

C++ Club UK

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What Happened to C++20 Contracts?

Nathan Myers: https://www.reddit.com/r/cpp/comments/cmk7ek/what_happened_to_c20_contracts/

This was the first time, in the (exactly) 30 years since ISO was first asked to form a Working Group to standardize C++, that the committee has removed from its Working Draft a major feature, for no expressible technical reason.

Almost immediately after the feature was voted in, one party to the original agreement -- authors of the rejected 2012 design -- began to post a bewildering variety of proposals for radical changes to the design, promoting them by encouraging confusion about consequences of the agreed-upon design.

What Happened to C++20 Contracts? (cont.)

One of the proposals, not seen before the day it was presented, seemed to offer that simplicity, and the group seized upon it, voting for it by a margin of 3 to 1. It was opposed by four of the five participants of the original design group, because it was fatally flawed: in use, programmers would need to define preprocessor macros, and put calls to those in their code instead of the core-language syntax defined. It would breed "macro hell".

On top of its inherent flaws, it amounted to a radical redesign from what was originally accepted by the full committee.

The immediate, predictable effect was panic. <...>

Two days later, the same Evolution Working Group voted to remove the feature entirely.

My word, what a thread.

How do C++ developers manage dependencies?

https://www.reddit.com/r/cpp/comments/c6l3eg/how_do_c_developers_manage_dependencies/

Through much pain and anguish.

Scott Meyers' TD trick

https://www.reddit.com/r/cpp/comments/c6vnb3/just_started_learning_c_coming_from_python_and/eshq8vb?utm_source=share&utm_medium=web2x

```
1 | template <typename T> struct TD; // no definition
```

Now you write something like `TD<decltype(thing)>` and the error message tells you the type of `thing` (as deduced by `decltype`, of course, but in this case that's probably what you want).

Just started learning C++ coming from Python

https://www.reddit.com/r/cpp/comments/c6vnb3/just_started_learning_c_coming_from_python_and/

The new GCC compiler with colour highlighting is a little bit better at pointing out errors. It's generally quite helpful for pure C/C++ until you make an error with the standard library and you get 200 lines about std:: whatever<random characters>

In C++ a trick I always use when the error message is massive is to just focus on the first error.

Use **constexpr** for faster, smaller, and safer code

<https://blog.trailofbits.com/2019/06/27/use-constexpr-for-faster-smaller-and-safer-code/>

https://www.reddit.com/r/cpp/comments/c646ng/use_constexpr_for_faster_smaller_and_safer_code/

<https://github.com/trailofbits/constexpr-everything> (Apache 2.0)

A closer look at **bake**: a tool that makes building C/C++ code effortless

<https://medium.com/@cortoproject/a-closer-look-at-bake-a-tool-that-makes-building-c-c-code-effortless-b2e0409fad8f>

- ▶ https://www.reddit.com/r/C_Programming/comments/a85f6w/meet_bake_a_new_build_system_package_manager_for/
- ▶ https://www.reddit.com/r/cpp/comments/a8d7ny/meet_bake_a_new_build_system_package_manager_for/
- ▶ <https://news.ycombinator.com/item?id=18787777>

<https://github.com/SanderMertens/bake> (GPLv3)

A cargo-like buildsystem and package manager for C/C++

Magic.

Introducing the Rule of DesDeMovA (1/4)

Blog post by Peter Sommerlad

<https://blog.safecpp.com/2019/07/01/initial.html>

https://accu.org/content/conf2014/Howard_Hinnant_Accu_2014.pdf

Rule of Zero:

Code that you do not write cannot be wrong.

Introducing the Rule of DesDeMovA (2/4)

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Rule of DesDeMovA

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Do you Remember: What Special Member Functions Do You Get?

