

COMPILER DESIGN

Paper-PC-CS-302A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt any *five* questions, selecting at least *one* question from each unit.

UNIT-I

1. (a) What is Regular Expression ? Write an algorithm to convert regular expression into NFA. 9
- (b) Draw NFA for the Regular Expression $a(a + b)^*ab$.
- (c) Draw NFA for $a + b + ab$.
- (d) Draw NFA corresponding to $(0 + 1)^*1(0 + 1)$. (2+2+2)
2. What are different phases of compiler and explain the role of different phases. 15

UNIT-II

3. (a) What is parsing? Explain top, down and bottom up parsing with the help of example. 9
- (b) $E \rightarrow T$
 $T \rightarrow T * F$
 $T \rightarrow id$
 $F \rightarrow T$
 $F \rightarrow id$

Draw parse tree representation of above expression for $id * id$.

4. what is LALR(1) parsing ? Draw DFA and parsing table for the following equation :

$S \rightarrow AA$

$A \rightarrow aA$

$A \rightarrow b$

15

UNIT-III

5. (a) What is heap allocation and stack allocation? Prove it by taking an appropriate example. 10

- (b) What are different issue is designing of code generator? 5

6. What is DAG and write its algorithm ? For the following statements :

1. $S1 := 4 * i$

2. $S2 := a[S1]$

3. $S3 := 4 * i$

4. $S4 := b[S3]$

5. $S5 := S2 * S4$

6. $S6 := prod * S5$

7. $S7 := i + 1$

$i := S7$

if $i \leq 20$ goto 1

15

UNIT-IV

7. What are different source of optimization ? Explain the following optimization in detail with example :
- (a) Machine independent optimization.
 - (b) Loop optimization.
 - (c) Peephole optimization. 15
8. What is Global data flow analysis ? Explain Storage organization, static storage management and heap storage management with the help of example. 15
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