

Tribhuvan University
Institute of Science and Technology
2072

Bachelor Level/ Third Year/ Six Semester/ Science
Computer Science and Information Technology (CSc.
352) (Compiler Design and Construction)

Full Marks: 60
Pass Marks: 24
Time: 3 hours

Candidates are required to give their answers in their own words as far as practicable. The questions are of equal value.

Attempt all questions.

(10x6=60)

1. Explain the analysis phase of the compiling a source program with example. [6]
2. What are the functional responsibilities of a lexical analyzer? Write a lexical analyzer that recognizes the identifier of C language. [3+3]
3. What are regular definitions? Given the following CFG,

stmt \rightarrow **if** expr **then** stmt
 if expr **then** stmt **else** stmt

E

expr \rightarrow * term **relop** term
term id | **num**

Write the regular definitions for the terminals used. Also, construct the transition diagram for id and num.

4. Given a regular expression **(a+E) bc***. Construct the DFA recognizing the pattern described by the regular expression using syntax tree based reduction. [6]
5. Explain in detail about the recursive-descent parsing with example. [6]
6. Given the following grammar:

$E \rightarrow TE'$

$T \rightarrow \cdot + TE'E$

$T \rightarrow FT'$

$T \rightarrow *FT'$

$F \rightarrow +(E)lid$

Construct the parsing table for this grammar for non-recursive predictive parser. [6]

7. Define the term 'item', 'closure' and 'goto' used in LR parsing. Compute the SLR DFA for the following grammar.

$\rightarrow CC$

$C \rightarrow aC lb$

8. For the following grammar,

$E \rightarrow E+E \ E*E \ (E) \ I \ id$

Annotate the grammar with syntax directed definitions using synthesized attributes. Remove left recursion from the grammar and re-write the annotation correspondingly. [6]

9. Consider the following grammar for arithmetic expression using an operator 'op' to integer or real numbers.

Ei op E2 I num.num I num I id

Give the syntax directed definitions to determine the type of expression as when two integers are used in expression, resulting type is integer otherwise real. [6]

10. What is three address code? Translate the expression $a = b * -c + b * -c$ in to three address code statement. [6]

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