CBCS SCHEME

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18CS61

Sixth Semester B.E. Degree Examination, July/August 2022
System Software and Compilers

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain in detail SIC/XE Machine Architecture. **(10 Marks)**

b. List the various machine independent assembler features. Explain the control sections how the assembler convert them into object code. **(10 Marks)**

OR

2 a. Write an algorithm for One Pass Assembler and give sample object program from One Pass Assembler. **(10 Marks)**

b. What are the basic functions of loader? Explain two ways of program relocation in loaders. **(10 Marks)**

Module-2

3 a. Explain various phases of Compiler. Show the translations for an Assignment statement.
Position = Initial + rate * 60.
Clearly indicate the output of each phase. **(12 Marks)**

b. What are the applications of Compiler? Explain. **(08 Marks)**

OR

4 a. Write a brief note on Language Processing System. **(06 Marks)**

b. Explain the concept of input buffering in the Lexical analysis with its implementation. **(10 Marks)**

c. Define Token , Lexeme and Pattern with example. **(04 Marks)**

Module-3

5 a. Define Context Free Grammar. Obtain CFG to generate strings of a's and b's having substring "ab". **(10 Marks)**

b. Consider grammar given below from which any arithmetic expressions can be obtained.
$E \rightarrow E + E$ $E \rightarrow E - E$ $E \rightarrow E * E$ $E \rightarrow E \mid E$ $E \rightarrow id$
Show that the grammar is ambigious for the sentence id + id * id. **(10 Marks)**

OR

6 a. Write an algorithm to eliminate left recursion from a grammar. Eliminate left recursion from the given grammar. $S \rightarrow Aa \mid b$ $A \rightarrow Ac \mid Sd \mid \varepsilon$. **(10 Marks)**

b. Define Shift – Reduce Parser and Handle. What are conflicts in shift – reduce parse, explain with example. **(06 Marks)**

c. List and explain different actions of shift – reducer parser **(04 Marks)**

Module-4

7 a. Explain the three basic section of LEX program with example. **(10 Marks)**

b. Write LEX program to count word, character and line count in a given file. **(10 Marks)**

OR

8 a. What is YACC? Explain the different sections used in writing the YACC specification. Explain with example program. **(10 Marks)**

b. Define Regular Expression. What is the use of following Meta characters :
i) · ii) * iii) ∧ iv) $ v) { } vi) ? **(07 Marks)**

c. Discuss how Lexes and Parser communicate. **(03 Marks)**

Module-5

9 a. Define S – Attribute and I – Attribute with respect to SDD and construct Syntax tree, Parse tree and annotated tree for string 5 *6 + 7 by using given grammar.

$S \rightarrow En$
$E \rightarrow E + T \mid E - T \mid T$
$T \rightarrow T * F$
$T \rightarrow T \mid F$
$T \rightarrow F$
$F \rightarrow (E) \mid digit \mid$
$n \rightarrow ;$

(10 Marks)

b. What are the different three address code instructions? Translate the arithmetic expression a + b – (-c) into quadruples , triplets and indirect triples. **(10 Marks)**

OR

10 a. Define SDD. Give SDD for simple type declaration. Construct a dependency graph for the declaration int a, b ; **(10 Marks)**

b. Explain the issues in design of code generation. **(10 Marks)**

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