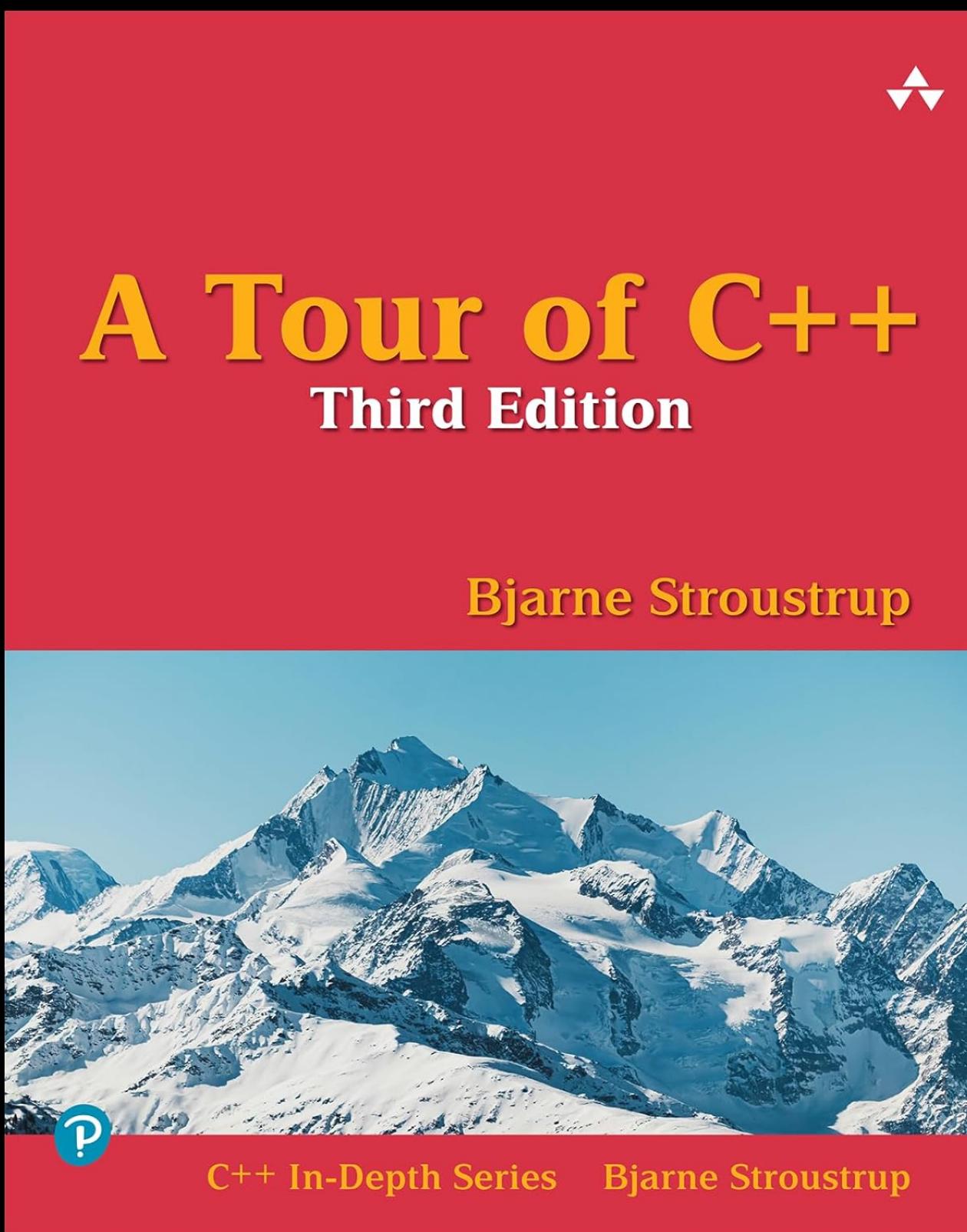
Books



Books



Books



Useful links



Useful links

- <https://isocpp.org>



Useful links

- <https://isocpp.org>
- <https://cppreference.com>



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- And more...



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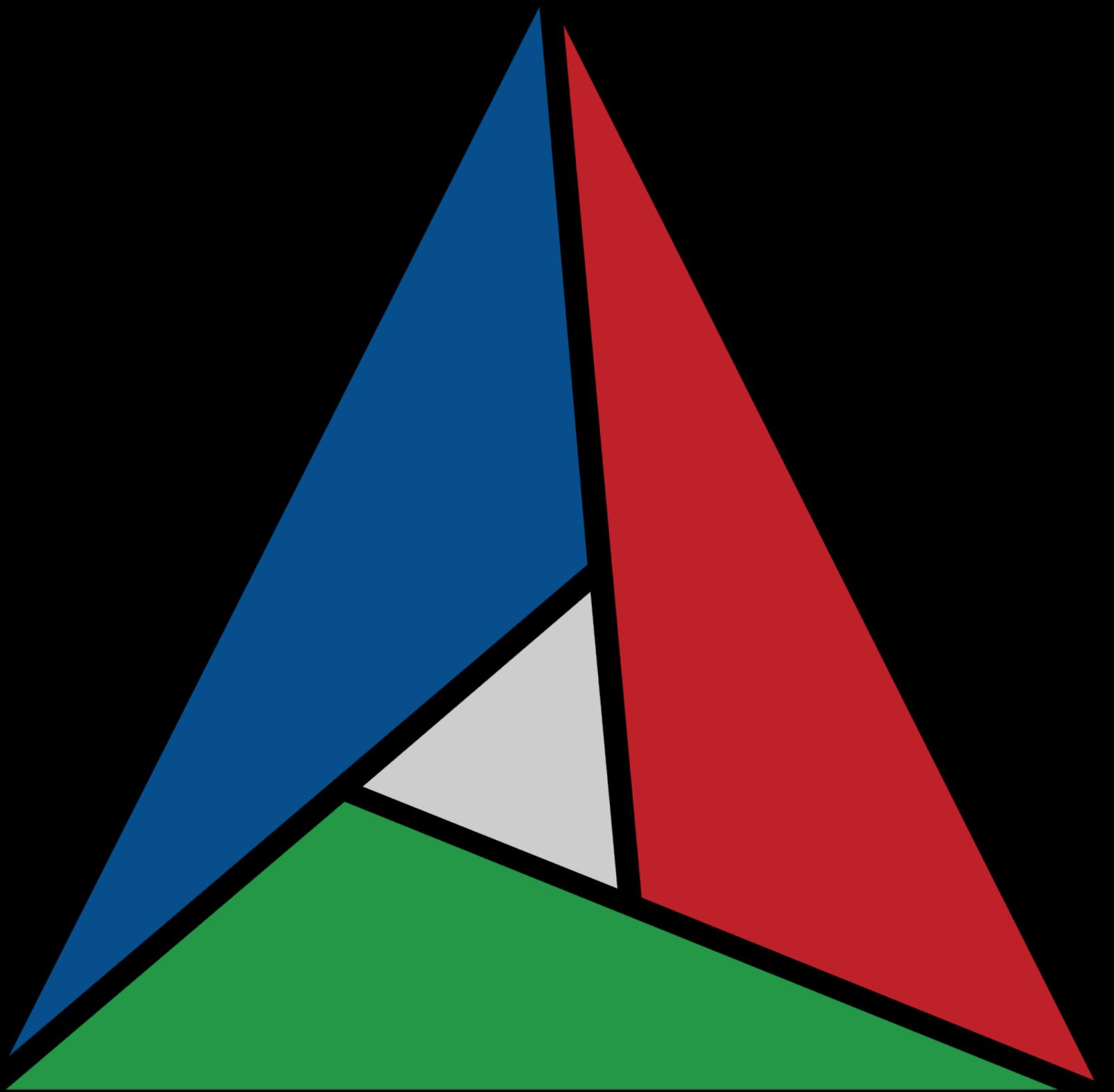


