

1. The following two algorithms both compute a table with $A[i] = i^2$. Assume that operations take the following amount of time: addition or subtraction, 1; multiplication, 5; indexing, 1; store, 1; if, 2; goto 1. No time is needed for other operations. How long does each algorithm take (as a function of N)

a. Set i to 0. Loop: Set $A[i]$ to $i \times i$. Set i to $i + 1$. If $i \leq N$ then goto Loop.

b. Set $A[0]$ to 0. Set i to 1. Loop: Set $A[i]$ to $A[i - 1] + i + i - 1$. Set i to $i + 1$. If $i \leq N$ then goto Loop.

2. Solve the inequality $p^l \geq k/b$ for p , where p is a probability. In other words, write an equivalent inequality that has only p on the left side.

3. Expand $(1 - \epsilon)^l$ into a power series with a big O of order ϵ^3 .

4. Find an asymptotic solution of the inequality

$$\epsilon + \frac{\epsilon^2}{2} + O(\epsilon^3) \leq \frac{-\ln(k/b)}{l}$$

for the case where the right side approaches zero.

5. Solve $a_n = 2a_{n-1} + n$ with $a_1 = 1$.

6. Find the general solution to $a_n = 2a_{n-1} - a_{n-2}$.