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Preface

This work grew out of my research in the field of program schemes during the years 1971 and 1972, and it is a direct descendant of the notes that I had to prepare while lecturing on the subject of program schemes.
I have lectured on this topic in Utrecht in the "Seminar on some syntactical and semantical problems in theoretical computer science "(organized by G. Rozenberg), in Oberwolfach during a "Tagung über Formale Sprachen und Programmiersprachen" (organized by W. Händler, G. Hotz and H. Langmaack), in Rocquencourt in a seminar "Théorie des algorithmes, des langages et de la programmation" (organized by M. Nivat), and in Oberwolfach during a "Tagung über Automatentheorie und Formale Sprachen" (organized by G. Hotz and H. Langmaack).†

I have not indicated in which degree the results in this work are original, which is always a difficult problem when a uniform approach to a subject is presented. However, most of the results of section 19 (published in Engelfriet [1973]) and of sections 20 and 21 (not published before) seem to be new.

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† See Engelfriet [1971 b, 1971 a, 1972 a, 1972 c] respectively.

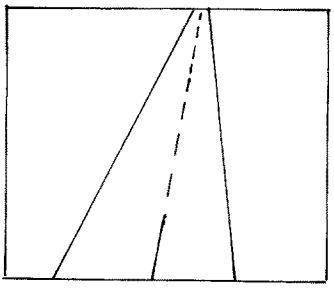
Acknowledgments

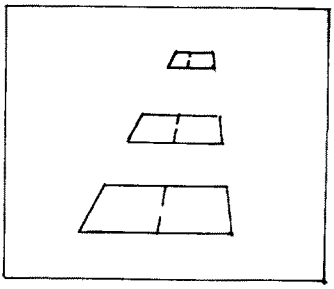
I would like to express my gratitude to Grzegorz Rozenberg for his constant stimulation of my research in theoretical computer science, and for his energetic guidance and encouragement during the preparation of this work.

I am grateful to those people who made this investigation possible by their helpful discussions and valuable comments. I am also indebted to the Department of Applied Mathematics, and in particular to the Computer Science Group, of the Technical University Twente, Netherlands, for providing pleasant working conditions.

I would like to express my thanks to Posy Rietman for her excellent typing of the manuscript.

Finally I want to thank Louco Engelfriet for trying to understand the difference between a program scheme and a formal language.





Note to the reader.

We have tried to make the reading structure of this book to be something in between a regular highway and a highway for grasshoppers. If the reader wishes to read this book in a "continuous" fashion, then we hope that he can easily do so. However, if the reader wishes to "grasshop" through the book, then he will find a number of facilities which should make it easy also for him.

These facilities include diagrams of the interrelations between sections within each Part and two indexes (of terms and of symbols used). To make the use of crossreferences easier, all theorems, lemmas, remarks, etc., are numbered consecutively. Thus "Lemma 10.8" refers to the 8^{th} numbered item in section 10 (which happens to be a lemma). We are using the sign /// to indicate the end of proofs, examples, remarks, etc. To take full advantage of these facilities the reader is advised to read carefully the introductions to the various Parts and in particular the text below the headings "Diagram of Sections" and "More Terminology".

Finally we want to indicate that

(1) occasionally the symbols $\Rightarrow$ and $\Leftrightarrow$ are used for the phrases "implies" and "if and only if" respectively, and

(2) references to the literature are given in the following style: Name(s) of author(s) [year(s) of publication, eventual details].

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