Preface

Symmetry has become a topic of significant interest in the constraint programming and related communities. Many constraint satisfaction problems (CSPs) have symmetries in the variables, domains or constraints - or any combination thereof. Each of these symmetries preserve satisfiability, so that when there is symmetry in a CSP, any assignment can be transformed into an equivalent assignment without affecting whether or not it satisfies the constraints. Similarly, applying such a transformation to a partial assignment does not affect whether or not it can be extended to an assignment satisfying the constraints. For instance, in many CSPs some of the variables refer to entities which are indistinguishable, and the values assigned to these variables can be interchanged in any solution.

Symmetry increases the combinatorial complexity of CSPs. In the presence of symmetry, a constraint solver may waste a large amount of time considering symmetric but equivalent assignments or partial assignments. Hence, dealing with symmetry is often crucial to the success of solving such CSPs efficiently.

As well as exploiting symmetry when solving CSPs, CSP solving techniques have been used to solve symmetry-related problems. For example, they have been used to answer the question of whether a particular search state is symmetrically equivalent to one already explored. As another example, they have been used to derive "generators" of a symmetry group, which allow the symmetries to be represented effectively without the need to list them all explicitly. Constraint programming techniques have the potential to improve on existing algorithms for solving these and related group-theoretic problems.

SymCon'04 is the fourth workshop in the series, following the successful earlier workshops at CP 2001 in Paphos, Cyprus, at CP 2002 in Ithaca, NY, USA, and at CP 2003 in Cork, Ireland. The papers in these proceedings present research into many aspects of symmetry in CSPs and related disciplines. The number of papers shows that symmetry is an active area of research in constraint programming, and it is hoped that they will stimulate further research. We also hope that the workshop will foster a cross-discipline exchange of ideas. In order to encourage this, the workshop includes a panel session on the methods being used to tackle symmetry in various disciplines related to constraints, and the invited talk is on symmetry in integer programming.

We would like to thank all the authors who submitted papers; the invited speaker, François Margot; the members of the "Symmetry in related disciplines" panel; and the members of the Programme Committee. We also thank Filippo Focacci, Chris Jefferson and Brendan McKay for their help in reviewing papers.

These proceedings can be found online at `http://www.dis.uu.se/SymCon04/`.

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Workshop Schedule

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