5.242 max_index

DESCRIPTION LINKS GRAPH

Origin N. Beldiceanu

Constraint max_index(MAX_INDEX, VARIABLES)

Arguments

MAX_INDEX	:	dvar
VARIABLES	:	collection(index−int, var−dvar)

Restrictions

$|\texttt{VARIABLES}| > 0$
$\texttt{MAX\_INDEX} \geq 0$
$\texttt{MAX\_INDEX} \leq |\texttt{VARIABLES}|$
required(VARIABLES, [index, var])
$\texttt{VARIABLES.index} \geq 1$
$\texttt{VARIABLES.index} \leq |\texttt{VARIABLES}|$
distinct(VARIABLES, index)

Purpose MAX_INDEX is one of the indices of the collection of variables VARIABLES corresponding to its maximum value.

Example

$$\left(\begin{array}{cc} & \texttt{index} - 1 \quad \texttt{var} - 3, \\ 3, \left\langle \begin{array}{ll} \texttt{index} - 2 & \texttt{var} - 2, \\ \texttt{index} - 3 & \texttt{var} - 7, \\ \texttt{index} - 4 & \texttt{var} - 2, \end{array} \right\rangle & \\ & \texttt{index} - 5 \quad \texttt{var} - 7 \end{array}\right)$$

The attribute $\texttt{var} = 7$ of the third and fifth items of the collection VARIABLES is the maximum value over values $3, 2, 7, 2, 7$. Consequently, the max_index constraint holds since its first argument MAX_INDEX is set to $3 \in \{3, 5\}$.

Typical

$|\texttt{VARIABLES}| > 0$
range(VARIABLES.var) > 1

Symmetries

- Items of VARIABLES are permutable.
- One and the same constant can be added to the var attribute of all items of VARIABLES.

See also **comparison swapped:** min_index.

Keywords **characteristic of a constraint:** maximum.

constraint type: order constraint.

modelling: functional dependency.

Arc input(s)	VARIABLES
Arc generator	$CLIQUE \mapsto$ collection(variables1, variables2)
Arc arity	2
Arc constraint(s)	$\bigvee \left(\begin{array}{l} \texttt{variables1.key} = \texttt{variables2.key}, \\ \texttt{variables1.var} > \texttt{variables2.var} \end{array} \right)$
Graph property(ies)	**ORDER**$(0, 0, \texttt{index}) = \texttt{MAX\_INDEX}$

Graph model Parts (A) and (B) of Figure 5.515 respectively show the initial and final graph associated with the **Example** slot. Since we use the **ORDER** graph property, the vertex of rank 0 (without considering the loops) of the final graph is outlined with a thick circle.

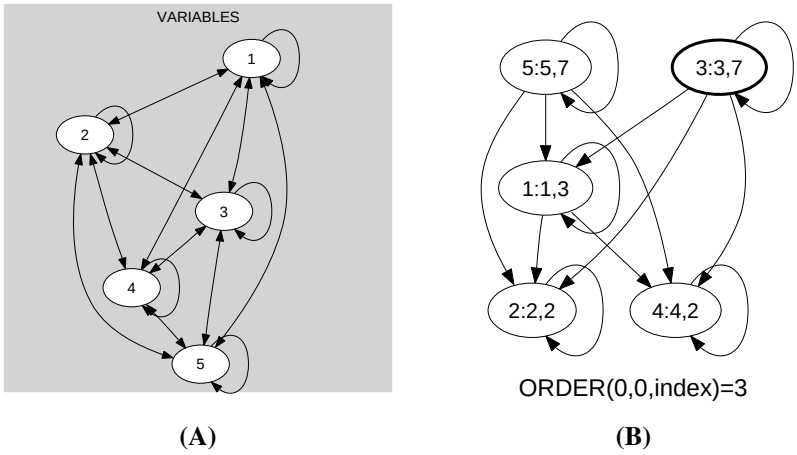

Figure 5.515: Initial and final graph of the max_index constraint