5.123 elementn

DESCRIPTION LINKS AUTOMATON

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Constraint elementn(INDEX, TABLE, ENTRIES)

Arguments

INDEX	:	dvar
TABLE	:	collection(value−int)
ENTRIES	:	collection(entry−dvar)

Restrictions

$\texttt{INDEX} \geq 1$
$\texttt{INDEX} \leq |\texttt{TABLE}| - |\texttt{ENTRIES}| + 1$
$|\texttt{TABLE}| \geq |\texttt{ENTRIES}|$
required(TABLE, value)
required(ENTRIES, entry)

Purpose $\forall i \in [1, |\texttt{ENTRIES}|] : \texttt{ENTRIES}[i].\texttt{entry} = \texttt{TABLE}[\texttt{INDEX} + i - 1].\texttt{value}$

Example $\left(\begin{array}{l} 3, \langle 6, 9, 2, 9\rangle\,, \\ \langle 2, 9\rangle \end{array}\right)$

The elementn constraint holds since its third argument $\texttt{ENTRIES} = \langle 2, 9\rangle$ is set to the subsequence starting at the third (i.e., $\texttt{INDEX} = 3$) item of the table $\texttt{TABLE} = \langle 6, 9, 2, 9\rangle$.

Typical

$|\texttt{TABLE}| > 1$
$\texttt{range}(\texttt{TABLE.value}) > 1$
$|\texttt{ENTRIES}| > 1$

Symmetry All occurrences of two distinct values in TABLE.value or ENTRIES.entry can be swapped; all occurrences of a value in TABLE.value or ENTRIES.entry can be renamed to any unused value.

Usage The elementn constraint is useful for extracting of subsequence of fixed length from a given sequence.

Reformulation Let $I_1 = \texttt{INDEX}, I_2 = \texttt{INDEX} + 1, \ldots, I_{|\texttt{ENTRIES}|} = \texttt{INDEX} + |\texttt{ENTRIES}| - 1$. The elementn(INDEX, TABLE, $\langle \texttt{entry} - E_1, \texttt{entry} - E_2, \ldots, \texttt{entry} - E_{|\texttt{ENTRIES}|}\rangle$) constraint can be expressed in term of a conjunction of $|\texttt{ENTRIES}|$ element constraints of the form:
element(I_1, TABLE, E_1),
element(I_2, TABLE, E_2),
...
element(INDEX + $|\texttt{ENTRIES}| - 1$, TABLE, $E_{|\texttt{ENTRIES}|}$).

See also **common keyword:** element *(data constraint)*.

Keywords

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

constraint network structure: Berge-acyclic constraint network.

constraint type: data constraint, sliding sequence constraint.

filtering: arc-consistency.

modelling: table.

Automaton

Figure 5.253 depicts the automaton associated with the `elementn` constraint of the **Example** slot. Let `I` and $\mathtt{E}_k$ respectively denote the `INDEX` argument and the `entry` attribute of the k^{th} item of the `ENTRIES` collection. Figure 5.254 depicts the reformulation of the `elementn` constraint.

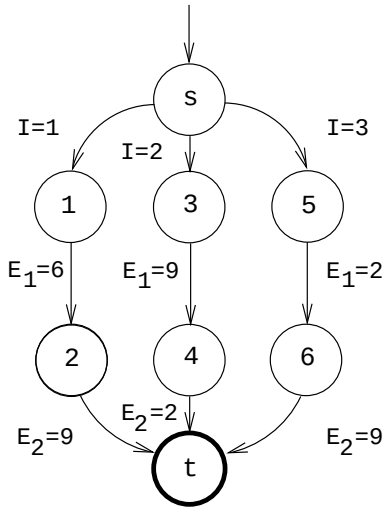

Figure 5.253: Automaton of the `elementn` constraint given in the example

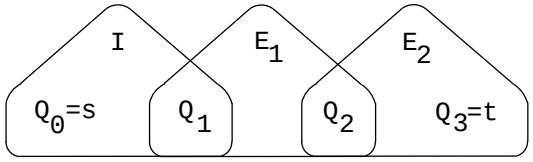

Figure 5.254: Hypergraph of the reformulation corresponding to the automaton of the `elementn` constraint