5.213 k_used_by_interval

DESCRIPTION LINKS GRAPH

Origin Derived from used_by_interval and from k_used_by.

Constraint k_used_by_interval(SETS, SIZE_INTERVAL)

Type
VARIABLES : collection(var−dvar)

Arguments

SETS	:	collection(set − VARIABLES)
SIZE_INTERVAL	:	int

Restrictions
required(VARIABLES, var)
|VARIABLES| ≥ 1
required(SETS, set)
|SETS| > 1
non_increasing_size(SETS, set)
SIZE_INTERVAL > 0

Purpose Given |SETS| sets of domain variables, the k_used_by_interval constraint forces a used_by_interval constraint between each pair of consecutive sets.

Example $(\langle \texttt{set} - \langle 1,1,1,8,6,2\rangle, \texttt{set} - \langle 1,0,7,7\rangle, \texttt{set} - \langle 1,2\rangle\rangle, 3)$

In the example, the second argument SIZE_INTERVAL = 3 defines the following family of intervals $[3 \cdot k, 3 \cdot k + 2]$, where k is an integer. Consequently, the k_used_by_interval constraint holds since:

- The first collection of variables is assigned 4 values in the interval $[0, 2]$ as well as 2 values in the interval $[6, 8]$, while the second collection of variables is assigned no more values in the previous two intervals.
- The second collection of variables is assigned 2 values in the interval $[0, 2]$ as well as 2 values in the interval $[6, 8]$, while the third collection of variables is assigned no more values in the previous two intervals.

Typical
|VARIABLES| > 1
SIZE_INTERVAL > 0

Symmetries
- Items of SETS are permutable.
- Items of SETS.set are permutable.
- An occurrence of a value of SETS.set.var that belongs to the k-th interval, of size SIZE_INTERVAL, can be replaced by any other value of the same interval.

Arg. properties
Contractible wrt. SETS.

See also

common keyword: `k_used_by` *(system of constraints)*.

implied by: `k_same_interval`.

part of system of constraints: `used_by_interval`.

used in graph description: `used_by_interval`.

Keywords

characteristic of a constraint: sort based reformulation.

constraint type: system of constraints, decomposition.

modelling: inclusion, interval.

Arc input(s)	SETS
Arc generator	$PATH \mapsto$ collection(set1, set2)
Arc arity	2
Arc constraint(s)	used_by_interval(set1.set, set2.set, SIZE_INTERVAL)
Graph property(ies)	**NARC**$= \lvert$SETS$\rvert - 1$

Graph model Parts (A) and (B) of Figure 5.485 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 used_by_interval constraint.

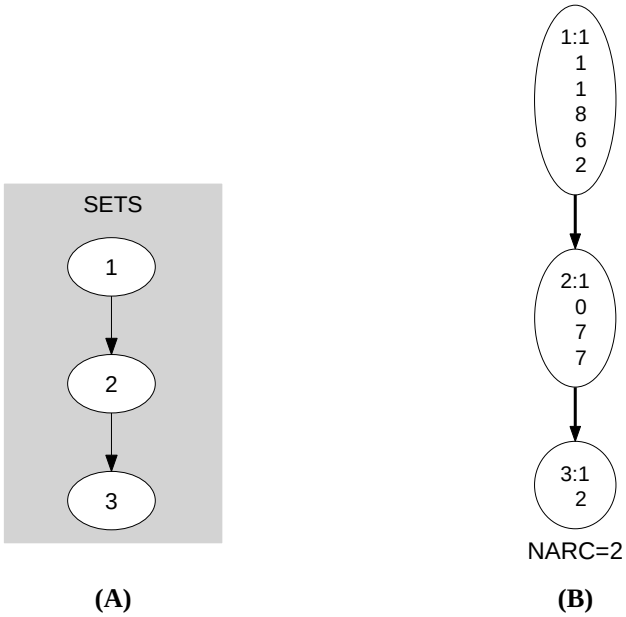

Figure 5.485: Initial and final graph of the k_used_by_interval constraint