ADS CCEE Mock Test3

Total points 20/40

0 of 0 points

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MCQ 20 of 40 points

✓ Which of the following condition is sufficient to detect cycle in a directed graph? *1/1

- (●) There is an edge from currently being visited node to an ancestor of currently visited node in DFS forest. ✓
- ( ) There is an edge from currently being visited node to an already visited node.
- ( ) Every node is seen twice in DFS.
- ( ) None of the above

✗ In a doubly linked list, the number of pointers affected for an insertion operation will be *0/1

- (●) 4 ✗
- ( ) 0
- ( ) 1
- ( ) None of the above

Correct answer

- (●) None of the above

✓ Given a binary-max heap. The elements are stored in an arrays as 25,14,16,13,10,8,12. What is the content of the array after two delete operations? *1/1

- ( ) a. 14,13,8,12,10
- ( ) b. 14,12,13,10,8
- (●) c. 14,13,12,8,10 ✓
- ( ) d. 14,13,12,10,8

✗ Suppose you are given an array s[1..n] and a procedure reverse (s, i, j) which is the reverse-order of elements in s between positions i and j (both inclusive). What does the following sequence do, where 1≤x<n: reverse (s, 1, x); *0/1

- ○ reverse (s, x+1, x);
- ○ reverse (s, 1, n);
- ○ Rotates s left by x positions
- ◉ Leaves s unchanged ✗

Correct answer

- ◉ reverse (s, x+1, x);

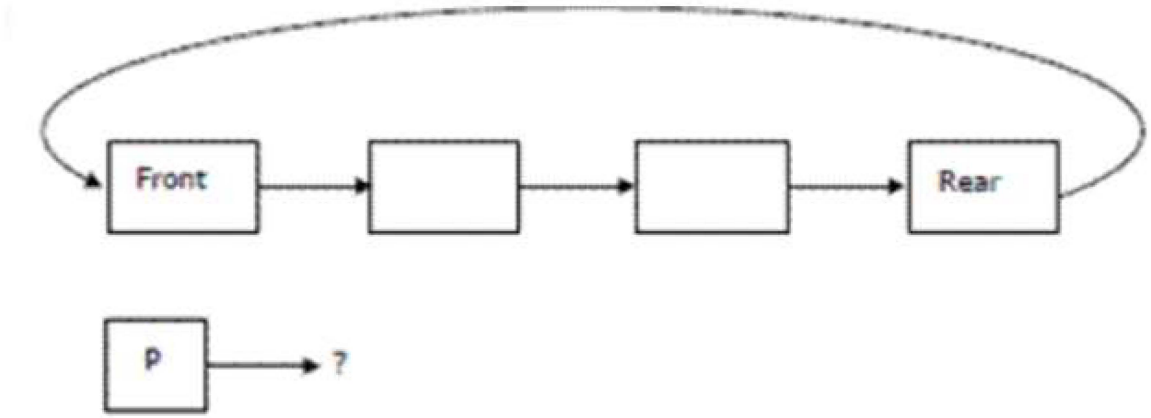
✓ The number of rotations required to insert a sequence of elements 9, 6, 5, 8, 7, 10 into an empty AVL tree is? *1/1

- ○ 0
- ○ 1
- ○ 2
- ◉ 3 ✓

✓ Queue can be used to implement * 1/1

- (●) radix sort ✓
- ( ) quick sort
- ( ) recursion
- ( ) depth first search

✓ A circularly linked list is used to represent a Queue. A single variable p is used to access the Queue. To which node should p point such that both the operations enQueue and deQueue can be performed in constant time? *1/1



- (●) a) Rear node ✓
- ( ) b) Front node
- ( ) c) Not possible with a single pointer
- ( ) d) Node next to front

✗ A single array A[1..MAXSIZE] is used to implement two stacks, The two stacks grow from opposite ends of the array. Variables top1 and top2 (top1 < top2) point to the location of the topmost element in each of the stacks, If the space is to be used efficiently, the condition for "stack full" is *0/1

