
Rule 0.11 $\langle \text{Delete Unused Storage Variables} \rangle$

<pre> [...] contract A { [...] function f(pds) { [...] var = defaultValue; stmts } [...] }</pre>	=	<pre> [...] contract A' { [...] function f(pds) { [...] delete var; stmts } [...] }</pre>
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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

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