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19/11/13 FN

Reg. No. : 

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**Question Paper Code : 81331**

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Second Semester

Computer Science and Engineering

CS 9223/CS 923 — ADVANCED SYSTEM SOFTWARE

(Regulation 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Construct the minimum state DFA for the regular expression :  $(a/b) * a(a/b)$ .
2. Define concrete and abstract syntax with an example.
3. Why is it necessary to generate intermediate code instead of generating target code?
4. How are C array references implemented in HIR and MIR?
5. What do you mean by local stack frame?
6. Give an example of inline expansion.
7. Write the differences between process and system virtual machines.
8. Specify the different stages involved in garbage collection process.
9. Define the process of profiling in interpretation.
10. Give any two real time examples for system software.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Construct the NFA, DFA and minimized DFA for the regular expression which have single line comments with characters from the alphabet  $\{a, b\}$ . (8)
- (ii) Write down the process involved in the syntactic analysis phases of the compiler. Write a CFG for expressions in a language and explain how the syntax phase recognizes the correct expressions. (8)

Or

- (b) (i) Write down the steps involved in implementation of a simple call return subprograms. Also mention the issues related to the implementation of recursive subprograms. (10)
- (ii) Write short note on virtual memory implementation. (6)
- 12. (a) (i) Discuss in brief about global and local symbol table structures and explain the issues related to their management. (8)
- (ii) Discuss the features of low level, medium level and high level languages. (8)

Or

- (b) (i) Write in brief about ICAN for an intermediate code generation. (6)
- (ii) Explain the significance of optimizing the generated code. Discuss in brief about loop optimization. (10)
- 13. (a) (i) Explain the concepts involved in speculative scheduling and instruction scheduling with their relative merits and demerits. (8)
- (ii) Explain how the run time support was provided for the process of register usage during optimization and scheduling. (8)

Or

- (b) Write a short note on the following:
  - (i) Software Pipelining. (8)
  - (ii) Trace scheduling. (8)
- 14. (a) (i) Explain the Pascal P-code architecture in brief with suitable illustrations. (8)
- (ii) Write short note on JVM architecture with neat illustrations. (8)

Or

- (b) Elucidate various garbage collection techniques with their advantages and disadvantages related to the real time implementations.
- 15. (a) (i) Explain the process of binary translations with suitable examples. (8)
- (ii) Explain various issues associated with the process of profiling and migration during the interpretation process. (8)

Or

- (b) (i) Write brief notes on instruction set issues in Virtual Machines. (8)
- (ii) Explain the migration of Virtual Machines in VMotion. (8)