Modelling Constraint Satisfaction Problems (1)

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

Use only arithmetic (possibly conditional) constraints of the Comet language to model and solve the following CSPLib problems:

CSPLib 06: Golomb Rulers

For different values of m, assess the minimum rulers that is possible. Assess the efficiency of the execution of your solution.

CSPLib 07: All-Interval Series

Test your solution for different values of n, to assess the efficiency of execution. Compare your program with another that uses the system available constraint "all_different".

CSPLib 24: Langford Number Problem.

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

CSPLib 76: Costas Array

A Costas array is a pattern of n marks on an n×n grid, one mark per row and one per column, in which the n× (n−1)/2 vectors between the marks are all-different.

Find solutions for different values of n, and assess the efficiency of execution.

From Test_1 (2015/16): Sequence Pairing

You are asked to solve the following problem: Find two sequences of 5 two-digit numbers such that

i. The 10 digits of the 5 two-digit numbers are all different;
ii. The difference between consecutive numbers in each of the sequences is the same; and
iii. No number in a sequence appears in the other.

For example, the sequences `S1 = <09,27,45,63,81>` and `S2 = <18,36,54,72,90>` are a solution to the problem as in both sequences the difference between consecutive numbers is `18`, in none of them a digit appears twice, and no number in a sequence appears in the other.