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10IS662

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
Compiler Design

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. With the help of a neat diagram, explain the various phases of a compiler. (08 Marks)
- b. What is input buffering? Explain the use of sentinels in recognizing the tokens in buffering. (08 Marks)
- c. Write the regular definition for a decimal number. (04 Marks)
- 2 a. What is Predictive Parsing? Explain the predictive parsing algorithm. (08 Marks)
- b. Explain ambiguous grammars with an example. (06 Marks)
- c. Given the grammar : $S \rightarrow iCt S \mid iC t Se S \mid a$
 $C \rightarrow b$
 - i) Compute FIRST() of FOLLOW () sets
 - ii) Construct the predictive parsing table
 - iii) Check whether the given grammar is LL (1) (06 Marks)
- 3 a. Explain the working of a shift reduce parser with a neat diagram. (06 Marks)
- b. What is handle pruning? Indicate handles by performing bottom-up parsing for the input string 00001111 for given grammar :
 $S \rightarrow 0S1 \mid 01$. (06 Marks)
- c. Given the grammar :
 $E \rightarrow 5 + T \mid 3 - T$
 $T \rightarrow V \mid V * V \mid V + V$
 $V \rightarrow a \mid b$
 - i) Perform LL (1) parsing
 - ii) Construct the predicative parsing table. (08 Marks)
- 4 a. For the given grammar, construct SLR(1) parse table and parse the string "aa".
 $S \rightarrow SA \mid A$
 $A \rightarrow a$ (10 Marks)
- b. Construct canonical parse table for the grammar:
 $S \rightarrow CC$
 $C \rightarrow cC \mid d$ (10 Marks)

PART – B

- 5 a. Write an SDD for simple desktop calculator. Show the annotated parse tree for the expression $(5*7) + (1*2)$. (10 Marks)
- b. Explain parser stack implementation of postfix SDT with an example. (10 Marks)
- 6 a. Construct DAG for the expression,
 $((x + y) - ((x + y) * (x - y))) + ((x + y) * (x - y))$
 Give the sequence of steps for the same. (08 Marks)
- b. Explain with examples quadruples, triples and indirect triples. (12 Marks)

10IS662

- 7 a. What is an activation record? Explain all the fields in an activation record. (08 Marks)
- b. Explain the following storage allocation strategies: (12 Marks)
- (i) Static allocation
 - (ii) Heap allocation.
- 8 a. Discuss the following terms: (10 Marks)
- (i) Basic blocks.
 - (ii) Next-use information.
 - (iii) Flow graph.
- b. Explain the following code optimization with example: (10 Marks)
- (i) Finding local common sub expression.
 - (ii) Dead code elimination.

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