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What you write	What you get					
	default constructor	destructor	copy constructor	copy assignment	move constructor	move assignment
nothing	defaulted	defaulted	defaulted	defaulted	defaulted	defaulted
any constructor	not declared	defaulted	defaulted	defaulted	defaulted	defaulted
default constructor	user declared	defaulted	defaulted	defaulted	defaulted	defaulted
destructor	defaulted	user declared	defaulted (!)	defaulted (!)	not declared	not declared
copy constructor	not declared	defaulted	user declared	defaulted (!)	not declared	not declared
copy assignment	defaulted	defaulted	defaulted (!)	user declared	not declared	not declared
move constructor	not declared	defaulted	deleted	deleted	user declared	not declared
move assignment	defaulted	defaulted	deleted	deleted	not declared	user declared

Howard Hinnant's Table: https://ericniebler.com/2016/06/06/Howard_Hinnant_Accept_2014.pdf

Note: Getting the defaulted special members denoted with a (!) is a bug in the standard.

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Introducing the Rule of DesDeMovA (3/4)

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Rule of DesDeMovA

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Rule of DesDeMovA: T&& operator=(T&&) noexcept=delete;

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What you write	DesDeMovA		Rule of if		Destructors defined		Deleted		Move Assignment	
	default constructor		copy constructor		move constructor		move assignment			
nothing	defaulted		defaulted		defaulted		defaulted			
any constructor	not declared		defaulted		defaulted		defaulted			
default constructor	user declared	defaulted	defaulted		defaulted		defaulted			
destructor	defaulted	user declared	defaulted (!)		defaulted (!)		not declared			
copy constructor	not declared	defaulted	user declared		defaulted (!)		not declared			
copy assignment	defaulted	defaulted	defaulted (!)		user declared		not declared			
move constructor	not declared	defaulted	deleted		deleted		user declared			
move assignment	defaulted	user declared	deleted		deleted		not declared			=delete


Howard Hinnant's Table: <https://ericniebler.com/2015/04/01/rule-of-five-2015-04-01/>
Note: Getting the defaulted special members denoted with a (!) is a bug in the standard.

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Summary

1. Rule of Zero
2. Rule of DesDeMovA (no copy, no move for SBRM/RAII and OO-Base classes)
3. Rule of Unique Resource Managers (move-only, no copy)
4. Rule of Five for Resource Managers with Value Semantics, or other really special cases



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strong_typedef - Create distinct types for distinct purposes

Article by Anthony Williams

https://www.justsoftwaresolutions.co.uk/cplusplus/strong_typedef.html

https://github.com/anthonywilliams/strong_typedef

```
1 using transaction_id =  
2     jss::strong_typedef<struct transaction_tag, std::string>;  
3  
4 bool is_a_foo(transaction_id id)  
5 {  
6     auto &s = id.underlying_value();  
7     return s.find("foo") != s.end();  
8 }
```

<https://www.cycfi.com/2019/07/photon-micro-gui/>

[https:](https://www.reddit.com/r/cpp/comments/ccq9pn/elemental_c_gui_library/)

[//www.reddit.com/r/cpp/comments/ccq9pn/elemental_c_gui_library/](https://www.reddit.com/r/cpp/comments/ccq9pn/elemental_c_gui_library/)

Are there any good C++ libraries for data visualization?

- ▶ VTK <https://vtk.org/>
- ▶ ROOT <https://root.cern.ch/>
- ▶ matplotlib-cpp <https://github.com/lava/matplotlib-cpp>
 - ▶ matplotlib (Python) <https://matplotlib.org/>
- ▶ QCustomPlot (QT, GPL/commercial) <https://www.qcustomplot.com/>

<http://cppcast.com/2019/07/robert-maynard/>

https://www.reddit.com/r/cpp/comments/c9bpxb/cppcast_cmake_and_vtk_with_robert_maynard/

CMake line by line - creating a header-only library

<http://dominikberner.ch/cmake-interface-lib/>

https://www.reddit.com/r/cpp/comments/c8ty2h/a_line_by_line_explanation_how_to_create_a/

<https://github.com/bernedom/Sl>

Professional CMake: A Practical Guide, 4th ed., CMake 3.15

<https://crascit.com/professional-cmake/> \$30

Are there any OSES built using C++

https://www.reddit.com/r/cpp/comments/cho1qb/are_there_any_oses_built_using_c/

- ▶ TempleOS
- ▶ Haiku
- ▶ Google Fuchsia
- ▶ IncludeOS
- ▶ DistortOS (RTOS)
- ▶ Symbian OS (Dead)
- ▶ SerenityOS