RECURRENCE RELATION

T(n) = T(n-1) + n A

Solution:

Iteration 1:

Put n=n-1, then

T(n-1) = T(n-2) + (n-1) B

Put the value of T(n-1) from B to A, then

T(n) = T(n-2) + (n-1) + n C

Iteration 2:

Put n=n-2 in A, then

T(n-2) = T(n-3) + (n-2) D

Put the value of T(n-2) from D to C, then

T(n) = T(n-3) + (n-2) + (n-1) + n E

Iteration 3:

Put n=n-3 in A, then

T(n-3) = T(n-4) + (n-3) F

Put the value of T(n-3) from F to E, then

T(n) = T(n-4) + (n-3) + (n-2) + (n-1) + n G

RECURRENCE RELATION

Iteration 4:

Put n=n-4 in A, then

T(n-4) = T(n-5) + (n-4) H

Put the value of T(n-4) from H to G, then

T(n) = T(n-5) + (n-4) + (n-3) + (n-2) + (n-1) + n I

Now, for "k" terms, it will be

T(n)=T(n-k)+(n+n+n+n+n+…+'k')–(1+2+3+4+…+'k')

Assume;

n-k = 0 (zero), n=k and T (0) = 0 (zero), then

T(n) = $n * k - \frac{[k*(k-1)]}{2}$

T(n) =$n * n - \frac{[n*(n-1)]}{2}$ as n=k assumed

T(n) = $n^2 - \frac{[n^2-n]}{2}$

T(n) =$\frac{[2*n^2-n^2+n]}{2}$ Taking LCM

T(n) = $\frac{[n^2+n]}{2}$

T(n) = $\frac{n^2}{2} + \frac{n}{2}$ Discard negligible terms

Answer: T(n) = O(n^2)

Homework: Solve T(n) = T(n-1) + 1