COMPUTING AND INFORMATON

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Toronto, Canada, 23–27 May, 1989

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PREFACE

This volume contains selected papers presented at the International Conference on Computing and Information (ICCI'89), held in Toronto, Canada, May 23-27, 1989. All papers have been reviewed by at least two independent referees nominated by the Program Committee members. A full list of referees is enclosed on a seperate page.

ICCI'89 was an international forum for the presentation of new results in research, development, and applications in computing and information. The primary goals of the meeting were to promote the exchange of ideas and cooperation between practitioners and theorists in the interdisciplinary fields of computing, communication and information theory. Participants from the following 31 countries joined the ICCI'89 Conference: Austria, Australia, Belgium, Brazil, Canada, P.R. China, Czechoslovakia, Denmark, East Germany, England, Finland, France, Holland, India, Iraq, Italy, Japan, Korea, Kuwait, N. Ireland, New Zealand, Norway, Poland, Singapore, Soviet Union, Spain, Sweden, Taiwan R.O.C., USA, West Germany, and Yugoslavia (listed in alphabetical order).

The ICCI'89 Program Committee consisted of:

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The conference was made possible through the generous support of the Natural Sciences and Engineering Research Council of Canada, Laurentian University, (Sudbury, Ontario), and McMaster University (Hamilton, Ontario).

We wish to express our sincere gratitude to G. Keech, Chairman, and M. Belec, Administrative Coordinator, both from the Department of Computer Science and Systems at McMaster University; R.F. Childs, Dean of Science at McMaster University; D. Goldsack, Dean of Science at Laurentian University; I. Hambledon, Chairman of the Department of Mathematics and Computer Science at McMaster University; and L. Davison, Chairman of the Department of Mathematics and Computer Science at Laurentian University.

The ICCI'89 Conference was not arranged without some minor teething problems which generally always occur when setting up a new scientific event. It would not have been possible to solve them without the help of C. Belanger, Vice-President Academic of Laurentian University; A. Frosst, Assistant President, Research Services, at McMaster University and L. Reed, Director of Research Services at Laurentian University. Special appreciation is forwarded to them as they have been a true source of support and encouragement in organizing the ICCI'89 Conference.

So many people were involved in the organization of the ICCI'89 Conference that the list will go on and on. Special appreciation goes to: M.M. Koczkodaj, M.G. Koetsier, W. Nasierowski, G. Nimmock, J. Rasi and C. Roy, and M. Ellis for their help and technical assistance.

We thank F. Franek and M.W. Herman for their contribution during the entire process of organizing the ICCI'89 Conference.

Finally, we would like to thank M. Behara at McMaster University for his role in the intial part of organizing the Conference.

Rysard Janicki and Waldemar W. Koczkodaj
Hamilton, Sudbury, April 1989

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to remain anonymous)

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Computing and Information
R. Janicki and W.W. Koczkodaj (Editors)

INVITED PAPER

WHY DENOTATIONAL?

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The paper is devoted to some practical aspects of applied denotational semantics. It is argued that the denotationality of a semantics of a software system is an important pragmatic property of the system itself, rather than merely of its description. The discussion is carried on an algebraic ground where *denotationality* is essentially a synonim of *compositionality* and where neither reflexive domains nor continuations are involved.

1. INTRODUCTION

This paper is a compressed version of an essay [Blikle 89b] where the author expresses his views on applied denotational semantics. In the author's opinion, whether a software system has or has not a sufficiently abstract denotational semantics is a property of a system rather than merely of its description. A software system with denotational semantics provides an adequate ground for structured programming and for inductive proofs of program correctness, which may be impossible if denotationality is not insured. The trade-off between denotationality and abstraction is also discussed and it is shown that a non-denotational semantics can be always artificially "made denotational" on the expense of lowering its level of abstraction. The discussion is carried on an algebraic ground.

In order to explain our claims in sufficiently technical terms we have, first of all, to clear up some ambiguities about the concept of semantics and to explain our understanding of the attribute of *denotationality*.

Let us start from a remark that the issue of semantics is not restricted to programming languages but applies to all kinds of software including system software, tools and applications. In fact each software system contains some programming language which provides the user with the means of communicating his/her requests to the system. In any software system we can always identify some syntax, which is used to

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This report was prepared when the author was visiting the Department of Computer Science of the Techn. Univ. of Denmark in Lyngby (Feb. - May 89) and the underlying research was sponsored by the Danish Natural Science Research Council under grant FTU (Mathematics of Software) 5.17.5.1.13.
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