1. Rearrange the following in the increasing order of their order of growth: n^n, log log n, log n, n^2 log n, 2^n

2^n, log log n, log n, n^2 log n, n^n

log n, log log n, n^2 log n, 2^n, n^n

log n, log log n, n^2 log n, n^n, 2^n

log log n, log n, n^2 log n, 2^n, n^n

1. Express the following function using theta notation: g(n) = 21n logen +100 logen + 2n + 256

theta(logen)

theta(n logen)

theta(n)

theta(n+logen)

1. Let T be the binary tree consists of 63 nodes. Predict its depth.

64

5

7

6

1. If (n > 0) then RecursiveSum(a[], n) algorithm returns

RecursiveSum (a[], n-1) + a[n]

RecursiveSum (a[], n+1) + a[n]

RecursiveSum (a[], n-1) + a[n-1]

RecursiveSum (a[], n) + a[n]

1. The binary tree of depth k that has exactly 2k-1 nodes is called a

full binary tree of depth k

complete binary tree of depth k

complete binary tree of depth k+1

full binary tree of depth k+1

1. The total number of nodes in a binary tree of depth 3 is

32

7

64

15

1. Identify the exponential computational complexity.

O(1)

O(2 power n)

O(n!)

O(n)

1. How to design iteartive algorithms?

Using for

Using while

Using do-while

Using for, while, do-while loop

1. If a procedure P contains an explicit reference to itself, then is said to be \_\_\_ recursive.

directly

indirectly

both a and b

none of the option

1. Comments in a program count as \_\_\_ steps.

1

0

3

2

1. Find the value of n! for n=6.

120

720

700

270

1. Define the termination condition for n! using recursion.

If (n = 0) then return 2

If (n = 0) then return 1

If (n = 1) then return 2

If (n = 0) then return 0

1. Predict the worst case input of sequential search algorithm.

a[1]

a[2]

a[n-1]

a[n]

1. Find the result of a recursive algorithm to find the array sum for n = 5 and the array elements are 1, 2, 3, 4, 5.

10

15

120

21

1. Find the average computing time of binary search algorithm.

O(n power 3)

O(n!)

O(log n)

O(n)

1. Identify the polynomial running time function.

O(n power c) where c > 1

O(n!)

O(n)

O(nlogn)

1. The maximum number of nodes in the 3rd level of a full binary tree is

15

7

4

8

1. For the log n functions, indicate how much the function' s value will change if its argument is increased fourfold

increase by constant

quadratic

linear

exponential

1. The maximum number of nodes in the 7th level of a full binary tree is

128

64

256

32

1. The performance measurement is called

debugging

profiling

testing

validation

1. In Prim' s algorithm, what is the initial step?

Start with an arbitrary vertex.

Select the vertex with the smallest weight.

Start with the vertex with the highest degree.

Randomly select any vertex as the starting point.

1. Suppose A is an unordered array consists of 49 elements. Then the expected number of comparisons performed on A in the successful case using linear search is

49

1

25

0

1. Which data structure is typically used in Dijkstra' s algorithm to efficiently find the vertex with the minimum distance?

Priority queue.

Stack.

Queue.

Array.

1. Which of the following is a valid approach to construct a heap from an array of elements?

Insert elements one by one into an empty heap

Starting from the last non-leaf node, repeatedly heapify down

Sorting the array first and then converting it into a heap

Reversing the array and converting it into a heap

1. Dijkstra' s algorithm is used to find:

The shortest path between two vertices in a graph.

The minimum spanning tree of a graph.

The maximum spanning tree of a graph.

The longest path in a graph.

1. Which of the following steps is involved in constructing a max heap from an array?

Sorting the array in descending order

Repeatedly heapifying down from the last non-leaf node

Repeatedly heapifying up from the last leaf node

Removing elements from the heap

1. Which of the following statements is true regarding Prim' s algorithm?

It is faster than Kruskal' s algorithm for dense graphs.

It can only be applied to connected graphs.

It always produces a minimum spanning tree.

It is not applicable to graphs with negative edge weights.

1. Identify the sorting algorithm that takes O (d\*(n+b)) time where b is the base for representing numbers with d digits.

heap sort

radix sort

merge sort

selection sort

1. Which of the following is true about the Greedy Method?

It always guarantees the optimal solution.

It may not always lead to the optimal solution.

It exhaustively searches all possible solutions.

It is only applicable to linear problems.

1. For an unordered array which consists of 32768 elements predict the average number of comparisons performed in the unsuccessful case using a linear search algorithm.

1

32767

16384

32768

1. Predict the worst case number of comparisons required for bubble sort during the (n-1)th pass. Assume the size of the array is n.

2

n-1

n

1

1. What is the time complexity of heap sort?

O(n^2)

O(n log n)

O(log n)

O(n)

1. In Kruskal' s algorithm, what data structure is typically used to store the edges?

Priority queue.

Stack.

Queue.

