

5.143 global_contiguity

	DESCRIPTION	LINKS	GRAPH	AUTOMATON
Origin	[242]			
Constraint	global_contiguity(VARIABLES)			
Synonym	contiguity.			
Argument	VARIABLES : collection(var-dvar)			
Restrictions	required(VARIABLES, var) VARIABLES.var ≥ 0 VARIABLES.var ≤ 1			
Purpose	Enforce all variables of the VARIABLES collection to be assigned value 0 or 1. In addition, all variables assigned to value 1 appear contiguously.			
Example	$((0, 1, 1, 0))$			
	The global_contiguity constraint holds since the sequence 0 1 1 0 contains no more than one group of contiguous 1.			
Typical	$ VARIABLES > 2$ range(VARIABLES.var) > 1			
Symmetry	Items of VARIABLES can be reversed.			
Usage	The article [242] introducing this constraint refers to hardware configuration problems.			
Algorithm	A filtering algorithm for this constraint is described in [242].			
See also	common keyword: group, inflexion (sequence). implies: consecutive_values, no_valley. related: roots.			
Keywords	characteristic of a constraint: convex, automaton, automaton without counters, reified automaton constraint. combinatorial object: sequence. constraint network structure: Berge-acyclic constraint network. filtering: arc-consistency. final graph structure: connected component.			

Arc input(s)	VARIABLES
Arc generator	<i>PATH</i> \mapsto collection(variables1, variables2) <i>LOOP</i> \mapsto collection(variables1, variables2)
Arc arity	2
Arc constraint(s)	<ul style="list-style-type: none"> • variables1.var = variables2.var • variables1.var = 1
Graph property(ies)	NCC \leq 1

Graph model

Each **connected component** of the final graph corresponds to one set of contiguous variables that all take value 1.

Parts (A) and (B) of Figure 5.275 respectively show the initial and final graph associated with the **Example** slot. The `global_contiguity` constraint holds since the final graph does not contain more than one **connected component**. This **connected component** corresponds to 2 contiguous variables that are both assigned to 1.

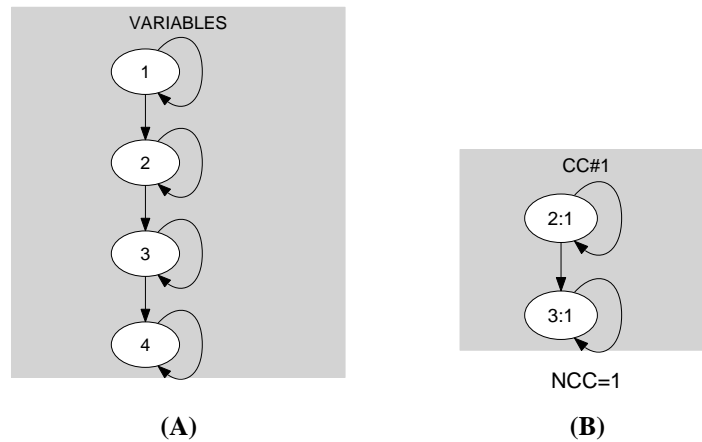


Figure 5.275: Initial and final graph of the `global_contiguity` constraint

Automaton

Figure 5.276 depicts the automaton associated with the `global_contiguity` constraint. To each variable VAR_i of the collection `VARIABLES` corresponds a signature variable that is equal to VAR_i . There is no signature constraint.

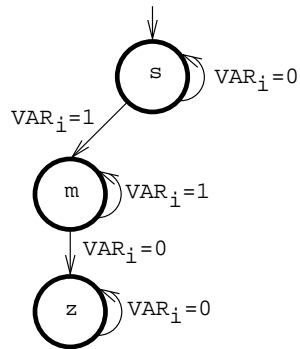


Figure 5.276: Automaton of the `global_contiguity` constraint

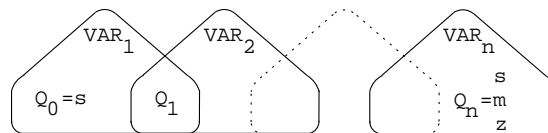


Figure 5.277: Hypergraph of the reformulation corresponding to the automaton of the `global_contiguity` constraint

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