B.Sc. (H) Computer Science V Sem (CBCS)

DSC 1

Guidelines (System Programming)

Topic	Reference	Contents	Number of Lectures
Assemblers & Loaders, Linkers: One pass and two pass assembler, design of an assembler, Absolute loader, relocation and Linking concepts, relocating loader and Dynamic Linking	[1]	Chap.3 (complete) [p36-62],Chap. 4(complete)[p63- 83]	10L
Introduction : Overview of compilation, Phases of a compiler	[2]	Sec1.1-1.2[p1-12]	2L
Lexical Analysis: Role of a Lexical analyzer, Specification and recognition of tokens, Symbol table, Lexical Analyzer Generator	[2]	Lex [2]Sec 3.1 [p109-113], Sec 3.3-3.5 [p116-144]	8L
Parsing: Bottom up parsing-LR parser,Parser Generator- YACC	[2]	Sec 4.5-4.7.4 [p233-270], Sec 4.8-4.9 [p278-297]	10L
Intermediate representations: Three address code generation, syntax directed translation, translation of types, control statements	[2]	Sec 5.1-5.2.4 [p303-314], Sec 6.2(upto 6.2.3) [p363-369], Sec 6.3-6.3.4 [p370-375], Sec 6.4-6.4.1 [p378-380], Sec 6.5-6.5.2 [p386-390],Sec 6.6(upto 6.6.4) [p399-405], Sec 6.6.6 [p408]	8L
Storage organization: Activation records, stack allocation,	[2]	Sec7.1-7.2 [p427-441]	5L
Code Generation: Object code generation	[2]	Chap 8 (upto 8.3.1) [p505-520]	5L

Recommended Reading Material

Text Books

1. Santanu Chattopadhyaya, System Software,PHI, 2011.

2. AlfredV.Aho, MonicaS.Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers: Principles, Techniques, and Tools, 2ndedition, Prentice Hall, 2006.

Reference Books

3. D. M. Dhamdhere,Systems Programming, TataMcGrawHill, 2011.

4. Leland Beck,D.Manjula, System Software:An Introduction to System Programming,3rd edition, Pearson Education, 2008.

5. GruneD,Van Reeuwijk.K, Bal H.E,Jacobs CJH,Langendoen K,Modern Compiler Design, 2ndedition,Springer, 2012

LIST OF PRACTICALS OF SYSTEM PROGRAMMING

1. To implement an assembler for a hypothetical language. Programs to get familiar with Lex and Yacc 1. Write a Lex program to count the number of lines and characters in the input file.

2. Write a Lex program that implements the Caesar cipher: it replaces every letter with the one three letters after in in alphabetical order, wrapping around at Z. e.g. a is replaced by d, b by e, and so on z by c.

3. Write a Lex program that finds the longest word (defined as a contiguous string of upper and lower case letters) in the input.

4. Write a Lex program that distinguishes keywords, integers, floats, identifiers, operators, and comments in any simple programming language.

5. Write a Lex program to count the number of identifiers in a C file.

6. Write a Lex program to count the number of words, characters, blank spaces and lines in a C file.

7. Write a Lex specification program that generates a C program which takes a string “abcd” and prints the following output

abcd

abc

ab

a

8. A program in Lex to recognize a valid arithmetic expression.

9. Write a YACC program to find the validity of a given expression (for operators + - * and /)A program in YACC which recognizes a valid variable which starts with letter followed by a digit. The letter should be in lowercase only.

10. A Program in YACC to evaluate an expression (simple calculator program for addition and subtraction, multiplication, division).

11. Program in YACC to recognize the string „abbb", „ab" „a" of the langauge (an b n , n>=1).

12. Program in YACC to recognize the language (an b , n>=10). (output to say input is valid or not)