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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

Two branches in a conditional structure should not have exactly the same implementation

Analyze your code

Code Smell | Major | design | suspicious

Having two `cases` in a `switch` statement or two branches in an `if` chain with the same implementation is at best duplicate code, and at worst a coding error. If the same logic is truly needed for both instances, then in an `if` chain they should be combined, or for a `switch`, one should fall through to the other.

Noncompliant Code Example

```
switch (i) {
  case 1:
    doFirstThing();
    doSomething();
    break;
  case 2:
    doSomethingDifferent();
    break;
  case 3:  // Noncompliant; duplicates case 1's implementatio
    doFirstThing();
    doSomething();
    break;
  default:
    doTheRest();
}

if (a >= 0 && a < 10) {
  doFirstThing();
  doTheThing();
}
else if (a >= 10 && a < 20) {
  doTheOtherThing();
}
else if (a >= 20 && a < 50) {
  doFirstThing();
  doTheThing();  // Noncompliant; duplicates first condition
}
else {
  doTheRest();
}
```

Exceptions

Blocks in an `if` chain that contain a single line of code are ignored, as are blocks in a `switch` statement that contain a single line of code with or without a following `break`.

```
if (a == 1) {
  doSomething();  //no issue, usually this is done on purpose
} else if (a == 2) {
  doSomethingElse();
} else {
  doSomething();
}
```

But this exception does not apply to `if` chains without `else`-s, or to `switch`-es without default clauses when all branches have the same single line of code. In case of `if` chains with `else`-s, or of `switch`-es with default clauses, rule {rule:cpp:S3923} raises a bug.

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

```
if (a == 1) {
  doSomething();  //Noncompliant, this might have been done o
} else if (a == 2) {
  doSomething();
}
```

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