E 8220

M.C.A. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

First Semester

CA 132 — DATA STRUCTURES AND ALGORITHMS

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by linear data structure?

2. How do you compute the storage location of a_{ij} in matrix A, where $0 < i \le m$ and $0 < j \le n$? Assume the first element is stored from BASE and row major order to followed.

3. What is a threaded binary tree?

4. When a tree is said to be balanced?

5. How do you compare the performances of different sorting schemes?

6. What is a sequential file?

7. State the constraints in a Travelling Salesman problem.

8. When do you say an algorithm is Np–hard?

9. What is a spanning tree? Minimum cost spanning tree?

10. Define Graph coloring problem.

PART B — (5 × 16 = 80 marks)

11. (i) Compare three traversal schemes and their applications on binary trees.

    (ii) How do you construct a binary tree from a linear set of numbers? Illustrate with example.

12. (a) Explain how stack operations are used for evaluating arithmetic expressions. Give algorithm and example.

Or

(b) (i) Describe a linked list creation, insertion, deletion of nodes.

(ii) Write briefly on garbage collection.

13. (a) Explain insertion sort. Is it comparable on complexity wise with merge sort? Justify.

Or

(b) Discuss the procedure for sorting on several keys and describe the applications.

14. (a) What are topological tables and files? How are they processed? Describe their applications.

Or

(b) Describe the organization and usage of index sequential and random access files.

15. (a) Explain Travelling salesman problem for 5 cities and solve the problem with branch and bound approach.

Or

(b) Explain Graph coloring problem with suitable algorithm for solving. Compute the time and spare complexities as the dimension of the problem increases.

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