CHAPTER 1

Introduction and Overview

1. Define the following terms: Data, Data structure, Linear data structure, Nonlinear data structure, Field, Record, File and Entity. 1X
2. Why data structure is necessary? 2

CHAPTER 4

Arrays Records and Pointers

1. What is array? Discuss the operations that are normally performed on any linear structure (array). 4
2. What is linear array? How can you found the no. of elements in any linear array? 2
3. Briefly discuss the representation of array in memory? 3
4. How can you traverse an array? 3
5. Briefly discuss the insertion and deletion situation. 3
6. How can you sort the elements of an array? Name some sorting algorithm? 3
7. What is the benefit of binary search over linear search? 2
8. Can we perform binary search on unsorted data? Justify your answer. 2
9. Simulate the binary search algorithm on the following data: 12 34 56 78 89 90 100 103 (suppose we search for item 34). 4
10. What is 2D array? How can you represent 2D array in memory? 4
11. How can you find out the no. of elements of a 2D array? Explain with example. 3
12. For row major order find out the address of the element score [10, 2] from a 25X4 matrix array score with base value 200 and w=4. 3
13. For column major order find out the address of the element score [10, 2] from a 25X4 matrix array score with base value 200 and w=4.
14. Maze(2:8, -4:1, 6:10) is a 3D array with base=200, w=4, calculate Maze[5, -1, 8] address in a row major order and column major order.
15. What is pointer and pointer array? 2
16. How a pointer can save memory space to store a 2D array? 4
17. How does a pointer array can save memory when store a variable sized groups of data? Discuss with necessary figures.
18. What is a record? What is the difference between a record and a linear array? 2
19. What is sparse matrix? What is the difference between triangular matrix and Tridiagonal matrix? 3
20. What is the memory saving if we store a sparse matrix in a 1D array rather than a 2D array? 3
21. How can you locate element aij of a sparse matrix from a 1D array? 2

CHAPTER 5

Linked Lists

1. What is a Linked List? Discuss with example. 3
2. What are the advantages of Linked List? 4
3. What are the disadvantages of Linked List? 3
4. How can you represent Linked List in memory? 3
5. Suppose 10 elements are maintained by array and another 10 are by Linked List. Which methods take longer time to access 7th element. Justify your answer. 2
6. What is meant by traversing a Linked List? How can you traverse a Linked List? 3
7. What is the difference between searching a sorted Linked List and an unsorted Linked List? 3
8. What is Garbage collection? When does it take place? 2
9. What is overflow and underflow? How can you handle them? 3
10. Briefly discuss inserting mechanism of an item at the beginning, after a given node and at the end. 6
11. Briefly discuss deleting mechanism of an item in the Linked List. 3
12. What is Header Linked List? Explain. 3
13. What is two way lists? Why it is important? Explain with Schematic diagram. 3