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Thapar University, Patiala
Department of Computer Science and Engineering

B. E. (Final Year) Auxillary Examination

Course code: UCS 802
Course Name:Compiler Construction
Name Of Faculty: Sunita Garhwal

Time: 3 Hours, M. Marks: 100
DATED: 4/09/2018

Note: Attempt all questions. Assume missing data, if any, suitably

Q1. Consider the following grammar G_1: (15)

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

a) Remove the left recursion from the above grammar.
b) Compute first and follows for the resulted grammar.
c) Construct LL(1) parsing table.
d) Show the parsing stack and the actions for the input string : w = id+id*id.

Q2. Consider the grammar G_1 of Q1 and perform the following(s) : (10)
a) Construct the DFA of LR(1) items.
b) Construct LR(1) parsing table.
c) Show the processing of input string : w=id+id*id.

Q3. Explain the five phases of compiler. Illustrate with help of some example. (10)

Q4. Consider the following grammar for simple integer arithmetic expressions: (10)

$$E \rightarrow E+T \mid E-T \mid T$$
$$T \rightarrow T*F \mid F$$
$$F \rightarrow (E) \mid num$$

a) Write the attribute equations for the val attribute.
b) Draw the parse tree for (82-5) / 5, together with attribute values.

Q5. Consider the following expression:

(a /b + c) * (b + c) -(a +b + c) (10)

a) Write sequence of three-address instructions that would be generated by above expression.
b) Represent the Quadruples, Triples and Indirect-Triple implementation for the above three-address code.

Q6. Consider the following grammar: **(10)**

$$X \rightarrow Ca$$
$$U \rightarrow Xb \mid c$$

a) Remove the left recursion.
b) Construct First and Follow sets for the non-terminals of the resulting grammar.

Q7. Explain in brief the different types of errors handled by the phases of compiler. Illustrate with help of some example. (10)

Q8. Given the regular expression r = (a | b)*abb. Convert it into NFA using Thompson's Construction. Convert the obtained NFA into DFA and minimize it. (15)

Q9. Discuss in brief the importance of symbol table in compiler design. (10)