Q1-: The operation that combines the element is of A and B in a single sorted array C with n=r+s element is called ....

Where r,s and n is total number of elements in sorted array A,B and c respectively
A. Inserting
B. Mixing
C. Merging
D. Sharing

Ans-: Merging

Q2-: Consider the following functions:

f(n) = n

g(n) = nlogn

h(n) = n^2

Which of the following statements about the asymptotic behaviour of f(n), g(n), and h(n) is true?

Ans-: g(n)= omega(f(n))

Q3-: What will be the best case complexity to find the largest element in a sorted array of n elements in term of Big-O notation?

O(n)

O(1)

O(logn)

O(n/2)

Q4-:Q: The complexity of following code will be:

```
for(int i=n;i>1; i--){

for(int j=1; j < n; j*= 2){
```

//do constant time stuff

}

}

Ans-:

O((logn)^2)

O(2logn)

O(n^2)

O(nlogn)

Q5-: What are the time complexities of finding kth element from beginning and kth element from end in a doubly linked list? Assume n>k, where k is a constant and n is a total number of nodes in the linked list.

O(1) and O(n)

O(1) and O(1)

O(n) and O(1)

O(n) and O(n)

Q6-: _____ list is a header list where the node points back to the header node.

Ans-: Circular header

Q7-: For the following statements, decide whether it is always true,never true ,or sometimes true for asymptotically non negative functions f and g.

F(n)=omega(g(n)) if and only if g(n)=O(f(n))

Ans-: Always true.

Q8-: Evaluate the following prefix expression: 1584/3++5/

Ans-: 4

Q9-: Suppose f and l pointers are pointing to first and last nodes of a singly linked list respectively, which of the following operation is dependent on the length of the linked list?

Delete the first element

Insert a new element as a first element

Delete the last element of the list

Add a new element at the end of the list

Q10-: How to delete last node from a given linked list, l is pointing last node and t is pointing previous node of last node .(next is pointer part of node)

A. T->next=l->next
   L=t
B. L->next=t->next (Not sure)
C. L=null
D. None of the mentioned

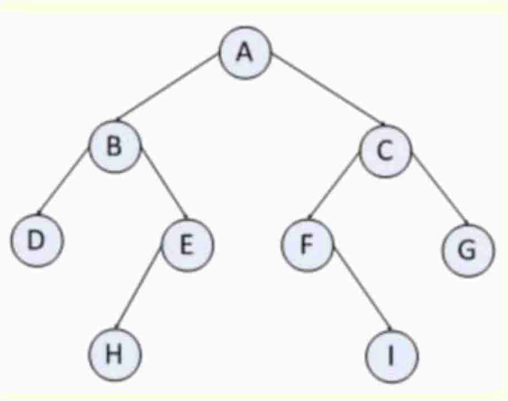
Q11-: If the sequence of operations –push(1),push(2),pop,push(1),push(2),pop,push(2),pop(),pop() are performed on a stack, the sequence of popped out values are

Ans-: 2,2,2,1

Q12-: If user try to remove element from the stack data structure which is already empty then it is called as _____

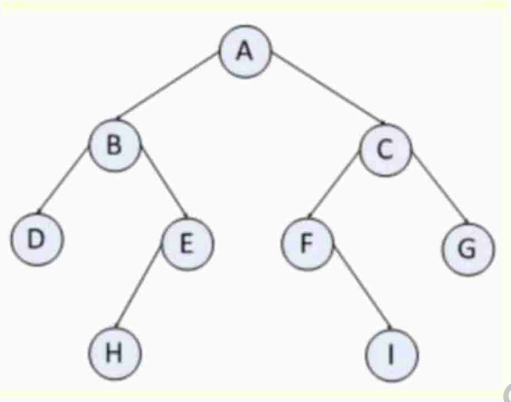
Ans-: Underflow of stack

Q13-: What is preorder traversal of the following binary tree?



Ans-: A,B,D,E,H,C,F,I,G

Q14-: What is inorder traversal of the following binary tree?



