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5 Sudoku

ICL_VAL: Value propagation or consistency (naive).
ICL_BND: Bounds propagation or consistency.
ICL_DOM: Domain propagation or consistency.
ICL_DEF: The default consistency for a constraint.

After the experiment (refer to the log A01_log.txt), we found that ICL_VAL and ICL_DEF have the same and the most size of search tree. ICL_BND has less size of search tree. ICL_DOM has the least size of tree.

Option	Depth	Memory	Used Node
ICL_VAL/ICL_DEF	11	67295	20
ICL_BND	7	50631	9
ICL_DOM	0	31668	1

For all the solutions, refer to A01_log.txt.

7 n-Queens with 0/1 Variables

The constraints in this model:

(1) All the variables should be 0 or 1.

$(x_i, y_i) \in \{0,1\} \text{for } 0 \leq i < n$

(2) All sum of all row or column should be 1.

$$\sum_{i=0}^{n-1}(x_j, i) = 1, \qquad \sum_{i=0}^{n-1}(i, y_j) = 1 \text{ for } (x_j, y_j), 0 \leq j < n$$

(3) For all the diagonals, the sum should be less or equal than 1.

$$\sum_{i=0}^{j-1}(x_{j-i-1}, y_i) \leq 1; \sum_{i=0}^{j-1}(x_{n+i-j}, y_i) \leq 1 \text{ for } 2 \leq j \leq n$$

$$\sum_{i=0}^{j-1}(x_{j-i-1}, y_{n-1-i}) \leq 1; \sum_{i=0}^{j-1}(x_{n+i-j}, y_{n-1-i}) \leq 1 \text{ for } 2 \leq j < n$$

For the branching of the value, there's no difference because there are only two possible

values 0 or 1.

Advantage:
This model has small constrains which is 2n+(n-1)*2+(n-2)*2 = 6n-6.

Disadvantage:
This model has more variables which is n^2.