Summary in Graph

Exam Summary (GO Classes Test Series 2024 | Algorithms | Test 2)

Qs. Attempted:	**15** (5 + 10)	**Correct Marks:**	**18** (4 + 14)
Correct Attempts:	**11** (4 + 7)	**Penalty Marks:**	**2** (0 + 2)
Incorrect Attempts:	**4** (1 + 3)	**Resultant Marks:**	**16** (4 + 12)

Total Questions:	**15** (5 + 10)
Total Marks:	**25** (5 + 20)
Exam Duration:	**45 Minutes**
Time Taken:	**43 Minutes**

EXAM RESPONSE | EXAM STATS | FEEDBACK

Technical

Q #1 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Algorithms

Let $S(n)$ be

$$S(n) = S(n/2) + \log(n).$$

What will be asymptotic bound on $S(n)$?

A. $\Theta(n \log n)$
B. $\Theta(\log n)$
C. $\Theta(\log \log n)$
D. $\Theta\left((\log n)^2\right)$

Your Answer: D | **Correct Answer: D** | Correct | Discuss

Q #2 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Algorithms

Let $T(n) = T(an) + T(bn) + n$, where $a + b < 1$.

What will be asymptotic bound on $T(n)$?

A. $\Theta(n)$
B. $\Theta\left(n^2\right)$
C. $\Theta(n \log n)$
D. $\Theta((a+b) \log n)$

Your Answer: A | Correct Answer: A | Correct | Discuss

Q #3 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Algorithms

Let $T(n)$ be

$$T(n) = 16T(n/4) + n^2(\log n)^3$$

What will be asymptotic bound on $T(n)$?

A. $\Theta\left(n^2(\log n)^3\right)$
B. $\Theta\left(n^2(\log n)^4\right)$
C. $\Theta\left(n^3 \log n\right)$
D. $\Theta\left(n^3(\log n)^3\right)$

Your Answer: B | Correct Answer: B | Correct | Discuss

Q #4 | Multiple Choice Type | Award: 1 | Penalty: 0.33 | Algorithms

Let $T(n)$ be

$$T(n) = 64T(n/4) + 8^{\log_2 n}$$

What will be asymptotic bound on $T(n)$?

A. $\Theta\left(n^3(\log n)^3\right)$
B. $\Theta\left(n^3\right)$
C. $\Theta\left(n^3 \log n\right)$
D. $\Theta\left(n^4\right)$

Your Answer: C | Correct Answer: C | Correct | Discuss

Q #5 | Multiple Select Type | Award: 1 | Penalty: 0 | Algorithms

Let $T(n) = 2T(n/2) + O(n)$, where "O" is big-oh. What will be asymptotic bound on $T(n)$?

A. $\Theta(n)$
B. $\Theta(n \log n)$
C. $\Theta\left(n^2\right)$
D. $O\left(n^3\right)$

Your Answer: B;D | Correct Answer: D | Incorrect | Discuss

Q #6 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Algorithms

Let $T(n)$ be

$$T(n) = T(\sqrt{n}) + \log \log n$$

What will be asymptotic bound on $T(n)$?

A. $\Theta(\log n)$
B. $\Theta((\log \log n)^2)$
C. $\Theta(\log \log \log n)$
D. $\Theta(\log \log \log \log n)$

Your Answer: B **Correct Answer: B** Correct Discuss

Q #7 Multiple Choice Type Award: 2 Penalty: 0.67 Algorithms

Let $T(n)$ be

$$T(n) = 2T(\sqrt{n}) + \log n$$

What will be asymptotic bound on $T(n)$?

A. $\Theta(\log n)$
B. $\Theta(\log \log n)$
C. $\Theta(\log n \log \log n)$
D. $\Theta(n \log n)$

Your Answer: C **Correct Answer: C** Correct Discuss

Q #8 Multiple Choice Type Award: 2 Penalty: 0.67 Algorithms

Let $T(n)$ be

$$T(n) = n^2 + T(n/2) + T(n/4)$$

What will be asymptotic bound on $T(n)$?

A. $\Theta\left(n^2\right)$
B. $\Theta\left(n^3\right)$
C. $\Theta\left(n^4\right)$
D. $\Theta\left(n^2 \log n\right)$

Your Answer: A **Correct Answer: A** Correct Discuss

Q #9 Multiple Choice Type Award: 2 Penalty: 0.67 Algorithms

Let

$$T(n) = \sqrt{n} \cdot T(\sqrt{n}) + n$$

What will be asymptotic bound on $T(n)$?

