Book Reviews

The role of language in problem solving 2: Edited proceedings of the Johns Hopkins University Applied Physics Laboratory Second Symposium on The Role of Language in Problem Solving held in Laurel, Maryland, 2–4 April 1986

Boudreaux, J.C.; Hamill, Bruce W.; and Jernigan, Robert (editors)

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In four hundred and seventy-one useful pages, including author and subject indices, this volume gives a good view of the problems posed by computer scientists and linguists in dealing with the title subject. However, although the book is format-wise of high quality, unfortunately the important word in the preceding sentence is "problems" (i.e., not "solutions"). This multipaper volume is the proceedings of The Johns Hopkins University Applied Physics Laboratory Second Symposium on The Role of Language in Problem Solving, held April 2–4, 1986.

The preface states that the issues addressed by the papers and panel sessions of the symposium are faced through

(1) formal theoretical analysis,
(2) empirical investigation ("theoretically-based"),
(3) structured system design, and
(4) development ("both formal and informal application-oriented"),

and that two computer programming metaphors predominate. These, "language" and "computer-as-tool kit", reflect the fact that items 2–4 above forced the symposium to emphasize the "languages for programming computers" aspect of "language in problem-solving". A realistic sense of the volume's contents is conveyed by the two preface parenthetical quotations in this paragraph. These items are included in this review as examples of wordy technical distinctions that, in the main, contribute to the systematization of what is being done.

Four symposium themes group the papers in this volume:

(1) knowledge representation,
(2) formal approaches,
(3) design issues, and
(4) programming language environments.

There are eighteen papers in all, four each in themes 1 and 4, five each in themes 2 and 3. Readers of this journal will be interested in two of the knowledge representation papers that take this artificial intelligence subfield into language topics: "Knowledge representation for reasoning abut language", by J. Neal and S. Shapiro, on language understanding as a part of both the task-domain analysis and the meta-language for problem-solving, and "Relating two knowledge bases: The role of identity and part-whole", by R. Rada, L. Darden and J. Eng, involving the National Library of Medicine Medical Literature Analysis and Retrieval System (MEDLARS). Next in interest would be the papers on formal approaches, particularly "Analogy in program development", by S. Dietzen and W. Scherlis, and "Computational ontology", by J. Boudreaux.

The five design issue papers are of greater interest to computer scientists. They introduce subjects discussed by the symposium as a whole (see below) and through such papers as "Programming the parallel processor", by G. Lyon, that are of fundamental importance. The products of three panels are included in the book:

(1) "Theoretical and empirical approaches",
(2) "Applications, language, and architecture: Dimensions in problem solving", and
(3) "Open questions: An agenda for language in problem solving".

Approximately fifteen percent of the text is of quite-readable edited transcripts of the actual discussions. The presence of question-answer transcripts from paper discussion that constitutes about another four percent of the text enhances the feeling of the reader of participation in the symposium.

The material on programming language environments concerns specialized applications ("Languages and software parts for elliptic boundary-value problems", by R. Boisvert; "AMPLE: A programming language environment for automated manufacturing", by J. Boudreaux) or topics (". . . diagnostic run-time . . .", and ". . . conceptual bugs in novices' programs: A comparison of FPL and PASCAL . . .") that are not of major interest. Overall, this is an interesting and useful contemporary record of the work and discussions brought together by the symposium committee, that is worth reading.

Allen Klinger received a PhD degree from the University of California, Berkeley, in 1966. His research interests include computer vision, pattern analysis and machine intelligence, and human-computer interaction. He is co-editor of the books *Data Structures, Computer Graphics, and Pattern Recognition* and *Structured Computer Vision*. Klinger's address is: Department of Computer Science, University of California, Los Angeles, CA 90024. E-mail: klinger@cs.ucla.edu.