Compilers

| C++ | GCC | Clang | MSVC | Apple Clang |
|-----|------------|------------|--------------|-------------|
| 11 | ≥ 4.8 | ≥ 3.3 | ≥ 19 | ≥ 3.3 |
| 14 | ≥ 4.9 | ≥ 3.4 | ≥ 19 | ≥ 3.3 |
| 17 | ≥ 7.3 | ≥ 5 | ≥ 19.01 | ≥ 10 |
| 20 | ≥ 11 | ≥ 19 | ≥ 19.29 | ≥ 15 |
| 23 | ≥ 15 | ≥ 19 | ≥ 19.40 | ≥ 15 |

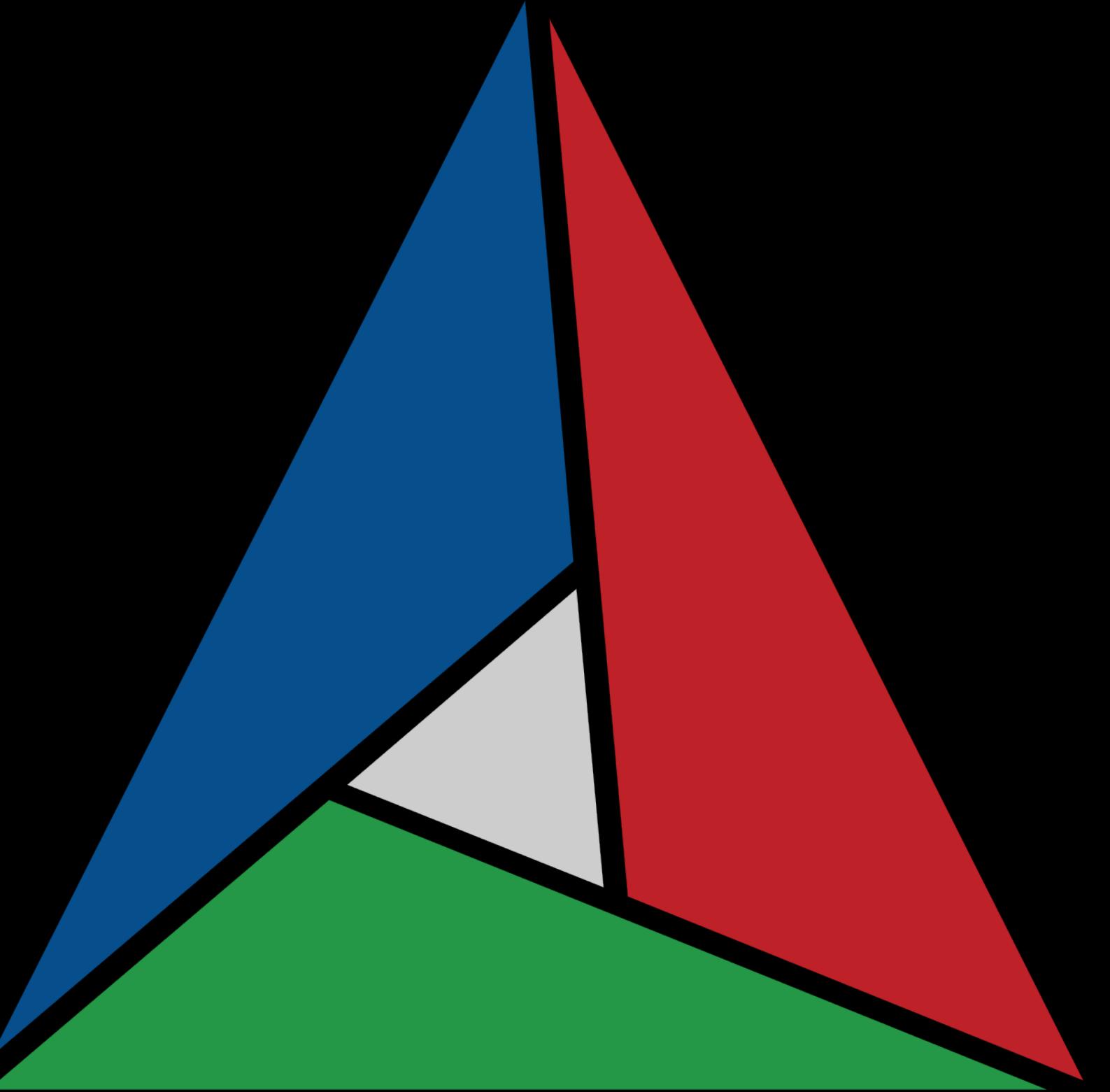


CMake



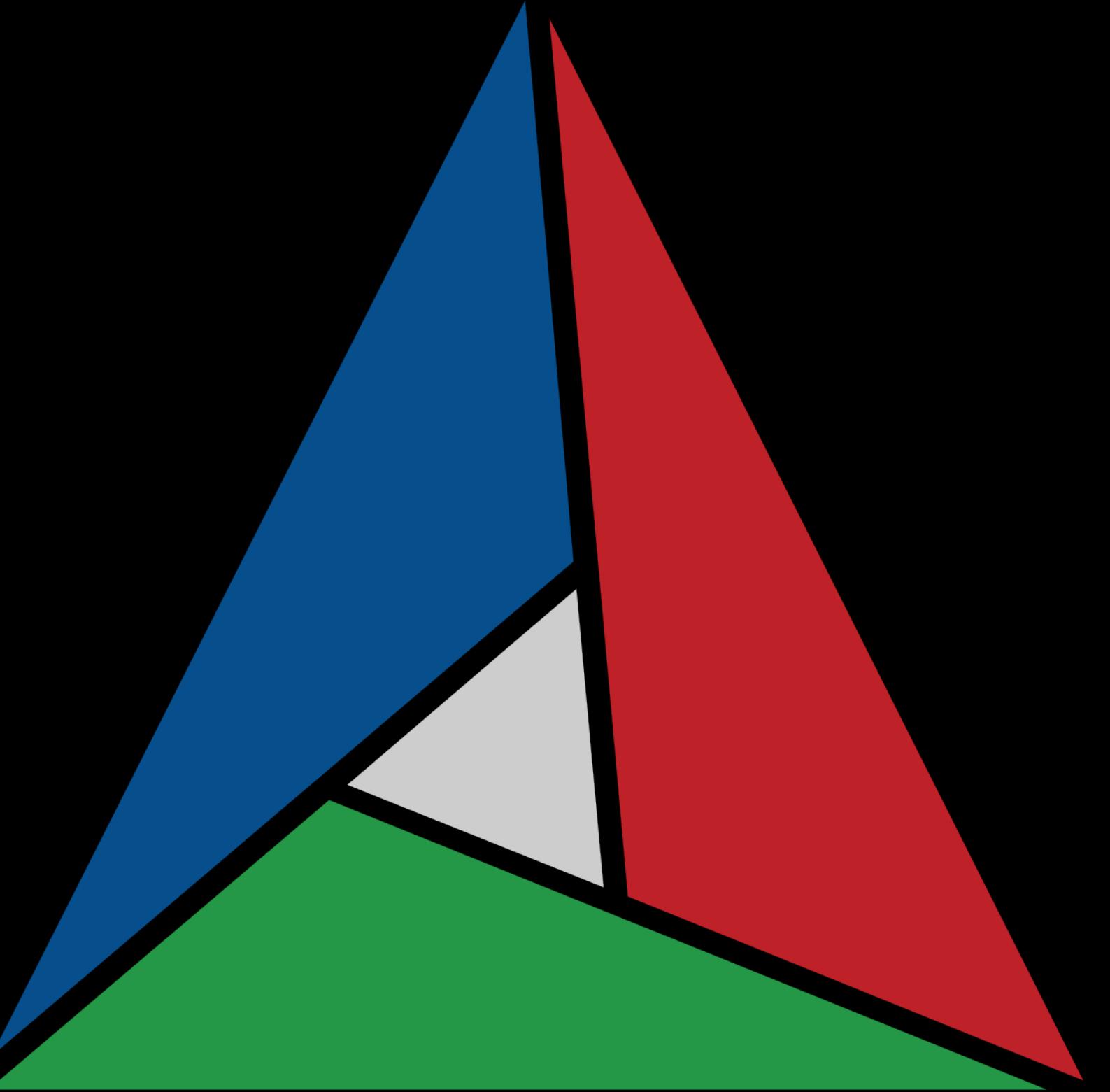
CMake

- Single source builds on multiple platforms



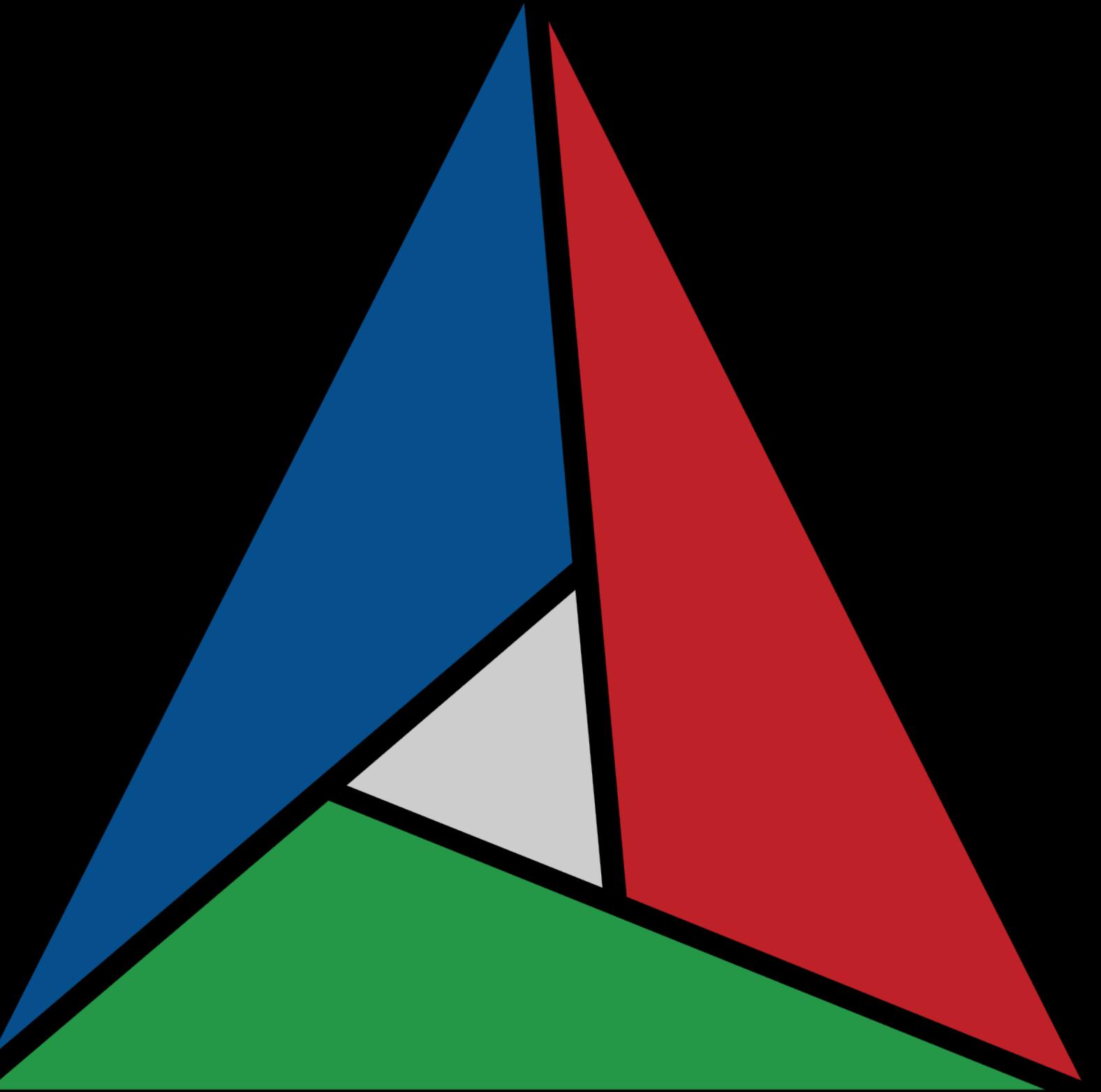
CMake

- Single source builds on multiple platforms
- Accurate dependencies and minimal rebuilds



