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# C++ static code analysis

Unique rules to find Bugs, Vulnerabilities, Security Hotspots, and Code Smells in your C++ code

All rules 578 | Vulnerability 13 | Bug 111 | Security Hotspot 18 | Code Smell 436 | Quick Fix 68

Tags

Search by name...

"memset" should not be used to delete sensitive data
Vulnerability

POSIX functions should not be called with arguments that trigger buffer overflows
Vulnerability

XML parsers should not be vulnerable to XXE attacks
Vulnerability

Function-like macros should not be invoked without all of their arguments
Bug

The address of an automatic object should not be assigned to another object that may persist after the first object has ceased to exist
Bug

Assigning to an optional should directly target the optional
Bug

Result of the standard remove algorithms should not be ignored
Bug

"std::scoped_lock" should be created with constructor arguments
Bug

Objects should not be sliced
Bug

Immediately dangling references should not be created
Bug

"pthread_mutex_t" should be unlocked in the reverse order they were locked
Bug

"pthread_mutex_t" should be properly initialized and destroyed
Bug

"pthread_mutex_t" should not be consecutively locked or unlocked twice

## Pure "virtual" functions should not override non-pure "virtual" functions

Analyze your code

Code Smell | Critical | based-on-misra | pitfall

A `virtual` function has an implementation that *may* be replaced in a child class. A pure `virtual` has no implementation, and *must* be implemented in child classes.

Hiding a base class implementation with a "pure implementation" (`=0`) is sure to confuse extenders, who may not be aware of the base class' implementation. Instead, they'll see there's no implementation in the class they're extending and assume that none exists. When that base class implementation contains crucial functionality such as freeing resources, this could cause future users of the class to introduce bugs.

This rule raises an issue if a pure virtual function overrides a virtual function that is not pure.

### Noncompliant Code Example

```
struct A {
  virtual void func1();
  virtual void func2() = 0;
};

struct B : A {
  virtual void func1() = 0; // Noncompliant; override non-pur
  virtual void func2() = 0; // Compliant; but useless
};
```

### Compliant Solution

```
struct A {
  virtual void func1();
  virtual void func2() = 0;
};

struct B : A {
  virtual void func1(); // Compliant; non-pure virtual
};
```

### See

- MISRA C++:2008, 10-3-3 - A virtual function shall only be overridden by a pure virtual function if it is itself declared as pure virtual.

Available In:

sonarlint | sonarcloud | sonarqube Developer Edition

Bug

"std::move" and "std::forward" should not be confused

Bug

A call to "wait()" on a "std::condition_variable" should have a condition

Bug

A pointer to a virtual base class shall only be cast to a pointer to a derived class by means of dynamic_cast

Bug

Functions with "noreturn" attribute should not return

Bug

RAII objects should not be temporary

Bug

"memcmp" should only be called with pointers to trivially copyable types with no padding

Bug

"memcpy", "memmove", and "memset" should only be called with pointers to trivially copyable types

Bug

"std::auto_ptr" should not be used

Bug

Destructors should be "noexcept"

Bug