Before Starting

- Use commas when reporting big numbers. E.g.,
  - 9,764,748 instead of 9764748
- Create a project (.mzp) for each problem.
  - Add the model files (*.mzn) and the data files (*.dzn) in the project file.
- Create a folder for each problem and submit them all in single zip file.
- Configure the solver to obtain the solution statistics and set a time limit (e.g., 5 minutes).
- Make observations on your results and write them down (avoid repeating the numerical results in text). For example:
  - When are random decisions (not) useful? Why?
  - Are dynamic heuristics always better than static heuristics? Why?
  - Is programming search and/or restarting always a good idea? Why?

N-Queens

- Using the alldifferent model (without symmetry breaking), search for **a solution** for N = 30, 35, 45, 50, using the following 6 variable - value ordering heuristics of Gecode:
  - input order – min value, input order – random value
  - smallest domain – min value, smallest domain – random value
  - domWdeg – min value, domWdeg – random value
- Record the number of failures ('-' for timed out instances).
- For each instance, indicate the best results in bold.

19x19: fails = 2037842 time 8s 315msec
19x19 Ord: fails 331406 time 1s 733msec

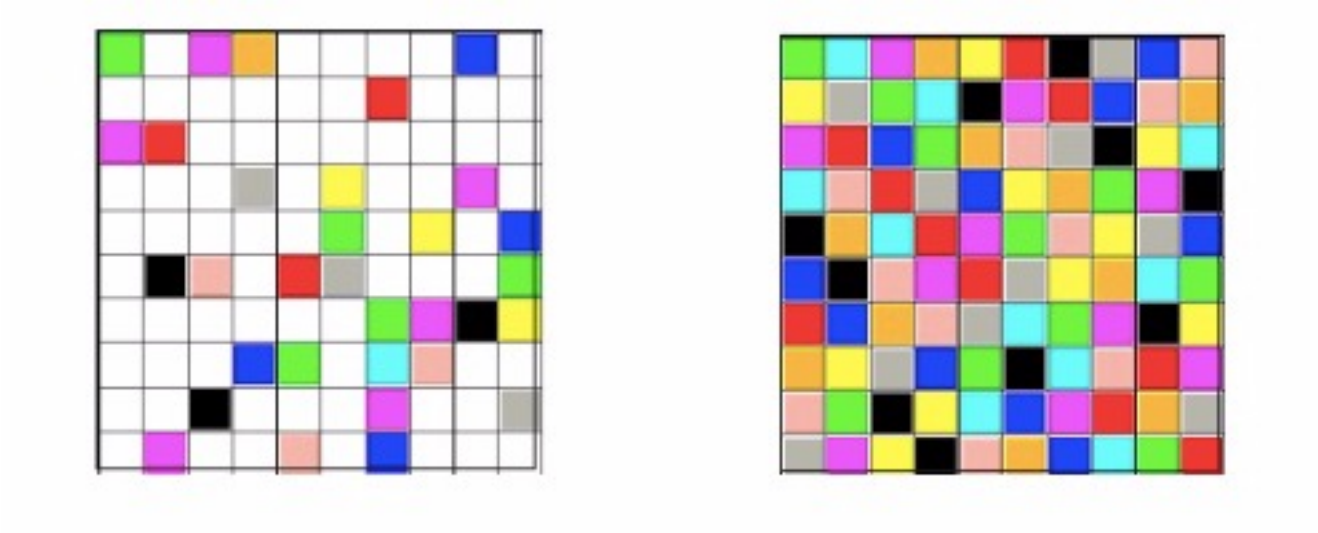
20x20: Over 35 min
20x20Ord: Over 15 min

Poster Placement

- Proceed similarly with the poster placement problem, by using the global model and the instances provided in the data files.
- Given the two sequences of variables X and Y, let the solver search on X_i and Y_i for all i in [1..n].
- Record the number failures and time (‘-’ for timed out instances).
- Repeat everything after re-ordering the rectangles in the data file in decreasing order by their perimeter.

Quasigroup Completion Problem

- Given a partial assignment of colours, can the partial Latin square (quasigroup) be completed so that we obtain a Latin square?



Quasigroup Completion Problem

- Implement a model using alldifferent constraints.
- Search for **a solution** to the instances given in the data files using Gecode and experiment with:
  - default search
  - domWdeg – random value
  - domWdeg – random value + restarting (employing the Luby strategy with L = 250)
- Record the number failures and time (‘-’ for timed out instances).
- For each instance, indicate the best results in bold.