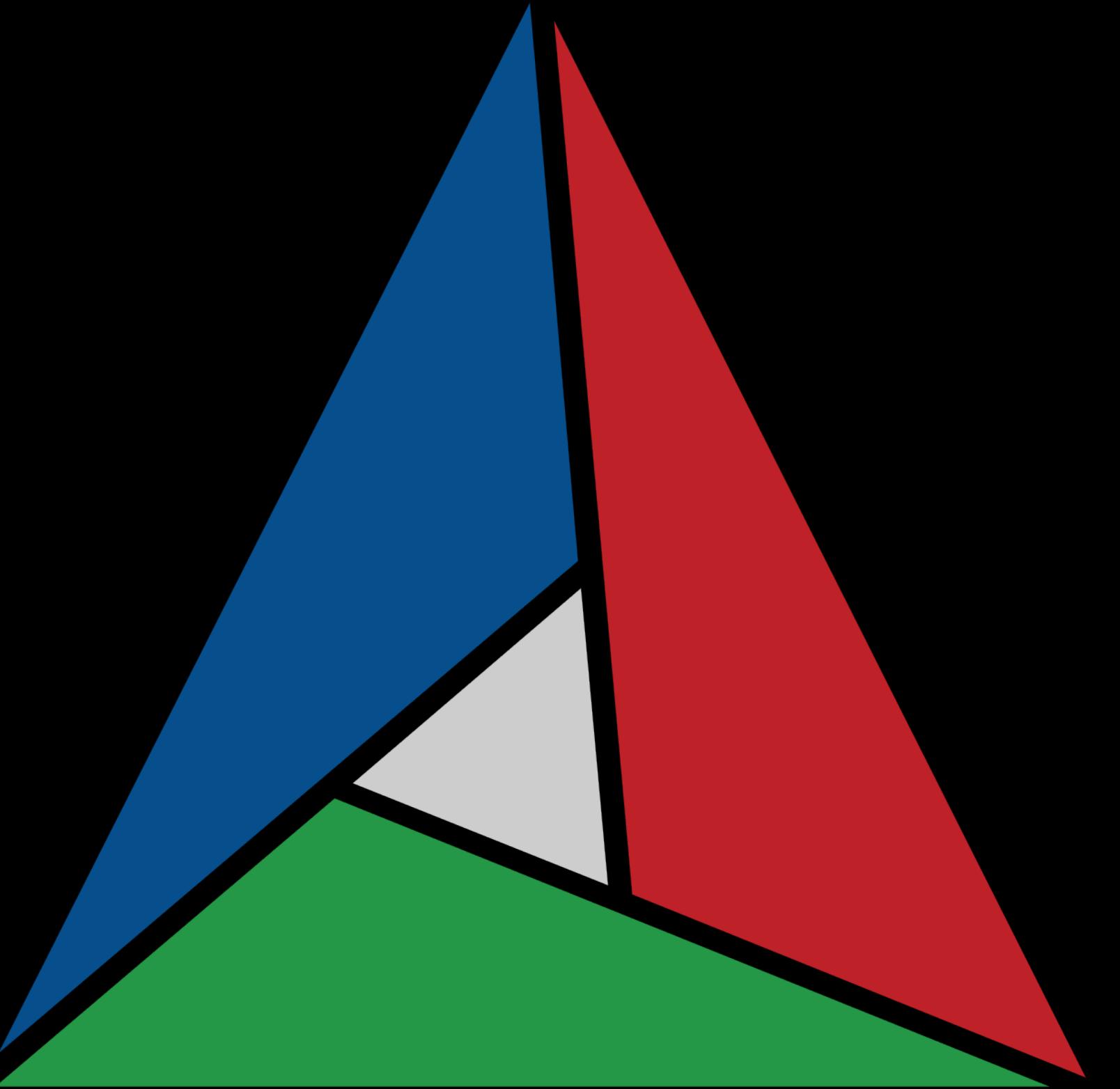
CMake

- Single source builds on multiple platforms
- Accurate dependencies and minimal rebuilds
- Out-of-source builds



