Foreword

This volume contains the pre-proceedings of the Fourth International Workshop on Rule-Based Programming (RULE2003).

This year, RULE 2003 is part of a federation of colloquia known as the Federated Conference on Rewriting, Deduction and Programming (RDP 2003) which includes the 14th International Conference on Rewriting Techniques and Applications (RTA), the 6th Conference on Typed Lambda Calculi and Applications (TLCA), the 5th Workshop on First-order Theorem Proving (FTP), as well as several other workshops. The colloquia and affiliated workshops will run from June 8 to June 14, 2003 and will be held in Valencia, Spain. Details about the affiliated conferences and workshops will appear at the URL www.dsic.upv.es/~rdp03.

Previous RULE meeting were held in Montréal (2000), Firenze (2001) and Pittsburgh (2002); their proceedings were published by Elsevier and by the ACM/SIGPLAN. The final version of this volume will be published as volume 86.2 in the series Electronic Notes in Theoretical Computer Science (ENTCS). This series is published electronically through the facilities of Elsevier Science B.V. and its auspices. The volumes in the ENTCS series can be accessed at URL www.elsevier.nl/locate/entcs.

The rule-based programming paradigm is characterized by the repeated, localized transformation of a shared data object such as a term, graph, proof, or constraint store. The transformations are described by rules which separate the description of the sub-object to be replaced (the pattern) from the calculation of the replacement. Optionally, rules can have further conditions that restrict their applicability. The transformations are controlled by explicit or implicit strategies.

The basic concepts of rule-based programming appear throughout computer science, from theoretical foundations to practical implementations. Term rewriting is used in semantics in order to describe the meaning of programming languages, as well as in the implementation of program transformation systems. It is used implicitly or explicitly to perform computations, e.g., in Mathematica, OBJ, or ELAN, or to perform deductions, e.g., by using inference rules to describe or implement a logic, theorem prover or constraint solver. Extreme examples of rule-based programming include the mail system in Unix which uses rules in order to rewrite mail addresses to canonical forms, or the transition rules used in model checkers.

Rule-based programming is currently experiencing a renewed period of growth with the emergence of new concepts and systems that allow a better understanding and better usability. On the theoretical side, after the in-depth study of rewriting concepts during the eighties, the nineties saw the emergence of the general concepts of rewriting logic and of the rewriting calculus. On the practical side, new languages such as ASM, ASF+SDF, BURG, Claire, ELAN,
Maude, and Stratego, new systems such as LRR and commercial products such as Ilog Rules and Eclipse have shown that rules are a useful programming tool. The practical application of rule-based programming prompts research into the algorithmic complexity and optimization of rule-based programs as well as into the expressivity, semantics and implementation of rules-based languages.

The purpose of this workshop is to bring together researchers from the various communities working on rule-based programming to foster fertilisation between theory and practice, as well as to favour the growth of this programming paradigm.

Program Committee

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