

5.295 open_among

	DESCRIPTION	LINKS	GRAPH
Origin	Derived from among and open_global_cardinality .		
Constraint	<code>open_among(S, NVAR, VARIABLES, VALUES)</code>		
Arguments	<pre>S : svar NVAR : dvar VARIABLES : collection(var-dvar) VALUES : collection(val-int)</pre>		
Restrictions	<pre>S ≥ 1 S ≤ VARIABLES NVAR ≥ 0 NVAR ≤ VARIABLES required(VARIABLES, var) required(VALUES, val) distinct(VALUES, val)</pre>		
Purpose	<p>Let \mathcal{V} be the variables of the collection VARIABLES for which the corresponding position belongs to the set S. Positions are numbered from 1. NVAR is the number of variables of \mathcal{V} that take their value in VALUES.</p>		
Example	<pre>({2, 3, 4, 5}, 3, ⟨8, 5, 5, 4, 1⟩, ⟨1, 5, 8⟩)</pre> <p>The <code>open_among</code> constraint holds since within the last four values (i.e., $S = \{2, 3, 4, 5\}$) of $\langle 8, 5, 5, 4, 1 \rangle$ exactly 3 values belong to the set of values $\{1, 5, 8\}$.</p>		
Typical	<pre>NVAR > 0 NVAR < VARIABLES VARIABLES > 1 VALUES > 1 VARIABLES > VALUES </pre>		
Symmetries	<ul style="list-style-type: none"> Items of VALUES are permutable. An occurrence of a value of VARIABLES.var that belongs to VALUES.val (resp. does not belong to VALUES.val) can be replaced by any other value in VALUES.val (resp. not in VALUES.val). 		
Arg. properties	<ul style="list-style-type: none"> Functional dependency: NVAR determined by S, VARIABLES and VALUES. Suffix-contractible wrt. VARIABLES when NVAR = 0. 		

See also

common keyword: `open_atleast`, `open_atmost` (*open constraint*, *value constraint*), `open_global_cardinality` (*open constraint*, *counting constraint*).

hard version: `among`.

used in graph description: `in_set`.

Keywords

constraint arguments: constraint involving set variables.

constraint type: open constraint, value constraint, counting constraint.

modelling: functional dependency.

Arc input(s)	VARIABLES
Arc generator	<i>SELF</i> \mapsto collection(variables)
Arc arity	1
Arc constraint(s)	<ul style="list-style-type: none"> • in(variables.var, VALUES) • in_set(variables.key, S)
Graph property(ies)	NARC = NVAR

Graph model

The arc constraint corresponds to the conjunction of unary constraints `in(variables.var, VALUES)` and `in_set(variables.key, S)` defined in this catalogue. Consequently we employ the *SELF* arc generator in order to produce an initial graph with a single loop on each vertex.

Parts (A) and (B) of Figure 5.612 respectively show the initial and final graph associated with the **Example** slot. Since we use the **NARC** graph property, the loops of the final graph are stressed in bold.

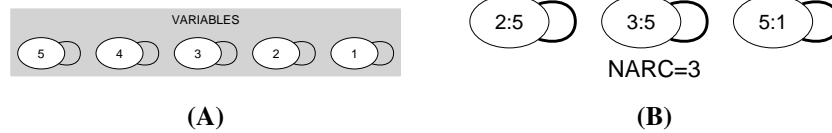


Figure 5.612: Initial and final graph of the open_among constraint

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