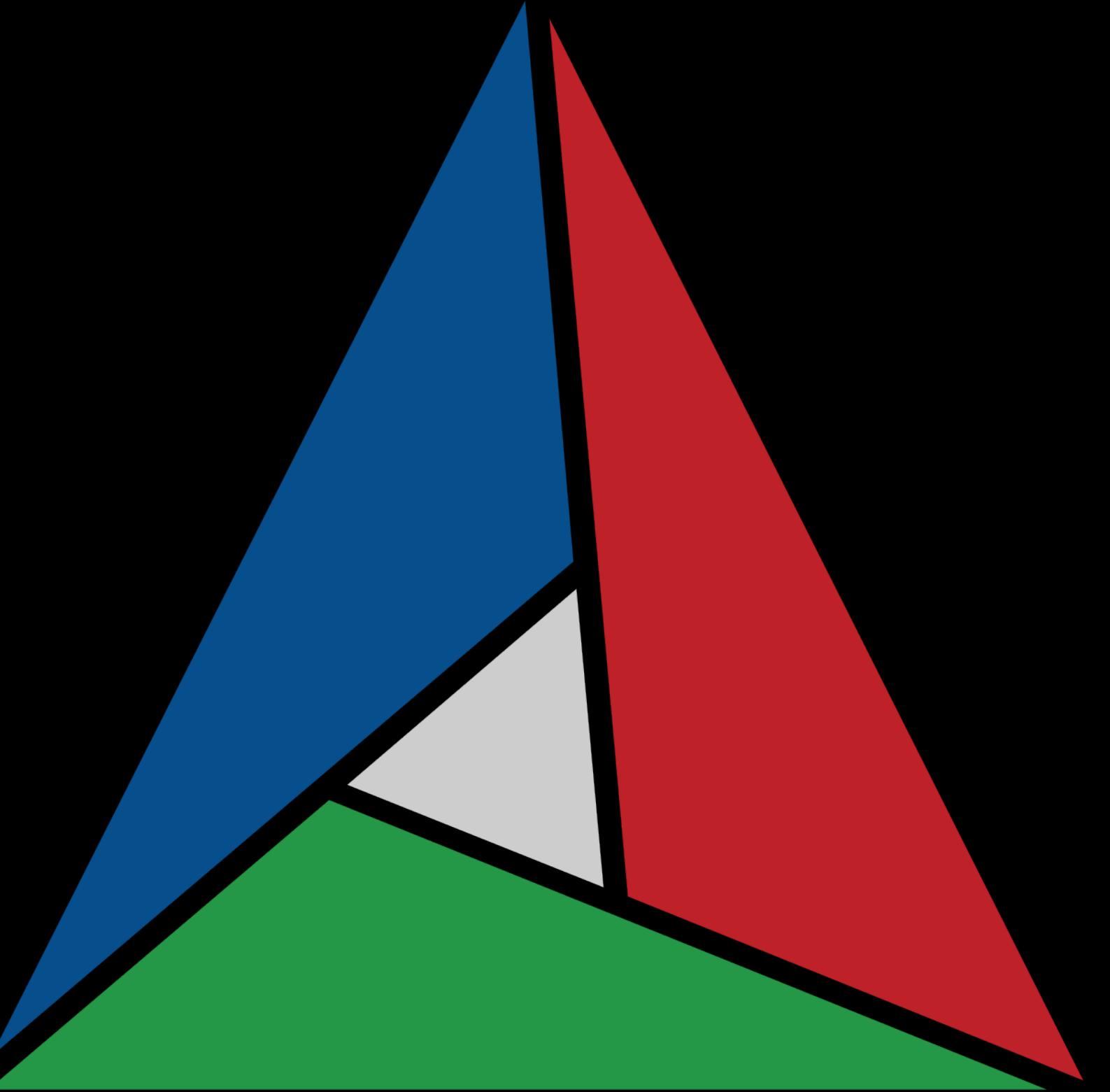
CMake

- Single source builds on multiple platforms
- Accurate dependencies and minimal rebuilds
- Out-of-source builds
- Cross-platform packaging system



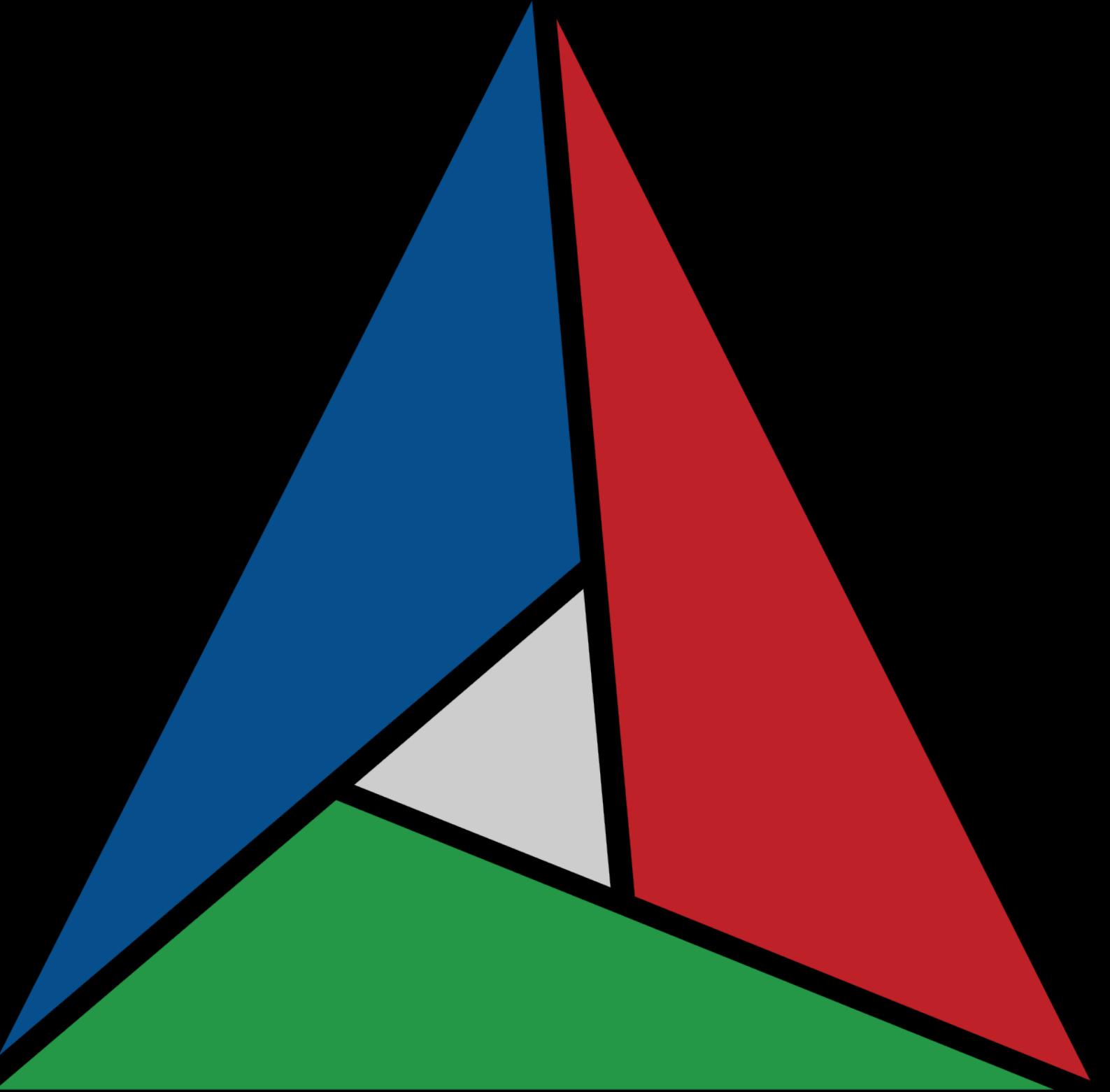
CMake

- Single source builds on multiple platforms
- Accurate dependencies and minimal rebuilds
- Out-of-source builds
- Cross-platform packaging system
- Cross-platform testing system



CMake

- Single source builds on multiple platforms
- Accurate dependencies and minimal rebuilds
- Out-of-source builds
- Cross-platform packaging system
- Cross-platform testing system
- And more...



