Before Starting

- Use a separate folder for each problem.
- Create a project (.mzp) for the problem, if there is any data file involved.
  - Add the model files (*.mzn)
  - Add the data files (*.dzn)
- Configure the solver to obtain the solution statistics, to search for one or all solutions, and to set a time limit when needed.

N-Queens

- Consider the n-Queens alldifferent model.
- Post the alldifferent constraints either by using global constraints or by decomposing them.
- Search for **one solution** for N = 28, 29 and 30 using the **input order of the variables and the values** with Gecode.

```
solve :: int_search(q, input_order, indomain_min)  satisfy;
```

N-Queens

- Report the number of the failures and the total time of the two models in a table.

n	Alldifferent GC		Decomposition	
	Fails	Time	Fails	Time
28	78847	2s 329msec	417027	7s 589msec
29	31294	1s 88msec	212257	4s 319msec
30	1588827	42s 351msec	7472978	2m 14s

- Write down briefly your observations.

The Sequence Puzzle

- Consider the model of the sequence puzzle.
  - Variables and Domains
    - $X_0, \ldots, X_{n-1} \in \{0, \ldots, n-1\}$
  - Constraints
    - for all i, $X_i = \sum_j (X_j = i)$
  - Implied constraints
    - $\sum_i X_i = n$
    - $\sum_i X_i * i = n$
- Globalize the problem constraints.

The Sequence Puzzle

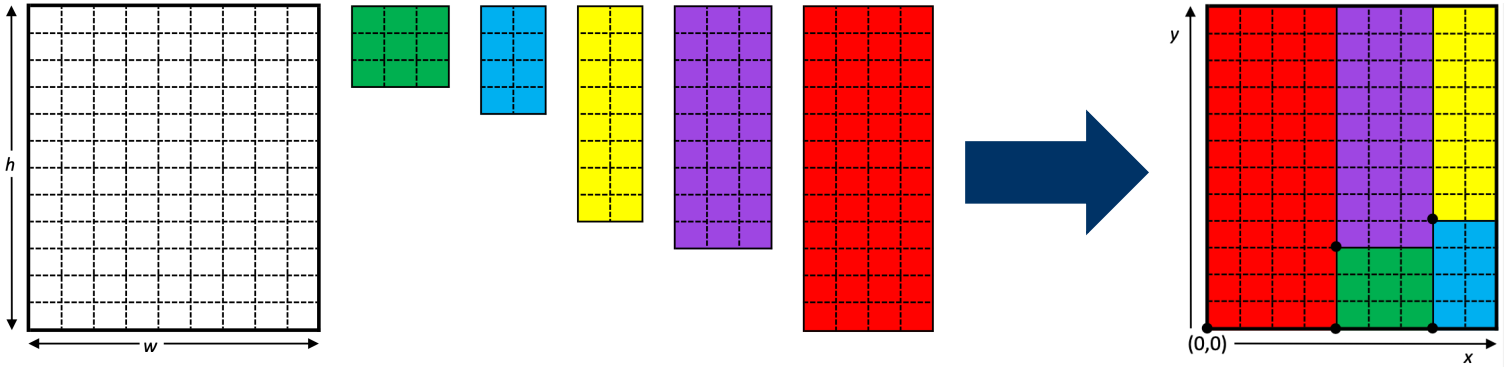
- Search for **one solution** for N = 500 and N=1000, using **the default search** of Gecode.
- Show the number of the failures and the total time of all the models in a table.

n	Base		Base + Implied		Global		Global + Implied	
	Fails	Time	Fails	Time	Fails	Time	Fails	Time
500	617	39s 611msec	495	26s 218msec	989	762msec	493	530msec
1000	1247	4m 6s	995	2m 3s	1989	1s 818msec	993	1s 27msec

- Write down briefly your observations.

Poster Placement

- Given a set of posters in rectangle shapes and their size, and a bounded paper roll size, find a placement of the posters on the paper so that they can be printed without changing their orientation.



Poster Placement

- Model the problem.
  - What are the variables and the domains?
  - What are the constraints?
- Start with naïve constraint expressions and then look for an appropriate global constraint.
- Search for **one solution** to the two provided instances using **the default search** of Gecode.

Poster Placement

- Report the number of the failures and the total time in a table.

Instance	Naïve Model		Global Model	
	Fails	Time	Fails	Time
19x19	1678013	18s 866msec	300649	2s 900msec
20x20	2504120	29s 282msec	2030	270msec

- Write down briefly your observations.