Code No: RR320504 **Set No. 1**

III B.Tech II Semester Supplimentary Examinations, Apr/May 2008
LANGUAGE PROCESSORS
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Draw a block diagram of phases of a compiler and indicate the main functions of each phase. [10]
   (b) Write the main difference between compiler and interpreter. [6]

2. (a) Explain the reasons for separating lexial analysis phase from syntax analysis. [6]
   (b) Eliminate ambiguities from the following grammar
   S → iEtSeS|iEtS|a
   E → b|c|d [10]

3. (a) What is an SLR grammer [4]
   (b) Construct LALR(1) parsetable for the following grammer [12]
   S → Aa|bAc|Bc|bBa
   A → d
   B → d .

4. (a) Which of the following recursive type expressions are equivalent ? Justify your answer?
   e1 = integer → e1, e2 = integer →(integer → e2), e3 = integer →(integer → e1). [8]
   (b) Suppose that the type of each identifier is a sub range of integers for expressions with the operators +, -,* , div and mod as in pascal. Write type? checking rules that assign to each sub expression, the sub range its value must lie in. [8]

5. (a) Which data structure will be used to implement a symbol table in an efficient way? Give reasons. [8]
   (b) Discuss and analyze about all the allocation strategies in run-time storage environment . [8]

6. (a) What are the various machine dependent code optimization techniques. [8]
   (b) Convert the following arithmetic expression into syntax tree and three address code
   b* 3 (a+b) [8]

7. (a) What is a flow graph. Explain how flow graph can be constructed for a given program. [10]

(b) Compare the various forms of three address code. [6]

8. (a) Explain how lexical substitution is performed for model statements by a macro preprocessor. [6]

(b) Differentiate Positional and keyword parameter. [5]

(c) How the value of the positional and keyword parameter is determined? Explain with an example. [5]

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Code No: RR320504 **Set No. 2**

III B.Tech II Semester Supplimentary Examinations, Apr/May 2008
LANGUAGE PROCESSORS
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Suppose we have the sequence of auxiliary definitions
   A_0 = a/b
   $A_1 = A_0A_0$
   $A_2 = A_1A_1$
   .
   . .
   $A_n = A_{n-1}A_{n-1}$ Followed by the pattern A_n.
   (a) Informally describe the set of strings denoted by the pattern (as a function of n) [6]
   (b) If we substitute out all auxiliary definitions in the pattern, how long is the regular expression [5]
   (c) Show that $2^n + 1$ states are necessary for any NFA recognize A_n. [5]

2. (a) The grammar S → aSa|aa generates all even length strings of a's except for the empty string-show that the brute force method of top down parsing succeeds of 2,4 and 8a's but fails on 6a's. Also find out what are the even strings that are passed by the technique. [8]
   (b) What is an LL(1) grammar. Can you convert every context free grammar into LL(1). [8]

3. Explain the algorithm for translator of S-attributed grammars along with bottom up parsing with suitable examples. [16]

4. (a) List out some typical semantic errors . Explain how they can be rectified? [8]
   (b) What is static checking ? Give some examples of static checks. [8]

5. (a) What is dangling reference in storage allocation? Explain with an example. [8]
   (b) Explain hash table organization of symbol tables for block structured languages. [8]

6. (a) Translate the expression -(a+b)*(c+d)+(a+b+c) into quadruple, triple and indirect triple. [9]
   (b) Explain in detail the optimization tecnique "Strength Reduction". [7]

7. Generate code for the following statements for the target machine (Target Machine is a byte addressable machine with four bytes to a word and N general purpose registers.) Assuming all variables are static. Assume 3 registers are available.

(a) x = a [I] +1 [4]

(b) a[I] = b [c[I]] [4]

(c) a[I] [J] = b[I] [k] * c[k] [J] [4]

(d) a[I] = a[I] + b[J] [4]

8. (a) An assembly Language program contains the following statement.

