5E1352

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B.Tech V Semester(Main) Examination,November - 2019
PCC/PEC Computer Science And Engineering.
5CS4-02 Compiler Design
Common For CS,IT

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

Attempt all ten questions from Part A, five question out of Seven from Part B and Four questions out of Five from Part C.

(Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(10×2=20)**

1. Define input Buffering.
2. What do you understand by Lexical Analyzer?
3. Define Finite automation and regular expression.
4. What do you mean by activation record?
5. Give the full form and definition of DAG.
6. Explain different types of errors in compilers.
7. Briefly describe parameter passing.
8. What do you mean by peephole optimization?
9. Eliminate left recursion in following grammar :-

   $S \rightarrow (L)|a$
   $L \rightarrow L,S|S$

10. Eliminate left factoring in following grammar :

    $S \rightarrow bSSaaS|bSSaSb|bSb|a$

PART - B

(Analytical/Problem solving questions)

Attempt any five questions (5×8=40)

1. Explain abstract syntax tree. Also create the syntax tree for following :

   i) $(a+b)*(c-d)+((e/f)*(a+b))$ (With post fix notation)

   ii) A + 4 - b + 3 (Also write functions)

2. Explain the phases of compiler and calculate the respective output, after each phase for the input c = a + b*5.

3. Consider the following program segment :

   Begin prod : = 0; i : = 1;

   do begin prod : = prod+ a(i)*b(i);

   i = i + 1; end while (I <=20) end

   Find the basic blocks and construct the flow graph and also optimize the code.

4. Explain type checking, type system, type expression and type conversion.

5. Explain activation record and activation tree. Also calculate the output using activation record for following program :-

```
f1 (int a)
{
int b = 10;
return (a+b);
}
 f2 (int b)
{
 Return (b+f1(b));
}
 main ( )
{
 f2 (4);
}
```

6. What is basic block? Also explain in detail the transformation in basic block.

7. Solve the input id + id*id, using operator precedence parser for the following grammar :

   $T \rightarrow T+T / T*T / id;$

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any Four questions (4×15=60)

1. Consider the following grammar : -

   $S \rightarrow L = RS \rightarrow RL \rightarrow *RL \rightarrow id\ R \rightarrow L$

   Construct the CLR parsing table for this grammar.

2. Given the syntax directed definition below with the synthesized attribute val, draw the annotated parse tree for the expression, specifying moves for the given input string :

   23*5 +4$

$L \rightarrow E$	L.val = E.val
$E \rightarrow T$	E.val = T.val
$E \rightarrow E+T$	E.val = E.val+T.val
$T \rightarrow F$	T.val = F.val
$T \rightarrow T*F$	T.val=T.val*F.val
$F \rightarrow (E)$	F.val = E.val
$F \rightarrow digit$	F.val = digit.lexval

3. Translate the following arithmetic expression

   a+a*(b-c)+(b-c)*d, into : -

   i) Post fix

   ii) Syntax Tree

   iii) 3 Address code

   iv) Quadruples

   v) Triples

   vi) Indirect triples

   vii) DAG

4. Given the grammar

$E \rightarrow E+T$
$E \rightarrow T$
$T \rightarrow T*F$
$T \rightarrow F$
$F \rightarrow (E)$
$F \rightarrow id$

a) Check whether the grammar is LR(O) and SLR(1) or not.

b) Parse the input string "id*id+id" for SLR and generate the parse tree.

5. Consider the following CFG = (N={S,A,B,C,D},T={a,b,c,d},P,S) where the set of production P is given below :

$S \rightarrow A$
$A \rightarrow BC|DBC$
$B \rightarrow Bb|\in$
$C \rightarrow c|\in$
$D \rightarrow a|d$

i) Calculate LL(1) for input string "dbb"

ii) Generate the parse tree for the same.