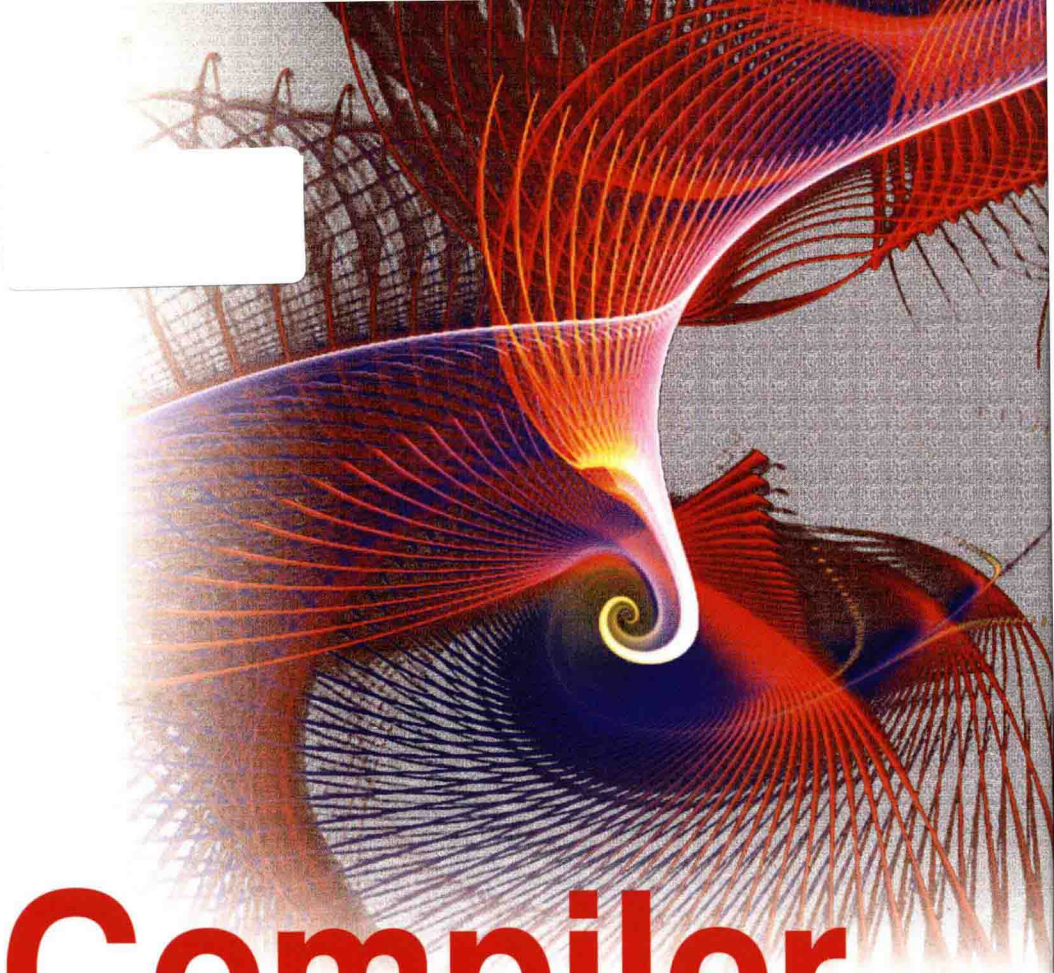

Compiler Design

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Alpha Science

COMPILER DESIGN

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COMPILER DESIGN

Dedicated
to
My Beloved Mother
Yashodha

PREFACE

Computer understands only Machine code. So it is necessary to have a intermediate to convert the source language into the machine code. So the design of compilers is very important in the engineering fields.

Overwhelming response from my students and other teachers of various engineering colleges who have referred my notes inspired me to write this book.

The book is written as a text, with problems and exercises. In every chapter of this book, more importance is given to the concepts and many problems are solved which covers all varieties of problems in a simpler and easier techniques.

The book covers the syllabus of Undergraduate and Postgraduate students of CSE and ISE branches of almost all universities.

Any suggestion for the improvement of the book will be acknowledged and well appreciated. Suggestions can be emailed to mohan_kit@yahoo.com

H. S. Mohan

ACKNOWLEDGEMENTS

The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mention of people who made it possible because "Success is the abstract of hard work and perseverance, but steadfast of all is encouragement guidance". So I would like to acknowledge all those whose guidance and encouragement served as a beacon light and crowned my efforts with success.

