قائمة الاسئلة

امتحان نهاية الفصل الدراسي الثاني - للعام الجامعي 1446 هـ - الموافق -2025/2024مـكلية الحاسوب وتكنولوجيا المعلومات :: هياكل البيانـ

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1) Convert the postfix expression A B C + * D E + * to infix notation.
   1) - A. A * (B + C) * (D + E)
   2) + B. (A * (B + C)) * (D + E)
   3) - C. A * ((B + C) * (D + E))
   4) - D. ((A * B) + C) * (D + E)
2) A program P reads 500 integers in the range [0..100] representing the scores of 500 students. It then prints the frequency of each score above 50. What would be the best way for P to store the frequencies?
   1) + A An array of 50 numbers
   2) - B. An array of 100 numbers
   3) - C. An array of 500 numbers
   4) - D. A dynamically allocated array of 550 numbers
3) Which of the following uses the first-in, first-out (FIFO) method?
   1) - A. Array
   2) + B. Queue
   3) - C. Binary Search Tree
   4) - D. Stack
4) What are the disadvantages of arrays?
   1) - A. Elements are sequentially accessed
   2) - B. Data structure like queue or stack cannot be implemented
   3) + C. There are chances of wastage of memory space if elements inserted in an array are lesser than the allocated size
   4) - D. None of the above
5) What is the need for a circular queue?
   1) - A. Easier computations
   2) - B. Implement LIFO principle in queues
   3) + C. Effective usage of memory
   4) - D. To delete elements based on priority
6) What is an AVL tree?
   1) - A. A tree which is unbalanced and is a height balanced tree
   2) + B. A tree which is balanced and is a height balanced tree
   3) - C. A tree with atmost 3 children
   4) - D. a tree with three children
7) What will be the maximum value of top when the size of stack is 5
   1) - A. 5
   2) - B. 6
   3) + C. 4
   4) - D. None of the above
8) What does a subtree represent?
   1) - A. Ancestors of a node
   2) + B. Descendants of a node
   3) - C. Siblings of a node
   4) - D. Parents of a node
9) Convert the prefix expression + * A B C - D to infix notation.
   1) - A. (A * B) + C - D
   2) - B. A * (B + C - D)
   3) + C. (A + (B * C)) - D

4) - D. A + ((B * C) - D)

10) When new data are to be inserted into a data structure, but there is not available space; this situation is usually called
1) - A. Underflow
2) + B. Overflow
3) - C. Houseful
4) - D. Saturated

11) What is the prefix notation for the expression A + B * (C - D)?
1) + A. + A * B - C D
2) - B. * + A B C - D
3) - C. * A + B C - D
4) - D. + A B * C D

12) The way in which the data item or items are logically related defines …..
1) - A. Storage structure
2) + B. Data structure
3) - C. Data relationship
4) - D. Data operation

13) Arrays are best for:
1) + A. Storing data that doesn't change much
2) - B. Data that keeps changing in size
3) - C. Both A and B
4) - D. Neither A nor B

14) Which of the following statement is false?
1) - A. Arrays are dense lists and static data structure.
2) - B. Data elements in linked list need not be stored in adjacent space in memory
3) + C. Pointers store the next data element of a list.
4) - D. Linked lists are collection of the nodes that contain information part and next pointer.

15) Each node in a linked list has two pairs of …….. and …….
1) + A. Link field and information field
2) - B. Link field and empty space
3) - C. Empty space and information field
4) - D. Address field and link field

16) What is common in three different types of traversals (Inorder, Preorder and Postorder)?
1) - A. Root is visited before right subtree
2) + B. Left subtree is always visited before right subtree
3) - C. Root is visited after left subtree
4) - D. All of the above

17) The disadvantage in using a circular linked list is …….
1) + A. It is possible to get into infinite loop.
2) - B. Last node points to first node.
3) - C. Time consuming
4) - D. Requires more memory space

18) In a priority queue, insertion and deletion takes place at ……
1) - A. front, rear end
2) - B. only at rear end
3) - C. only at front end
4) + D. any position

19) If the base address of an integer array is 200 and the size of an integer is 4 bytes, what is the address of arr[3]?

1) - A. 208
2) - B. 210
3) + C. 212
4) - D. 216

20) Which of the following operations is performed more efficiently by doubly linked list than by singly linked list?
1) + A. Deleting a node whose location is given
2) - B. Searching of an unsorted list for a given item
3) - C. Traversing the list to process each node
4) - D. None of the above

21) ?What is a key feature of a dynamic array
1) - A. It has a fixed size determined at compile-time
2) + B. It can grow or shrink during runtime
3) - C. It cannot change size after allocation
4) - D. It is stored in stack memory

22) In a binary tree, The maximum number of nodes in a binary tree of height ‘h’ is ...
1) - A. 2h – 1
2) + B. 2h – 1
3) - C. 2h + 1
4) - D. None of the above

23) A balance factor in AVL tree is used to check ……
1) - A. what rotation to make.
2) - B. if all child nodes are at same level.
3) - C. when the last rotation occurred.
4) + D. if the tree is unbalanced.

