

Lecture Notes in Computer Science

Edited by G. Goos and J. Hartmanis

275

A. N. Habermann U. Montanari (Eds.)

System Development and Ada

CRAI Workshop on Software Factories and Ada
Capri, Italy, May 26–30, 1986
Proceedings



Springer-Verlag

Berlin Heidelberg New York London Paris Tokyo

Editorial Board

D. Barstow W. Brauer P. Brinch Hansen D. Gries D. Luckham
C. Moler A. Pnueli G. Seegmüller J. Stoer N. Wirth

Editors

A. Nico Habermann
Department of Computer Science, Carnegie Mellon University
Pittsburg, Pennsylvania 15213, USA

Ugo Montanari
Dipartimento di Informatica, Università di Pisa
Corso Italia 40, I-56100 Pisa, Italy

CR Subject Classification (1987): D.2.2, D.2.6, D.2.9, D.2.10

ISBN 3-540-18341-8 Springer-Verlag Berlin Heidelberg New York
ISBN 0-387-18341-8 Springer-Verlag New York Berlin Heidelberg

Library of Congress Cataloging-in-Publication Data. Workshop on Software Factories and Ada (1986: Capri, Italy) System development and Ada. (Lecture notes in computer science; 275) Includes bibliographies. 1. System design--Congresses. 2. Computer software--Development--Congresses. 3. Ada (Computer program language)--Congresses. I. Habermann, A. Nico, 1932-. II. Montanari, U. (Ugo) III. Title. IV. Series.
QA76.9.S88W66 1986 004.2'5 87-23397
ISBN 0-387-18341-8 (U.S.)

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in other ways, and storage in data banks. Duplication of this publication or parts thereof is only permitted under the provisions of the German Copyright Law of September 9, 1965, in its version of June 24, 1985, and a copyright fee must always be paid. Violations fall under the prosecution act of the German Copyright Law.

© Springer-Verlag Berlin Heidelberg 1987
Printed in Germany

Printing and binding: Druckhaus Beltz, Hemsbach/Bergstr.
2145/3140-543210

Preface

The collection of papers published in this book was initially presented at the workshop on Software Factories and Ada held on Capri in May 1986. The collection consists of three groups: the first five papers concern software development environments, the next four papers deal with formal methods for software development and the last three discuss activities related to the Ada language.

Although Ada plays an important role in the papers, it is clear that the work presented here goes far beyond the limits of a programming language. The environment papers show a variety of approaches, ranging from language-specific environments to multi-language and methodology-driven environments. All environments presented in the first five papers are operational and are commercially available.

The papers on formal methods show the great variety of ideas that exist to assure the accurate correspondence of specification and implementation. Of particular interest are the papers that do not just address the programming product, but develop formal methods for the design process as well. Interesting ideas are presented on planning the design process and on supporting project management by formal tools.

The impressive task of Ada compiler validation is described in the first of the last group of papers. The very last paper in this group presents an interesting approach to specifying and testing events in Ada tasks. The paper shows that this approach extends to languages other than Ada.

The authors want to express their gratitude to the Italian hosts, in particular CRAI (Consorzio per le Ricerche e le Applicazioni di Informatica), who made the local arrangements. We are also grateful for the cooperation of the Commission of the European Communities in Brussels, Belgium and the Software Engineering Institute in Pittsburgh, Pennsylvania.

The Editors, A. Nico Habermann
 Ugo Montanari

Table of Contents

Design of the Rational Environment <i>James E. Archer Jr.</i>	1
The PCTE Initiative: Toward a European Approach to Software Engineering <i>Ferdinando Gallo</i>	16
Engineering VAX Ada for a Multi-Language Programming Environment <i>Charles Z. Mitchell</i>	30
The Ada Environment – A Personal View <i>Vic Stenning</i>	48
Knowledge-Based Software Development from Requirements to Code <i>Stephen J. Westfold, Lawrence Z. Markosian, William A. Brew</i>	62
The SMoLCS Approach to the Formal Semantics of Programming Languages – A Tutorial Introduction <i>Egidio Astesiano, Gianna Reggio</i>	81
Project Graphs and Meta-Programs. Towards a Theory of Software Development <i>Dines Bjørner</i>	117
Software Development Based on Formal Methods <i>Cliff B. Jones</i>	153
Integration of Program Construction and Verification: The PROSPECTRA Methodology <i>Bernd Krieg-Brückner</i>	173
Ada Compiler Validation: An Example of Software Testing Theory and Practice <i>John B. Goodenough</i>	195
The Software Engineering Institute at Carnegie Mellon University <i>A. Nico Habermann</i>	233
Task Sequencing Language for Specifying Distributed Ada Systems <i>David C. Luckham, D. P. Helmbold, S. Meldal, D. L. Bryan, M. A. Haberler</i>	249