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TEAM HADI(VU LAHORE)

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WARNING: Team HADI is not responsible for any mistake or wrong answer. All students reading and using this document may check and confirm the answers at their own.



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Best of luck!



Question No : 1 of 26

Marks: 1 (Budgeted Time 1 Min)

Unlike programs, algorithms to be understood primarily by _____ and _____.

Answer (Please select your correct option)

☐ Machines, not people

☐ Mathematical expressions, not algebraic expressions

☒ Programmers, not machines

☐ RAM, not programmer



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Question No : 2 of 26

Marks: 1 (Budgeted Time 1 Min)

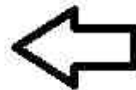
Recurrences are useful for analyzing

Answer (Please select your correct option)

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☒ Recursive Algorithms



☐ Simple Algorithms

☐ Parallel Algorithms

☐ Parallel Algorithms & Recursive Algorithms

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Question No : 3 of 26

Marks: 1 (Budgeted Time 1 Min)

Divide-and-conquer involves breaking the problem into a small number of

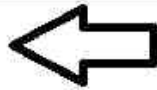
Answer (Please select your correct option)

☐ pivot

☐ Sub problems

☐ Selection

☐ Sieve



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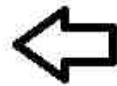
Question No : 4 of 26

Marks: 1 (Budgeted Time 1 Min)

In which order we can sort?

Answer (Please select your correct option)

☐ increasing order or decreasing order



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☐ both at the same time

☐ increasing order only

☐ decreasing order only

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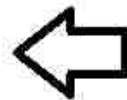
Question No : 5 of 26

Marks: 1 (Budgeted Time 1 Min)

Comparison based sorting algorithms can not run faster than

Answer (Please select your correct option)

☐ $\Omega(n \log n)$



☐ $(n \log n)$

☐ $\Omega(n^2)$

☐ (n^2)

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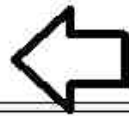
Question No : 6 of 26

Marks: 1 (Budgeted Time 1 Min)

In Quick sort, we don't have the control over the sizes of recursive calls

Answer (Please select your correct option)

☐ True



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☐ False



☐ Less information to decide



☐ Either true or false



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Question No : 7 of 26

Marks: 1 (Budgeted Time 1 Min)

Who invented Quick sort procedure?

Answer (Please select your correct option)

☐ Hoare



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☐ Sedgewick

☐ Mellroy

☐ Coreman

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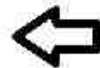
Question No : 8 of 26

Marks: 1 (Budgeted Time 1 Min)

Counting sort assumes that the numbers to be sorted are in the range 1 to k , where k is

Answer (Please select your correct option)

☐ Small



☐ Large

☐ No restriction on k

☐ None of these

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Question No : 9 of 26

Marks: 1 (Budgeted Time 1 Min)

If there are $\Theta(n^2)$ entries in edit distance matrix then the total running time is

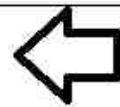
Answer (Please select your correct option)

☐ $\Theta(1)$

☒ $\Theta(n^2)$

☐ $\Theta(n)$

☐ $\Theta(n \log n)$



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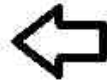
Question No : 10 of 26

Marks: 1 (Budgeted Time 1 Min)

When a recursive algorithm revisits the same problem over and over again, we say that the optimization problem has _____ sub-problems.

Answer (Please select your correct option)

☐ Overlapping



☐ Over costing

☐ Optimized

☐ None of these

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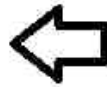
Question No : 11 of 26

Marks: 1 (Budgeted Time 1 Min)

A $p \times q$ matrix A can be multiplied with a $q \times r$ matrix B. The result will be a $p \times r$ matrix C. In particular, for $1 \leq i \leq p$ and $1 \leq j \leq r$,

Answer (Please select your correct option)

☐ $C[i, j] = \sum_{k=1}^q A[i, k]B[k, j]$



☐ $C[i, j] = \sum_{k=1}^q A[k, i]B[k, j]$

☐ $C[i, j] = \sum_{k=1}^q A[k, i]B[j, k]$

☐ None of these

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Question No : 12 of 26

Marks: 1 (Budgeted Time 1 Min)

We can find the product $A \times B$ of matrices A and B, only if they are compatible which means,

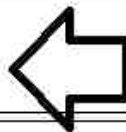
Answer (Please select your correct option)

☐ No of Columns of A must be equal to No of Rows of B

☐ No of Columns of A must be equal to No of Columns of B

☒ No of Rows of A must be equal to No of Rows of B

☐ Order of A must be equal to order of B



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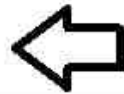
Question No : 13 of 26

Marks: 1 (Budgeted Time 1 Min)

Time complexity of chain matrix multiplication is $\Theta(n^3)$ and space complexity is

Answer (Please select your correct option)

☒ $\Theta(n^2)$



☐ $\Theta(n^3)$

☐ $\Theta(n \log n)$

☐ $\Theta(\log n)$

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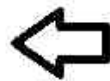
Question No : 14 of 26

Marks: 1 (Budgeted Time 1 Min)

Computational model of sequential RAM is:

Answer (Please select your correct option)

- ☐ Parallel machines may be expensive to model and have more computational power than sequential RAM.
- ☐ Computational power of sequential RAM is same as that of parallel machines only time efficiency is achieved with parallel machines
- ☐ Both first and second options are true for the statement
- ☐ Less powerful computational wise than parallel machines



