Rule 0.11 ⟨*Delete Unused Storage Variables*⟩

[...]
 contract A {
  [...]
  function $f(pds)$ {
   [...]
   $var = defaultValue$;
   $stmts$
  }
  [...]
 }
	$=$	[...]
		 contract A' {
		  [...]
		  function $f(pds)$ {
		   [...]
		   delete var;
		   $stmts$
		  }
		  [...]
		 }

where

var is a storage variable or storage location being reset;

defaultValue is the default zero value for the type of var;

stmts represents the sequence of statements following the operation;

pds are the parameter declarations of function f.

provided

var refers to a storage location (state variable, mapping entry, or array element);

The assignment $var = defaultValue$ is semantically equivalent to **delete** var;

The **delete** operation triggers gas refunds in the EVM;

var is not read again within the same transaction after this operation;

The storage being cleared is no longer needed by the contract logic.

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

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