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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.

 $E \rightarrow TE'$

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

 $T \rightarrow FT'$

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

 $F \rightarrow (E) | id$
(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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