

5.195 int_value_precede

	DESCRIPTION	LINKS	AUTOMATON
Origin	[258]		
Constraint	<code>int_value_precede(S, T, VARIABLES)</code>		
Synonyms	<code>precede</code> , <code>precedence</code> , <code>value_precede</code> .		
Arguments	S : <code>int</code> T : <code>int</code> VARIABLES : <code>collection(var—dvar)</code>		
Restrictions	$S \neq T$ <code>required(VARIABLES, var)</code>		
Purpose	If value T occurs in the collection of variables VARIABLES then its first occurrence should be preceded by an occurrence of value S.		
Example	$(0, 1, \langle 4, 0, 6, 1, 0 \rangle)$ The <code>int_value_precede</code> constraint holds since the first occurrence of value 0 precedes the first occurrence of value 1.		
Typical	$S < T$ $ VARIABLES > 1$ <code>atleast(1, VARIABLES, S)</code> <code>atleast(1, VARIABLES, T)</code>		
Symmetries	<ul style="list-style-type: none"> An occurrence of a value of <code>VARIABLES.var</code> that is different from S and T can be <code>replaced</code> by any other value that is also different from S and T. All occurrences of values S and T can be <code>swapped</code> in S, T and <code>VARIABLES.var</code>. 		
Arg. properties	<ul style="list-style-type: none"> <code>Suffix-contractible</code> wrt. <code>VARIABLES</code>. <code>Aggregate</code>: <code>S(id)</code>, <code>T(id)</code>, <code>VARIABLES(union)</code>. 		
Algorithm	A filtering algorithm for maintaining value precedence is presented in [258]. Its complexity is linear to the number of variables of the collection VARIABLES.		
Systems	<code>precede</code> in <code>Gecode</code> , <code>value_precede</code> in <code>MiniZinc</code> .		
See also	generalisation: <code>int_value_precede_chain</code> (sequence of 2 values replaced by sequence of at least 2 values), <code>set_value_precede</code> (sequence of domain variables replaced by sequence of set variables).		

Keywords

characteristic of a constraint: automaton, automaton without counters, reified automaton constraint.

constraint network structure: Berge-acyclic constraint network.

constraint type: order constraint.

filtering: arc-consistency.

symmetry: symmetry, indistinguishable values, value precedence.

Automaton

Figure 5.452 depicts the automaton associated with the `int_value_precede` constraint. Let VAR_i be the i^{th} variable of the `VARIABLES` collection. To each triple (S, T, VAR_i) corresponds a signature variable S_i as well as the following signature constraint: $(\text{VAR}_i = S \Leftrightarrow S_i = 1) \wedge (\text{VAR}_i = T \Leftrightarrow S_i = 2) \wedge (\text{VAR}_i \neq S \wedge \text{VAR}_i \neq T \Leftrightarrow S_i = 3)$.

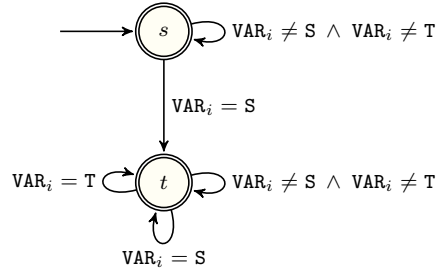


Figure 5.452: Automaton of the `int_value_precede` constraint (state s means that value S was not yet encountered, while state t means that value S was already encountered)

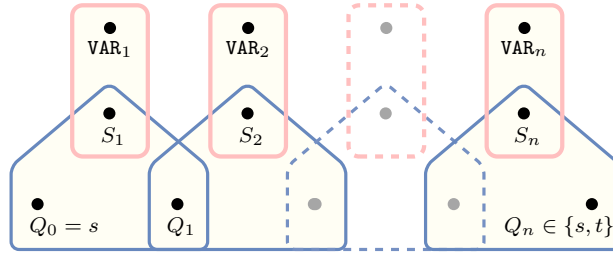


Figure 5.453: Hypergraph of the reformulation corresponding to the automaton of the `int_value_precede` constraint

