Lecture Notes in
Computer Science

Edited by G. Goos and J. Hartmanis

200

Jan L. A. van de Snepscheut

Trace Theory and VLSI Design

Springer-Verlag
Berlin Heidelberg New York Tokyo

Author

Jan L.A. van de Snepscheut
Dept. of Mathematics and Computing Science, Groningen University
P.O. Box 800, 9700 Groningen, The Netherlands

CR Subject Classification (1985): D1.3, F1.1, F.3.1, B.7

ISBN 3-540-15988-6 Springer-Verlag Berlin Heidelberg New York Tokyo
ISBN 0-387-15988-6 Springer-Verlag New York Heidelberg Berlin Tokyo

Library of Congress Cataloging in Publication Data. Snepscheut, Jan L. A. van de, 1953-. Trace theory and VLSI design. (Lecture notes in computer science; 200) Thesis (Ph. D.)—Eindhoven University of Technology. Bibliography: p. Includex index. 1. Integrated circuits—Very large scale integration—Design and construction. I. Title. II. Series. TK7874.S625 1985 621.395 85-25001
ISBN 0-387-15988-6 (U.S.)

Printing and binding: Beltz Offsetdruck, Hemsbach/Bergstr.
2145/3140-543210

Foreword

The general Ph.D. Thesis is written for a very specific audience: the members of the Ph.D. Committee and a few close colleagues of the author. Hence, it is a rare occurrence when a Ph.D. Thesis is suitable reading for a much wider audience. The thesis of Jan L.A. van de Snepscheut is such an exception, and I applaud its inclusion in Springer's "Lecture Notes in Computer Science".

It is a text that can be read with many eyes, even with eyes looking beyond its subject matter proper. This is due to the style in which its proofs have been conducted: the proofs are in a form of annotated formal calculations we owe to W.H.J. Feijen, a form, which makes the proofs as pleasant to read as they were to write down. The mere fact that this text is the first large-scale application of Feijen's discipline is, all by itself, a sufficient justification for its wider dissemination.

For those with more technical interests it has more technical charms. It is, for instance, not a mere exercise in some sort of algebra: its

close connection between formalism and physical reality ranks it among the jewels of applied science. It is the first formal attack on the technically important notion of delay-insensitivity. On a more detailed level, the text is full of nuggets of mathematical technology: I mention the algorithm (plus its correctness proof) for the minimization of finite automata and the way in which the traditional problems of concatenation have been avoided by distinguishing between "components" and "commands".

Finally, I applaud its inclusion in the Lecture Notes because it is a well-written manuscript in every sense of the words.

Edsger W. Dykstra

Acknowledgements

The present monograph constitutes my Ph. D.- thesis written under guidance of prof. dr. M. Rem and prof. dr. E. W. Dijkstra at the Eindhoven University of Technology.

I am also indebted to the members of the Tuerday Afternoon Club and Wednesday Morning Club, especially to ir. W. H. J. Feijen, drs. A. J. M. van Gasteren, prof. dr. F. E. J. Kruseman Aretz, and dr. ir. J. T. Udding, for inspiring discussions. Their suggestions improved both the contents and its presentation.

Contents