

Question - 1
Question

SCORE: 1 points

Which one of the following is the worst case time complexity of inserting an object into a binary search tree of n nodes?

- $O(1)$
- $O(\log n)$
- $O(n)$
- $O(n \log n)$

Question - 2
Question

SCORE: 1 points

Which of the following statement about binary tree is CORRECT?

- Every binary tree is either complete or full
- Every complete binary tree is also a full binary tree
- Every full binary tree is also a complete binary tree
- A binary tree cannot be both complete and full

Question - 3
Question

SCORE: 1 points

Items D, C, B, A and E are added to an empty FIFO queue in this order. Then three elements are removed from the queue and pushed to an empty stack. Then two elements are popped from the stack and added to the queue. Finally one element is removed from the queue. The removed element is _____.

- A
- E
- B
- C

Question - 4
Question

SCORE: 1 points

In a binary max heap containing n numbers, the smallest element can be found in time

-

$\theta(n)$

$\theta(\log n)$

$\theta(\log \log n)$

$\theta(1)$

Question - 5

Question

SCORE: 1 points

In delete operation of BST, we need inorder successor of a node when the node to be deleted has both left and right child as non-empty. Which of the following is true about inorder successor needed in delete operation?

Inorder Successor is always a leaf node

Inorder successor is always either a leaf node or a node with empty left child

Inorder successor may be an ancestor of the node

Inorder successor is always either a leaf node or a node with empty right child

Question - 6

Question

SCORE: 1 points

Postorder traversal of a given binary search tree, T produces the following sequence of keys 10, 9, 23, 22, 27, 25, 15.

Which one of the following sequences of keys can be the result of an in-order traversal of the tree T?

9, 10, 15, 25, 23, 22, 27

15, 9, 10, 25, 22, 23, 27

27, 23, 22, 25, 10, 9, 15

9, 10, 15, 22, 23, 25, 27

Question - 7

Question

SCORE: 1 points

The following C function takes a single linked list as an input argument. It modifies the list by moving the last element to the front of list and returns the modified list. Some part of code is left blank. Choose the correct alternative to replace blank line

```

typedef struct node
{
    int value;
    struct node *next;
}Node;

Node *move_to_front(Node *head)
{
    Node *p, *q;
    if ((head == NULL || (head->next == NULL))
        return head;
    q = NULL; p = head;
    while (p-> next !=NULL)
    {
        q = p;
        p = p->next;
    }
    return head;
}

```

- q=NULL;p->next=head;head=p;
- q->next=NULL;head=p;p->next=head;
- head=p;p->next=q;q->next=NULL;
- q->next=NULL;p->next=head;head=p;

Question - 8

Question

SCORE: 1 points

An alphabet consist of the letters A, B, C and D. The probability of occurrence is: $P(A) = 0.45$, $P(B) = 0.1$, $P(C) = 0.2$ and $P(D) = 0.25$. The Huffman code is

- A = 01
B = 111
C = 110
D = 10
- A = 0
B = 11
C = 10
D = 111
- A = 0
B = 111
C = 110
D = 10
- A = 0
B = 111
C = 11
D = 101

Question - 9

Question

SCORE: 1 points

What does the following function do for a given binary tree?

```

int fun(struct node *root)
{
    if (root == NULL)
        return 0;
    if (root->left == NULL && root->right == NULL)
        return 0;
    return 1 + fun(root->left) + fun(root->right);
}

```

Counts leaf nodes.

Counts internal nodes.

Returns height where height is defined as number of edges on the path from root to deepest node.

Return diameter where diameter is number of edges on the longest path between any two nodes.

Question - 10

Question

SCORE: 1 points

The following C function takes a single linked list of integers as parameter and rearranges the elements of the list. The function is called with the list containing the integers 1, 2, 3, 4, 5, 6, 7 in given order. What will be the contents of the list after the function completes execution?

```

struct node
{
    int value;
    struct node *next;
};
void rearrange(struct node *list)
{
    struct node *p, *q;
    int temp;
    if (!list || !list->next)
        return;
    p = list;
    q = list->next;
    while(q)
    {
        temp = p->value;
        p->value = q->value;
        q->value = temp;
        p = q->next;
        q = p?p->next:0;
    }
}

```

1, 2, 3, 4, 5, 6, 7

2, 1, 4, 3, 6, 5, 7

1, 3, 2, 5, 4, 7, 6

2, 3, 4, 5, 6, 7, 1

Question - 1

SCORE: 1 points

Question

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Question - 2

SCORE: 1 points

Question

Which of the following statement about binary tree is CORRECT?

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Question - 3

SCORE: 1 points

Question

1. Items D, C, B, A and E are added to an empty FIFO queue. Then three elements are removed from the queue and pushed to an empty stack. Then two elements are popped from the stack and added to the queue. Finally one element is removed from the queue. The removed element is _____.

- A
- E
- B
- C

Question - 4
Question

SCORE: 1 points

Which of the following operations is not $O(1)$ for an array of sorted data. You may assume that array elements are distinct.

- Find the i^{th} largest element.
- Delete an element.
- Find the i^{th} smallest element.
- All of the above.

Question - 5
Question

SCORE: 1 points

The following sequence of operation is performed on stack : push(1), push(2), pop, push(1), push(2), pop, pop, pop, push(2), pop. The sequence of popped out values are ?

- 2, 2, 1, 2, 2
- 2, 1, 2, 2, 1
- 2, 2, 1, 1, 2
- 2, 1, 2, 2, 2

Question - 6
Question

SCORE: 1 points

Given two sorted lists of size m and n respectively. The number of comparisons needed in the worst case by the merge sort algorithm will be?

- mn
- $\max(m,n)$
- $\min(m,n)$
- $m+n-1$

Question - 7
Question

SCORE: 1 points

The height of a Binary tree is given as h . Consider the height of the tree as the number of edges in the longest path from root to the leaf. The maximum number of nodes possible in the tree is?

- $2^{h-1} - 1$

- $2^{h+1} - 1$
- $2^h + 1$
- $2^{h-1} + 1$

Question - 8
Question

SCORE: 1 points

Consider the function print() that receives root of a Binary Search Tree (BST) and a positive integer k as arguments. What does the function print() do?

```
// A BST node
struct node {
    int data;
    struct node *left, *right;
};

int count = 0;

void print(struct node *root, int k)
{
    if (root != NULL && count <= k)
    {
        print(root->right, k);
        count++;
        if (count == k)
            printf("%d ", root->data);
        print(root->left, k);
    }
}
```

- Prints the k^{th} smallest element in BST.
- Prints the rightmost node at level k from root.
- Prints the leftmost node at level k from root.
- Prints the k^{th} largest element in BST.

Question - 9
Question

SCORE: 1 points

In a fractional Knapsack, three items (1, 2, 3) have weights (4,8,6) & profits (12,32,30) respectively. If the weight of the knapsack is 10 then the solution (Item no, Weight) is

- 3->4, 2->6
- 3->6, 1->4
- 3->6, 2->4
- 1->4, 2->6

Question - 10

Question

SCORE: 1 points

Let P be a QuickSort Program to sort numbers in ascending order using the last element as pivot. Let t_1 and t_2 be the number of comparisons made by P for the inputs $\{1, 2, 3, 4, 5\}$ and $\{4, 1, 5, 3, 2\}$ respectively. Which one of the following holds true?

- $t_1 = 5$
- $t_1 < t_2$
- $t_1 > t_2$
- $t_1 = t_2$