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Quiz 2 and 3(Spring 2022)

Paper: Data Structure & Algorithms

Time: 30 Mins

Marks: 35

**Note: Attempt all questions on Question paper.**

**Q1). Select from below a NOT in-place sorting algorithm?**

- a) Selection sort
- b) Heap sort
- c) Quick sort
- d) Merge sort

**Q2). Time Complexity of Merge sort on a sorted array?**

- a)  $O(n)$
- b)  $O(n \log n)$
- c)  $O(n^2)$
- d) None

**Q3). Which of the following is best choice for sorting a sorted or nearly sorted array?**

- a) Insertion sort
- b) Selection sort
- c) Quick sort
- d) Merge sort

**Q4). How many comparisons are required to merge two lists of size m & n?**

- a)  $O(m)$
- b)  $O(n)$
- c)  $O(m+n)$
- d)  $O(\log m + \log n)$

**Q5). How many minimum number of fields per node of a doubly-linked list?**

- (A) 2
- (B) 3
- (C) 4
- (D) None of the above

**Q6). Type of algorithm technique used in quick sort?**

- a) Dynamic programming
- b) Backtracking
- c) Divide-and-conquer
- d) Greedy method

**Q7). Linked-list nodes are stored?**

- (A) In a structure
- (B) In an array
- (C) Anywhere the computer has space for them
- (D) In contiguous memory locations

**Q8). Worst-case time complexity for finding a single element in an array using serial search is?**

- (A) Quadratic time
- (B) Linear time
- (C) Logarithmic time
- (D) Constant time

**Q9). Linear list, where elements can be removed and added at either end is known as?**

- (A) Circular queue
- (B) Priority queue
- (C) Queue
- (D) Deque

**Q10). Example of First Come First Serve is?**

- (A) Priority queue
- (B) Heap
- (C) Stack
- (D) Queue

**Q11). Average Time Complexity of quick sort is?**

- (A)  $O(n^2)$
- (B)  $O(n \log_2 n)$
- (C)  $O(n)$
- (D)  $O(\log_2 n)$

**Q12). Queue doesn't support which operation?**

- (A) Inserting element at rear
- (B) Removing element from front
- (C) Removing element from middle
- (D) None of above

**Q13). Worst-case time complexity of binary search for finding single element is?**

- (A) Quadratic time
- (B) Linear time
- (C) Logarithmic time
- (D) Constant time

**Q14). Stack operation for inserting and deleting an item is called**

- A) push, pop
- B) pop, push
- C) insert, delete
- D) delete, insert

**Q15). Data structure which uses pointers to maintain linear sequence is?**

- (A) Array
- (B) Stack
- (C) Linked list
- (D) Pointer-based data structure

**Q16). The  $\Theta$  notation in asymptotic evaluation represents –**

- A - Base case
- B - Average case
- C - Worst case
- D - NULL case

**Q17). Which of the following algorithm pays the least attention to the ordering of the elements in the input list?**

- a) Insertion sort
- b) Selection sort
- c) Quick sort
- d) None

**Q18). Time complexity of bubble sort in best case is**

- a)  $\theta(n)$
- b)  $\theta(n \log n)$
- c)  $\theta(n^2)$
- d)  $\theta(n(\log n)^2)$

**Q19). The lower bound on the number of comparisons performed by comparison-based sorting algorithm is**

- a)  $\Omega(1)$
- b)  $\Omega(n)$
- c)  $\Omega(n \log n)$
- d)  $\Omega(n^2)$

**Q20). Which of the following data structure is more appropriate to represent a heap?**

- (A) Two-dimensional array
- (B) Doubly linked list
- (C) Linear Array
- (D) Linked list

**Q21). A graph in which all vertices have equal degree is known as \_\_\_\_**

- (A) Complete graph
- (B) Regular graph
- (C) Multi graph
- (D) Simple graph

**Q22). A graph is a tree if and only if graph is**

- (A) Directed graph
- (B) Contains no cycles
- (C) Planar
- (D) Completely connected

**Q23). The number of edges in a complete graph of n vertices is**

- (A)  $n(n+1)/2$
- (B)  $n(n-1)/2$
- (C)  $n^2/2$
- (D) n

**Q24). If two trees have same structure and but different node content, then they are called \_\_\_\_**

- (A) Synonyms trees
- (B) Joint trees
- (C) Equivalent trees
- (D) Similar trees

**Q25). If two trees have same structure and node content, then they are called \_\_\_\_**

- (A) Synonyms trees
- (B) Joint trees
- (C) Equivalent trees
- (D) Similar trees

**Q26). A non-circular doubly linked list can best and most generally be defined as a \_\_\_\_**

- (A) Set of elements, each with two pointers
- (B) Set of elements chained together with pointers
- (C) Linear sequence of elements in sequential memory locations
- (D) Linear sequence of elements chained together with pointers

**Q27). To create a linked structure, each node must have one member, which is \_\_\_\_**

- (A) A pointer to the head of the list
- (B) A pointer to NULL
- (C) A pointer to the node type
- (D) A reference to the element type

**Q28). A \_\_\_\_ is a linear collection of self-referential structures, called nodes, connected by pointer links.**

- (A) Queue
- (B) Linked list
- (C) Tree
- (D) Stack

**Q29). A queue where all elements have equal priority is a**

- (A) ILFO data structure
- (B) LILO data structure
- (C) FIFO data structure
- (D) LIFO data structure

**Q30). Which of the following is not a linear data structure?**

- (A) Stack
- (B) Queue
- (C) Linked list
- (D) Binary tree

**Q31). Which of the following data structure permits insertion and deletion operations only on one end of the structure?**

- (A) Linked list
- (B) Array
- (C) Stack
- (D) Queue

**Q32). A dequeue operation removes an element**

- (A) From the front of the queue
- (B) From any place in the queue
- (C) From the rear of the queue
- (D) None of above

**Q33). What is the number of nodes in a full binary tree with depth 3?**

- (A) 5
- (B) 6
- (C) 7
- (D) 8

**Q34). What kind of list is best to answer many questions such as “what is the item at position n?”**

- (A) Singly-linked lists
- (B) Doubly-linked lists
- (C) Lists implemented with an array
- (D) Circular- linked lists

**Q35). Which of the following statements about a binary tree is not correct?**

- (A) Every binary tree has at least one node
- (B) Every non-empty tree has exactly one root node
- (C) Every node has at most two children
- (D) Every non-root node has exactly one parent

**Q36). Which of these is the worst case time complexity of the Binary Search algorithm on a sorted array - and cannot be expressed in lower order terms?**

- (a)  $O(n)$
- (b)  $O(n \log n)$
- (c)  $O(n^2)$
- (d)  $O(\log n)$

**Q37). Which of the following algorithm does not divide the list?**

- (A) merge sort
- (B) binary search
- (C) linear search
- (D) quick sort