A. $\Theta(\sqrt{n}\log n)$
B. $\Theta(\log\log n)$
C. $\Theta(n\log\log n)$
D. $\Theta(\sqrt{n}\log\log n)$

Your Answer: C | Correct Answer: C | Correct | Discuss

Q #10 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Algorithms

Let $T(n)$ be

$$T(n) = \begin{cases} 2T(n/2) + 8T(n/4) + n^2 & \text{if } n \geq 4 \\ 1 & \text{if } n \leq 3 \end{cases}$$

What will be asymptotic bound on $T(n)$?

A. $\Theta\left(n^2\log n\right)$
B. $\Theta\left(n^2\right)$
C. $\Theta\left(n^3\right)$
D. $\Theta\left(n^3\log n\right)$

Your Answer: D | Correct Answer: A | Incorrect | Discuss

Q #11 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Algorithms

Select the correct asymptotic complexity of an algorithm with runtime $T(n,n)$ where

- $T(x,c) = \Theta(x)$ for $c \leq 2$,
- $T(c,y) = \Theta(y)$ for $c \leq 2$, and
- $T(x,y) = \Theta(x) + T(x,y/2)$

A. $\Theta(\log n)$
B. $\Theta(n)$
C. $\Theta(n\log n)$
D. $\Theta\left(n\log^2 n\right)$

Your Answer: B | Correct Answer: C | Incorrect | Discuss

Q #12 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Algorithms

Consider mutually recursive definitions of $T(a,b)$ and $S(c,d)$:

$$\begin{aligned} T(x,c) &= \Theta(x) && \text{for } c \leq 2 \\ T(x,y) &= \Theta(x) + S(x,y/2), \\ S(c,y) &= \Theta(y) && \text{for } c \leq 2, \text{ and} \\ S(x,y) &= \Theta(y) + T(x/2,y) \end{aligned}$$

Select the correct asymptotic complexity of an algorithm with run-time $T(n,n)$.

A. $\Theta(\log n)$.
B. $\Theta(n)$.
C. $\Theta(n\log n)$.

D. $\Theta\left(n \log^2 n\right)$.

Your Answer: B | Correct Answer: B | Correct | Discuss

Q #13 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Algorithms

A list of n arrays, each of length n, is passed to an algorithm like merge-sort. The algorithm recursively divides a set of arrays into two parts until there are only two arrays.

If there are two arrays, then, as a base case, the algorithm combines or merges both in cost of $\mathrm{O}(p+q)$ where p and q are sizes of arrays.

What will be the time complexity recurrence relation of such algorithm?

Let $T(n)$ be time taken for n arrays.

A. $T(n) = 2T(n/2) + n^2$
B. $T(n) = 2T(n/2) + n$
C. $T(n) = 2T(n/2) + n^3$
D. None of these

Your Answer: A | Correct Answer: D | Incorrect | Discuss

Q #14 | Multiple Select Type | Award: 2 | Penalty: 0 | Algorithms

Consider a recurrence relation.

$$T(n) = \alpha T(n/2) + n^2.$$

Let $a \geq 1$ be an integer.

Which of the following is/are true?

A. For $\alpha > 4, T(n) = \theta\left(n^{\lg \alpha}\right)$
B. For $\alpha = 4, T(n) = \theta\left(n^2 \lg n\right)$
C. For $\alpha < 4, T(n) = \theta\left(n^2\right)$
D. For all values of $\alpha, T(n) = \theta\left(n^2 \lg n\right)$

Your Answer: A;B;C | Correct Answer: A;B;C | Correct | Discuss

Q #15 | Multiple Choice Type | Award: 2 | Penalty: 0.67 | Algorithms

Let $T(n)$ be

$$T(n) = 2T\left(\frac{n}{2}\right) + \frac{n}{\lg n}$$

$T(2) = 1$

What will be asymptotic bound on $T(n)$?

A. $\Theta\left(n^2(\log n)\right)$
B. $\Theta\left(n(\log n)^2\right)$
C. $\Theta(n \log \log n)$
D. $\Theta\left(n^2 \log \log n\right)$

Your Answer: C **Correct Answer: C** Correct Discuss

You're doing Great!

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