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Question No : 15 of 26

Marks: 1 (Budgeted Time 1 Min)

The worst case running time of the algorithm given below is,

MAXIMA(int n, Point P[1...n])

1 for i ← 1 to n **$n \log n$**

2 do maximal ← true

3 if P[i].x > P[maximal].x

Answer (Please select your correct option)

☐ $\Theta(n^6)$

☐ $\Theta\left(n^{\frac{2n}{6}}\right)$

☐ $\Theta(n^2)$

☐ $\Theta(2n \lg 6)$

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Question No : 15 of 26

Marks: 1 (Budgeted Time 1 Min)

```
1  for i ← 1 to n
2  do maximal ← true
3    for j ← 1 to n
4    do
5      if (i ≠ j) & (P[i].x < P[j].x) & (P[i].y < P[j].y)
```

Answer (Please select your correct option)

☐ $\Theta(n^6)$

☐ $\Theta\left(\frac{2n}{n^6}\right)$

☐ $\Theta(n^2)$

☐ $\Theta(2n \lg 6)$

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Question No : 15 of 26

Marks: 1 (Budgeted Time 1 Min)

```
3   for j ← 1 to n
4   do
5       if (i ≠ j) & (P[i].x ≤ P[j].x) & (P[i].y ≤ P[j].y)
6           then maximal ← false break
7   if maximal
```

Answer (Please select your correct option)

☐ $\Theta(n^6)$

☐ $\Theta\left(n^{\frac{2n}{6}}\right)$

☒ $\Theta(n^2)$

☐ $\Theta(2n \lg 6)$



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Question No : 15 of 26

Marks: 1 (Budgeted Time 1 Min)

```
5      if (i ≠ j) & (P[i].x ≤ P[j].x) & (P[i].y ≤ P[j].y) 1 incorrect
6      then maximal ← false break
7  if maximal
8      then output P[i].x, P[i].y 2 incorrect
```

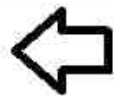
Answer (Please select your correct option)

☐ $\Theta(n^6)$

☐ $\Theta\left(\frac{2n}{n^6}\right)$

☐ $\Theta(n^2)$

☐ $\Theta(2n \lg 6)$



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Question No : 16 of 26

Marks: 1 (Budgeted Time 1 Min)

In Sieve Technique, we know _____

Answer (Please select your correct option)

☐ Item of ineterst

☐ Order of items

☐ complexity of items

☒ All items are of ineterst



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Question No : 17 of 26

Marks: 1 (Budgeted Time 1 Min)

In Random access machine, instructions are executed _____.

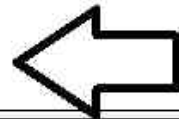
Answer (Please select your correct option)

☐ five at a time

☐ infinite instructions at a time

☒ one-by-one

☐ parallel



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Question No : 18 of 26

Marks: 1 (Budgeted Time 1 Min)

Which type of instructions Random Access Machine (RAM) can execute? Choose best answer

Answer (Please select your correct option)

☐ Algebraic and logic

☐ Geometric and arithmetic

☒ Arithmetic and logic

☐ Parallel and recursive



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Question No : 19 of 26

Marks: 1 (Budgeted Time 1 Min)

Which of the following is calculated with **Big O notation**?

Answer (Please select your correct option)

☐ Medium bounds

☐ Lower bounds

☒ Upper bounds

☐ Both upper and lower bound



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Question No : 20 of 26

Marks: 1 (Budgeted Time 1 Min)

Which of the following functions grows fastest as n gets larger?

Answer (Please select your correct option)

☐ $n^{10}2^n$

☐ n^83^n

☐ n^55^n

☐ n^32^{2n}

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Question No : 21 of 26

Marks: 2 (Budgeted Time 4 Min)

What is the essential constraint for the Counting Sort?

Answer ([Please click here to Add Answer](#))



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Question No : 22 of 26

Marks: 2 (Budgeted Time 4 Min)

How we proceed with m entries in cost table for chain matrix multiplication problem?

Answer ([Please click here to Add Answer](#))



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Solve it,

$$T(n) = \frac{1}{2} \sum_{q=1}^2 (T(q-1) + T(2-q) + 2)$$

Answer (Please [click here to Add Answer](#))

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Question No : 24 of 26

Marks: 3 (Budgeted Time 6 Min)

True or False: A sequence of values in a row of the dynamic programming table for an instance of the knapsack problem is always non-decreasing. Give a brief description.

Answer (Please [click here to Add Answer](#))



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Question No : 25 of 26

Marks: 5 (Budgeted Time 10 Min)

Whether each of the following sorting algorithms is stable and in-place or not?

Sorting Algorithm	Stable	In-Place
Merge Sort	Yes/No	Yes/No
Heapsort	Yes/No	Yes/No
Quicksort	Yes/No	Yes/No
Counting Sort	Yes/No	Yes/No

Answer ([Please click here to Add Answer](#))



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Question No : 25 of 26

Marks: 5 (Budgeted Time 10 Min)

Merge Sort	Yes/No	Yes/No
Heapsort	Yes/No	Yes/No
Quicksort	Yes/No	Yes/No
Counting Sort	Yes/No	Yes/No
Bubble Sort	Yes/No	Yes/No

Answer ([Please click here to Add Answer](#))



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Question No : 26 of 26

Marks: 5 (Budgeted Time 10 Min)

Write down the steps of dynamic programming strategy.

Answer (Please [click here to Add Answer](#))



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