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(2124)

1797

MCA 5th Semester Examination

Compiler Design

MCA-504

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt Five questions in all selecting one from each of the Sections A, B, C & D. Section E is Compulsory.

SECTION - A

1. (a) What is a translator? Discuss the role of various phases of the compiler in the translation of source program to object code.
- (b) Discuss the action taken by every phase of the compiler on the following strings:
 $A=B*C + D/E$ (12)

OR

- (a) The process of porting a compiler can be considered as two distinct operations: retargeting and rehosting. Discuss the distinctness of these two operations.
- (b) Consider the following C program and makeup the token:
int main (l, j)
{
 int i, j;
 return i > j ? i : j;
}
- (12)

[P.T.O.]

SECTION - B

3. (a) Construct a Finite Automata for the regular expression:
 $r = (a+b)^* abb$
- (b) What is the use of deterministic finite automata in lexical analysis? Explain with suitable example. (12)

OR

4. After Computing FIRST and FOLLOW functions, construct predictive parsing table for the following grammar:

$$E \rightarrow TE'$$

$$E' \rightarrow +TE' / \epsilon$$

$$T \rightarrow FT'$$

$$T' \rightarrow *FT' / \epsilon$$

$$F \rightarrow (E) / id \quad (12)$$

SECTION - C

5. What is the role of intermediate code generation in overall compiler design? Show the annotated parse tree and code generation process for the following, arithmetic expression:

$$A+(b-c)*d \quad (12)$$

OR

6. Write the semantic actions to generate three-address code for case statement of any language you are familiar with. (12)

SECTION - D

7. (a) Specify the necessary and sufficient conditions for performing:
- Constant propagation.
 - Dead code elimination.

- (b) Explain the need of code optimization. With example, illustrate loop optimization. (12)

OR

8. Show the DAG for the following statement:

$$Z = X-Y+X*Y*U-V/W+X+V \quad (12)$$

SECTION - E

9. Answer short answer type questions:

- Differentiate between compiler and Interpreter. (2)
- Differentiate sentence and sentential form. (2)
- How semantic rules are defined? (1)
- What are the benefits of using machine-independent intermediate form? (1)
- Mention the application of DAG. (1)
- Define back patching. (1)
- What are the characteristics of peephole optimization? (1)
- Give the block diagram of organization of code optimizer? (1)
- Do we really need a two-pass assembler? Why? (1)
- What are the two standard storage allocation strategies? (1)