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Design and Implementation of Programming Languages

Proceedings of a DoD Sponsored Workshop
Ithaca, October 1976

Edited by
John H. Williams and David A. Fisher



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PREFACE

Since the Department of Defense began its common high order programming language effort in 1974, there have been many discussions about the features that such a language should include. One of the frequently recurring questions has been the extent to which the various features proposed for inclusion are within the present capabilities of language designers and implementors. Therefore it was thought that it might be useful to organize a workshop for the purpose of identifying the current state of the art of programming language design and implementation.

This report contains the proceedings of the resulting workshop. It was held on September 30 and October 1, 1976 at Cornell University in Ithaca, New York. During those two days, 62 people from academe, industry and the services met to present position papers and to discuss the design and implementation of programming languages. The workshop was conducted in four sessions, the first three being technical sessions and the fourth a general discussion of the common language effort. Each technical session consisted of brief presentations of the position papers followed by a panel discussion of the topics presented in the papers.

This report is organized into five sections. The first is a brief review by David Fisher of the DoD's common programming language effort. Section II is a transcript of the discussion of data types that followed the presentations by C. Earnest, B. Brosgol, J. Nestor, J. Donahue and R. LeBlanc. Section III is the discussion of parallel processing, machine dependence and program verification that followed the presentations by J. Dennis, G. Andrews, J. Ichbiah, L. Weissman and R. London. Section IV is the discussion of specifications, optimization and run time support systems that followed the presentations by P. Cohen, J. Goodenough, F. Richard, A. Evans and T. Cheatham.

Rather than interspersing the papers throughout the transcripts of the discussions, they have been collected and appear in Section V. Also, in Section V is a copy of Jim Horning's semi-extemporaneous after dinner speech, a rough draft of which was sketched on the back of an envelope during the first morning's coffee break.

Finally, to permit a ready reference source for some of the discussions, the needed characteristics section of the "Tinman" document, "Department of Defense Requirements for High Order Computer Programming Languages", July 1976, has been included as an appendix to this report.

We wish to thank CENTACS, U.S. Army Electronics Command at Fort Monmouth and the U.S. Army Computer Systems Command at Fort Belvoir for funding the workshop and all of the participants for making the workshop a success, and we gratefully acknowledge the excellent work of Pauline Cameron and Geri Pinkham who transcribed the discussions and typed this manuscript.

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*The latest version of the technical requirements are available from members of the High Order Language Working Group as DoD document Department of Defense Requirements for High Order Computer Programming Languages - Revised "IRONMAN", dated July 1977.