I would like to express my pranam's to his Divine soul Padmabhushana Sri Sri Sri Dr. Balagangadharanatha Maha Swamiji and pranam's to his Holiness Sri Sri Sri Nirmalanandanatha Maha Swamiji , the president of Sri Adichunchanagiri shikshana trust ® for their Blessings.

I would like to express my profound grateful to Reverend Sri Sri Prakashnath Swamiji, Managing Director, SJBIT, Bangalore for his blessings.

I am grateful to Dr. Puttaraju, Principal for his kind co-operation and encouragement.

I am grateful to Dr. V. Rajappa, Founder, Director Prajwal Academy of Technical Educations and Neelakanta V. for their moral support and encouragement given to me for writing this book.

I would like to render my heartfelt gratitude to my parents, my wife Bindiya M.K. and My daughter Aditi Mohan and my son Adithya Mohan for their kind cooperation, valuable moral support and encouragement given to me and the role they have played in completing my book.

I am grateful to all my friends, collegues and others who are directly or indirectly involved for their inspiration, encouragement and support to successfully complete this book.

Finally I convey my thanks to publisher of this book, for their constructive critism and suggestions for improvement in the manuscript.

H. S. Mohan

CONTENTS

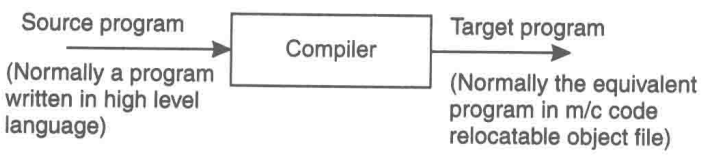
CHAPTER

1

INTRODUCTION TO COMPILERS

1.1 COMPILERS

A Compiler is a program, takes a program written in a source language and translates it into equivalent program in a target language.



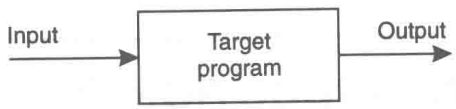
1.2 OTHER APPLICATIONS

In addition to the development of Compiler, the techniques used in compiler design can be applicable to many problems in Computer Science.

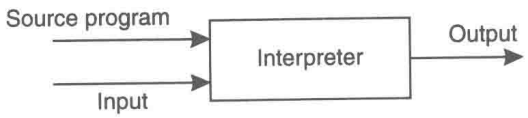
1. Techniques used in Lexical Analyzer can be used in Text editors, information retrieval system and Pattern Recognition Programs.
2. Techniques used in a parser can be used in a query processing system such as SQL.
3. Many software having a complex front end may need techniques used in Compiler Design.

4. Most of the techniques used in Compiler Design may be used in Natural Language Processing (NLP) Systems.

If the *target program* is an executable Machine language program. It can then be called by the user to process inputs and process outputs.



An **interpreter** is another common kind of Language Processor. Instead of producing a target program as a transition an interpreters appear to directly execute the operations specified in the source. Program on inputs supplied by the user.



Example

A java language Processor combine compilation and interpretation.

A Java Source Program may first be compiled into an intermediate form called *Byte Code.* The Byte codes are then interpreted by a virtual machine.

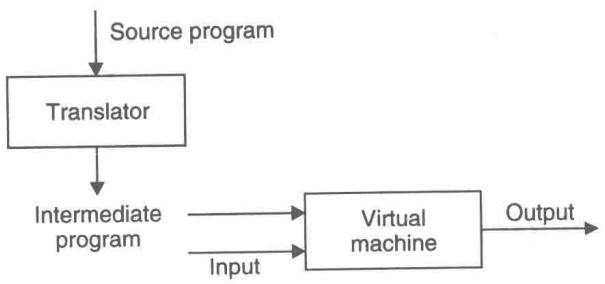


Figure: A hybrid compiler

1.3 A LANGUAGE PROCESSING SYSTEM

In addition to a compiler, several other Programs may be required to create an executable Target Program as shown in figure.

- A source program may be divided into modules stored in seperate files. The task of collecting the source program is sometimes entrusted to a seperate program called a *preprocessor.* The preprocessor may also expand shorthands called Macros.