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W. Rance Cleaveland (Ed.)

Tools and Algorithms for the Construction and Analysis of Systems

5th International Conference, TACAS'99
Held as Part of the Joint European Conferences
on Theory and Practice of Software, ETAPS'99
Amsterdam, The Netherlands, March 22-28, 1999
Proceedings

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Foreword

ETAPS'99 is the second instance of the European Joint Conferences on Theory and Practice of Software. ETAPS is an annual federated conference that was established in 1998 by combining a number of existing and new conferences. This year it comprises five conferences (FOSSACS, FASE, ESOP, CC, TACAS), four satellite workshops (CMCS, AS, WAGA, CoFI), seven invited lectures, two invited tutorials, and six contributed tutorials.

The events that comprise ETAPS address various aspects of the system development process, including specification, design, implementation, analysis and improvement. The languages, methodologies and tools which support these activities are all well within its scope. Different blends of theory and practice are represented, with an inclination towards theory with a practical motivation on one hand and soundly-based practice on the other. Many of the issues involved in software design apply to systems in general, including hardware systems, and the emphasis on software is not intended to be exclusive.

ETAPS is a loose confederation in which each event retains its own identity, with a separate programme committee and independent proceedings. Its format is open-ended, allowing it to grow and evolve as time goes by. Contributed talks and system demonstrations are in synchronized parallel sessions, with invited lectures in plenary sessions. Two of the invited lectures are reserved for "unifying" talks on topics of interest to the whole range of ETAPS attendees. As an experiment, ETAPS'99 also includes two invited tutorials on topics of special interest. The aim of cramming all this activity into a single one-week meeting is to create a strong magnet for academic and industrial researchers working on topics within its scope, giving them the opportunity to learn about research in related areas, and thereby to foster new and existing links between work in areas that have hitherto been addressed in separate meetings.

ETAPS'99 has been organized by Jan Bergstra of CWI and the University of Amsterdam together with Frans Snijders of CWI. Overall planning for ETAPS'99 was the responsibility of the ETAPS Steering Committee, whose current membership is:

> André Arnold (Bordeaux), Egidio Astesiano (Genoa), Jan Bergstra (Amsterdam), Ed Brinksma (Enschede), Rance Cleaveland (Stony Brook), Pierpaolo Degano (Pisa), Hartmut Ehrig (Berlin), José Fiadeiro (Lisbon), Jean-Pierre Finance (Nancy), Marie-Claude Gaudel (Paris), Susanne Graf (Grenoble), Stefan Jähnichen (Berlin), Paul Klint (Amsterdam), Kai Koskimies (Tampere), Tom Maibaum (London), Ugo Montanari (Pisa), Hanne Riis Nielson (Aarhus), Fernando Orejas (Barcelona), Don Sannella (Edinburgh), Gert Smolka (Saarbrücken), Doaitse Swierstra (Utrecht), Wolfgang Thomas (Aachen), Jerzy Tiuryn (Warsaw), David Watt (Glasgow)

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- KPN Research
- Philips Research
- The EU programme "Training and Mobility of Researchers"
- CWI
- The University of Amsterdam
- The European Association for Programming Languages and Systems
- The European Association for Theoretical Computer Science

I would like to express my sincere gratitude to all of these people and organizations, the programme committee members of the ETAPS conferences, the organizers of the satellite events, the speakers themselves, and finally Springer-Verlag for agreeing to publish the ETAPS proceedings.

Edinburgh, January 1999

Donald Sannella
ETAPS Steering Committee Chairman

Preface

This volume contains the proceedings of the fifth international meeting on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'99). TACAS'99 took place on 22–25 March 1999 in Amsterdam as a constituent conference of the European Joint Conferences on Theory and Practice of Software (ETAPS). More information about it may be found in the foreword. Previous TACAS meetings occurred in 1998 (Lisbon), 1997 (Twente), 1996 (Passau), and 1995 (Aarhus). Like TACAS'98, TACAS'99 was a conference, while the meetings before 1998 were workshops. All previous TACAS proceedings have been published as volumes in Springer's Lecture Notes in Computer Science series.

TACAS's mission is to provide a forum for researchers, developers and users interested in rigorously based tools for the construction and analysis of systems. The conference aims to bridge the gaps between different communities — including but not limited to those devoted to formal methods, real-time, software engineering, communications protocols, hardware, theorem proving, and programming languages — that have traditionally had little interaction but share common interests in and techniques for tool development. In particular, by providing a venue for the discussion of common problems, heuristics, algorithms, data structures and methodologies, TACAS hopes to support researchers in their quest to improve the utility, reliability, flexibility and efficiency of tools for building systems.

These proceedings contain an invited paper, 28 refereed contributions, a position statement, and the text of an ETAPS tool demonstration that was reviewed independently of the TACAS program committee. The 28 regular papers were selected from 82 submissions, which represents the largest number of submissions TACAS has had to date. The accepted papers cover a wide range of topics, as the table of contents indicates, although all have relevance to the development and deployment of tools.

As Program Committee Chairman for TACAS, I would like to acknowledge the efforts of the Program Committee and paper reviewers. The obvious strength of the conference program is a testament to their thoughtful analyses of the submitted papers and to the seriousness with which they approached the selection process. I would also like to thank the other members of the TACAS Steering Committee for their guidance and advice in organizing the conference.

Stony Brook, January 1999

W. Rance Cleaveland II
Program Committee Chairman
TACAS'99

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Job Zwiers

Table of Contents

Symbolic Analysis

Process Algebra

Frameworks for System Construction and Analysis

Tool Descriptions

Position Paper

ETAPS Tool Demonstation