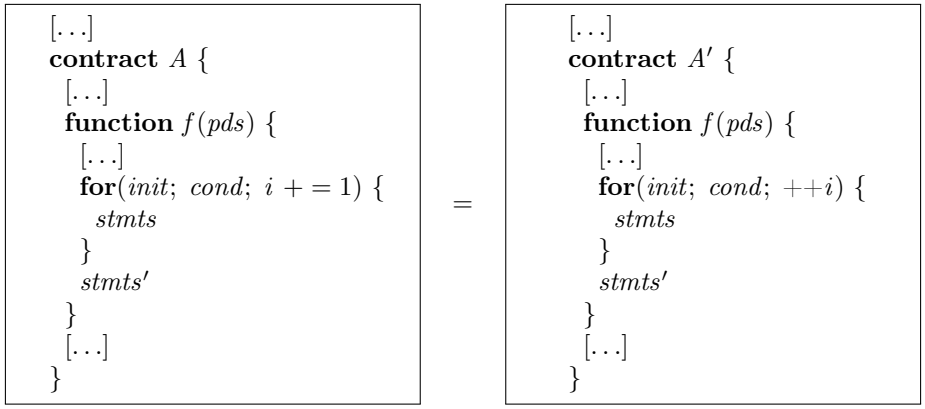
Rule 0.27 ⟨*Use Efficient Loop Increment*⟩



where

i is the loop counter variable;

$i += 1$ is the addition assignment increment operation;

$++i$ is the pre-increment operator;

init and *cond* are the loop initialization and condition expressions;

stmts represents the loop body statements;

pds are the parameter declarations of function f;

stmts′ represents statements following the loop.

provided

The loop uses $i += 1$ for incrementing the counter;

The pre-increment operator $++i$ produces equivalent behavior;

The increment operation occurs only in the loop update expression;

No side effects depend on the specific increment method used;

The pre-increment generates more efficient bytecode than addition assignment.

Invariant:

Let s_i and s_i' be the initial state of A and A', respectively.

Let s_f and s_f' be the state reached by A and A', respectively, after $A.f()$ and $A'.f()$ are executed from s_i and s_i', respectively.

Then, the coupling invariant is

$$\forall\, s_i, s_i' \;.\; (s_i = s_i') \rightarrow (s_f = s_f')$$