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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Sixth Semester, B.E. - Computer Science and Engineering

Semester End Examination; June - 2016

Compiler Design

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. What is compiler? Explain the different phases of compiler by considering the following statement as input : 10
 $a = b + c * 10$ assume a, b, c are type real.
- b. Write regular definition and transition diagram to recognize the identifier and unsigned number. 10
- 2 a. Explain the language processing system with a neat diagram. 8
- b. Explain the roles of lexical analyzer. 6
- c. Define the following terms with an example : 6
 i) Lexeme ii) Token iii) Pattern

UNIT - II

- 3 a. Briefly explain the problems associated with top-down parser. 6
- b. Show that the grammar given below is ambiguous : 8
 $E \rightarrow E + E / E * E / id$
 Give an unambiguous grammar for the above grammar such that + has higher priority * has less priority and both are right associative.
- c. Define FIRST and FOLLOW rules used in predictive parsing technique. 6
- 4 a. Design the context free grammar for the type declaration statement of the C-programming language. 5
- b. Obtain the predictive parsing table for the following grammar : 10
 $S \rightarrow uBz$
 $B \rightarrow Bv / vuE / vxuE / ByE$
 $E \rightarrow v / vx$
- c. Using the parsing table constructed in Q4(b), show that parsing steps for the string "uvuvz". 5

UNIT - III

- 5 a. Explain with an example, the stack, implementation of a shift reduce parser. 6

- b. Construct LR(0) automation and parsing table for the input string “bab”
 $S \rightarrow AS / b$ 14
 $A \rightarrow SA / a$
- 6 a. What is handle pruning? Explain with the help of the grammar $S \rightarrow SS + / SS * / a$ and input string $aaa * a++$. Give a bottom up parse of the given input string. 6
- b. Construct LR(1) parsing table for the grammar :
 $S \rightarrow L = R / R$ 10
 $L \rightarrow *R / id$
 $R \rightarrow L$
- c. Write SLR parsing algorithm. 4

UNIT - IV

- 7 a. Define a syntax directed definition. Give SDD for simple type declaration including int and float type. 4
- b. Construct a dependency graph for the declaration float id1, id2, id3. 8
- c. Discuss the general structure of activation record. 8
- 8 a. Define inherited and synthesized attributes. Give examples for each. 6
- b. What is meant by calling sequence and return sequence? List calling sequence design principles. 8
- c. Write a note on Garbage collection. 6

UNIT - V

- 9 a. Describe the method of Generating intermediate code for the flow control statement. 10
- b. Explain the different types of representation of 3 address code. Generate 3-address code for $a < b$ or $c > b$ or $e < f$. 10
- 10 a. Briefly explain main issues in code generations. 10
- b. Explain the code generation algorithm and generate code for the following expression :
 $X = (a - b) + (a + c)$. 10

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