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Reg. No.

Name.....



B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Seventh Semester

Branch : Computer Science and Engineering

CS 010 702—COMPILER CONSTRUCTION (CS)

(New Scheme—2010 admission onwards)

[Regular / Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Write a regular expression to describe an IP address.

2. $L \rightarrow P S) | P)$

$P \rightarrow ($

$S \rightarrow aa | aL | LaLL$

Obtain a precedence matrix for this grammar.

3. Define S-attributed definition and L-attributed definition.

4. Explain the need for code optimization.

5. What is the significance of symbol table at runtime ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. What are the issues in the design of a lexical analyzer ?

7. $E \rightarrow E [E]$

$E \rightarrow E + E$

$E \rightarrow (E)$

$E \rightarrow id$

Turn over



Write an unambiguous grammar for the same language such that array accesses have higher precedence than assignments and both array accesses and assignments have higher precedence than addition. Addition is left-associative and assignment is right-associative.

8. What are synthesized and inherited attributes? Give an example based on a programming language construct for each of these.
9. Explain how a code sequence may be converted into a Basic Block.
10. Describe how peephole optimization can be used in code generation.

(5 × 5 = 25 marks)

Part C

Answer all questions.

Each full question carries 12 marks.

1. (a) Construct NFA and then optimized WFA for the following regular expression :

$ab(a|b)^*a^*$.

Or

- (b) Explain in detail about the various phases of a compiler.

2. (a) Consider the following grammar :

$S \rightarrow aA | b | cB | d$

$A \rightarrow aA | b$

$B \rightarrow cB | d$

construct an operator precedence parser for the above grammar and show the moves of the parser on the string *aaab*. Also write down the algorithm to implement operator precedence parsing.

Or

- (b) Obtain the SLR (1) parsing table for the following grammar :

$X \rightarrow a | aY | bZ$

$Y \rightarrow b | bY | aX$

$Z \rightarrow aZ | bX$

3. (a) Describe the type checking of expressions and statements.

Or



- (b) (i) Describe heap storage allocation. (5 marks)
- (ii) What is meant by block structured programming? (7 marks)
4. (a) Write the translation scheme for the following statement and also produce three-address code for that statement $c = a + B[i][j]$.

Or

- (b) Explain the various optimizations that can be done on a loop with examples for each.
5. (a) Discuss the various data structures used for symbol table organization.

Or

- (b) Explain a simple code generation algorithm with example.

[5 × 12 = 60 marks]