

[Chapter-1]

Fundamental Notations

- Q.1.** Describe the “top-down” design approach.
- Q.2.** What is the Bottom-up Model? Write also its advantages and disadvantages.
- Q.3.** What are the differences between the top-down and bottom-up approaches?
- Q.4.** Write a short note on Structured programming.
- Q.5.** Discuss the data types used in C.
- Q.6.** What are the difference B/W the Variables and Constant?
- Q.7.** What is the Data Structure?
- Q.8.** What are the difference between data type and data structure?
- Q.9.** Explain the classification of data structure.
- Q.10.** Discuss the need of Data Structure.
- Q.11.** What do you mean by Data Structure? Discuss various operations that are performed on any data structure.
- Q.12.** What are the characteristics of data structure?
- Q.13.** Explain the different types of data structure.
- Q.14.** How are data structure used?
- Q.15.** What are the advantages and disadvantages of data structure?

[Chapter-2]

Arrays

- Q.1.** Discuss the concept of array?
- Q.2.** What are the characteristics of an Array?
- Q.3.** Explain the various operations performed on the array.
- Q.4.** Write the various applications of array.
- Q.5.** Explain the different type of arrays.
- Q.6.** What are the differences between the One-dimensional and Two-dimensional array?
- Q.7.** Write the various properties of an array.
- Q.8.** Why Array Data Structures is needed?
- Q.9.** Discuss the representation of array.
- Q.10.** Why are arrays required?
- Q.11.** Explain the Memory allocation of an array.
- Q.12.** How do you access an element from the array?
- Q.13.** Explain the basic operations of the array with examples.
- Q.14.** Describe the memory address calculation of any element stored in the 1-D array.
- Q.15.** Describe the memory address calculation of any element stored in the 2-D array.
- Q.16.** Describe the memory address calculation of any element stored in the 3-D array.
- Q.17.** Explain the pointer array.
- Q.18.** What are the advantages and disadvantages of an array?
- Q.19.** Write a program in C to print the table of an input number.
- Q.20.** Given the base address of an array A[1300....1900] as 1020 and the size of each element is 2 bytes in the memory, find the address of A [1700].

[Chapter-3]

Linked lists

- Q.1.** What is a Linked List?
- Q.2.** Why is a Linked List data structure needed?
- Q.3.** Explain the different types of linked list.
- Q.4.** What are the characteristics of a linked lists?
- Q.5.** What are the differences between the array and linked lists?
- Q.6.** What are the advantages and disadvantages of linked lists?
- Q.7.** Write some applications of the linked list.
- Q.8.** Explain the advantages of a linked list over the array.
- Q.9.** Write a short note on Insertion in Linked List.
- Q.10.** Explain the doubly Linked list.
- Q.11.** What are the characteristics of doubly linked list?
- Q.12.** Write a short note on Insertion in a doubly Linked List.
- Q.13.** What are the difference between the single and double linked list?
- Q.14.** What are the limitations of linked list?
- Q.15.** Why Insertion/deletion are faster in linked list?
- Q.16.** Write the various applications of doubly linked list.
- Q.17.** What are the advantages and disadvantages of Doubly linked list?
- Q.18.** What are the various applications of circular linked list?

[Chapter-4]

Stacks, Queues, and Recursion

- Q.1.** Explain the stack and queue with a graphical representation.
- Q.2.** Distinguish between stack and queue data structure.
- Q.3.** What is the common operation performed on the stack?
- Q.4.** How can a stack be implemented?
- Q.5.** What are the characteristics of a stack?
- Q.6.** Write the various applications of stack.
- Q.7.** What are the characteristics of a Queue?
- Q.8.** Write the various applications of Queue.
- Q.9.** What are the various common operation performed on the queue?
- Q.10.** Explain the circular queue and priority queue with a diagram.
- Q.11.** What are the differences between the circular and Priority queues?
- Q.12.** What is a deque (or double-ended queue)?
- Q.13.** Explain the different type of Deque.
- Q.14.** Explain the various operations performed on deque.

