

## Quiz Questions: Complexity of Algorithms

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- The complexity of finding the second largest element of a list is:
  - $O(n)$
  - $O(n^2)$
  - $O(n^3)$
  - $O(2^n)$
- Algorithm  $A$  and  $B$  have a worst-case running time of  $O(\log n)$  and  $O(n)$  respectively.
  - $\forall A, B, I$   $A$  runs faster than  $B$  for input  $I$
  - None of the other answers is correct
  - $\forall A \exists B \forall I$   $A$  runs faster than  $B$  for input  $I$
  - $\forall B \exists A \forall I$   $B$  runs faster than  $A$  for input  $I$
- Which of the following is correct (little-o)?
  - $x^3$  is  $o(x^\pi)$
  - $x^3$  is  $o(x^{\frac{3}{2}})$
  - $x^3$  is  $o(x^2)$
  - $x^3$  is  $o(x^e)$
- What is the smallest integer  $n$  such that  $f(x) = (\log x)^4 + 4x + \frac{1}{x^4}$  is  $O(x^n)$ ?
  - 1
  - 2
  - 3
  - 4
- If for an algorithm time complexity is given by  $O(\pi^n)$  then complexity is
  - Quadratic
  - Exponential
  - Cubic
  - Rational
- Which of the following are ordered by decreasing complexity (big-O)?
  - $n \log n^2 > n(\log n)^2 > n^2$
  - $n^2 > n(\log n)^2 > n \log n^2$
  - $n(\log n)^2 > n \log n^2 > n^2$
  - $n \log n^2 > n^2 > (\log n)^2$
- Let  $k, n$  be positive integers, then  $k^n + \dots + 2^n + 1^n$  is:
  - $O(k^{n+1})$
  - $O(n^{k+1})$
  - $O(\log_n k)$
  - $O(nk^n)$
- The big- $\theta$  estimate for  $\sum_{j=1}^n (j-1)(j+1)$  is
  - $\theta(2^n)$
  - $\theta(n^2)$
  - $\theta(\log n)$
  - $\theta(n^3)$

### Answers:

1. A
2. C
3. A
4. A
5. B
6. B
7. A
8. D