COMPILER DESIGN

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PREFACE

This book presents the subject of Compiler Design in a way that's understandable to a programmer.A compiler translates (or compiles) a program written in a high-level programming language, that is suitable for human programmers, into the low-level machine language that is required by computers. During this process, the compiler will also attempt to detect and report obvious programmer mistakes. Using a high-level language for programming has a large impact on how fast programs can be developed. The main reasons for this are compared to machine language, the notation used by programming languages is closer to the way humans think about problems. Programs written in a high-level language tend to be shorter than equivalent programs written in machine language. Anadvantage of using a high-level language is that the same program can be compiled to many different machine languages and, hence, be brought to run on many different machines.

Unit I: Presents an **INTRODUCTION ABOUT STRUCTURE OF A COMPILER AND LEXICAL ANALYSIS**which is the initial part of reading and analyzing the program text: The text is read and divided into tokens, each of which corresponds to a symbol in the programming language, Lexical analysis is often abbreviated to lexing. This unit also specifies the theory of finite automata and regular expressions, and then applies this theory to the construction of a scanner.

Unit II: Presents **SYNTAX ANALYSIS** phase that takes the list of tokens produced by the lexical analysis and arranges these in a tree structure (called the syntax tree) that reflects the structure of the program. This phase is

often called parsing. This unit also provides the theory of context-free grammars as it pertains to various parsing techniques such as Recursive Descent Parser , Predictive Parser LL(1), Shift Reduce Parser and LR Parser such as LR (0), SLR(1) Parsing Table, LALR(1) Parser, CLR(1), Error Handling and Recovery in Syntax Analyzer, YACC

Unit III: Presents the **INTERMEDIATE CODE GENERATION** in which the program is translated to a simple machine-independent intermediate language. This phase analyses the syntax tree to determine if the program violates certain consistency requirements. This unit is a comprehensive account of static semantic analysis, focusing on attribute grammars and syntax tree traversals. It also discusses code generation, both for intermediate code such as three-address code and for executable object code for a simple architecture, for which a simulator is given. It gives extensive coverage to the construction of symbol tables and static type checking, of semantic analysis

Unit IV: This unit Presents **RUN-TIME ENVIRONMENT AND CODE GENERATION** which discusses the common forms of runtime environments, from the fully-static environment, through the many varieties of stack-based environments. This unit also provides an implementation for a heap of dynamically-allocated storage. The symbolic variable names used in the intermediate code are translated to numbers, each of which corresponds to a register in the target machine code. The intermediate language is translated to assembly language (a textual representation of machine code) for a specific machine architecture. Assembly and linking The assembly language code is translated into binary representation and addresses of variables,

functions, etc., are determined

Unit V: This unit presents **CODE OPTIMIZATION** techniques and Principal Sources of Optimization, Peep hole optimization , DAG, Optimization of Basic Blocks, Global Data Flow Analysis, Efficient Data Flow Algorithm.

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✍ *Dr. G.Simi Margarat*

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✍ *Dr. Amutha M.*

DEDICATED TO OUR
BELOVED
FAMILY MEMBERS
AND
TO OUR FRIENDS

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