

Roll Number: _____

Thapar Institute of Engineering & Technology, Patiala
Department of Computer Science and Engineering

Course code: UCS 802

B. E. (Final Year) Auxillary Examination

Course Name: Compiler Construction

Name Of Faculty: Sunita Garhwal

Time: 3 Hours, M. Marks: 100

Dated: 25/07/2018

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

(15)

Q1. Consider the following grammar:

$$G \rightarrow E$$

$$E \rightarrow T + E$$

$$E \rightarrow T$$

$$T \rightarrow F * T$$

$$T \rightarrow F$$

$$F \rightarrow id$$

- Construct the DFA of LR(1) items for the above grammar
- Construct LR(1) parsing table.
- Show the parsing stack and the actions for the input string $w = id + id * id$.

(15)

Q2. Consider the following grammar and perform the following(s):

$$T \rightarrow X = V$$

$$V \rightarrow U \mid V + U$$

$$U \rightarrow W \mid \text{integer} \mid (V)$$

$$W \rightarrow id$$

- Construct the DFA of LALR(1) items.
- Construct LALR(1) parsing table.
- Show the processing of input string $w = id = integer + id$.

(10)

Q3. Consider the following grammar for simple integer arithmetic expressions:

$$E \rightarrow E + T \mid E - T \mid T$$

$$T \rightarrow T * F \mid F$$

$$F \rightarrow (E) \mid \text{num}$$

- Write the attribute equations for the val attribute.
- Draw the parse tree for $(-42-5) / 3$, together with attribute values.

(10)

Q4. Explain the five phases of compiler. Illustrate with help of some example.

Q5. Consider the following expression:

$$(x * y + z) / (y + z) - (x + y + z)$$

(10)

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

(10)

Q6. Consider the following grammar:

$$S \rightarrow Aa$$

$$A \rightarrow Sb \mid c$$

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

Page 1 of 2

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

Q8. Given the regular expression $r = (a + b)^*ba(ba + b)^*$. Convert it into NFA using Thompson's Construction. Convert the obtained NFA into DFA and minimize it. (10)

Q9. Discuss in brief the importance of regular expression in lexical analyzer. (10)