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B. TECH.

✓ SEMESTER EXAMINATION, 2008-2009
TCS-502, COMPILER DESIGN

Time : 3 Hours

Maximum Marks: 100

Note : Attempt any FIVE questions

1. (a) Specify the lexical form of numeric constants, identifiers and keywords in C. (10)
- (b) What do you understand by a Compiler? Describe the Analysis-Synthesis Model of compilation. (10)
2. (a) What are the functions of preprocessors? Also discuss the reasons for separating the analysis phase of compiling into Lexical analysis and parsing. (10)
- (b) Consider the following grammar:
 $E \rightarrow E + T \mid T$
 $T \rightarrow TF \mid F$
 $F \rightarrow F * F \mid a \mid b$
(i) Construct the SLR parsing table for this grammar.
(ii) Construct the LALR parsing table. (10)
3. (a) Explain the various phases of a compiler in detail. Also write down the output for the following expression after each phase a: =b*c-d (10)
- (b) Show that the following grammar:
 $S \rightarrow AaAb \mid BbBa$
 $A \rightarrow \epsilon$
 $B \rightarrow$
Is LL(1) but not SLR(1). Also show that every LL(1) grammar is LR(1) grammar. (10)
4. (a) For the grammar given below, calculate the operator precedence relation and the precedence functions.
 $E \rightarrow E + E \mid E - E \mid E * E \mid E / E \mid E \wedge E \mid (E) \mid -E \mid id$ (10)
- (b) What are the various ways of calling procedures? Explain in detail. (10)

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5. (a) Describe the method of generating syntax-directed definition for Control statements. (10)
- (b) How Back patching can be used to generate code for Boolean expressions and flow of control statements. (10)
6. (a) Describe in detail the syntax-directed translation of case statements. (10)
- (b) Explain the issues in design of code generator. (10)
7. (a) Consider the matrix multiplication of three square matrices a , b , c of size $n \times n$. Write a program for matrix multiplication and answer the following:
- (i) Assuming a , b , c are allocated static storage and there are four bytes per word in a byte-addressed memory, produce three-address statements for your program. (10)
 - (ii) Generate target-machine code from the three-address statements. (10)
 - (iii) Construct a flow graph from the three-address statements. (10)
- (b) Write about Data flow analysis of structural programs. (10)
