Compiler Design

SWAYAM Prabha Course Code-KCS 502

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COURSE OUTLINE	The objective of the course is to understand the basic phases required for the compilation of any programming language. This will also develop the understanding how the compiler detects and handles the syntactic and semantic errors in a program during compilation.

COURSE DETAILS

S. No	Module ID/ Lecture ID	Lecture Title/Topic
1	Lecture 1	Introduction to Compiler
2	Lecture 2	Phases and Passes
3	Lecture 3	Finite state machines, regular expressions and Optimization of DFA-based Pattern Matches, Bootstrapping
4	Lecture 4	Lexical Analysis and Input Buffering
5	Lecture 5	Lexical Analyzer Generator and Implementation
6	Lecture 6	LEX-compiler and YACC
7	Lecture 7	Formal Grammar, BNF Notation and Ambiguity
8	Lecture 8	The syntactic specification of programming languages: Context free grammars, derivation and parse trees
9	Lecture 9	Eliminating Ambiguity and Left Factoring
10	Lecture 10	Elimination of Left Recursion and Parsing
11	Lecture 11	FIRST, FOLLOW and Constructing Predictive Parsing Table
12	Lecture 12	Predictive Parsing

13	Lecture 13	Shift Reduce Parsing
14	Lecture 14	Operator Precedence Table
15	Lecture 15	Precedence Function and Operator Precedence Parsing
16	Lecture 16	LR parsers: the Canonical Collection of LR(0) items
17	Lecture 17	Constructing SLR parsing tables and Parsing
18	Lecture 18	Constructing Canonical LR parsing tables
19	Lecture 19	Shift Reduce Conflicts
20	Lecture 20	Syntax-directed Translation schemes, Implementation of Syntax directed Translator
21	Lecture 21	Intermediate code, postfix notation, Parse Tree and Syntax Tree
22	Lecture 22	Three address code, quadruple, triple and Translations of Assignment Statements
23	Lecture 23	Boolean expressions
24	Lecture 24	Statements that alter the flow of control, postfix translation, translation with a top down Parser
25	Lecture 25	Array references in arithmetic Expressions
26	Lecture 26	Procedures call, declarations and case statements
27	Lecture 27	Symbol Tables: Data structure for Symbols Tables
28	Lecture 28	Symbol Tables: Representing Scope Information.
29	Lecture 29	Run-Time Administration: Implementation of Simple Stack Allocation Scheme
30	Lecture 30	Storage allocation in block
31	Lecture 31	Lexical Phase Errors
32	Lecture 32	Syntactic and Semantic Phase Errors
33	Lecture 33	Code Generation: Design Issues
34	Lecture 34	Target Language Addresses in the Target Code

35	Lecture 35	Basic Blocks and Flow Graphs, Optimization of Basic Blocks
36	Lecture 36	Code Generator
37	Lecture 37	Machine-Independent Optimizations
38	Lecture 38	Value numbers and algebraic laws, Global Data-Flow Analysis

References:

1. Principles of Compiler Design by Aho and Ullman, Narosa Publication
2. Compiler Design Using Flex and YACC by Vinu V. Das, PHI Publication
3. Compilers: Principles, Techniques and Tools by Aho, Ullman and Sethi and Monica S. Lam, Pearson Publication
4. Compiler Design by V. Raghvan, Tata Mc Hill

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