Algorithmic Languages and Calculi

IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

> IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- the IFIP World Computer Congress, held every second year;
- open conferences;
- working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

Algorithmic Languages and Calculi

IFIP TC2 WG2.1 International Workshop on Algorithmic Languages and Calculi 17–22 February 1997, Alsace, France

Edited by

Richard S. Bird

Computing Laboratory
Oxford University
Oxford
UK

and

Lambert Meertens

CWI
Amsterdam
The Netherlands

SPRINGER INTERNATIONAL PUBLISHING, CHAM

First edition 1997

Originally published by Chapman & Hall in 1997
Softcover reprint of the hardcover 1st edition 1997 978-0-41282050-2
ISBN 978-1-5041-2877-3 ISBN 978-0-387-35264-0 (eBook)
DOI 10.1007/978-0-387-35264-0

A catalogue record for this book is available from the British Library

CONTENTS

PREFACE

This book contains the papers presented at the IFIP Working Conference on Algorithmic Languages and Calculi, held in Bisschoffsheim, Alsace, on February 17–19, 1997. The conference was sponsored by IFIP Technical Committee 2 and organised in cooperation with Working Group 2.1 on Algorithmic Languages and Calculi, whose 50th meeting was held immediately afterwards.

For a number of years the inspiration of WG 2.1 has been to seek to develop a theory of algorithmics, comprising notations and calculi appropriate for rigorous yet elegant methods of program development. The following papers reflect this inspiration in a variety of ways. Together, they provide a state-of-the-art overview of ongoing research in the field, as well as its application to the production of practical software. There are derivations both of individual programs and classes of algorithms, a number of which are conducted in a point-free style using equational and inequational reasoning in a relational calculus. There are presentations of general program-transformation schemes, descriptions of implemented systems for carrying out transformations automatically (or semi-implemented systems for semi-automatic transformations), and explorations of the use of categorical concepts in the specification and design of general systems. Overall, the papers attest to continuing progress in our ability to improve conceptual clarity, to increase notational simplicity, and to tackle progressively harder problems. All this is made possible by striving for mathematical abstraction and unification.

The papers are recorded in the order they were presented at the conference, and are interleaved with edited transcripts of four short discussion sessions.

The editors are grateful to the members of the Program Committee and the reviewers for their careful work, and to the Organising Committee for providing a stimulating environment for the conference. They would also like to thank Doug Smith, chairman of WG 2.1, for providing much useful information, and Aileen Parlane of Chapman & Hall for general support in the preparation of this book.

Amsterdam, April 1997

Richard Bird
Lambert Meertens

PROGRAMME COMMITTEE

D.R. Smith, Palo Alto, USA (Chair)
J-P. Finance, Nancy, France (Co-Chair)

R. Back, Turku, Finland
R. Backhouse, Eindhoven, The Netherlands
T. Coquand, Goteborg, Sweden
H. Ehrig, Berlin, Germany
M.S. Feather, Pasadena, USA
J. Gibbons, Auckland, New Zealand
D. Gries, Ithaca, USA
A.M. Haeberer, Rio de Janeiro, Brazil
R. Hehner, Toronto, Canada
L.G.L.T. Meertens, Amsterdam, The Netherlands
B. Möller, Augsburg, Germany
C. Morgan, Oxford, UK
F. Orejas, Barcelona, Spain
R. Paige, New York, USA
H. Partsch, Ulm, Germany
P. Pepper, Berlin, Germany
D. Sannella, Edinburgh, UK
M. Sintzoff, Louvain-la-Neuve, Belgium
W. Turski, Warsaw, Poland