

VIRTUAL UNIVERSITY OF PAKISTAN

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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)

The word *Algorithm* comes from the name of the Muslim author _____

Answer (Please select your correct option)

Abu Ja'far Mohammad ibn Musa al-Khwarizmi or Al-Khwarizmi



Khwarizm

Kheva

Uzbekistan

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Question No : 2 of 26

Marks: 1 (Budgeted Time 1 Min)

Al-Khwarizmi's work was written in a book titled _____

Answer (Please select your correct option)

- al Kitab al-mukhatasar fi hisab al-jabrwa'l-muqabalah correct answer solve by hadi
- Calculation by Completion
- al Kitab
- al-jabrwa'l-muqabalah



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Question No : 3 of 26 Marks: 1 (Budgeted Time 1 Min)

_____ is a graphical representation of an algorithm

Answer (Please select your correct option)

- Σ notation
- Θ notation
- Flowchart
- Asymptotic notation



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Question No : 4 of 26

Marks: 1 (Budgeted Time 1 Min)

What is the asymptotic growth of $n^2 + \frac{4n + 15n + 11n}{16}$?

Answer (Please select your correct option)

$\Theta\left(\frac{4n + 15n + 11n}{16}\right)$

$\Theta\left(n^2 + n + \frac{1}{16}\right)$

$\Theta(n^2)$

$\Theta(n)$



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Question No : 5 of 26

Marks: 1 (Budgeted Time 1 Min)

Recurrences are useful for analyzing

Answer (Please select your correct option)

- Recursive Algorithms
- Simple Algorithms
- Parallel Algorithms
- Parallel Algorithms & Recursive Algorithms

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Question No : 6 of 26

Marks: 1 (Budgeted Time 1 Min)

The sieve technique is a special case, where the number of sub problems is just

Answer (Please select your correct option)

- 5
- many
- 1
- few



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Question No : 7 of 26

Marks: 1 (Budgeted Time 1 Min)

What is the total time to heapify?

Answer (Please select your correct option)

$O(\log n)$



$O(n \log n)$

$O(n^2 \log n)$

$O(\log^2 n)$

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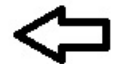
Question No : 8 of 26

Marks: 1 (Budgeted Time 1 Min)

Comparison based sorting algorithms can not run faster than

Answer (Please select your correct option)

- $\Omega (n \log n)$
- $O (n \log n)$
- $\Omega (n^2)$
- $O (n^2)$



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Question No : 9 of 26

Marks: 1 (Budgeted Time 1 Min)

After partitioning array in Quick sort, pivot is placed in a position such that

Answer (Please select your correct option)

Values smaller than pivot are on left and larger than pivot are on right

Values larger than pivot are on left and smaller than pivot are on right

Pivot is the first element of array

Pivot is the last element of array



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60:00

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Question No : 10 of 26

Marks: 1 (Budgeted Time 1 Min)

The running time of quick sort depends heavily on the selection of

Answer (Please select your correct option)

Required Output

Input and output

Pivot

Input data only



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Question No : 11 of 26

Marks: 1 (Budgeted Time 1 Min)

Memoization is a process

Answer (Please select your correct option)

To avoid unnecessary repetitions by writing down the results of recursive calls and looking them again if needed later

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To avoid repeated data by writing down the results of input array and looking them again if needed later.

None of these

All options are correct

Start Time: 5:37 AM

60:00

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11

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Question No : 12 of 26

Marks: 1 (Budgeted Time 1 Min)

A problem exhibits _____ if an optimal solution to the problem contains within it optimal solution to sub-problems.

Answer (Please select your correct option)

- Optimal structure
- Efficient structure
- Inefficient structure
- Unknown behavior



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60:00
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12

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Question No : 13 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. There are $(p \cdot r)$ total entries in C and each takes _____ to compute.

Answer (Please select your correct option)

- (q) correct answer solve by hadi
- (1)
- (n^2)
- (n^3)

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60:00 Time Left

13

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Question No : 14 of 26

Marks: 1 (Budgeted Time 1 Min)

Catalan number is given by the formula.

