53 (CS 601) CMDG

2012 C
2013
(May)

COMPILER DESIGN

Paper : CS 601

Full Marks : 100

Pass Marks : 30

Time : Three hours

**The figures in the margin indicate full marks
for the questions.**

*Answer **any five** questions out of seven questions.*

1.   *(a)*   Briefly discuss about the different phases of compiler.   10

      (b)   Remove left recursion for the following grammar   5

        P→PQ|R

        Q→b

        R→c

(c) Consider the following grammar

E→E + T | T

T→T *F | F

F→id

With an example prove that the grammar is ambiguous. 5

2. (a) Design an NFA which can accept the regular expression $a \cdot (a \cdot b)^* b$. 10

(b) Consider the following grammar

E→E + T | T

T→T *F | F

F→id

Show the right most and left most derivation for the string id + id * id. 5+5

3. Consider the following grammar

E → AE'

E' → /AE'|∈

A → BA'

A' → −BA'|∈

B → (E)| id

(a) Compute FIRST and FOLLOW for the above grammar. 10

(b) Construct predictive parsing table for the above grammar. 10

4. Consider the augmented grammar given below :

$$E' \rightarrow E$$
$$E \rightarrow E + T | T$$
$$T \rightarrow T * F | F$$
$$F \rightarrow (E) | id$$

(a) Compute the sets of LR(0) items. 15

(b) What is the meaning of S, L, R and (1) in SLR (1) parser ? 5

5. Consider the following augmented grammar

$$A' \rightarrow A$$
$$A \rightarrow AB$$
$$A \rightarrow aA | c$$
$$B \rightarrow bB | d$$

(a) Construct the sets of LR (1) items 10

(b) Construct the canonical parsing table for the above grammar 10

6. *(a)* Construct the DAG and three address code for the expression

$$((a+b)-((a+b)*(a-b)))+((a+b)/(a-b))$$

5+5

(b) Write down the assembly language code for the three address code you derived in Question no. 6(*a*) 5

(c) Write briefly on *any one* code optimization technique. 5

7. *(a)* Write a LEX program to compute the number of characters, words and lines for any input. Write the compilation steps. (How to run ?) 10

(b) Write the differences between :

(i) LL (1) and SLR (1) parsing

(ii) Syntax and semantic error. 5+5

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