

Assignment 1

ID2204 – Constraint Programming

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1 Sudoku

For the Sudoku puzzle, initially we had to add a custom option handler. We did this to parameterize which puzzle from the examples would solve. The Script takes the command line options as argument and parses the puzzle to solve and the Integer Consistency Level. It also initializes a *IntVarArray* matrix with size 81 ($9 * 9$) and values from 1 to 9.

After that, it creates an integer array by flattening the sudoku example matrix. The Sudoku grid is represented by the *IntVarArray*, created before, and transformed into a Matrix object. The constraints we put are integer equality for every element in the sudoku example that is different from zero. Also, the numbers in each row, column and every 3x3 sub-matrix should be distinct.

For branching there was no strategy that outperformed an other one. We experimented with different parameters and we concluded that in most of the examples the strategy that performed better is INT_VAR_MIN_MAX for variable selection and INT_VAL_MED for value selection.

Similarly, there is no best option for the Consistency Level. The Domain propagation performed better than other levels in most of the given sudoku puzzles. But for instance, the Domain propagation for example 4 results in 4 node traversed and 1 failures whereas the Default level results in 23 nodes traversed and 10 failures. The Bounds propagation performs better than the default one and the Domain propagation by achieving 2 nodes traversed and 0 failures. On puzzle number 17 all Consistency levels traverse the same number of nodes and perform the same number of failures.

2 n-Queens

3 Compile and Run

To compile the two programs type `make` in the main directory. To delete the object files type `make clean` and to delete both executable and object type `make dist-clean`.

In order to run the sudoku program, type `./sudoku [-puzzle NUM]` where NUM is the number of the sudoku puzzle in the given examples file. Default puzzle is the first one. Also it supports every option of the Options class.