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10CS63

Sixth Semester B.E. Degree Examination, July/August 2021
Compiler Design

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Write a note on impact of compiler technology on different areas of computer science. **(08 Marks)**

b. Justify the need of 'lookahead' during lexical analysis. Illustrate how lookahead is implemented using "Busses pairs" in lexical analysis. **(06 Marks)**

c. Write a program segment for recognizing relational operators with first state and one final state implementation of its transition diagram. **(06 Marks)**

2 a. Explain different error recovery strategies used during syntax analysis. **(04 Marks)**

b. Explain "dangling-else" grammar. Provide an unambiguous grammar for the same. **(06 Marks)**

c. Explain recursive descent parsing with an example. **(06 Marks)**

d. Write an algorithm to remove left recursion from a grammar. **(04 Marks)**

3 a. Give the rules of constructing FIRST and FOLLOW sets. Construct the FIRST and FOLLOW sets for the following grammar.

$E \rightarrow TE'$

$E' \rightarrow +TE' | \varepsilon$

$T \rightarrow FT'$

$T' \rightarrow *FT' | \varepsilon$

$F \rightarrow (E) | id$ **(10 Marks)**

b. Construct LL(1) parsing table for the following grammar:

$P \rightarrow Ra | Qba$

$R \rightarrow aba | caba | Rbc$

$Q \rightarrow bbc | bc$ **(10 Marks)**

4 a. Explain the working of shift reduce parse. Parse the input string int id, id; using shift reduce parses for the following grammar:

$S \rightarrow TL;$

$T \rightarrow int | float$

$L \rightarrow L, id | id$ **(08 Marks)**

b. Give an algorithm for construction of SLR parsing table. **(04 Marks)**

c. Construct the LR(1) parsing table for the following grammar:

$S \rightarrow CC$

$C \rightarrow aC$

$C \rightarrow d$ **(08 Marks)**

5 a. Explain the concept of Syntax-Directed Definitions (SDD) and differentiate among its clauses with suitable examples. **(10 Marks)**
b. Give the syntax directed definition for a simple type declaration in C and construct dependency graph for the input float a, b, c. **(10 Marks)**

6 a. What are Directed Acyclic Graphs (DAG). Develop an SDD to produce DAG for an expression. Construct DAG for the expression $a + a * (b - c) + (b - c) * d$. **(10 Marks)**
b. Write and explain syntax directed definitions for flow of control statements. **(10 Marks)**

7 a. Explain the different forms of representing three address codes with examples. **(08 Marks)**
b. Write a note on performance metrics to be considered while designing a garbage collector. **(06 Marks)**
c. With a neat diagram, describe the general structure of an activation record. **(06 Marks)**

8 a. Discuss the issues in the design of code generator. **(10 Marks)**
b. Explain basic blocks and flow graphs with a suitable example. **(10 Marks)**

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