- Q.15.** Write the application of deque.
- Q.16.** Explain the Implementation of deque.
- Q.17.** Write a short note on recursion.
- Q.18.** Explain the need of recursion.
- Q.19.** How are recursive functions stored in memory?
- Q.20.** What is the base condition in recursion?
- Q.21.** How a particular problem is solved recursion?
- Q.22.** Why does stack Overflow error occur in recursion?
- Q.23.** Explain the different types of recursion in Structure.
- Q.24.** What is the difference between direct and indirect recursion?
- Q.25.** What is the difference between tailed and non-tailed recursion?
- Q.26.** How is memory allocated to different function calls in Recursion?
- Q.27.** Write the common applications of recursion.

[Chapter-5]

Trees

- Q.1.** Explain the concept of the tree.
- Q.2.** What are the characteristics of a Tree?
- Q.3.** Write the various applications of tree.
- Q.4.** What are the various operations performed on the tree?
- Q.5.** What is a Binary Search Tree?
- Q.6.** Explain the different type of binary tree.
- Q.7.** Explain the binary tree representation.
- Q.8.** What is the tree data structure used in real life?
- Q.9.** Construct a binary search tree for the following element.
47,12,75,88,90,73,57,1,85,50,62.
- Q.10.** Construct a binary search tree for the given array.
14,10,17,11,20,18,8,22,23.
- Q.11.** Construct a binary search tree for the following
Sequence: 45,62,70,30,12,27,35,65,50,25.
- Q.12.** Write a short note on Operations on the binary search tree.
- Q.13.** For the following binary tree, write In-order, Pre-order
And post-order traversal.
- Q.14.** What is heap? Discuss its operations also.
- Q.15.** Write the applications of the heap.
- Q.16.** What are the advantages and disadvantages of heap?
- Q.17.** Why and when to use heap?

[Chapter-6]

Sorting and Searching

- Q.1.** What is sorting?
- Q.2.** What is stable and unstable sorting?
- Q.3.** What are the difference between the Internal and external sorting?
- Q.4.** What are the advantages and disadvantages of internal sorting?
- Q.5.** What are the advantages and disadvantages of external sorting?
- Q.6.** What is the linear search? Example also.
- Q.7.** What is the binary search? Example also.
- Q.8.** What are the differences between linear and binary Search?
- Q.9.** Write a short note on Insertion sort.
- Q.10.** Write a short note on selection sort.
- Q.11.** Write a short note on Quick sort.
- Q.12.** Apply the quick sort on the following list of 12 num.
: 44,33,11,55,77,90,40,60,99,22,81,66.

Q.13. Explain merge sort.

Q.14. Explain Bubble sort with an example.

Q.15. What are the advantages and disadvantages of bubble selection Sort?

Q.16. What are the advantages and disadvantages of Sort?

Q.17. What are the differences between bubble sort and Selection sort?

Q.18. Explain Heap sort along with algorithm.

[Chapter-7]

Graph

- Q.1. Explain the concept of Graph.
- Q.2. What are the characteristics of the graph?
- Q.3. What are the various operations performed graph?
- Q.4. What are the components of the graphs?
- Q.5. What are the different types of graphs?
- Q.6. Write a short note on Directed graph.
- Q.7. Write a short note on undirected graph.
- Q.8. What are the characteristics of the directed graph?
- Q.9. Write the applications of the directed graph.
- Q.10. What are the advantages and disadvantages of the directed graph?
- Q.11. What are the differences between the tree and the graph?
- Q.12. Discuss the representation of graphs.
- Q.13. **What are the differences between the Adjacency Matrix and Adjacency List?**
- Q.14. Discuss the various basic operations on graph.

Q.15. What are the advantages and disadvantages of Graph?

Q.16. What are the usages of graphs?

Q.17. Write the various real-life applications of the graph.

Q.18. Discuss when to use graph.

Q.19. What is DFS?

Q.20. how does DFS work?

Q.21. Write the various applications of Depth First Search.

Q.22. What are the advantages and disadvantages of the Depth First Search?

Q.23. What is BFS?

Q.24. How does BFS work?

Q.25. Differentiate between BFS and DFS Traversal of graph with example.