Answer (Please select your correct option)

$C(n) = \frac{1}{n+1} \binom{2n}{n}$



correct answer solve by hadi

$C(n) = \frac{1}{n-1} \binom{2n}{n}$

$C(n) = \frac{1}{n+1} \binom{n}{2n}$

$C(n) = \frac{1}{n-1} \binom{n}{2n}$

Start Time: 5:37 AM

60:00
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14

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Question No : 15 of 26 Marks: 1 (Budgeted Time 1 Min)

For Chain Matrix Multiplication we can not use divide and conquer approach because,

Answer (Please select your correct option)

- We do not know the optimum k
- We use divide and conquer for sorting only
- We can easily perform it in linear time
- Size of data is not given

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15

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Question No : 16 of 26 Marks: 1 (Budgeted Time 1 Min)

Time complexity of chain matrix multiplication is $\Theta(n^2)$ and space complexity is

Answer (Please select your correct option)

- $\Theta(n^2)$ ← correct answer solve by hadi
- $\Theta(n^3)$
- $\Theta(n \log n)$
- $\Theta(\log n)$

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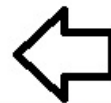
Question No : 17 of 26

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



correct answer solve by hadi

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60:00

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17

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Question No : 18 of 26

Marks: 1 (Budgeted Time 1 Min)

What is the correct order of operations in merge sort?

Answer (Please select your correct option)

Conquer → Divide → Combine

Divide → Conquer → Combine

Conquer → Divide → Split

Split → Conquer → Destroy



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Question No : 19 of 26

Marks: 1 (Budgeted Time 1 Min)

What is the average-case time for merge sort to sort an array of n elements?

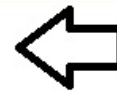
Answer (Please select your correct option)

$O(\log n)$

$O(n)$

$O(n \log n)$

$O(n^2)$



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60:00

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Question No : 20 of 26

Marks: 1 (Budgeted Time 1 Min)

What is the solution to the recurrence $T(n) = T(n/2) + n$, $T(1) = 1$?

Answer (Please select your correct option)

$O(\log n)$

$O(n)$

$O(n \log n)$

$O(n^2)$

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Question No : 21 of 26

Marks: 2 (Budgeted Time 4 Min)

What is the idea behind in counting sort algorithm, to sort the elements without comparisons in linear time?

Answer (Please click here to Add Answer)

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Question No : 22 of 26

Marks: 2 (Budgeted Time 4 Min)

Which one is the better approach to cop with chain matrix multiplication?

Answer (Please click here to Add Answer)

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Question No : 23 of 26 Marks: 3 (Budgeted Time 6 Min)

Consider sorting three numbers a1, a2 and a3 with comparison-based sorting algorithms then write the possible combinations?

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

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60:00
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23

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Question No : 24 of 26

Marks: 3 (Budgeted Time 6 Min)

What are Catalan numbers? Give the formula to find Catalan numbers.

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

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24

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Question No : 25 of 26

Marks: 5 (Budgeted Time 10 Min)

The following summation form represents quick sort, so what will be the outcome after solving this recurrence in terms of asymptotic notation?

$$\sum_{i=1}^{n+1} i = \frac{(n+1)(n+2)}{2}$$

Answer (Please click here to Add Answer)

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Start Time: 5:37 AM
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25

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Question No : 26 of 26

Marks: 5 (Budgeted Time 10 Min)

What is the time complexity of the following algorithm?

```
KNAPSACK(n, W)
1 for w = 0, W
2 do V[0, w] ← 0
3 for i = 0, n
4 do V[i, 0] ← 0
5   for w = 0, W
```

Answer (Please click here to Add Answer)

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26

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Question No : 26 of 26

Marks: 5 (Budgeted Time 10 Min)

```
2  do v[i,w] ← v
3  for i = 0, n
4  do V[i,0] ← 0
5  for w = 0, W
6  do if (wi ≤ w & vi + V[i-1, w-wi] > V[i-1, w])
7     then V[i, w] ← vi + V[i-1, w-wi]
8     else V[i, w] ← V[i-1, w]
```

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

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Question No : 26 of 26

Marks: 5 (Budgeted Time 10 Min)

```
4 do  $v[i, w] \leftarrow v$ 
5 for  $w = 0, W$ 
6 do if ( $w_1 \leq w$  &  $v_1 + V[i-1, w-w_1] > V[i-1, w]$ )
7 then  $V[i, w] \leftarrow v_1 + V[i-1, w-w_1]$ 
8 else  $V[i, w] \leftarrow V[i-1, w]$ 
```

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

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