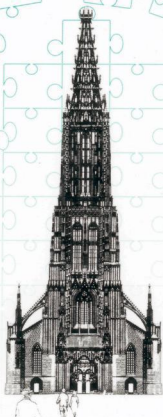


PETER SCHULTHESS (ED.)

# ADVANCES IN MODULAR LANGUAGES



Proceedings of the  
Joint Modular Languages Conference  
University of Ulm, Germany  
28–30 September 1994

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CONFERENCE PROCEEDINGS

# JOINT MODULAR LANGUAGES CONFERENCE

**Modula, Oberon  
& Friends**

**Editor P. Schulthess**

**Germany**

**28-30 September 1994**

**University of Ulm**

## Preface

"Advances in Modular Languages" presents the scientific contributions of the "Joint Modular Language Conference" held in September 1994 at the University of Ulm. The large number and the diverse character of the papers submitted to the conference proves that in the area of modular, structured and object oriented languages the computer science community continues to produce new and relevant results. By presenting some of these results in our book we hope to encourage further research to finally reach the distant goal of safe, cost effective and lean software systems.

The tradition of the JMLC conference goes back to the year 1989 when the First "International Modula-2 Conference" was held in Bled, Slovenia. The success of this conference spawned the "Second International Modula-2 Conference" in 1991 in Loughborough, UK. A similar strong interest in the Modula-2 language led to a pair of two "European Modula-2 Conferences" in Wales in summer 1990 and in Leicester in 1992. The title "Joint Modular Language Conference" was selected to indicate that the conference committee combines the forces of earlier "European" and "International" Modula-2 conference traditions.

For the JMLC '94 conference experts from both committees have selected 36 contributions from approximately 80 submissions. Each paper has been reviewed by at least three members of the programme committee and been subjected to a formal rating scheme. The theme of the JMLC '94 conference has been extended to assume a more comprehensive perspective of the current programming language scene and is no longer restricted to the Modula-2 language family. The scope of the selected papers includes contributions on the use of Oberon, Modula-2, Modula-3, C++, Ada, Eiffel, Beta and other languages. Three tutorials preceding the conference have provided the opportunity to the participants to familiarize themselves with C++, Ada or Oberon.

One of the goals of the conference and of the associated proceedings is to make programmers from different programming communities aware of alternative language schemes and to let them base their choice of programming language and environment on pragmatic arguments rather than on tradition and sometimes prejudice. The decision to choose a programming language for use in a particular situation is of utmost importance for the software industry and must be carefully weighed.

Our sincere thanks go to a large number of individuals and institutions which have worked and contributed to the success of the conference. Alfred Lupper has done an outstanding job as director of the local organizing committee simultaneously dealing at each instant with a dozen different issues. We appreciate the support we received from Steven Collins (Real Time Associates), from Gregor Snelting (GI FG 2.1.3) and from François Nicolet (SI) when distributing the conference announcements. Of equal importance is also the institutional support by the University of Ulm, the German Research Council (DFG), the German Computer Society (GI), the British Computer Society (BCS), IBM Germany Development GmbH, Daimler Benz Research Institute, the FAW foundation and the NC Society for manufacturing innovation. Without this co-operation the conference would not have been possible.

We very much hope that the papers in this book contribute to the professional success of all readers, to the satisfaction of data processing managers, to the productivity of computer programmers and to the happiness of computer non-programmers.

