

5.13 alldifferent_between_sets

	DESCRIPTION	LINKS	GRAPH
Origin	ILOG		
Constraint	<code>alldifferent_between_sets(VARIABLES)</code>		
Synonyms	<code>all_null_intersect</code> , <code>alldiff_between_sets</code> , <code>alldistinct_between_sets</code> , <code>alldiff_on_sets</code> , <code>alldistinct_on_sets</code> , <code>alldifferent_on_sets</code> .		
Argument	VARIABLES : <code>collection</code> (<code>var-svar</code>)		
Restriction	<code>required</code> (VARIABLES, var)		
Purpose	Enforce all sets of the collection VARIABLES to be distinct.		
Example	$(\langle \text{var} - \{3, 5\}, \text{var} - \emptyset, \text{var} - \{3\}, \text{var} - \{3, 5, 7\} \rangle)$ <p>The <code>alldifferent_between_sets</code> constraint holds since all the sets $\{3, 5\}$, \emptyset, $\{3\}$ and $\{3, 5, 7\}$ are distinct.</p>		
Typical	$ \text{VARIABLES} > 2$		
Symmetry	Items of VARIABLES are <code>permutable</code> .		
Arg. properties	<code>Contractible</code> wrt. VARIABLES.		
Usage	This constraint was available in some configuration library offered by Ilog.		
Algorithm	A filtering algorithm for the <code>alldifferent_between_sets</code> is proposed by C.-G. Quimper and T. Walsh in [335] and a longer version is available in [336] and in [337].		
See also	common keyword: <code>link_set_to_booleans</code> (<i>constraint involving set variables</i>). specialisation: <code>alldifferent</code> (set variable replaced by variable). used in graph description: <code>eq_set</code> .		
Keywords	characteristic of a constraint: all different, disequality. constraint arguments: constraint involving set variables. filtering: bipartite matching. final graph structure: <code>one_succ</code> .		

Arc input(s)	VARIABLES
Arc generator	<code>CLIQUE</code> \mapsto <code>collection</code> (variables1, variables2)
Arc arity	2
Arc constraint(s)	<code>eq_set</code> (variables1.var, variables2.var)
Graph property(ies)	<code>MAX_NSCC</code> ≤ 1
Graph class	<code>ONE_SUCC</code>

Graph model

We generate a *clique* with binary *set equalities* constraints between each pair of vertices (including a vertex and itself) and state that the size of the largest strongly connected component should not exceed 1.

Parts (A) and (B) of Figure 5.32 respectively show the initial and final graph associated with the **Example** slot. Since we use the `MAX_NSCC` graph property we show one of the largest strongly connected components of the final graph. The `alldifferent_between_sets` holds since all the strongly connected components have at most one vertex.

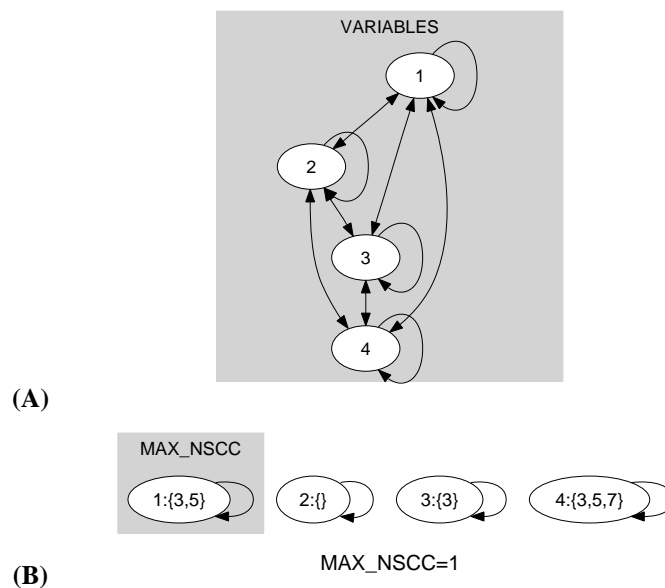


Figure 5.32: Initial and final graph of the `alldifferent_between_sets` constraint