

Code No: 156AH

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, August/September - 2024

COMPILER DESIGN

(Common to CSE, ECM, CSE(DS))

Time: 3 Hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) What is input buffering? [2]
- b) Why lexical and syntax analyzers are separated? [3]
- c) Remove left recursion $S \rightarrow Aab$, $A \rightarrow Ac|Sd|e$. [2]
- d) Define dangling else problem. [3]
- e) What do you mean by dependency graph? [2]
- f) Define type checking. [3]
- g) What do you mean by nesting depth of procedure? [2]
- h) How can you identify the leader in a Basic block? [3]
- i) What is meant register allocation and assignment? [2]
- j) Define register descriptor. [3]

PART – B**(50 Marks)**

2. Explain the various phases of a compiler in detail and also write down the output for the following expression after each phase [10]

$$position = initial + rate * 60$$
OR

- 3.a) Construct the optimized DFA for the following regular expression $(a|b)^*abb$.
- b) Write a regular expression for identifiers and reserved words. Design the transition diagrams for them. [5+5]

4. Construct a Predictive parsing (LL) table for the Grammar:

$$E \rightarrow E+T/T$$
$$T \rightarrow T*F/F$$
$$F \rightarrow (E)/id$$

And parse the following input string "id+id*id". [10]

OR

5. Construct LALR parsing table for the following grammar: [10]

$$S \rightarrow CC$$
$$C \rightarrow aC | d$$

- 6.a) Construct an annotated parse tree for **9-5+2** using expression grammar. [5+5]
b) Give syntax directed translation scheme for simple desk calculator. [5+5]
- OR**
- 7.a) Construct a Quadruple, Triple and Indirect Triple for the statement $a = b * - c + b * d$.
b) Differentiate between Synthesized and Inherited attributes with suitable examples. [5+5]
- 8.a) What is a leader of basic block? Write and explain the algorithm used to find leaders.
b) Draw flow graph for quicksort algorithm. [5+5]
- OR**
- 9.a) Explain in detail about peephole optimization techniques.
b) What is meant by activation of procedure? How it can be represented with activation tree and record? [5+5]
- 10.a) Justify the statement "Copy propagation Leads to Dead code".
b) Write detailed note on data flow analysis. [5+5]
- OR**
11. Explain various principal sources of code optimization techniques. [10]

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