X EQU Y + 25

Indicate how the EQU statement can be processed by a single pase assembler if

i. Y is a Back reference

ii. Y is a Forward reference. [8]

(b) What are assembler directives. [8]

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Code No: RR320504 **Set No. 3**

III B.Tech II Semester Supplimentary Examinations, Apr/May 2008
LANGUAGE PROCESSORS
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Draw a block diagram of phases of a compiler and indicate the main functions of each phase. [10]
   (b) Write the main difference between compiler and interpreter. [6]

2. (a) Eliminate ambiguity if any from the following grammar for boolean expressions.
   bexpr → bexpr or bterm|bterm
   bterm → bterm and bfactor|bfactor
   bfactor → nst factor|(bexpr)|true|false.
   where or, and, not (,), true, false are terminals in the grammar. [8]
   (b) Write a recursion discent parser for the above grammar. [8]

3. (a) Define syntax directed translater.
   (b) Write a syntax directed translation scheme for converting the following grammer with the syntax
   E → E +T
   E → E -T
   T → T *F
   T → T /F
   F → P ↑ F
   T → F
   F → P
   P → i d
   $P \rightarrow (E)$ [6+10]

4. (a) How do you check the expressions in polymorphic functions? Explain through an example. [8]
   (b) Consider the following declarations
   type link = ↑ cell;
   var next : link;
   last : link;
   p : ↑ cell;
   q,r : ↑ cell;
   Which among the following expressions are Structurally equivalent? Which are name equivalent? Justify your answer.
   i. link

ii. pointer(cell)
iii. pointer(link)
iv. pointer(record((info X integer) X (next X pointer(cell))) [8]

5. (a) Which data structure will be used to implement a symbol table in an efficient way? Give reasons. [8]
   (b) Discuss and analyze about all the allocation strategies in run-time storage environment . [8]

6. (a) Explain with an example the abstract machine code form of Intermediate code. [8]
   (b) Give a detailed account on loop optimisation techniques. [8]

7. (a) Define Address Descriptor and Register Descriptor. [4]
   (b) Why Next-use information is required for generating Object code? [6]
   (c) What are the various object code forms. [6]

8. (a) Explain all the data structures used for designing the macro preprocessor. [8]
   (b) Formulate an algorithm for processing Macro Definition. [8]

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Code No: RR320504 **Set No. 4**

III B.Tech II Semester Supplimentary Examinations, Apr/May 2008
LANGUAGE PROCESSORS
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain with one example how LEX program perform lexical analysis for the following PASCAL patterns: identifier, comments, numerical constants, key words, arithmetic operation. [16]

2. (a) Convert the following grammar into LL(1) grammar
   R → R"|'R|RR|R ∗ |(R)|a|b [10]
   (b) What are the advantages and disadvantages of operator precedence parsing. [6]

3. (a) Define LR(0) grammer. [4]
   (b) Construct SLR passing table for the following grammar. [12]
   E → E + T/T
   T → TF/F
   F → F*|a|b.

4. (a) Which of the following recursive type expressions are equivalent ? Justify your answer?
   e1 = integer → e1, e2 = integer →(integer → e2), e3 = integer →(integer → e1). [8]
   (b) Suppose that the type of each identifier is a sub range of integers for expressions with the operators +, -,* , div and mod as in pascal. Write type? checking rules that assign to each sub expression, the sub range its value must lie in. [8]

5. (a) What are the advantages and disadvantages of static storage allocation strategy. [8]
   (b) What are the advantages and disadvantages of heap storage allocation strategy? [8]

6. (a) What are the applications of DAG. Explain how the following expression can be converted in a DAG
   a+b*(a+b)+c+d [8]
   (b) Explain how loop invariant components can be eliminated. [8]

7. (a) Discuss global optimization techniques. [8]
   (b) Explain the equation for computing live variables in a given flow graph. [8]

8. Develop program specifications for the passes of a two pass assembler indicating

(a) Tables for internal use of the passes. [4]

(b) Tables to be shared between passes. [4]

(c) Inputs (Files and Tables) for every pass. [4]

(d) Outputs (Files and Tables) of every pass. [4]

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