Use of extreme values in arithmetic expression

Name: Use of extreme values in arithmetic expression

Description: If a variable is assigned the maximum or minimum value for that variable's type and is then used in an arithmetic expression, this may result in an overflow.

ID: cpp/arithmetic-with-extreme-values

Kind: problem

Severity: warning

Precision: low

Assigning the maximum or minimum value for a type to a variable of that type and then using the variable in calculations may cause overflows.

Recommendation

Before using the variable, ensure that it is reassigned a value that does not cause an overflow, or use a wider type to do the arithmetic.

Example

In this example, assigning `INT_MAX` to a variable and adding one causes an overflow. However, casting to a `long` beforehand ensures that the arithmetic is done in the wider type, and so does not overflow.

```
1  int main(int argc, char** argv) {
2      int i = INT_MAX;
3      // BAD: overflow
4      int j = i + 1;
5
6      // ...
7
8      int l = INT_MAX;
9      // GOOD: no overflow
10     long k = (long)l + 1;
11 }
```

References

- Common Weakness Enumeration: CWE-190.
- Common Weakness Enumeration: CWE-191.