- ○ (top 1 = MAXSIZE/2) AND (top 2 = MAXSIZE/2 + 1)
- ◉ top 1 + top 2 = MAXSIZE ✗
- ○ (top 1 = MAXSIZE/2) or (top 2 = MAXSIZE)
- ○ top 1 = top 2 – 1

Correct answer

- ◉ top 1 = top 2 – 1

✗ An advantage of chained hash table (external hashing) over the open addressing scheme is *0/1

- ○ a. Worst case complexity of search operations is less
- ◉ b. Space used is less ✗
- ○ c. Deletion is easier
- ○ d. None of the above

Correct answer

- ◉ c. Deletion is easier

✗ In-order, pre-order and post-order can be applied to * 0/1

- (●) any trees ✗
- ( ) only binary trees
- ( ) any trees other than binary trees
- ( ) None of the above

Correct answer

- (●) only binary trees

✓ What is the worst-case number of arithmetic operations performed by recursive binary search on a sorted array of size n? *1/1

- ( ) θ(√n)
- (●) θ(log(n)) ✓
- ( ) θ(n2)
- ( ) θ(n)

✓ A binary search tree T contains n distinct elements. What is the time complexity of picking an element in T that is smaller than the maximum element in T? *1/1

- ○ Θ(nlogn)
- ○ Θ(n)
- ○ Θ(logn)
- ◉ Θ(1) ✓

✗ Convert the following infix expression into their Postfix form * (X^Y)/(A*B) 0/1

- ◉ / ^ XY * A B ✗
- ○ XY ^ AB * /
- ○ X ^ Y AB * /
- ○ None of the above

Correct answer

- ◉ XY ^ AB * /

✓ Merge sort uses _____ strategy * 1/1

- backtracking
- heuristic
- greedy
- (●) divide and conquer ✓

✗ What is recurrence for worst case of QuickSort and what is the time complexity in Worst case? *0/1

- a. Recurrence is T(n) = T(n-1) + O(n) and time complexity is O(n2)
- (●) b. Recurrence is T(n) = T(n-2) + O(n) and time complexity is O(n2) ✗
- c. Recurrence is T(n) = 2T(n/2) + O(n) and time complexity is O(nlog n)
- d. Recurrence is T(n) = T(n/10)+T(9n/10) + O(n) and time complexity is O(nlog n)

Correct answer

- (●) a. Recurrence is T(n) = T(n-1) + O(n) and time complexity is O(n2)

✓ Which of the following are related to stack? * 1/1

- push
- pop
- LIFO
- (●) All of the above ✓

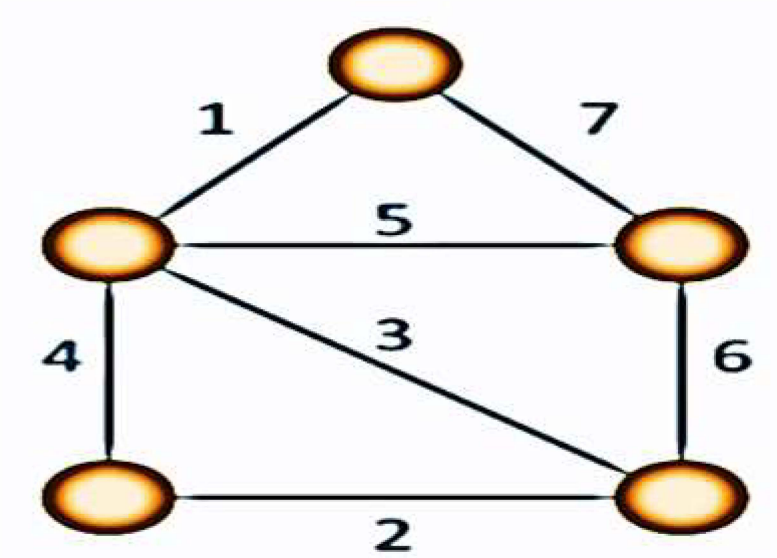
✓ What this code is doing in a Binary search tree? * 1/1

```
void do_job(BST node){

If(node!=NULL)

{

        do_job (node.left());

        do_job (node.right());

        cout<<node.data;

}

}
```