Integrated Development Environment (IDE)



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-  Microsoft Visual Studio (Windows)



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-  Xcode (macOS)

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-  Microsoft Visual Studio (Windows)
-  Xcode (macOS)
-  Microsoft Visual Studio Code (Windows, macOS and Linux)

Integrated Development Environment (IDE)

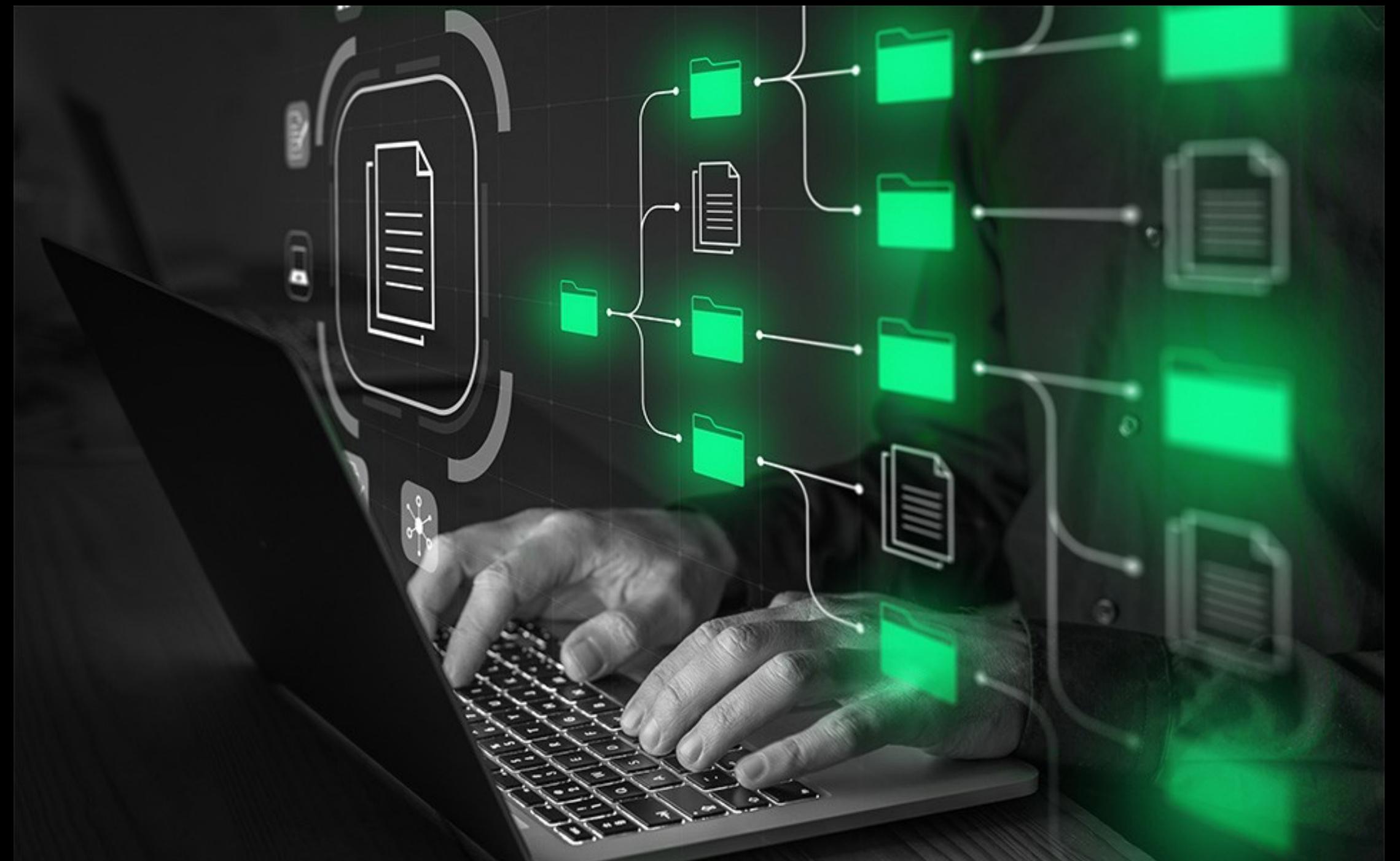
-  Microsoft Visual Studio (Windows)
-  Xcode (macOS)
-  Microsoft Visual Studio Code (Windows, macOS and Linux)
-        and others