Ans-: DBHEAFICG

Q15-: **Consider an implementation of unsorted singly linked list. Suppose ONLY F is pointing to first node of a singly linked list then which of the following operation can be implemented in O(1) time?**

i) Insertion of a node at the first of the linked list
ii) Insertion of a node at the end of the linked list
iii) Deletion of the first node of the linked list
iv) Deletion of the last node of the linked list

Ans-: I,III

Q16-: The postfix expression for the following infix expression (A+B)*(C+D)/F+D*E is

Ans-: **AB+CD+*F/DE*+**

17-: Construct a binary search tree by inserting the following elements in the order of their occurrence 24,23,22,25,26,46 and 41.What is the postorder traversal of constructed tree.

Ans-: 22,23,41,46,26,25,24

Q18-: The preorder traversal sequence of a binary search tree is 10,8,9,13,12. Which one of the following is the postorder traversal sequence of the same tree?

Ans-: 9,8,12,13,10

Q19-: Consider the following queue of characters, where QUEUE is a circular array which located six memory cells: FRONT=2,REAR=4, QUEUE: -,A,C,D,-,-(for notation "-" denotes empty memory cell). What will be the value of front and rear respectively after the following operation? (1)Two letters are deleted (2)three letters x,y,z added to the queue.

Ans-: 4 and 1

Q20-: 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 1;
else
  return fun(root->left) + fun(root->right);
}
```

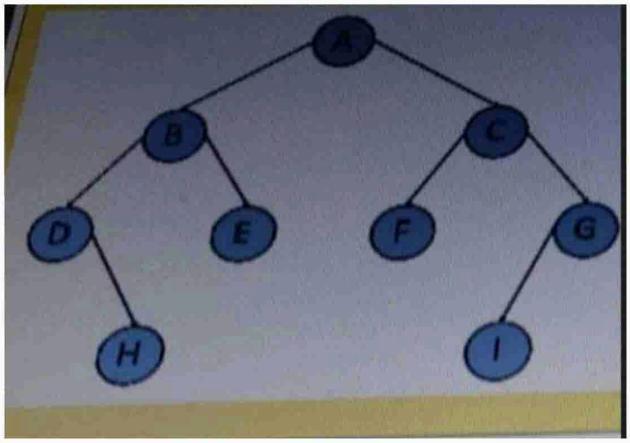
a)Returns total number of leaf nodes

Q21-: What does the following function value() do for a given binary search tree?

```
int value(struct node* node){

if (node->left == NULL)

return node->data;

return value(node->left);

}
```

Ans-: Returns node with minimum value

Q22-:What will be postorder traversal of the following binary tree?



Ans-:HDEBFIGCA

Q23-:What does the following function value() do for a given binary search tree?

```
int value(struct node" node)
 if (node->right = NULL)
   retum node->data,
 return value(node->right);
```

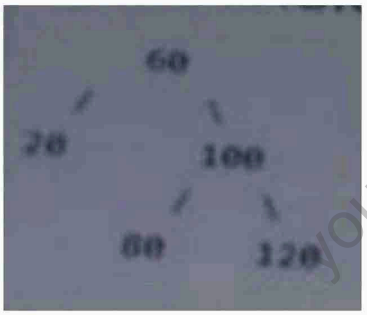
Returns node with minimum value

Returns root node always

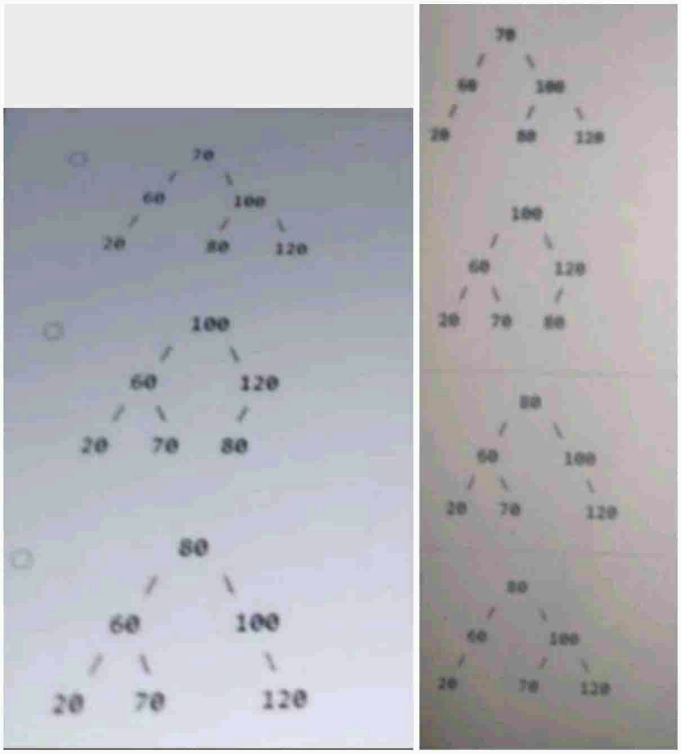
Returns node with maximum value

Returns any leaf node always

Q24-: Consider following AVL tree



Which of the following updated AVL tree after insertion of 70?



Ans-: C

Q25-: Suppose given function Height() is to calculate the height of a Binary tree. (Where height of a Binary tree is number of nodes along the longest path from the root node to the leaf node.)