- (●) a) Traversing post-order ✓
- ( ) b) Traversing pre-order
- ( ) c) Traversing in-order
- ( ) d) Finding the dept

✓ Consider the following undirected graph with edge weight as shown: * 1/1

The minimum-weight spanning trees of the graph is ----



- ○ 10
- ◉ 11 ✓
- ○ 12
- ○ 11.5

✓ What sorting algorithms have equal best case and worst case time complexity? *1/1

- ○ heap and selection sort
- ○ insertion sort & merge sort
- ◉ merge sort and heap sort ✓
- ○ None of these

✗ Suppose each set is represented as a linked list with elements in arbitrary order. Which of the operations among union, intersection, membership,and cardinality will be the slowest? *0/1

- (●) Union only ✗
- ( ) Intersection, membership
- ( ) Membership, cardinality
- ( ) Union, intersection

Correct answer

- (●) Union, intersection

✗ What is the worst-case performance of Selection sort algorithm? * 0/1

- (●) O(log n) ✗
- ( ) O(n* n)
- ( ) O(n)
- ( ) O(n log n)

Correct answer

- (●) O(n* n)

✗ A binary search tree T contains n distinct elements. What is the time complexity of picking an element in T that is smaller than the maximum element in T? *0/1

- ○ Θ(n log n)
- ◉ Θ(n) ✗
- ○ Θ(log n)
- ○ Θ(1)

Correct answer

- ◉ Θ(1)

✓ What is the recursive traversing of Pre-order traversal * 1/1

- ○ a) traverse the left subtree, visit the root node and traverse the right sub-tree
- ◉ b) visit the root node, traverse the left sub-tree, and traverse the right sub-tree ✓
- ○ c) traverse the left sub-tree, traverse the right sub-tree, and visit the root node
- ○ d) None of the above

✗ The concatenation of two lists is to be performed in O(1) time. Which of the following implementations of a list should be used? *0/1

- (●) a. Singly linked list ✗
- ( ) b. Doubly linked list
- ( ) c. Circular doubly linked list
- ( ) d. Array implementation of lists

Correct answer

- (●) c. Circular doubly linked list

✓ Which of the following types of Linked List support forward and backward traversal? *1/1

- ( ) A. Singly Linked List
- (●) B. Doubly Linked List ✓
- ( ) C. Circular Singly Linked List
- ( ) D. All of these

✓ How much time is required by Prim's algorithm of Graph(G) & n is the number of vertices? *1/1

- O(n)
- O(n^2) ✓
- O(log n)
- O(n long n)

✓ The minimum number of fields with each node of doubly linked list is * 1/1

- 1
- 2
- 3 ✓
- 4

✓ *Point mutations* of strings str1 into str2 are * 1/1

- change a letter
- insert a letter or
- delete a letter
- Any one of the above ✓

✗ The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)? *0/1

- (●) 2 ✗
- ( ) 3
- ( ) 4
- ( ) 6

Correct answer

- (●) 3

✓ What is the use of Dijkstra's algorithm? * 1/1

- ( ) Job sequencing
- ( ) Find the minimum spanning tree
- (●) Single source shortest path ✓
- ( ) None of these

✗ In _____the exploration of node is suspended as soon as new unexplored node is reached. *0/1

- ○ BFS
- ○ DFS
- ◉ Prims algorithm ✗
- ○ Kruskal's algorithm

Correct answer

- ◉ DFS

✗ What is the time complexity of build Heap operation. Build Heap is used to build a max(or min) binary heap from a given array. Build Heap is used in Heap Sort as a first step for sorting *0/1

