

5.207 k_same

	DESCRIPTION	LINKS	GRAPH
Origin	[151]		
Constraint	k_same(SETS)		
Type	VARIABLES : collection (var–dvar)		
Argument	SETS : collection (set – VARIABLE)		
Restrictions	required (VARIABLES, var) VARIABLES ≥ 1 required (SETS, set) SETS > 1 same_size (SETS, set)		
Purpose	Given SETS sets, each containing the same number of domain variables, the <code>k_same</code> constraint forces that the multisets of values assigned to each set are all identical.		
Example	$\left(\left\langle \begin{array}{l} \text{set} - \langle 1, 9, 1, 5, 2, 1 \rangle, \\ \text{set} - \langle 9, 1, 1, 1, 2, 5 \rangle, \\ \text{set} - \langle 5, 2, 1, 1, 9, 1 \rangle \end{array} \right\rangle \right)$		
	The <code>k_same</code> constraint holds since:		
	<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	<ul style="list-style-type: none"> • 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. 		
Arg. properties	Contractible wrt. SETS.		
Remark	It was shown in [151] that, finding out whether the <code>k_same</code> constraint has a solution or not is NP-hard when we have more than one <code>same</code> constraint. This was achieved by reduction from 3-dimensional-matching in the context where we have 2 <code>same</code> 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

characteristic of a constraint: sort based reformulation.
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 5.461 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.

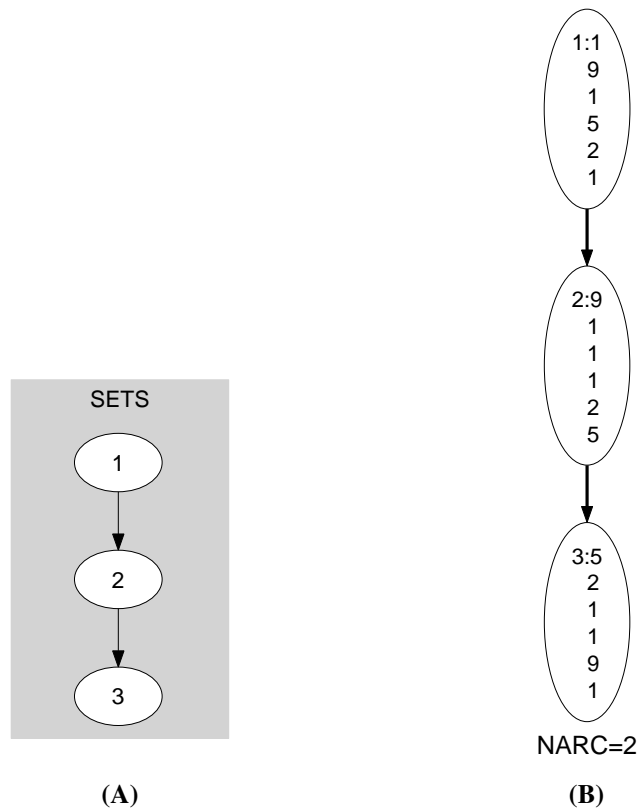


Figure 5.461: Initial and final graph of the k .same constraint

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