Modelling Constraint Satisfaction Problems (2)

Consider the CSPLIB benchmarks, available at the www.csplib.org web site.

Use arithmetic constraints, as well as some global constraints, such as alldifferent and element, to model and solve the CSPLib problems below.

CSPLib 15: Schur's Lemma.

Generalize it to $k > 3$ and test your solution for different values of n and k, to assess the efficiency of execution.

CSPLib 24: Langford Number Problem.

Generalize it to different values of n and k and assess the efficiency of execution.

CSPLib 10: Social Golfers Problem

Test your solution for different values of n (golfers), m (groups) and p (weeks) to assess the efficiency of execution.

From Test_1 (2016/17): Round-table

A group of **nf** friends is organizing a number of **nw** weekly lunches on a restaurant, which has a round table that fit all of them (i.e. it seats **nf** people). Because the goal is to socialise, the organiser is trying to find an allocation of seats for the participants, so that each of them has different neighbours every week.

CSPLib 26: Round-robin Tournament (adapted)

The problem is to schedule a tournament of n teams over n−1 weeks, with each week divided into n/2 periods, and each period divided into two slots. The first team in each slot plays at home, whilst the second plays the first team away. A tournament must satisfy the following three constraints:

- every team plays once a week;
- every team plays at most twice in the same period over the tournament;
- every team plays every other team.

An example schedule for 8 teams is:

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Period 1	0 v 1	0 v 2	4 v 7	3 v 6	3 v 7	1 v 5	2 v 4
Period 2	2 v 3	1 v 7	0 v 3	5 v 7	1 v 4	0 v 6	5 v 6
Period 3	4 v 5	3 v 5	1 v 6	0 v 4	2 v 6	2 v 7	0 v 7
Period 4	6 v 7	4 v 6	2 v 5	1 v 2	0 v 5	3 v 4	1 v 3