Total No. of Questions : 10] [Total No. of Printed Pages : 4

Roll No. .....

CS/IT–701

B. E. (Seventh Semester) EXAMINATION, June, 2010

(Common for CS & IT Engg.)

COMPILER DESIGN

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions. Each question carries equal marks.

1. (a) Explain the working of a compiler drawing its block diagram. 5

   (b) Explain why code optimization is called optional phase. 5

   (c) Following are the sequences of auxiliary definitions : 10

$$A_0 = a/b$$

$$A_1 = A_0A_0$$

$$A_2 = A_1A_1$$

:

:

:

$$A_n = A_{n-1}A_{n-1}$$

P. T. O.

followed by the pattern A_n :

(i) Describe the set of strings denoted by the pattern (as a function of n).

(ii) If we substitute out all auxiliary definitions in the pattern, how long is the regular expression ?

(iii) If you convert the regular expression from 2 into on NFA how many states are there ?

Or

2. (a) Discuss the merits and demerits of single pass and multi pass compiler. 5

(b) Disucss two compiler writing tools. 5

(c) Consider the following LEX program : 10

Auxiliary Definition

Keyword = BEGIN | IF THEN | ELSE | END

Letter = A | B | ..... | Z

Digit = 0 | 1 | ..... | 9

Identifier = letter (letter | digit)*

Constant = digit$^+$

Operator = > | < | <> | >= | < = | =

Translation Rules :

Token Pattern	Action
Keyword	{return kw}
Identifier	{return id}
Constant	{return const}
Operator	{return op}

3. (a) Consider a grammar G, S → SaS | b, show that G is ambiguous for string 'bababab'. 10

(b) Consider the grammar : 10

$$S \rightarrow ACB/CbB/Ba$$

$$A \rightarrow da/BC$$

$$B \rightarrow g/\varepsilon$$

$$C \rightarrow h/\varepsilon$$

Calculate FIRST and FOLLOW.

Or

4. (a) Consider the grammar : 12

$$S \rightarrow aBDh$$

$$B \rightarrow cC$$

$$C \rightarrow bC/\varepsilon$$

$$D \rightarrow EF$$

$$E \rightarrow g/\varepsilon$$

$$F \rightarrow f/\varepsilon$$

Construct the predictive parsing table.

(b) Discuss the problems in top-down parsers. How do they overcome ? 8

5. (a) Write a Syntax-Directed Defintion to translate 'switch' statement. With a suitable example, show the translation of the source language 'switch' statement. 10

(b) Give three-address code for the following code fragment : 10

```
If a < b then
        while c > d do
                x = x − y
else
        do
                p = p + q
        while e < = f
```

Or

6. (a) What is a three address code ? What are its types ? How is it implemented ? 10

   (b) Write a translation scheme to generate intermediate code for assignment statements with array references. 10

7. (a) Explain the various data structures used for implementing the symbol table and compare them. 10

   (b) Explain the difference between static, stack and heap allocation. 10

Or

8. (a) What is an activation record ? Explain each of its fields. 10

   (b) Explain with a suitable example, mechanism used by a compiler to handle procedure parameters. 10

9. (a) What is a basic block ? With a suitable example, discuss various transformations on the basic blocks. 10

   (b) Explain the code generation algorithm. 10

Or

10. (a) Write a note on application of Directed Acyclic Graph (DAG) in code generation. 10

    (b) Explain the principles sources of optimization with suitable example. 10