Array.

1. The average number of comparisons needed to find the location for the Jth element using insertion sort algorithm is

J/2+1-1/(J+1)

J/2+1+1/(J+1)

J/2+1-1/(J-1)

J/2-1+1/(J+1)

1. Which type of heap is used to implement a priority queue where the highest priority element is extracted first?

Max heap

Min heap

Full heap

Complete heap

1. Identify the incorrect statement.

Best case performance of linear and binary search is not the same

There can be more than one worst case input for binary search

There can be more than one worst case input for linear search

Binary search is not faster than linear search

1. Which of the following algorithm performs inserting elements into the sorted array?

Insertion sort

Bubble sort

Quick sort

Heap sort

1. What is the time complexity of inserting an element into a heap?

O(1)

O(log n)

O(n)

O(n log n)

1. In a min heap, which of the following statements is true?

The root node contains the minimum element

The value of each node is greater than or equal to the values of its children

It is used to implement a priority queue where the lowest priority element is extracted first is extracted first

Both a and c are true

1. Which operation is performed during the heapification process in max heap construction?

Swapping the parent node with its left child

Swapping the parent node with its right child

Swapping the parent node with its larger child

None of the All

1. In the context of the Greedy Method, what does the " greedy choice property " mean for Minimum Cost Spanning Trees?

Making locally optimal choices always leads to a globally optimal solution.

All subproblems of a problem must be solved before an optimal solution can be found.

The problem can be divided into smaller subproblems that can be solved independently.

The optimal solution contains the locally optimal choice at each step.

1. The Horner' s method is used for the efficient evaluation of:

Dense polynomials

Sparse polynomials

Both dense and sparse polynomials

None of the above

1. What is the primary advantage of using the Horner' s method for polynomial evaluation?

It requires fewer additions and multiplications.

It works only for polynomials of degree 1.

It provides a symbolic solution to polynomial equations.

It reduces the number of terms in the polynomial

1. Which of the following is NOT a benefit of Strassen' s algorithm?

Reduced number of multiplications

Improved cache performance

Reduced space complexity

Lower time complexity than the divide and conquer method

1. What advantage does Horner' s method offer for sparse polynomials

It reduces the number of non - zero terms

It increases the degree of the polynomial

It requires more multiplications

It only works for polynomials with complex roots

1. How is the efficiency of the Naive String Matching Algorithm usually described?

It has a constant time complexity

It has a linear time complexity.

It has a quadratic time complexity

It has an exponential time complexity

1. The recurrence relation for Strassen' s algorithm can be represented as:

T(n) = T(n/2) + O(n^2)

T(n) = 7T(n/2) + O(n^2)

T(n) = 8T(n/2) + O(n^3)

T(n) = T(n/2) + O(n^3)

1. The Naive String Matching Algorithm checks for a pattern within a text by:

Utilizing dynamic programming.

Employing backtracking.

Comparing the pattern to every substring of the text.

Utilizing finite automata

1. In conventional matrix multiplication of two matrices A and B, what is the time complexity?

O(n)

O(n^2)

O(n^3)

O(log n)

1. The time complexity of evaluating a sparse polynomial using the straight evaluation method is:

O(n)

O(nlogn)

O(m)

O(n^2)

1. In the straight evaluation method for sparse polynomials, what operation is performed for each non - zero term?

Multiplication

Division

Subtraction

Addition

1. What is the purpose of the KMP flowchart

To visualize the KMP algorithm

To find the longest common subsequence

To sort elements in an array

None of the above

1. Which data structure is primarily used in the construction of the KMP flowchart?

Arrays

Stacks

Trees

Linked Lists

1. Which of the following is NOT a step in the Naive String Matching Algorithm?

Compute the hash value of the pattern

Compare the pattern with each substring of the text

Slide the pattern one position to the right and repeat the comparison

Stop when a match is found or the end of the text is reached.

1. Which step of the KMP algorithm involves constructing the failure function?

Preprocessing

Matching

Failure function construction

All of the above

1. How does the KMP algorithm improve over the brute - force algorithm?

By reducing the number of character comparisons

By increasing the size of the pattern

By decreasing the size of the text

By using a different data structure

1. Horner' s method is based on:

Dividing the polynomial by its roots

Factoring the polynomial into irreducible factors

Evaluating the polynomial at specific points

Repeatedly factoring out a common factor

1. Which of the following algorithms is based on the concept of finite automata for pattern matching?

KMP algorithm

Boyer - Moore algorithm

Rabin - Karp algorithm

Brute - force algorithm

1. Which of the following algorithms is based on the divide and conquer approach for matrix multiplication?

Bubble Sort

Merge Sort

Strassen' s algorithm

Insertion Sort

1. Which algorithm is commonly used to find the Minimum Cost Spanning Tree?

Dijkstra' s algorithm.

Prim' s algorithm.

Kruskal' s algorithm.

Bellman - Ford algorithm.