CTR QUIZ

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# **DATA STRUCTURES & ALGORITHMS QUIZ**

1. Which of the following sorting algorithms can be used to sort a random linked list with minimum time complexity?

A) Insertion Sort

B) Quick Sort

C) Heap Sort

D) Merge Sort

Answer: D)

2. Consider n elements that are equally distributed in k stacks. In each stack, elements of it are arranged in ascending order (min is at the top in each of the stack and then increasing downwards). Given a queue of size n in which we have to put all n elements in increasing order. What will be the time complexity of the best known algorithm?

A) O(n logk)

B) O(nk)

C) O(n2)

D) O(k2)

Answer: A)

3. Consider the following pseudo code. Assume that IntQueue is an integer queue. What does the function fun do?

void fun(int n)

{

IntQueue q = new IntQueue();

q.enqueue(0);

q.enqueue(1);

for (int i = 0; i < n; i++)

{

int a = q.dequeue();

int b = q.dequeue();

q.enqueue(b);

q.enqueue(a + b);

ptint(a);

}

}

A) Prints numbers from 0 to n-1

B) Prints numbers from n-1 to 0

C) Prints first n Fibonacci numbers

D) Prints first n Fibonacci numbers in reverse order

Answer: C)

4. The in-order and pre-order traversal of a binary tree are d b e a f c g and a b d e c f g respectively. The post order traversal of a binary tree is

A) e d b g f c a

B) e d b f g c a

C) d e b f g c a

D) d e f g b c a

Answer: C)

5. A binary search tree is generated by inserting in order the following integers:

50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24

The number of nodes in the left subtree and right subtree of the root respectively is

A) (4, 7)

B) (7, 4)

C) (8, 3)

D) (3, 8)

Answer: B)

6. You have to sort 1 GB of data with only 100 MB of available main memory. Which sorting technique will be most appropriate?

A) Heap Sort

B) Merge Sort

C) Quick Sort

D) Insertion Sort

Answer: B)

7. Which of the following condition is sufficient to detect cycle in a directed graph?

A) There is an edge from currently being visited node to an already visited node.

B) There is an edge from currently being visited node to an ancestor of currently visited node in DFS forest.

C) Every node is seen twice in DFS.

D) None of the above

Answer: B)

8. Consider an array consisting of –ve and +ve numbers. What would be the worst time comparisons an algorithm can take in order to segregate the numbers having same sign altogether i.e all +ve on one side and then all -ve on the other ?

A) N-1

B) N

C) N+1

D) (N\*(N-1))/2

Answer: A)

9. Predict the output of following program

#include <stdio.h>

int f(int n)

{

if(n <= 1)

return 1;

if(n%2 == 0)

return f(n/2);

return f(n/2) + f(n/2+1);

}

int main()

{

printf("%d", f(11));

return 0;

}

A) Stack Overflow

B) 3

C) 4

D) 5

Answer: D)

10. Which of the following is not a backtracking algorithm?

A) Knight tour problem

B) N queen problem

C) Tower of hanoi

D) M coloring problem

Answer: C)

11. We use dynamic programming approach when

A) It provides optimal solution

B) The solution has optimal substructure

C) The given problem can be reduced to the 3-SAT problem

D) It's faster than Greedy

Answer: B)

12. Consider the following C program

int main()

{

int x, y, m, n;

scanf ("%d %d", &x, &y);

/\* x > 0 and y > 0 \*/

m = x; n = y;

while (m != n)

{

if(m>n)

m = m - n;

else

n = n - m;

}

printf("%d", n);

}

What does the program compute?

A) x + y using repeated subtraction

B) x mod y using repeated subtraction

C) the greatest common divisor of x and y

D) the least common multiple of x and y

Answer: C)

13. Which data structure is most efficient to find the top 10 largest items out of 1 million items stored in file?

A) Min Heap

B) Max Heap

C) BST

D) Sorted Array

Answer: A)

14. Assume that the operators +, -, / are left associative and ^ is right associative. The order of precedence (from highest to lowest) is ^, / , +, -. The postfix expression corresponding to the infix expression a + b / c - d ^ e ^ f is

A) abc / + def ^ ^ -

B) abc / + de ^ f ^ -

C) ab + c / d - e ^ f ^

D) - + a / bc ^ ^ def

Answer: A)

15. Which of the following statements is/are TRUE for an undirected graph?

P: Number of odd degree vertices is even Q: Sum of degrees of all vertices is even

A) P Only

B) Q Only

C) Both P and Q

D) Neither P nor Q

Answer: C)