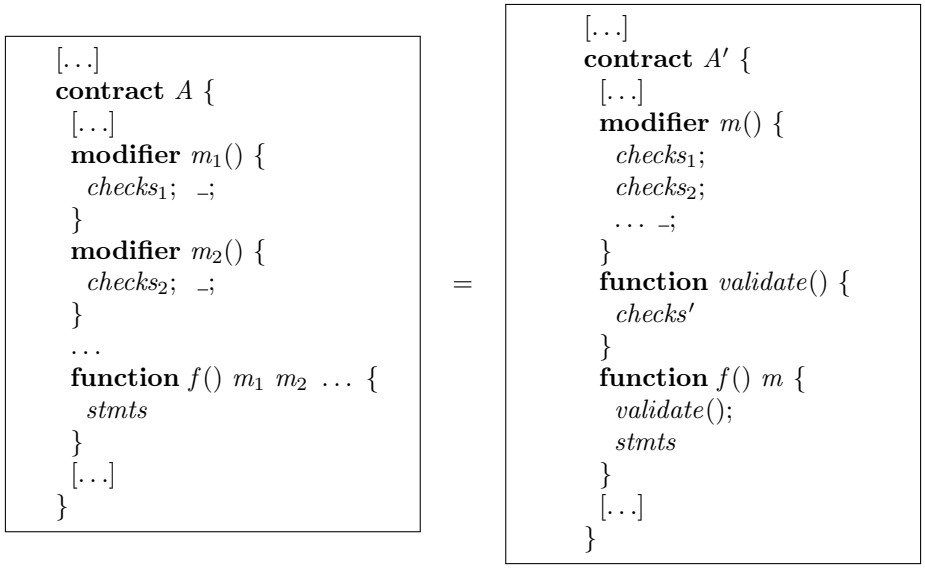
Rule 0.20 ⟨*Limit Number of Modifiers*⟩



where

$m_1, m_2, \ldots, m_k$ are modifiers in contract A applied to function f;

m is a consolidated modifier in contract A' that combines multiple checks;

$checks_i$ represents the validation logic in modifier m_i;

$checks'$ represents additional validation logic moved to a function;

$validate()$ is a helper function that performs some of the validation checks;

$stmts$ represents the function body statements;

_ denotes the placeholder in modifiers where the function body is executed.

provided

The modifiers $m_1, \ldots, m_k$ perform related validation checks;

Consolidating modifiers into m or moving checks to $validate()$ maintains the same validation logic;

The order of checks is preserved to maintain security properties;

All validation conditions remain equivalent before and after transformation;

The consolidated approach reduces function call stack depth;

Access control and validation semantics are preserved.

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

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