GUEST EDITOR'S NOTE

The relevance of category theory to computer science has been recognized long time ago. There are two major areas of theoretical computer science, where category theory seems to have the most direct impact: one is the semantics of programming languages, the other is the computational aspects of mathematical logic. For the first area, the typed and untyped lambda-calculi represent the crucial links between various programming languages and the category-theoretical models of their semantics. For the second area, the latest developments are usually related to Girard's linear logic.

This special issue contains nine papers dealing with various aspects of category theory and computer science. We briefly describe them below in the alphabetical order of the names of their first authors without, of course, trying to do justice to any of them in these terse preliminary notes.

The paper by A. Asperti spans across the above mentioned two major areas. It studies the properties of optimal graph reduction techniques for the lambda-calculus from a categorical perspective via a correspondence between optimal reductions and Linear Logic.

The paper by K. H. Hofman and M. W. Mislove deals with various models of the untyped lambda-calculus. In particular, it shows that any compact Hausdorff model is degenerate, i.e. the semantic map from the calculus to the model is constant.

Lambek's paper presents classical bilinear logic as a dual Schütte style deductive system and shows how to eliminate the cut rule. Deductive systems are considered here mainly from a logical point of view, for the author has developed a categorical model of intuitionistic bilinear logic in an earlier paper.

Longo's paper gives a fairly comprehensive overview of the various aspects of type theory. The paper is motivated by the desire to develop a unified categorical environment for a better understanding of the relations between the different approaches.

The paper by M. W. Mislove and F. J. Oles is full of interesting new results, new slants on old results and extensions of old results. In particular, it provides a useful summary of various power domain constructions and explains their relevance in the context of constructing adjoints to inclusions of the category of Scott domains into larger categories.

Moggi's paper introduces an important new idea into the study of denotational semantics of programming languages – the use of categorical monads as a structuring tool. A modal predicate calculus called 'Evaluation Logic' incorporating some aspects of the monadic approach was developed earlier by A. Pitts. In the present paper, Moggi takes a more standard approach to modelling evaluation logic – based upon the requirement that the categorical monad preserve (distinguished) subobjects – and develops sound and complete axiom systems for this kind of model.

The paper by Revesz is concerned with the relationship between categorical combinatory logic and an extended lambda-calculus. In particular, it studies the impact of surjective pairing on certain equational theories.

Stark's paper presents an interesting algebraic framework for the study of dataflow

networks which represent an important paradigm for concurrent computations. Its main theorem states that the free dataflow algebra construction is the underlying functor of a monad, whose algebras are called here "dataflow algebras".

Finally, the paper by E. G. Wagner, W. Khalil, and R. F. C. Walters generalizes the notion of a pseudofunction (functional processor) in **Set**, which was developed earlier by the last two authors, to an arbitrary distributive category with pseudofunctions becoming morphisms in this category. A notion of a solution of such a morphism is introduced, and it is shown that there is a natural way to generalize the expected operations on imperative programs in this framework (composition, disjoint union, product, iteration) so that the solutions and semantics of the components combine to yield solutions and semantics of the composed program in a natural way.

I want to thank the authors for their outstanding contributions to this special issue. Thanks are due also to the reviewers for their generous help with this project and to the editors who made this whole project possible. It has been a pleasure working with this fine group of people and I hope that their combined effort will inspire further progress in this important area of current research.

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