

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

P. Pages : 3

Time : Three Hours



**NRT/KS/19/3561**

Max. Marks : 80

- 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.

1. a) Write a short note on compiler writing tools LEX and YACC. 7
- b) Write a LEX program to identify keyword, numbers and identifiers. 7

**OR**

2. a) Explain phases of compiler in details. 10
- b) Define the following terms. 4  
Compiler, Interpreter, Translator.
3. a) Explain the significance of FIRST and FOLLOW with suitable example. 6
- b) Get LR (0) parsing table for the following grammar and show whether the grammar is LR (0) or not. 7  
 $S \rightarrow 1s1 \mid 0s0 \mid 10$

**OR**

4. a) Construct LR (1) parsing table for the grammar and show whether the grammar is LR (1) or not. 6  
 $S \rightarrow AaAb \mid BbBa$   
 $A \rightarrow \epsilon$   
 $B \rightarrow \epsilon$
- b) Construct LALR parsing table for the following grammar with S as starting symbol. 7  
 $S \rightarrow AA$   
 $A \rightarrow aA \mid b$
5. a) Represent the expression  $a = (b + c) * -c$  in quadruple, triple and indirect triple representation. 7
- b) Write SDTS for if-then-else statements. 7

**OR**

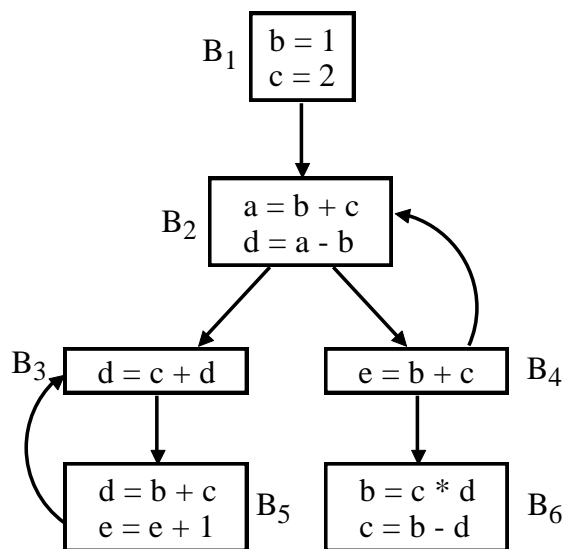
6. Generate the translation scheme for array reference intermediate code along with annotated parse tree for the following statement. 14  
 $X[I,J] = Y[I,J] + Z[K]$   
 X & Y as dimension 10x10.  
 Z as dimension 10  
 and bpw in 2

7. a) Get three address code, basic blocks and optimization for following code 10  
 begin.  
     PROD = 0 ;  
     I = 1  
 do  
     begin  
         PROD = PROD + A [I] + B [I]  
         I = I + 1  
     end  
 while I ≤ 20  
end.

- b) What is dominator? Give the properties of dominator. 3

**OR**

8. Compute IN and OUT for the following graph. 13

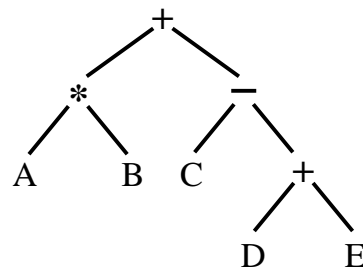


Also compute ud chain for block B<sub>2</sub> & B<sub>5</sub>

9. a) Explain peephole optimization in detail. 5  
 b) Use simple code generation algorithm to generate code for the following three address code. Assume two register are available. 8  
 $T_1 = a + b$   
 $T_2 = c + b$   
 $T_3 = e - T_2$   
 $T_4 = T_1 - T_3$

**OR**

10. a) Give the labelling algorithm. Label the following tree by labelling algorithm & determine how many number of register required. 7



- b) Explain different issues in code generation. 6
11. a) Define symbol table. Explain data structure use for representation of symbol table. 7
- b) What are different error Recovery strategies? Explain. 6

**OR**

12. a) Explain phrase level error recovery in LR parsing. 6
- b) What are different storage allocation strategies? Explain. 7

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