

UNIT – I

1. A) Define an Array? Explain Types of Arrays?
B) Explain various types of operations on Arrays?
2. A) List out various applications of linked list.
B) What is Single Linked List? Write an algorithm of Inserting a Node at END position?
3. What is Static Data Structure?
A) Define One-Dimensional Array? Explain with Example?
B) Define Two-Dimensional Array? Explain with Example?
4. What is An Array, possible operations on An Array? Write traversing algorithm using an Array?
5. Write algorithm for DELETE a node at front position in Linked List with Example?
6. What is Circular Linked List and Operations on Circular?
7. List out various applications of Linked List?
8. What is Double Linked List? Write an algorithm of Inserting Node at END position?
9. What is Circular Double Linked List and Write about representation?
10. Describe about FRONT and REAR pointers of queue with Example?

UNIT – 2

1. List out various applications of stack and queues.
2. Describe about Infix, Postfix, and Prefix? Convert Infix to Postfix with One Example using Stack?
3. Define Dynamic representation. Describe Dynamic Memory Allocation Terminologies?
4. ENQUEUE the given Item (Item=27) in Queue with ENQUEUE Algorithm?
5. Describe about QUEUE Operations with Algorithm?
6. Define Infix and Prefix, convert the following expression Infix to Postfix $((x+y)/z)+(a+b)$
7. Define Infix and Postfix, convert the following expression Infix to Postfix $((a+b)*c-((d-e)*(f+g))$
8. What is stack? Explain various operations of stack? Algorithm of PUSH using Array?
9. What is Stack?
A) POP algorithm using An Arrays
B) PUSH algorithm using An Array
10. Define a Queue?
A) REAR algorithm using An Arrays
B) FRONT algorithm using An Array

UNIT-3

1. What is B-Tree? Construct B-tree of degree(m)=3 with numbers
3,6,2,1,9,8,7,20,11,14,16,18,19,40,30,60,70
2. A) what is red-black tree? Illustrate imbalances with suffix "r" while inserting elements
B) What are the properties of binary trees?
3. Narrate the different Traversal Operations on a Binary Tree with Algorithms
4. A. What are the advantages and disadvantages of array (sequential) representation of a binary tree?
B. Write an algorithm to search an element in binary search tree?
5. Construct AVL Tree using "8,9,10,2,1,5,6,4,7,11,12,3" elements inserting in sequence
6. Illustrate heap sort technique using heap trees.
7. A. In how many ways we can represent a graph?
B. Explain about applications of graph
8. Write BFS algorithm and illustrate it with an example.
9. Write DFS algorithm and illustrate it with an example.
10. A) what is in order traversal of a tree?
B) Difference between complete binary tree and full binary tree?
C) What is binary search tree?
D) Give one example for DFS
E) What is connected graph?

UNIT-4

1. Illustrate heap sort technique using heap trees.
2. Illustrate bubble sort technique with an algorithm.
3. Explain any one of the insertion sort techniques.
4. Explain straight insertion sort algorithm with an example.
5. Explain any one of the internal sort techniques with an example.
6. Describe selection sort technique with an example.
7. Explain any one of the exchange sorting technique.
8. A) what is lexicographic sorting?
B) Illustrate internal sorting with an example.
9. A) Define External sorting and also explain with an example.
B) What is min-heap and max-heap trees give examples?
10. Write about the various terminologies used in sorting techniques.

UNIT-5

1. Illustrate binary search technique with algorithm?
2. A) Write linear search algorithm
B) Write binary search algorithm
3. Explain linear search with array technique with an example?
4. A) How does ordered search technique work?
B) Write algorithm for linear probing.
5. Describe hash functions (methods) with appropriate examples.
6. Differentiate linear probing and quadratic probing.
7. Explain double hashing and random probing.
8. Differentiate open hashing (chaining) and bucket hashing with example.
9. Explain any two open addressing (closed hashing) techniques with an example.
10. A) Define bucket hashing.
B) Differentiate sequential search with binary search.

UNIT – I

1. What is the index number of the last element of an array with 29 elements?
A. 29 **B. 28** C. 0 D. Programmer-defined
2. Size of the array need not be specified, when
A. Initialization is a part of definition B. It is a declaration
C. It is a formal parameter D. All of these
3. Set of consecutive memory locations is called as _____.
A. Function B. Loop **C. Array** D. Pointer
4. Generally collection of Nodes is called as _____.
A. Stack **B. Linked List** C. Heap D. Pointer
5. Which of the following is not a type of Linked List ?
A. Doubly Linked List B. Singly Linked List
C. Circular Linked List **D. Hybrid Linked List**
6. Linked list is generally considered as an example of _____ type of memory allocation.
A. Dynamic B. Static C. Compile Time D. None of These
7. Two dimensional arrays are also called
A. tables arrays B. matrix arrays **C. both A and B** D. none
8. Which of the following data structure store the homogeneous data elements?
A. Arrays B. Records C. Pointers D. None
9. In linked list each node contain minimum of two fields. One field is data field to store the data second field is?
A. Pointer to character B. Pointer to integer **C. Pointer to node** **D. Node**
10. Two main measures for the efficiency of an algorithm are
A. Processor and memory B. Complexity and capacity
C. Time and space D. Data and space

