Total No. of Questions : 8]

SEAT No. :

P2353

[Total No. of Pages : 2

[5254] - 686
B.E. (Information Technology) (Semester - I)
MODERN COMPILERS
(2012 Pattern) (Elective - I)

Time :2:30 hours] *[Max. Marks :70*

Instructions to the candidates:

1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.*
2) *Figures to the right side indicate full makrs.*
3) *Assume suitabe data, if necessary.*

Q1) a) Draw a stack frame. Explain the concepts of static linking, display array, lambda lifting with respect to stack frame. **[6]**

b) Define Basic Block. What are the steps for converting a long sequence of statements into basic blocks? **[6]**

c) What is incremental garbage collection? Describe tricolor marking. **[8]**

OR

Q2) a) Describe tree operators for intermediate representation. **[6]**

b) What is a trace? Write the algorithm for traces generation. **[6]**

c) Explain reference counting for garbage collection. Discuss the problems with this techniques using suitable example. **[8]**

Q3) a) Explain Higher - order functions and functional programming language in brief. What are three flavors of functional programming language? **[6]**

b) Explain different techniques for optimization of lazy functional programming. **[6]**

c) Explain tail position with suitable example. Write the steps to implement tail call. **[6]**

OR

Q4) a) Define inline expansion. Explain the rules for inline expansion. **[6]**

b) Explain call-by-name and call-by-need with respect to lazy evaluation. **[6]**

c) Discuss function - types for a simple functional language with a sample program. **[6]**

P.T.O.

Q5) a) Explain Inter-procedural data-flow analysis in brief. Describe different functions for flow - insensitive side effect analysis. **[8]**

b) What are possible caches in a system? Describe different approaches for instruction-cache optimization. **[8]**

OR

Q6) a) Differentiate between register allocation and assignment? Discuss different approaches for the same. **[8]**

b) What is inter-procedural optimization? Describe different kinds of inter-procedural optimizations. **[8]**

Q7) a) How to avoid the repeated global calculations of dataflow information? Write value-numbering algorithm to justify the same. **[8]**

b) What is reaching definitions? Write in and out definitions for reaching definitions. **[8]**

OR

Q8) a) Explain transformations using dataflow analysis with suitable examples. **[8]**

b) Explain explicit and implicit parametric polymorphism with suitable examples. **[4]**

c) Draw IR tree representation for quadruple: X = C1 * Z [i] + C2. **[4]**