DCL04-C. Do not declare more than one variable per declaration

Every declaration should be for a single variable, on its own line, with an explanatory comment about the role of the variable. Declaring multiple variables in a single declaration can cause confusion regarding the types of the variables and their initial values. If more than one variable is declared in a declaration, care must be taken that the type and initialized value of the variable are handled correctly.

Noncompliant Code Example

In this noncompliant code example, a programmer or code reviewer might mistakenly believe that the two variables `src` and `c` are declared as `char *`. In fact, `src` has a type of `char *`, whereas `c` has a type of `char`.

```c
char *src = 0, c = 0;
```

Compliant Solution

In this compliant solution, each variable is declared on a separate line:

```c
char *src;    /* Source string */
char c;       /* Character being tested */
```

Although this change has no effect on compilation, the programmer's intent is clearer.

Noncompliant Code Example

In this noncompliant code example, a programmer or code reviewer might mistakenly believe that both `i` and `j` have been initialized to 1. In fact, only `j` has been initialized, and `i` remains uninitialized.

```c
int i, j = 1;
```

Compliant Solution

In this compliant solution, it is readily apparent that both `i` and `j` have been initialized to 1:

```c
int i = 1;
int j = 1;
```

Exceptions

DCL04-C-EX1: Multiple loop control variables can be declared in the same `for` statement, as shown in the following function:

```c
#include <limits.h>  /* For CHAR_BIT */
#include <stddef.h>  /* For size_t */
extern size_t popcount(uintmax_t);
#define PRECISION(umax_value) popcount(umax_value)

size_t bitcount(size_t n) {
    const size_t limit = PRECISION(SIZE_MAX);
    size_t count = 0;
    for (size_t i = 0, j = 1; i < limit; ++i, j <<= 1) {
        if (n & j)
            ++count;
    }
    return count;
}
```
The \texttt{PRECISION()} macro provides the correct precision for any integer type and is defined in \texttt{INT35-C}. Use correct integer precisions—see that rule for more information.

**DCL04-C-EX2**: Multiple, simple variable declarations can be declared on the same line given that there are no initializations. A simple variable declaration is one that is not a pointer or array.

```c
int i, j, k;
```

**Risk Assessment**

Declaring no more than one variable per declaration can make code easier to read and eliminate confusion.

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**Automated Detection**

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**Related Vulnerabilities**

Search for vulnerabilities resulting from the violation of this rule on the CERT website.

**Related Guidelines**

SEI CERT C++ Coding Standard: VOID DCL04-CPP. Do not declare more than one variable per declaration