UNIT – II

1. form of access is used to add and remove nodes from a queue.
A. LIFO, Last In First Out B. **FIFO, First In First Out**
C. Both a and b D. None of these
2.) form of access is used to add remove nodes from a stack.
A. **LIFO** B. FIFO C. Both A and B D. None of these
3. In the linked representation of the stack behaves as the top pointer variable of stack.
A. Stop pointer B. Begin pointer C. **Start pointer** D. Avail pointer
4. New nodes are added to the of the queue.
A. Front B. **Rear** C. Middle D. Both A and B
5. The retrieval of items in a stack is operation.
A. push B. **pop** C. retrieval D. access
6. The term push and pop is related to
A. Array B. Lists C. **Stacks** D. Trees
7. Deletion operation is done using in a queue.
A. **front** B. rear C. top D. list
8. Which of the following is an application of stack?
A. finding factorial B. tower of Hanoi C. infix to postfix D. **all of the above**
9. Which data structure is needed to convert infix notation to postfix notation?
A. Branch B. Tree C. Queue D. **Stack**
10. Which data structure is used for implementing recursion?
A. Queue B. **Stack** C. Array D. List

UNIT – III

1. The operation of processing each element in the list is known as
A. sorting B. merging C. inserting D. **traversal**
2. Other name for directed graph is
A. Direct graph B. Digraph C. Dir-graph D. **Digraph**
3. Which indicates pre-order traversal?
A. Left sub-tree, Right sub-tree and root B. Right sub-tree, Left sub-tree and root
C. **Root, Left sub-tree, Right sub-tree** D. Right sub-tree, root, Left sub-tree
4. A terminal node in a binary tree is called.....
A. Root B. **Leaf** C. Child D. Branch
5. Which of the following ways below is a post- order traversal?
A. Root->left sub tree->right sub tree B. Root-> right sub tree ->left sub tree
C. right sub tree->left sub tree->Root D. **left sub tree->right sub tree->Root**
6. Breadth First Search is used in
A. Binary trees B. Stacks C. **Graphs** D. Both a and c above
7. A tree cannot contain cycles
A. False B. **True**
8. Which of the following traversal outputs the data in sorted order in a BST?
A. Preorder B. **Inorder** C. Postorder D. Level order
9. BFS makes use of _____
A. Stack B. **Queue** C. List D. Heap
10. The total number of edges containing the node u is called
A. In-degree B. Out-degree C. **Degree** D. None of these

UNIT – IV

1. Which of the following is associated(related) with “external sorting”?
A. RAM B. ROM C. **Hard disk** D. both RAM, ROM
2. which of the following is improved version of insertion sort
A. **shell sort** B. list insertion C. heap sorting D. bubble sort
3. Which of the following sorting technique obeys “divide and conquer” strategy
A. **Quick sort** B. list insertion C. insertion sorting D. bubble sort
4. Arrangement of given data in any order is called
A. searching B. **sorting** C. both a and b D. none
5. Partition and exchange sort is
6. sorting algorithm is frequently used when n is small where n is total number of elements.
A. Heap B. **Insertion** C. Bubble D. Quick
7. Which of the following sorting algorithm is of divide and conquer type?
A. Bubble sort B. Insertion sort C. **Merge sort** D. Selection sort
8. is the method used by play card sorter.
A. Radix sort B. **Insertion** C. Heap D. Quick
9. The complexity of bubble sort algorithm is
10. is rearranging pairs of elements which are out of order, until no such pairs remain.
A. Insertion B. **Exchange** C. Selection D. Distribution

UNIT – V

1. The Binary Search Algorithms needs the Elements to be in _____ Order
A. **Ascending** B. Random C. Both D. None
2. The Linear Search Algorithms needs the Elements to be in _____ Order
A. Ascending B. **Random** C. Both D. None
3. What is a hash table?
A. A structure that maps values to keys
B. **A structure that maps keys to values**
C. A structure used for storage
D. A structure used to implement stack and queue
4. If several elements are competing for the same bucket in the hash table, what is it called?
A. Diffusion B. Replication C. **Collision** D. None of the mentioned
5. What is a hash function?
A. A function has allocated memory to keys
B. **A function that computes the location of the key in the array**
C. A function that creates an array
D. None of the mentioned

6. What can be the techniques to avoid collision?
 - A. Make the hash function appear random
 - B. Use the chaining method
 - C. Use uniform hashing
 - D. **All of the mentioned**
7. In simple chaining, what data structure is appropriate?
 - A. Singly linked list
 - B. **Doubly linked list**
 - C. Circular linked list
 - D. Binary trees
8. What is direct addressing?
 - A. **Distinct array position for every possible key**
 - B. Fewer array positions than keys
 - C. Fewer keys than array positions
 - D. None of the mentioned
9. What is the search complexity in direct addressing?
 - A. $O(n)$
 - B. $O(\log n)$
 - C. $O(n \log n)$
 - D. **$O(1)$**
10. In simple uniform hashing, what is the search complexity?
 - A. $O(n)$
 - B. $O(\log n)$
 - C. $O(n \log n)$
 - D. **$O(1)$**