```
int Height(struct node* node){

if (node==NULL)

return 0;

else{

int lHeight = Height(node->left);

int rHeight = Height(node->right);

if (lHeight > rHeight)
```

return x;

else return Y;

}

}

What should be the values of X and Y so that the function works correctly?

X-Height, Y Height

X = IHeight, Y = rHeight

X = IHeight -1, Y =rHeight - 1

X = IHeight+1, Y=rHeight+1

Q26-:Which of the following non linear data structure contains cycle?

Stack

Queue

Tree

Graph

Q28-: Construct a binary search tree by inserting the following elements in the order of their occurrence 36,37,46,45,44,55 and 50.what is postorder traversal of contructed tree.

Ans-: 44,45,50,55,46,37,36

Q29-: How many LR rotation(s) will be applied to construct an AVL tree with given nodes?

30,40,20,50,35,33,15

Ans-: 0

Q30-: Consider a min heap, represented by the following

array:

11,31,21,71,41,51,81,91

After inserting a node with value 32, which of the following is the updated min heap?

Ans-:

11,31,21,32,41,51,81,91,71

11, 31, 21, 71, 41, 51, 81, 61, 32

11, 32, 21, 31, 41, 51, 81, 61, 32

32, 11, 31, 21, 71, 41, 51, 81, 61

Q31-:What will be the third move to transfer 3 discs from peg P to peg R with the help of peg Q in Tower of Hanoi problem?

Q->R

Q->P

P->Q

R->Q

Q32-: Suppose we are inserting following value in a sequence 10,5,20 and 15 to construct AVL tree .Now suppose we insert 12,which rotation to be carried out to make tree as balance.

Ans-: LL

Q33-: The preorder traversal sequence of a binary search tree is 30,20,10,15,25,23,39,35,42.Which one of the following is the postorder traversal sequence of the same tree.

Ans-: 15,10,23,25,20,35,42,39,30

Q34-: Suppose we are inserting following value in sequence 20,50,70 and 10 to construct AVL tree. Now suppose we delete 70,which rotation to be performed to make tree as balance?

Ans-: R1

Q35-: Which of the following operations on a max-heap require O(logn) time?

(i) Finding the maximum element

(ii) Inserting any element

(iii) Inserting an element greater than the maximum element

(iv) Inserting an element lesser than the minimum

element

(ii). (iv)

(ii), (iii)

(i), (ii), (iii)

(ii), (iii), (iv)

Q36-: Which traversal gives a sorted sequence in an AVL Tree?

inorder

preorder

postorder

levelorder

Q37-:Consider a binary max-heap implemented using an array. Which one of the following array represents a binary max-heap?

25, 12, 16, 13, 10

25, 12, 16, 10, 13

25, 13, 12, 14, 10

25,14,16,13,10

Q38-: What will be the postorder traversal of the AVL tree formed by the nodes given below:

10,15,40,20,50?

Ans-: 10,20,50,40,15

Q39-: True statements about AVL tree are

i) It is a binary search tree.
ii) Left node and right node differs in height by at most 1 unit
iii) Worst case time complexity to search an element is O(logn)
iv) Worst case time complexity to search an element is O(n)

Ans-: i,ii,iii

Q40-: What is the maximum height of any AVL tree with 7 nodes?(Assume that height of a tree with single node is 1.)

Ans-: 4

Q41-: Consider a min heap, represented by the following

array:

10,30,20,70,40,50,80,90

After inserting a node with value 33, which of the following is the updated min heap?

Ans-:10,30,20,33,40,50,80,90,70

Q42-: Consider a hash table of size five ,with starting index zero,and a hash function(x mod 5). Assuming the hash table is initially empty,which of the following is the contents of the table when the sequence 19,32,15,39 is inserted into the table using closed hashing and solving collision using linear probing ? Now that "_" denotes an empty location in the table.

Ans-: 15,39,32,_,19

Q43-: Consider a binary min heap implemented using an array. Which one of the following array represents a binary min heap?

10, 40, 45, 20, 30, 25

20, 40, 45, 10, 25, 30

10, 40, 20, 50, 45, 25

10, 45, 20, 40, 50, 25

Q44-: What will be the worst case time complexity for inserts,searches and deletes in AVL tree?

