Roll No ....

CS - 701

B.E. VII Semester

Examination, December 2015

Compiler Design

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) Write the advantage of multipass compiler over single pass compiler.

   b) What is BOOT strapping? Also explain cross compiler.

   c) What are the various components of a lexical specification file? Illustrate with an example.

   d) What is LEX? Describe auxiliary definitions and translation rules for LEX with suitable example.

OR

Discuss the various phases of compiler with the help of neat labelled diagram.

2. a) What is syntax analysis? What are its primary functions?

   b) How do you classify the different parsing techniques?

   c) How does an operator precedence parser work? Use a preconstructed operator precedence table to guide the parsing of an input 'a+b–20' using operator precedence parser.

   d) What is a translation scheme? How is it different from a syntax directed definition? Illustrate the order of execution of semantic actions in a translation scheme.

OR

Describe the SLR(1) method of constructing the LR parsing table from a given grammar. Illustrate with an example.

3. a) What is symbol table? How is it used in compilers?

   b) What is an activation record? With the help of diagram show the important fields in an activation record.

   c) What are the procedure calling and returning sequences? Explain the sequence of actions in each of them.

   d) What is run time environment? What are the important elements of runtime environment? How is it controlled in a program that is compiled?

OR

Explain various storage allocation strategies.

4. a) Describe the backpatching technique.

   b) Draw DAG for the given block:

   $a = b+c$

   $b = a–d$

   $c = b+c$

   $d = a–d$

   c) Translate the following expression to quadruple and triple-

   $–(X–Y)/(Z*C)–(X+Y–Z)$

   d) Explain briefly:-

   i) Peephole optimization

   ii) Register allocation

   iii) Three address code

OR

Write down the three address code for the following switch statement:-

Switch (i+j)

{

    case 1: x:= y–z

    case 2: a: = b+c

    case 3: i = j+k

}

5. a) What is loop optimization?

   b) Explain any two data flow properties used by target code generator for producing efficient code.

   c) What is an iterative approach to solving the data flow equations? When do we need it? Give an example in context of computing available expression data flow property.

   d) What are induction variables? How does the strength reduction on induction variable help in improving loop optimization? Illustrate with an example.

OR

What is global data flow analysis? What is its use in code optimization.

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