Configure your development environment



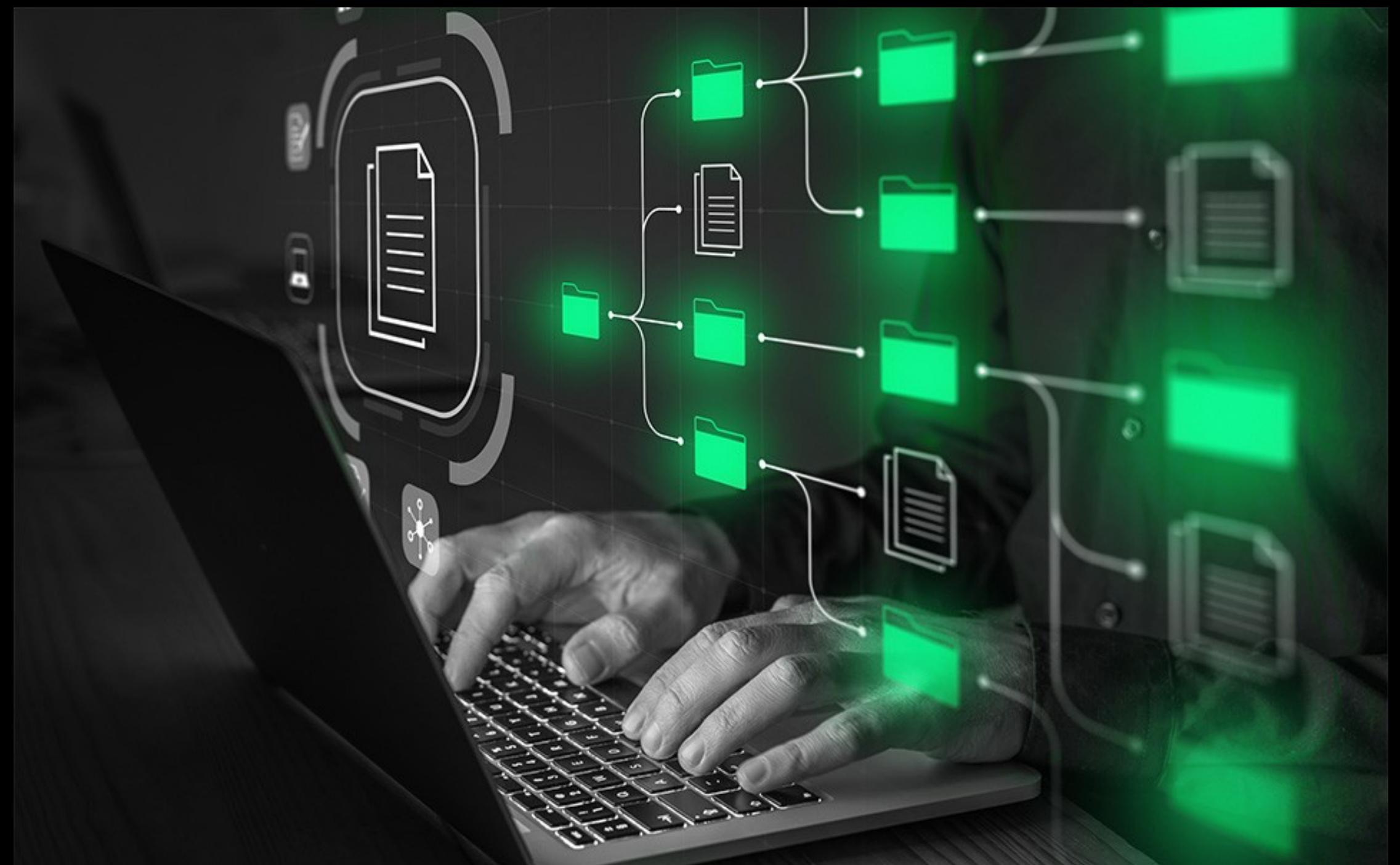
Configure your development environment

- Install compiler



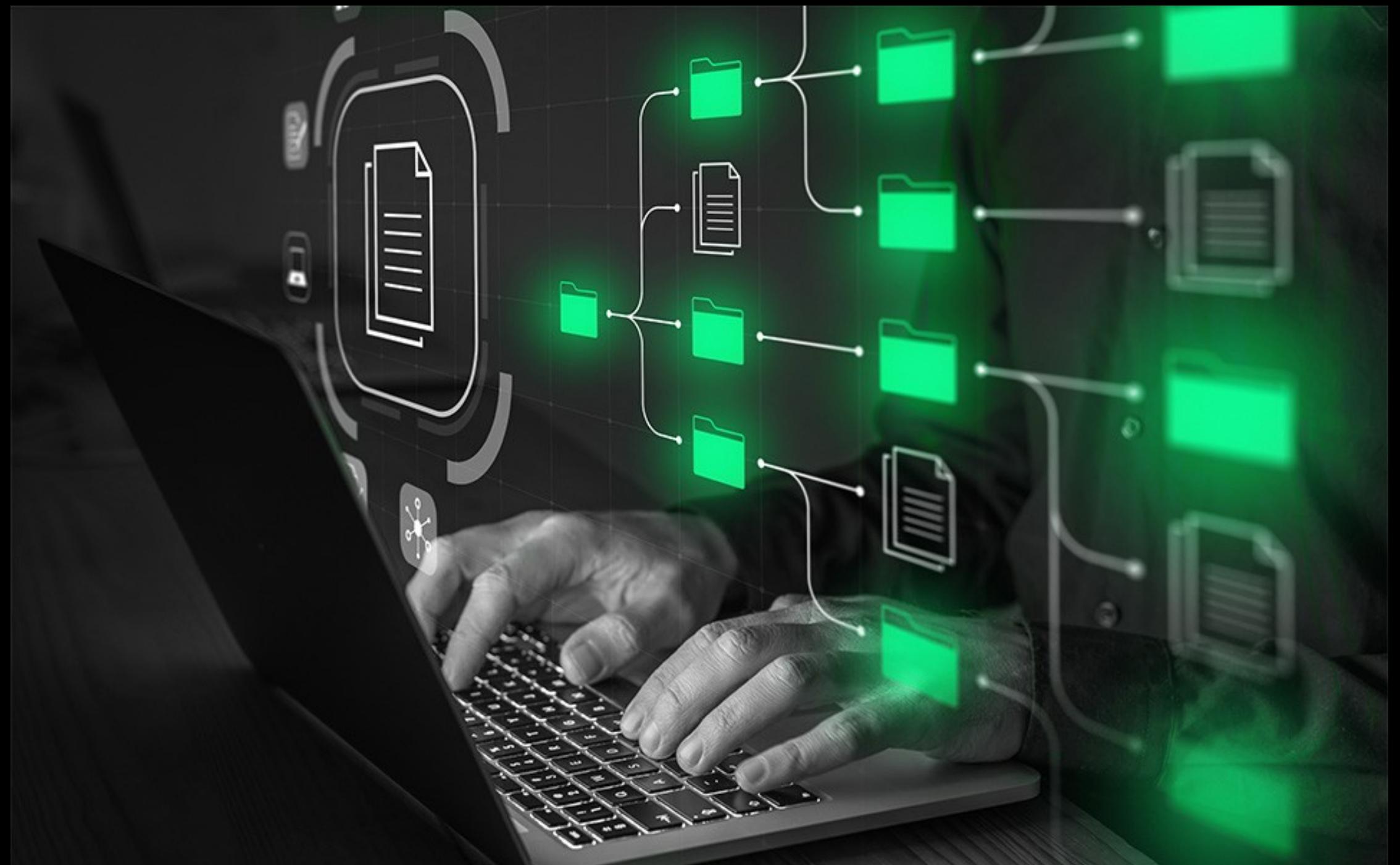
Configure your development environment

- Install compiler
- Install IDE (according to OS)



