

# C++ Club UK

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2019-08-22

# 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](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)

C++ now

2019  
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Peter Sommerlad

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\\_August\\_2014.pdf](https://ericniebler.com/2016/06/06/Howard_Hinnant_August_2014.pdf)

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

© Peter Sommerlad

# Introducing the Rule of DesDeMovA (3/4)

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

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


**DesDeMovA**  
Rule of if  
Destructer defined  
Deleted  
Move Assignment

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

# Introducing the Rule of DesDeMovA (3/4)

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Summary 🍌 7

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

[https://github.com/anthonywilliams/strong\\_typedef](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/)

# 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/](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://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

# OSes built using C++

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

# Agner Vector Class Library V2

This is a C++17 class library for using the Single Instruction Multiple Data (SIMD) instructions in modern microprocessors.

<https://www.agner.org/optimize/blog/read.php?i=1013>

<https://github.com/vectorclass/version2> (Apache 2.0)

Manual

[https://github.com/vectorclass/manual/blob/master/vcl\\_manual.pdf](https://github.com/vectorclass/manual/blob/master/vcl_manual.pdf)

# Approval tests

Also known as **Golden Master Tests** or **Snapshot Testing**

- ▶ CppOnSea 2019 - Clare Macrae - Quickly testing legacy code  
<https://youtu.be/dtm8V3TIB6k>
- ▶ CppCast with Clare Macrae <https://cppcast.com/clare-macrae/>
  - ▶ r/cpp [https://www.reddit.com/r/cpp/comments/ckzc11/cppcast\\_approval\\_tests\\_with\\_clare\\_macrae/](https://www.reddit.com/r/cpp/comments/ckzc11/cppcast_approval_tests_with_clare_macrae/)
- ▶ Code <https://github.com/approvals/ApprovalTests.cpp> (Apache 2.0)
- ▶ Approval Tests Library - Capturing Human Intelligence [available for Java, C#, VB.Net, PHP, Ruby, Node.JS and Python]  
<https://approvaltests.com/>

- ▶ Implementation <https://github.com/kokkos/mdspan> (BSD 3-Clause)
  - ▶ Intro <https://github.com/kokkos/mdspan/wiki/A-Gentle-Introduction-to-mdspan>
  - ▶ r/cpp [https://www.reddit.com/r/cpp/comments/cl127i/mdspan\\_productionquality\\_reference\\_implementation/](https://www.reddit.com/r/cpp/comments/cl127i/mdspan_productionquality_reference_implementation/)
- ▶ Kokkos <https://github.com/kokkos/kokkos>
- ▶ Multi-dimensional strided array views in Magnum  
<https://blog.magnum.graphics/backstage/multidimensional-strided-array-views/>
- ▶ P0009R9 **mdspan**: A Non-Owning Multidimensional Array Reference  
<http://wg21.link/p0009r9>

# Twitter: Neural Proposals



**Simon Brand** @TartanLlama

Threw every C++ proposal title in history into a recurrent neural network and some sound surprisingly legit

```
Introducing the Proposal for an Resumable memory related initialization from string_user enuming_values
Integer C++ Function (Revision 9)
Fixing The Konates of Capture
feature_lock_view-expressions
GENDA, Tiny Proposed Regrogish to Standard Library
Transparentic atomic operations (rev. 3)
Editor's Report for Deprecate Vector Technical Specification and Allocation
Containers for Parflock Points
std::function without a requirement and optimization for the C++2 Defects Record
Propose-a the Generic Memory Modification
Equalized Interaction for the Model Proposal for P0107R2
Introduce types in computing and string that in C++
Contract Design Aliation for be Business
Gegropage initialization finesy policies in point memory scheduler be_rodng_robot and enumerations
Reflection of noexcepts in C++20
std:::haluter_tokence_related (revision 1)
Meeting Not C++
Parallellative Interimate() and unlumbing_cip
What madened: Propose-tight member of Painfreacted Default
Lookup Asiomation TS
```

2d • 16/07/2019 • 20:07 •