24) Recursive procedures are implemented by using …….. data structure.
1) - A. queues
2) + B. stacks
3) - C. linked lists
4) - D. strings

25) If a node having two children is deleted from an AVL binary tree, it is replaced by its …..
1) - A. Inorder predecessor
2) + B. Inorder successor
3) - C. Preorder predecessor
4) - D. None of these

26) What actions can you perform on primitive data structures?
1) - A. create
2) - B. delete
3) - C. update
4) + D. All of the above

27) What data structure can be used to efficiently manage tasks with varying priorities?
1) - A. Stack
2) - B. Linked List
3) + C. Priority Queue
4) - D. Tree

28) What is a defining characteristic of a full binary tree?
1) - A. Each node has 0 or 1 child.
2) + B. Each node has either 0 or 2 children.
3) - C. Each node has at least 2 children.

4) - D. Leaf nodes must have children.

29) Which type of data structure works best for simple data?
1) - A. Doubly linked list
2) - B. Circular linked list
3) + C. Singly linked list
4) - D. Binary trees

30) The smallest element of an array's index is called its
1) + A. lower bound
2) - B. upper bound
3) - C. range
4) - D. extraction

31) In a circular linked list:
1) - A. components are all linked together in some sequential manner.
2) + B. there is no beginning and no end.
3) - C. components are arranged hierarchically.
4) - D. forward and backward traversal within the list is permitted

32) The height of a binary tree is the highest level number of any _____ in the binary tree.
1) - A. Sibling node
2) - B. Parent node
3) + C. Leaf node
4) - D. None of the above

33) What kind of linked list begins with a pointer to the first node, and each node contains a pointer to the next node, and the pointer in the last node points back to the first node?
1) + A. Circular singly linked list.
2) - B. Circular doubly linked list.
3) - C. Singly linked list.
4) - D. Doubly linked list.

34) A data structure in which elements can be inserted or deleted at/from both ends but not in the middle is?
1) - A. Priority queue
2) + B. Dequeue
3) - C. Circular queue
4) - D. Queue

35) A circular linked list can be used for ……..
1) - A. Stack
2) - B. Queue
3) + C. Both Stack & Queue
4) - D. Neither Stack or Queue

36) Re-balancing of AVL tree costs ……..
1) - A. O(1)
2) + B. O(log n)
3) - C. O(n)
4) - D. O(n2)

37) Which of the following is NOT a common operation in a queue data structure?
1) - A. Enqueue
2) - B. Dequeue
3) - C. Peek
4) + D. Shuffle

38) Let the following circular queue can accommodate maximum six elements with the following data front = 2 rear = 4 ,
What will happen after ADD aother element?
1) + A. front = 2 rear = 5
2) - B. front = 3 rear = 5
3) - C. front = 3 rear = 4
4) - D. front = 2 rear = 4

39) What is a dequeue?
1) - A. A queue implemented with both singly and doubly linked lists
2) - B. A queue with insert/delete defined for front side of the queue
3) + C. A queue with insert/delete defined for both front and rear ends of the queue
4) - D. A queue implemented with a doubly linked list

40) The number of edges from the node to the deepest leaf is called _____ of the tree.
1) - A. Width
2) - B. Depth
3) - C. Length
4) + D. Height

41) Which of the following that determines the need for the Circular Queue?
1) - A. Access the Queue using priority
2) + B. Avoid wastage of memory
3) - C. Follows the FIFO principle
4) - D. None of the above

42) State true or false.
i) The degree of root node is always zero.
ii) Nodes that are not root and not leaf are called as internal nodes.
1) - A. True, True
2) - B. True, False
3) + C. False, True
4) - D. False, False

43) In a circular queue using an array, the queue is empty when:
1) + A. Front=rear= -1
2) - B. Front=rear=0
3) - C. Front=rear+1
4) - D. None of the above

44) Which of the following is NOT the type of queue?
1) - A. Priority queue
2) - B. Circular queue
3) + C. Single ended queue
4) - D. Simple queue

45) Which of the following options is NOT true about the Binary Search tree?
1) - A. The value of the left child should be less than the root node
2) - B. The value of the right child should be greater than the root node.
3) - C. The left and right sub trees should also be a binary search tree
4) + D. None of the above

46) Which of the following points is/are not true about Linked List data structure when it is compared with an array?
1) - A. Random access is not allowed in a typical implementation of Linked Lists
2) + B. Access of elements in linked list takes less time than compared to arrays
3) - C. Arrays have better cache locality that can make them better in terms of performance

4) - D. It is easy to insert and delete elements in Linked List

47) What is a data structure?
1) - A. A programming language
2) - B. A collection of algorithms
3) + C. A way to store and organize data
4) - D. A type of computer hardware

48) What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.
1) - A. 2
2) + B. 3
3) - C. 4
4) - D. 5

49) ……. is NOT the component of data structure.
1) - A. Operations
2) - B. Storage Structures
3) - C. Algorithms
4) + D. None of the above

50) Which data structure allows deleting data elements from front and inserting at rear?
1) - A. Stacks
2) + B. Queues
3) - C. Dequeues
4) - D. None of the above