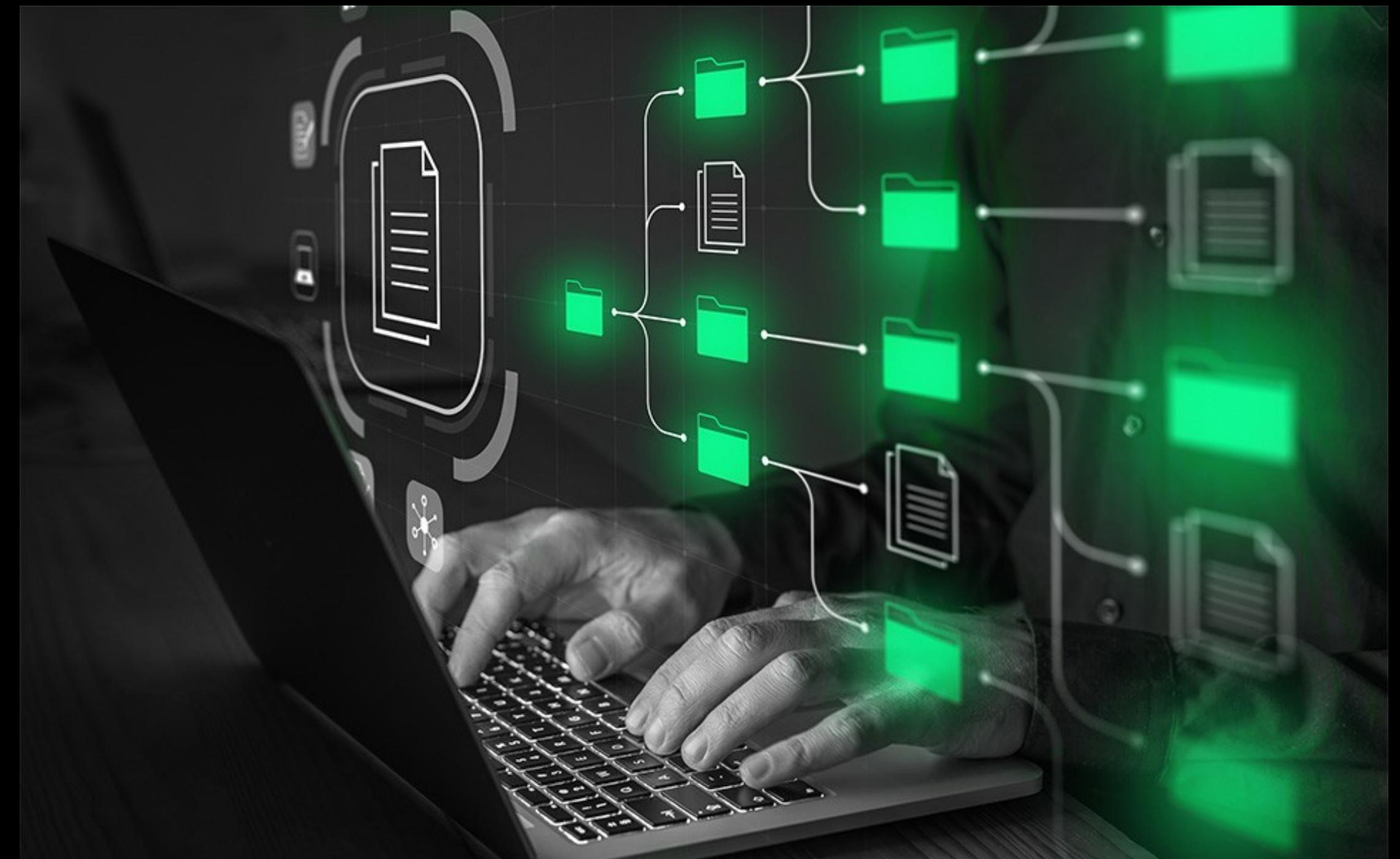
Configure your development environment

- Install compiler
- Install IDE (according to OS)
- Install CMake



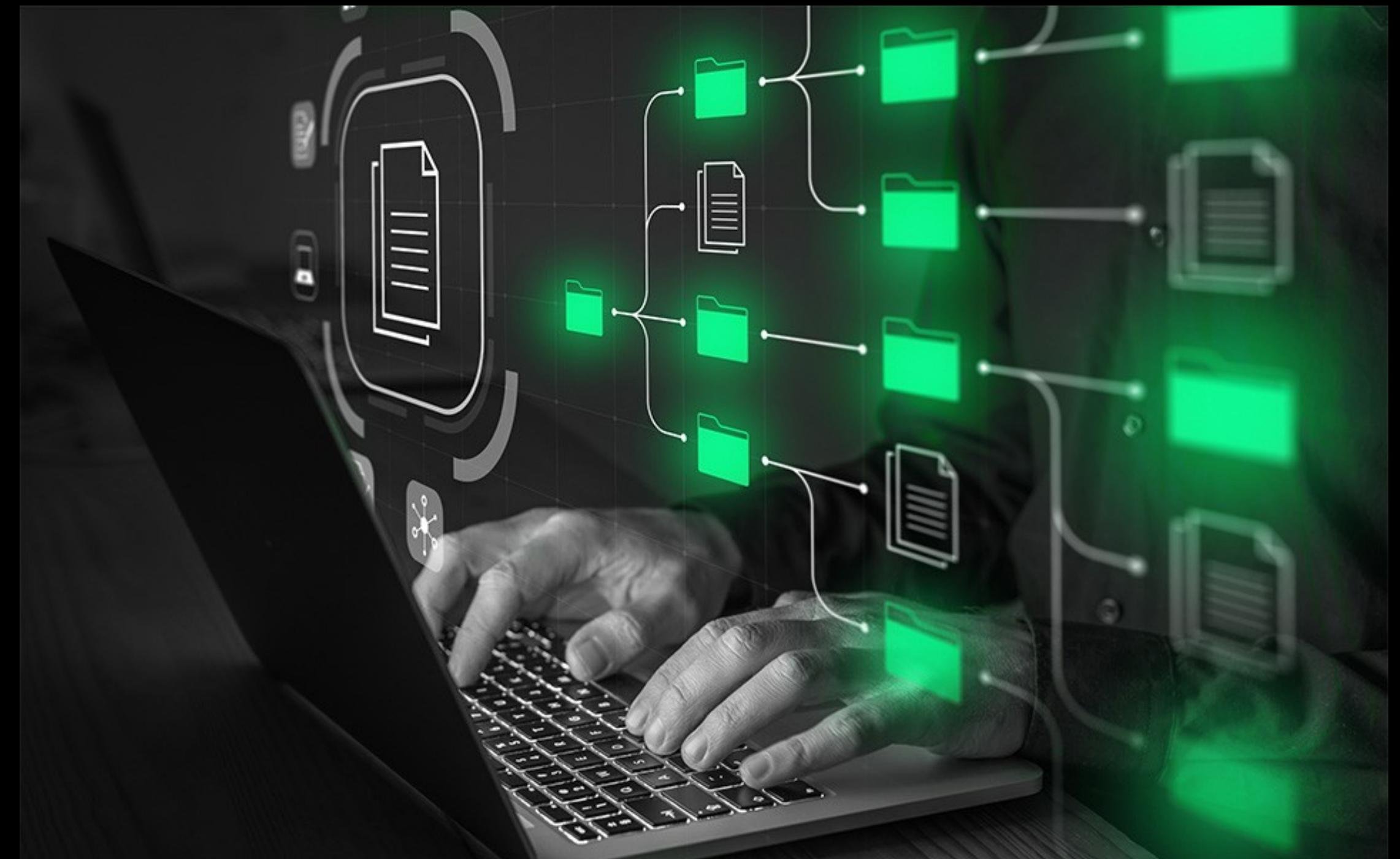
Configure your development environment

- Install compiler
- Install IDE (according to OS)
- Install CMake
- Install SCM like git (not mandatory)



Configure your development environment

- Install compiler
- Install IDE (according to OS)
- Install CMake
- Install SCM like git (not mandatory)
- Subscribe to GitHub (not mandatory)



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