

5.178 k_same

	DESCRIPTION	LINKS	GRAPH
Origin	[133]		
Constraint	k_same(SETS)		
Type	VARIABLES : collection(var-dvar)		
Argument	SETS : collection(set - VARIABLES)		
Restrictions	<pre>required(VARIABLES, var) VARIABLES > 0 required(SETS, set) SETS > 1 same_size(SETS, set)</pre>		
Purpose	<p>Given SETS sets, each containing the same number of domain variables, the k_same constraint enforces that the multisets of values assigned to each set are all identical.</p>		
Example	$\left(\begin{array}{c} \text{set} - \left\langle \begin{array}{l} \text{var} - 1, \\ \text{var} - 9, \\ \text{var} - 1, \\ \text{var} - 5, \\ \text{var} - 2, \\ \text{var} - 1 \end{array} \right\rangle, \\ \left\langle \text{set} - \left\langle \begin{array}{l} \text{var} - 1, \\ \text{var} - 1, \\ \text{var} - 1, \\ \text{var} - 2, \\ \text{var} - 5, \\ \text{var} - 5, \\ \text{var} - 2, \\ \text{var} - 1, \\ \text{var} - 1, \end{array} \right\rangle, \right\rangle \\ \text{set} - \left\langle \begin{array}{l} \text{var} - 1, \\ \text{var} - 1, \\ \text{var} - 9, \\ \text{var} - 1 \end{array} \right\rangle \end{array} \right)$		
	<p>The k_same constraint holds since:</p> <ul style="list-style-type: none"> • The first and second collections of variables are assigned to the same multiset. • The second and third collections of variables are also assigned to the same multiset. 		
Typical	VARIABLES > 1		

Symmetries

- Items of SETS are [permutable](#).
- Items of SETS.set are [permutable](#).
- All occurrences of two distinct values of SETS.set.var can be [swapped](#); all occurrences of a value of SETS.set.var can be [renamed](#) to any unused value.

Remark

It was shown in [133] that, finding out whether the `k_same` constraint has a solution or not is NP-hard when we have more than one [same](#) constraint. This was achieved by reduction from [3-dimensional-matching](#) in the context where we have 2 [same](#) constraints.

See also

common keyword: [k_same_interval](#), [k_same_modulo](#), [k_same_partition](#) (*system of constraints*).

implies: [k_used_by](#).

part of system of constraints: [same](#).

used in graph description: [same](#).

Keywords

combinatorial object: [permutation](#), [multiset](#).

complexity: [3-dimensional-matching](#).

constraint type: [system of constraints](#), [decomposition](#).

modelling: [equality between multisets](#).

Arc input(s)	SETS
Arc generator	$\text{PATH} \mapsto \text{collection}(\text{set1}, \text{set2})$
Arc arity	2
Arc constraint(s)	$\text{same}(\text{set1.set}, \text{set2.set})$
Graph property(ies)	$\text{NARC} = \text{SETS} - 1$

Graph model

Parts (A) and (B) of Figure 5.360 respectively show the initial and final graph associated with the **Example** slot. To each vertex corresponds a collection of variables, while to each arc corresponds a **same** constraint.

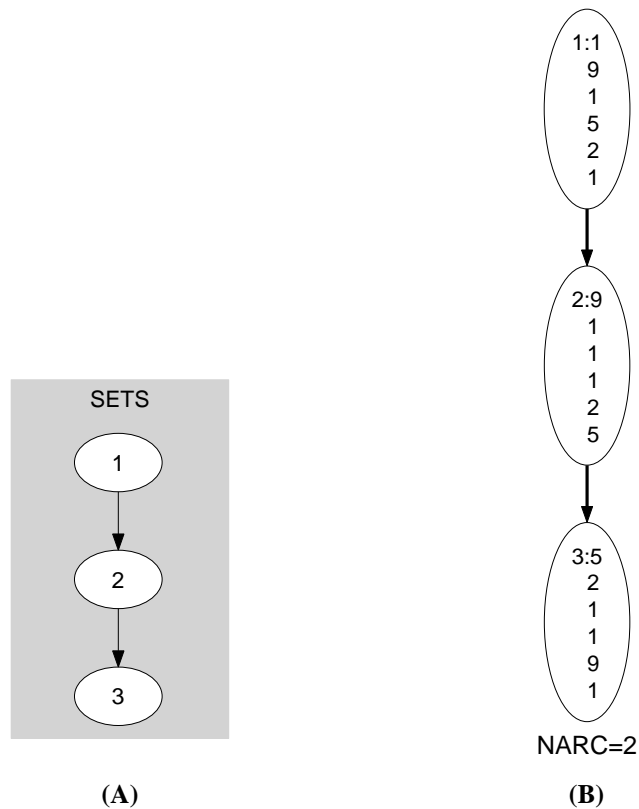


Figure 5.360: Initial and final graph of the $k_{\text{.same}}$ constraint

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