B.E.(Computer Technology) Semester Seventh (C.B.S.)
# Compilers

P. Pages : 3

Time : Three Hours

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KNT/KW/16/7477

Max. Marks : 80

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Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Explain phases of Compiler in detail. **10**

   b) Write a LEX specification for recognizing real constants in floating point format as well as exponential formal. **4**

OR

2. a) What is Cross Compiler? How boot strapping is needed to developed cross compiler. **4**

   b) What are prerequisite of CFG for TOP-DOWN parser. **4**

   c) Write recursive descent parsing procedures for the grammar
   $S \rightarrow aAd, \quad A \rightarrow cA/d$ **6**

3. a) Show that the following grammar is LL(1) or not without constructing parsing table. **5**
   $D \rightarrow L : T$
   $L \rightarrow L, id \mid id$
   $T \rightarrow integer$

   b) Comment on following statements. **8**
   i) Every LR(1) grammar is LALR but reverse is not true.
   ii) For errorneous input LR parser detect error earlier than LALR parser.
   iii) Every unambiguous grammar is LR grammar.
   iv) Number of states of LR parser and LALR parser is same.

OR

4. a) Show that the following grammar is LR(1) but not LALR. **9**
   $S \rightarrow Aa \mid bAc \mid Bc \mid bBa$
   $A \rightarrow d$
   $B \rightarrow d$

   b) Explain the data structure for LR parsing table. **4**

5. a) What are different types of intermediate code? Show all of them for $c = a + b/ - e * d$ **6**

   b) Give SDTS for 'for' loop explain with suitable example. **7**

OR

6. Give SDTS for array reference and show three address code for following statement. **13**

$$A[I, J] = B[I + K, C[K]] + B[I, J]$$

Where array A and B is of size 20 x 30

   C is of size 30 and

   assume bpw = 4

7. a) Explain in brief loop optimization techniques. **6**

   b) How local common subexpression is identified? If present what is the action taken by code optimization in this regard. **7**

OR

8. a) Find IN and OUT of every block for the following graph. **10**
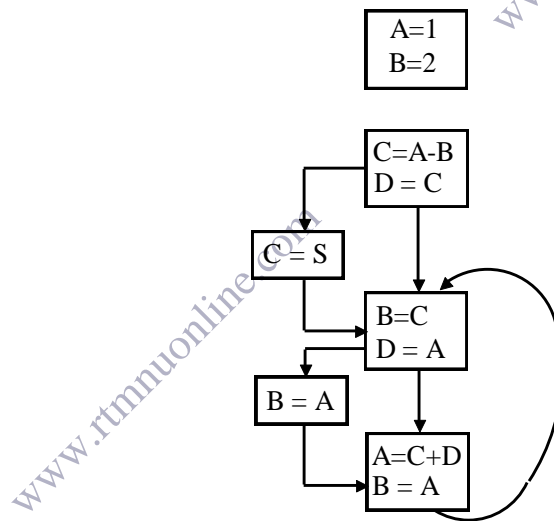
   b) What is dominators? How it can be use to detect loop in three address code. **3**

9. a) What are problems in code generation? **5**

   b) Use simple code generation algorithm to generate code for following three address code. assume two registers are available. **9**
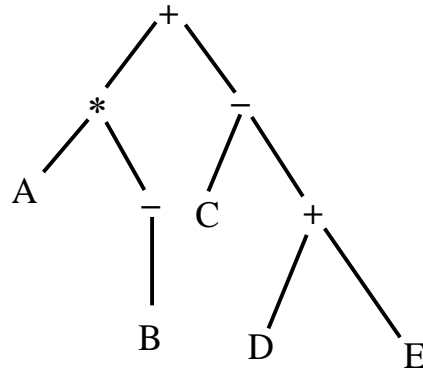
$$T_1 = a + b$$
$$T_2 = c + d$$
$$T_3 = e - T_2$$
$$T_4 = T_1 - T_3$$

OR

10. a) Give the first part of the labelling algorithm. Give number of register required for following DAG. **7**

b) Construct DAG for the following TAC. **7**

$$T_1 = a + b$$
$$T_2 = T_1 + c$$
$$T_3 = T_1 - T_2$$
$$T_4 = a + b$$
$$T_5 = T_4 / T_2$$

11. a) Explain phrase level error recovery in LR parsing. **6**

b) Give data structure used for symbol table in block structure language. **7**

OR

12. a) Explain error recovery in lexical analysis phase. **5**

b) Explain run time storage allocation for procedure call and return statement. **8**

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