## 5.207 k_disjoint

DESCRIPTION LINKS GRAPH

**Origin** Derived from disjoint

**Constraint** k_disjoint(SETS)

**Type** VARIABLES : collection(var−dvar)

**Argument** SETS : collection(set − VARIABLES)

**Restrictions**
required(VARIABLES, var)
|VARIABLES| ≥ 1
required(SETS, set)
|SETS| > 1

**Purpose** Given |SETS| sets of domain variables, the k_disjoint constraint forces that no value is assigned to more than one set.

**Example** $(\langle \texttt{set} - \langle 1,9,1,5\rangle, \texttt{set} - \langle 2,7,7,0,6,8\rangle, \texttt{set} - \langle 4,4,3\rangle\rangle)$

The k_disjoint constraint holds since:

- The set of values $\{1,5,9\}$ and $\{0,2,6,7,8\}$ respectively assigned to the variables of the first and second collections have an empty intersection.
- The set of values $\{1,5,9\}$ and $\{3,4\}$ respectively assigned to the variables of the first and third collections have an empty intersection.
- The set of values $\{0,2,6,7,8\}$ and $\{3,4\}$ respectively assigned to the variables of the second and third collections have an empty intersection.

**Typical** |VARIABLES| > 1

**Symmetries**
- Items of SETS are permutable.
- Items of SETS.set are permutable.
- An occurrence of a value of VARIABLES.var can be replaced by any value of VARIABLES.var.
- 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.

**See also**
**part of system of constraints:** disjoint.
**used in graph description:** disjoint.

**Keywords**

**characteristic of a constraint:** disequality.

**constraint type:** system of constraints, decomposition, value constraint.

**modelling:** empty intersection.

| | |
|---|---|
| **Arc input(s)** | SETS |
| **Arc generator** | $CLIQUE(<) \mapsto$ collection(set1, set2) |
| **Arc arity** | 2 |
| **Arc constraint(s)** | disjoint(set1.set, set2.set) |
| **Graph property(ies)** | **NARC**$= |\text{SETS}| * (|\text{SETS}| - 1)/2$ |

**Graph model** Parts (A) and (B) of Figure 5.479 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 disjoint constraint.

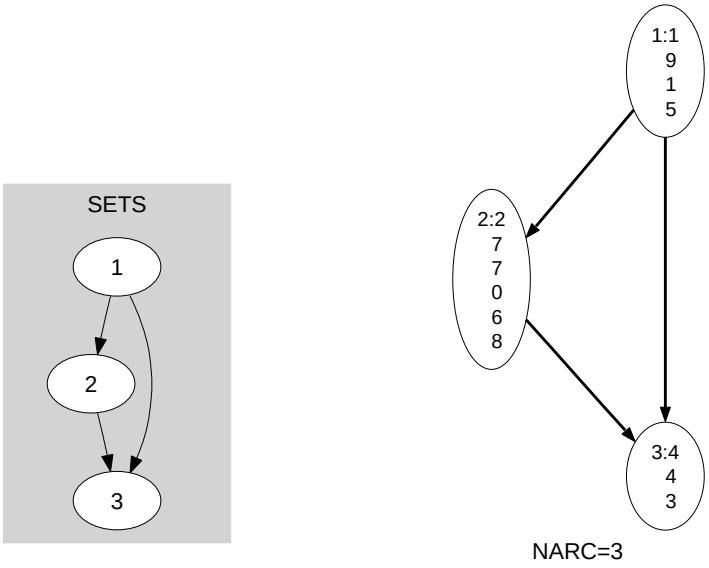


Figure 5.479: Initial and final graph of the k_disjoint constraint