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10CS63

Sixth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Compiler Design

Time: 3 hrs.

Max. Marks:100

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

PART - A

- 1 a. Discuss the various phases of a compiler, show the translation for an assignment statement position = initial + rate * 60 clearly indicate the output of each phase. (12 Marks)
- b. Write regular definition for an unsigned number, also draw transition diagrams for the same. (06 Marks)
- c. Write a brief note on science involved in building a compiler. (02 Marks)
- 2 a. Define the terms: i) Left recursion; ii) Left factorization, and refine the following grammer.
 - i) $S \rightarrow Aa|b$
 $A \rightarrow Ac|Sd|\epsilon$
 - ii) $st \rightarrow \text{identifier} := \text{exp}|\text{identifier} (\text{exp-list})| \text{other.}$ (06 Marks)
- b. Given the grammer

$$S \rightarrow a\uparrow|(M)$$

$$M \rightarrow M, S|S$$
 - i) Make necessary changes, suitable for LL(1) parsing (02 Marks)
 - ii) Construct predictive parsing table (08 Marks)
 - iii) Show the parser moves on the input (a, (a, a)). (04 Marks)
- 3 a. What is shift reduce parsing, list the actions of S|R parser for the grammer given below,

$$S \rightarrow (S)S|\epsilon$$
 and the input is () \$. What are the 2 conflicts that may occur during shift reduce parsing? (08 Marks)
- b. Obtain a set of canonical LR(0) items for the grammer and construct LR(1) parsing table. Is the grammer SLR(1), Give reasons.
 Grammer is $S \rightarrow L = R$

$$S \rightarrow R$$

$$L \rightarrow * R$$

$$L \rightarrow \text{id}$$

$$R \rightarrow L$$
 (12 Marks)
- 4 Consider the following grammer

$$S \rightarrow AA$$

$$A \rightarrow aA|b$$
 - a. Determine if the grammer is LR(1) or not. (10 Marks)
 - b. Determine if the grammer is LALR or not. (10 Marks)

PART – B

- 5 a. Give the syntax directed definition to process a simple variable declaration in 'C'. (06 Marks)
 b. Define dependency graph and construct dependency graph for the input float id1, id2, id3. (08 Marks)
 c. Define inherited and synthesized attributes, give examples for each. (06 Marks)
- 6 a. Write syntax directed definition for flow of control statements
 i) $S \rightarrow \text{if (B) S1}$
 ii) $S \rightarrow \text{while (B) S1}$ (06 Marks)
 b. Explain the following with an example:
 i) Quadraples
 ii) Triples
 iii) Indirect triples. (09 Marks)
 c. Translate the given, assignment statement into three-address-code,
 $n = f(a[i]);$ (05 Marks)
- 7 a. What is an activation record? Explain the purpose of each item in the activation record with example. (10 Marks)
 b. Explain desirable properties of memory manager. (05 Marks)
 c. Explain briefly the performance metrics to be considered while designing a garbage collector. (05 Marks)
- 8 a. Discuss the various issues in the design of a code generator. (10 Marks)
 b. Write the three-address code and construct the basic blocks, for the following program segment:
 $\text{Sum} = 0;$
 $\text{for (i = 0; i} \leq 10; \text{i++)}$
 $\text{sum} = \text{sum} + \text{aL[i];}$ (10 Marks)

24 JAN 2020