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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 311 | Vulnerability 13 | Bug 74 | Security Hotspot 18 | Code Smell 206 | Quick Fix 14

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

"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
Bug

Functions with "noreturn" attribute should not return
Bug

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

"pthread_mutex_t" should not be consecutively locked or unlocked twice

Analyze your code

Bug | Blocker | symbolic-execution | multi-threading

Mutexes are synchronization primitives that allow to manage concurrency.

- *non recursive mutexes* are targeted by this rule. They can be locked/unlocked only once. Any locking/unlocking sequence that contains two consecutive identical operations leads to an undefined behaviour.
- *recursive mutexes* are not target by this rule. They can be locked several times and unlocked several times as long as the number of locks/unlocks is the same.

This rule raises an issue when a `pthread_mutex_t` is locked or unlocked several times in a row. We assume that all `pthread_mutex_t` are non-recursive (this is the most common case).

Noncompliant Code Example

```
pthread_mutex_t mtx1;

void bad1(void)
{
  pthread_mutex_lock(&mtx1);
  pthread_mutex_lock(&mtx1);
}

void bad2(void)
{
  pthread_mutex_unlock(&mtx1);
  pthread_mutex_unlock(&mtx1);
}
```

Compliant Solution

```
pthread_mutex_t mtx1;

void ok(void)
{
  pthread_mutex_lock(&mtx1);
  pthread_mutex_unlock(&mtx1);
}
```

See

- The Open Group pthread_mutex_init, pthread_mutex_destroy

Available In:

sonarlint | sonarcloud | sonarqube Developer Edition

Stack allocated memory and non-owned memory should not be freed

Bug

Closed resources should not be accessed

Bug

Dynamically allocated memory should be released

Bug

Freed memory should not be used