Ans-:O(logn),O(logn) and O(logn) respectively

Q45-: In order to compute the path from vertex I to vertex J in warshall algorithm, we need to find the p[I,J]=_____ for k,I,J=1,2,__,M(Where M in number of nodes in graph)

Ans-: P[I,J] OR (P[I,K] AND P[K,J])

Q46-: Consider a hash table of size five ,with starting index zero,and a hash function(x mod 5). Assuming the hash table is initially empty.What will be the number of collision when the sequence 19,32,15,39 is inserted into the table using closed hashing and solving collision using linear probing?

Ans-: 3

Q47-: What is the reason of traversal of a graph using BFS or DFS is different from binary tree traversal ?

BFS of a graph uses queue, but postorder traversal of binary tree is recursive

DFS of a graph uses stack, but inorder traversal of binary tree is recursive

There can be a loop in graph so we must maintain a visited flag for every vertex

All of the above

Q48-: Consider a hash table with five slots. The hash function is h(k)=k mod 5. The collisions are resolved by chaining.The following 5 keys are inserted in the order:18,27,13,25,28. The maximum chain lengths in the hash table will be,

Ans-: 3

Q49-: The balance factor for an AVL tree is either

Ans-: 0,1 or -1

Q50-: What will be time complexity to find the smallest element in a binary max heap containing n numbers?

Ans-: O(N)

Q51-: What is/are TRUE statement(s)?

(a) Collision occurs when two or more keys produce same hash address

(b) Every hash algorithm may produce collision

(c) Linear probing is a collision resolution techniques

(d) The goal of hashing is to produce a search that takes O(1) time

a only

a and b

a, b and c

a, b, c and d

Q52-: Given the following input (323,335,472,680,989,172) and the hash function x mod 10. The number of collision using linear probing will be ,

Ans-: 3

Q53-: In order to compute the shortest path from vertex I to vertex J in Floyd warshall Algorithm, we need to find the p[I,J]=_____ for k,I,J=1,2,__,M.(Where M in number of nodes in graph).

Ans-: MIN(P[I,J],P[I,K]+P[K,J])

Q54-: Consider a hash table of size five ,with starting index zero,and a hash function(x mod 5). Assuming the hash table is initially empty,which of the following is the contents of the table when the sequence 17,30,12,19 is inserted into the table using closed hashing and solving collision using linear probing ? Now that "_" denotes an empty location in the table.

Ans-: 30,_,17,12,19

Q55-: Consider a hash table of size five ,with starting index zero,and a hash function(x mod 5). Assuming the hash table is initially empty.What will be the number of collision when the sequence 17,30,12,19 is inserted into the table using closed hashing and solving collision using linear probing?

Ans-: 2

Q56-: Which of the following non linear data structure must not have any cycle?

Stack

Queue

Tree

Graph

Q57-: Which of the following is best data structure for DFS traversal of a graph?

Ans-: stack

Q58-: Given the following input (321, 333, 470, 678, 988, 170) and the hash function x mod 10, which of the following statements are true?

i) 978, 988 hash to the same value

ii) 470, 170 hash to the same value

iii) All elements hash to the same value

iv) Each element hashes to a different value

i only

ii only

i and ii (question is wrong only ii can also be the answer)

iii and iv

Q59-: Which of the following is best data structure for the BFS traversal of a graph?

Ans-: Queue

Q60-: Consider a hash table with five slots. The hash function is h(k)=k mod 5. The collisions are resolved by chaining.The following 5 keys are inserted in the order:18,27,13,25,28. The minimum chain lengths in the hash table will be,

Ans-: 0

Q61-: Suppose we are inserting following value in a sequence 10,5,20 and 15 to construct AVL tree .Now suppose we insert 18,which rotation to be carried out to make tree as balance.

Ans-: LR