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B.E. (Information Technology) Seventh Semester (C.B.S.)

Elective - I : Compiler Design

P. Pages : 2 **NRT/KS/19/3588**

Time : Three Hours * 0 3 0 5 * 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.

1. a) Explain various phases of compiler. **8**

b) Differentiate between a phase and pass of a compiler. **5**

OR

2. a) Give structure of a LEX program. Write a program in LEX, to recognize signed decimal constant in 'C'. **8**

b) What are error that may encounter in each phase of a compiler. **5**

3. a) What type of preprocessing is required in LL (1) parsing? Give the 3 rules to determine whether the grammar is LL (1) or not. **6**

b) Construct LR (0) parsing table for the grammar. **8**

$S \rightarrow L = R \mid R$

$L \rightarrow * R \mid id$

$R \rightarrow L$

OR

4. a) Construct LR (0) parsing table for the grammar **8**

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

Using the standard associativity rules and precedence of operators eliminate conflict in parsing table if any.

b) Comment on the statements **6**

i) "Every ambiguous grammar is not LR (0)"

ii) LR (1) parser detects error earlier than LALR parser.

5. a) Give SDTS and generated three address code for the statement **8**

```
for (i = 0; i <10 && j > 5; i = i+1)
{
        c = i + j ;
        j = j - 1 ;
}
```

b) Give SDTS for mixed mode arithmetic expression. **5**

OR

6. Give SDTS for array translation. Generate three address code for the statement **13**

A [i, j, k] = B [i, j] + C [i + j]

where array A is of size 10x20x30

array B is of size 10x20, and

array C is of size 30.

Assume bpw = 4

7. a) What are the sources of error? **5**

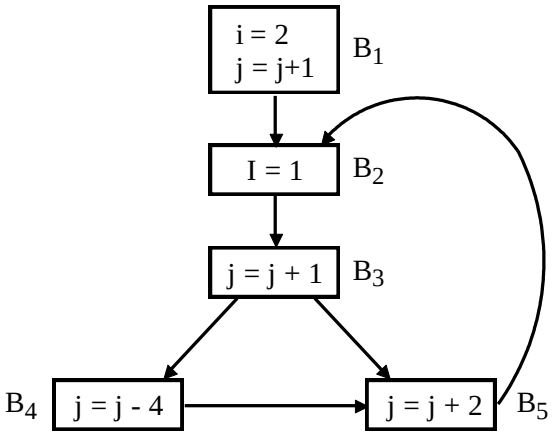
b) Explain data structure for symbol table in block structure language. **8**

OR

8. a) Explain phrase level error recovery in LR parsing. **7**

b) Explain memory allocation in procedure call and return statement. **6**

9. a) Find IN and OUT for the following flow graph. **7**



b) What is dominators? How it is used to identify natural loop in tree address code. **7**

OR

10. a) Write short note on peephole optimization. **7**

b) What are different loop optimization. **7**

11. a) What are the difficulties in good code generation? **5**

b) Explain the use of DAG in code generation. **8**

OR

12. a) Use simple code generation algorithm to generate the code for following three address code. Assume two registers are available, **8**

$T_1 = a + b$

$T_2 = c + d$

$T_3 = e - T_2$

$T_4 = T_1 - T_2$

b) Explain use of algebraic properties for reducing register requirement. **5**

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The secret of getting ahead is getting started.

~ Mark Twain