- ○ a. O(nlogn)
- ○ b. O(n2)
- ◉ c. O(logn) ✗
- ○ d. O(n)

Correct answer

- ◉ d. O(n)

✓ In a complete k-ary tree, every internal node has exactly k children or no child. The number of leaves in such a tree with n internal nodes is: *1/1

- nk
- (n-1)k+1
- n(k-1)+1 ✓
- n(k-1)

✗ Consider an implementation of the unsorted single linked list. Suppose it has its representation with a head and a tail pointer (i.e. pointers to the first and last nodes of the linked list). Given the representation, which of the following operation can not be implemented in O(1) time? *0/1

- Insertion at the front of the linked list. ✗
- Insertion at the end of the linked list.
- Deletion of the front node of the linked list.
- Deletion of the last node of the linked list.

Correct answer

- Deletion of the last node of the linked list.

✗ *The Floyd-Warshall algorithm for all-pair shortest paths computation is based on* *0/1

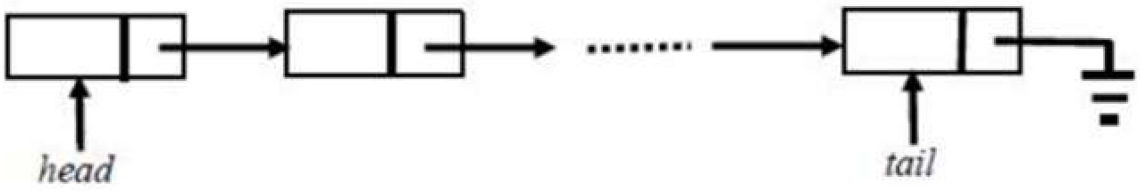
- (●) a. Greedy paradigm ✗
- ( ) b. Divide-and-Conquerparadigm.
- ( ) c. Dynamic Programing paradigm.
- ( ) d. neither Greedy nor Divide-and-Conquer nor Dynamic Programming paradigm

Correct answer

- (●) c. Dynamic Programing paradigm.

✓ A queue is implemented using a non-circular singly linked list. The queue has a head pointer and a tail pointer, as shown in the figure. Let n denote the number of nodes in the queue. Let 'enqueue' be implemented by inserting a new node at the head, and 'dequeue' be implemented by deletion of a node from the tail. *1/1

Which one of the following is the time complexity of the most time-efficient implementation of 'enqueue' and 'dequeue, respectively, for this data structure?



- ( ) a) Θ(1), Θ(1)
- (●) b) Θ(1), Θ(n) ✓
- ( ) c) Θ(n), Θ(1)
- ( ) d) Θ(n), Θ(n)

✗ A Stack structure would require * 0/1

- ○ head pointer to remove an existing node
- ○ tail pointer to add to a new node
- ◉ both (a) and (b) ✗
- ○ None of the above

Correct answer

- ◉ head pointer to remove an existing node

✗ We have a binary heap on n elements and wish to insert n more elements (not necessarily one after another) into this heap. The total time required for this is *0/1

- ○ a. Θ (logn)
- ○ b. Θ (n)
- ○ c. Θ (nlogn)
- ◉ d. Θ(n 2) ✗

Correct answer

- ◉ b. Θ (n)

✗ Floyd-Warshall algorithm utilizes _____ to solve the all-pairs shortest paths problem on a directed graph in _____ time. *0/1

- a. Greedy algorithm, θ (V3)
- b. Greedy algorithm, θ (V2log n) ✗
- c. Dynamic Programming, θ (V3)
- d. Dynamic Programming, θ (V2 log n)

Correct answer

- c. Dynamic Programming, θ (V3)

✗ What is the best case complexity of quick sort? * 0/1

- Ω(n)
- Θ(logn)
- Ω(n(log n))
- Ω(log n) ✗

Correct answer

- Ω(n(log n))