Ulm, August 29, 1994

Peter Schulthess

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# Contents

## From Modula-2 to Oberon

Process Visualisation with Oberon System 3 and Gadgets	13
<i>E. Templ, A. Stritzinger, G. Pomberger</i>	

## Language Design

Restricted Multiple Inheritance	21
<i>A.E. Nedorya, E.V. Tarasov, A.D. Hapugin</i>	
Sequential and Parallel Exception Handling in Modula-3*	31
A Unifying Semantics Specification	
<i>E.A. Heinz</i>	
A Class Mechanism Supporting Subtype-check	51
<i>Z. Guoliang, L. Xuedong</i>	

## Formal Methods and Theory

The Formal Class Model	59
<i>P. André, D. Chiorean, J.C. Royer</i>	
A Semantic Framework for Understanding the Behavior of Modules and Classes in Programming Languages	79
<i>M.H. Dodani, K.S. Gan</i>	
Teaching a Systematic Method of Program Development	93
<i>C. Pronk, P.G. Kluit</i>	

## Compiler Issues

Compiler Optimizations Should Pay for Themselves <i>M. Franz</i>	111
Building an Optimizing Compiler for Oberon: Implications on Programming Language Design <i>M.M. Brandis</i>	123

## Development Tools and Techniques

Post Mortem Debugger for Oberon <i>M. Hof</i>	137
Using Oberon to Design a Hierarchy of Extensible Device Drivers <i>P.J. Muller, P.J.A. de Villiers</i>	147
STUDIO: A Modular, Compiled, Actor-Oriented Language, Based upon a Multitask Runtime System <i>A. Hadjadji, L. Frécon</i>	159

## Distributed Systems

Object-Oriented Distributed Programming in the Oberon-PVM Environment <i>E. Bugnion, M. Gitsels, B.A. Sanders</i>	173
The Design of a Distributed Oberon System <i>S. Traub</i>	189
Adding Parallel and Persistent Sets to Modula-3 <i>L. Böszörményi, K.H. Eder</i>	201

## OO Development using BETA & Eiffel

Part Objects and their Location <i>O.L. Madsen, B. Moller-Pedersen</i>	217
Model-View-Controller classes in Eiffel <i>M.C. Skipper</i>	235

## Programming Models

An O-O Functional Logic Language for the Oberon System <i>P. Dykstra</i>	249
Modular Inheritance of Objects through Mixin-Methods <i>C. Lucas, P. Steyaert</i>	273
Combining Different Implementations of Types in a Program <i>X. Franch</i>	283

## Application and Education, F. Schweiggert

An Oberon-Based Implementation Tool <i>J. Lampe</i>	303
Making the transition from ADT's to Objects in Undergraduate Software Engineering: A CASE-based approach <i>A.J. Peralta</i>	313

## Realtime Programming

A Distributed Architecture for Real-Time, in Oberon-2 <i>B. Kirk, L. Nigro</i>	325
Writing Real-Time Applications in Modula-2 <i>P.J. Moylan</i>	367
Timing as a Programming-In-The-Large Issue <i>L. Nigro, F. Tisato</i>	377

## Oberon and beyond

Oberon - Perspectives of Evolution <i>J. Gutknecht</i>	395
Towards End-User Objects: The Gadgets User Interface System <i>J.L. Marais</i>	407



## Large Software Systems

A New Approach to Modularization of Large Object-Oriented Systems	421
<i>A. Belkhelladi, B. Lazzerini, F. Marcelloni</i>	

How to Structure Parallel Applications: Nested Local Aggregates	431
<i>A. Corradi, L. Leonardi, F. Zambonelli</i>	

Capability Based Protection in a Persistent Object-Based Programming Language	457
<i>M. Hollins, J. Rosenberg, M. Hitchens</i>	

## Implementation and Porting Projects

PC-Oberon: Native Oberon on the PC compatible (ISA) platform	471
<i>F. Arickx, J. Broeckhove, T. Van den Eede, L. Vinck</i>	

Alpha AXP/OpenVMS Modula-2 and Oberon-2 Compiler Project	481
<i>G. Dotzel</i>	

Bringing the Oberon Language to the Macintosh	505
<i>J. Geßwein, K. Froitzheim, R. Ondrus, O. Schirpf</i>	

Dynamic Polymorphism: An Ada-Based Approach	521
<i>J. Shen, G. Cormack, D. Duggan</i>	