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Objective C static code analysis

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

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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

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

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

Using pseudorandom number generators (PRNGs) is security-sensitive

Analyze your code

Security Hotspot | Critical | cwe cert owasp

Using pseudorandom number generators (PRNGs) is security-sensitive. For example, it has led in the past to the following vulnerabilities:

- CVE-2013-6386
- CVE-2006-3419
- CVE-2008-4102

When software generates predictable values in a context requiring unpredictability, it may be possible for an attacker to guess the next value that will be generated, and use this guess to impersonate another user or access sensitive information.

As the functions rely on a pseudorandom number generator, they should not be used for security-critical applications or for protecting sensitive data.

Ask Yourself Whether

- the code using the generated value requires it to be unpredictable. It is the case for all encryption mechanisms or when a secret value, such as a password, is hashed.
- the function you use generates a value which can be predicted (pseudo-random).
- the generated value is used multiple times.
- an attacker can access the generated value.

There is a risk if you answered yes to any of those questions.

Recommended Secure Coding Practices

- Use functions which rely on a strong random number generator such as `randombytes_uniform()` or `randombytes_buf()` from `libsodium`, or `randomize()` from Botan.
- Use the generated random values only once.
- You should not expose the generated random value. If you have to store it, make sure that the database or file is secure.

Sensitive Code Example

```
#include <random>
// ...

void f() {
  int random_int = std::rand(); // Sensitive
}
```

Compliant Solution

Freed memory should not be used

Bug

Memory locations should not be released more than once

Bug

Memory access should be explicitly bounded to prevent buffer overflows

Bug

Printf-style format strings should not lead to unexpected behavior at runtime

Bug

Recursion should not be infinite

Bug

Resources should be closed

Bug

Hard-coded credentials are security-sensitive

Security Hotspot

"goto" should jump to labels declared later in the same function

Code Smell

Only standard forms of the "defined" directive should be used

Code Smell

Switch labels should not be nested inside non-switch blocks

Code Smell

```
#include <sodium.h>
#include <botan/system_rng.h>
// ...

void f() {
  char random_chars[10];
  randombytes_buf(random_chars, 10); // Compliant
  uint32_t random_int = randombytes_uniform(10); // Compliant

  uint8_t random_chars[10];
  Botan::System_RNG system;
  system.randomize(random_chars, 10); // Compliant
}
```

See

- OWASP Top 10 2021 Category A2 - Cryptographic Failures
- OWASP Top 10 2017 Category A3 - Sensitive Data Exposure
- Mobile AppSec Verification Standard - Cryptography Requirements
- OWASP Mobile Top 10 2016 Category M5 - Insufficient Cryptography
- MITRE, CWE-338 - Use of Cryptographically Weak Pseudo-Random Number Generator (PRNG)
- MITRE, CWE-330 - Use of Insufficiently Random Values
- MITRE, CWE-326 - Inadequate Encryption Strength
- MITRE, CWE-1241 - Use of Predictable Algorithm in Random Number Generator
- CERT, MSC02-J. - Generate strong random numbers
- CERT, MSC30-C. - Do not use the rand() function for generating pseudorandom numbers
- CERT, MSC50-CPP. - Do not use std::rand() for generating pseudorandom numbers
- Derived from FindSecBugs rule Predictable Pseudo Random Number Generator

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