Ams. To The Ques. No.2

(2-12)

Implementation - 1

got typolacci-T (v):

JE. N 5-50;

Print ("Invalled input)")

elf n2=2:

troturn 18 bonacei I (n-D+ 20 bonacei 1 (n-2)

W= int (outon ("Engar a numbers, "))

nith plb = Albanacci-1(n)

Prant ("The %d-th fibonacci number 15 %d" & (n, n-th-fib))

The above implementation is a native recurrence approach. This code implementation operates on two sub-problems. The elze of one sub problem is (stre of the original problem -1) and the size of other sub problem is (size of the original problem-3) Then the above implementation performs O(1) additional coord So, the rounning time equation we can have,

T(n) = T(n-1) + T(n-2) + 1; T(0) = 1, T(1) = 1.

Mone ? Think Hardly 50 50 BONDE OF 100

Suppose, c=1 Recurredon Three of T(n) T(n-1) T(n-2) T(n-2) T(n-3) F(n-3) T(ne) T(n-g) P(n-E) T(n-g) T(n-5) T(n-6) T(1) T(1) T(1) T(1) T(1) T(1) T(1) T(1)The last term will be $\leq c \times 2^{n-1}$ T(n) < c+2c+2c+2c+....2n-1c ⇒ T(n) ≤ cx ?1+2+22+...2n-1? > T(n) < cx 2n-1? Therestone, T(n) = O(2n) · motherapho of soon adillo seles low limber on the free of the control of modern due and # So with of malding due inche to into with the ammatery moltohis and fail avodo int great mos and nathange and profound all is

1 (0) f (1-(0) f (1+(0-4)) f + (1-2) - (0) f

Implementation-2

det Alpanace, 5(2):

fibonace? - armay = [0,]

and county to the complete JE NO: # exacutes constant time - 0(1) Print ("Invalid input!")

ell 2 ~ <= 5;

Hexacutes constant time = 0(1) roturn Floonacci_array [n-]

with 1911 at bong (14.2) was

to (1892) watering would see

elso?

for in range (2, n): # exacutes n times - 0(n)

fibonacci_annay, appoind (fibonacci-annay[1-1]+Abonacci-annay[1-2]) noturn Aboracei-annay[-1]

n= int (input ("Enter a number:"))

nth_lib = Abonacci_2(n)

Print ("The %d-th Libonacei number 13 %d" (n, nth_ 186))

So, time complexity = 0(1) + 0(1) + 0(n) 16 1/2 0(m)

The above implementation is factor than implementation -1 O(n) < O(2n)). Basically, in case of Implementation-2, use interate n' number of times to find the -nth. fibonacei number. That Is why, time complexity 15 0(n).

On the other hand, in the implementation 1, it n>2, then

T(n) = T(n-1) + T(n-2) +1. Because each recurrision would call two Author recursions. This aspect increases the time complexity exponentially. Hence, we got O(2n) as the time complexity of implementation -1. ("I form billow it") to "

Proceedure Multiply-matrix (A,B) (A,B) Input A,B han matrix (A,B) begin begin InHalize C as a non matrix for 1=0 to m-1 for J=0 to m-1 CTI, J += ATI, KJ * BK, J and force the time counterfaithment of How the simple mintelion - 25. Beeding the mintel

woods (100 / 200) Somothelisto Fortifique (200 / 200) In the above algorithm, the inner, middle and outer loop

excute n times. Basically, there are three nested loops. or The time complexity is o(n3) ·17-12-17-

(e-10) P = (e-10) P = (10) P =

Recurrision Trace Time Complexity

II P(n)= T(n/2) + n-1; T(1)=0

Wing Master Theorem for T (n/2) + n parel, T(n)/2 T(n/2) +n

After comparing P(n) with T(n) = aT(n/b)+1(n); 1(n)=O(nk)ogn) we got, P=0, a=1, b=2, k=1,-m) 1,0=

Therefore, T(n) =n; [since log a < k and p>0]

so, time complexity is o(n)

$$\Rightarrow n = k+1$$

$$= 0 + \frac{n(n-1)}{2}$$

$$= 0 + \frac{n}{2} + \frac{n}{2}$$

Therefore, time complexity is O(n2).

1-01((-0)) = (0)) [S]

[3] T(n) = T(n/3) + 2T(n/3) + nUsing Moster Theorem on 2T(n/3) + n paret, T(n)' = 2T(n/3) + nAfter comparing T(n)' with T(n) = aT(n/3) + p(n)';

Los got, $a = 2 \cdot b = 3 \cdot p = 0, k = 1$ So, time complexity = 0(n).

Again, using Master Theorem

Again, using Master Theorem, P(n) = T(n/3) + nLet get, a = 1, b = 3, p = 0, k = 1Therefore, The time complexity 95 O(n).

(Ans)

Page -8! 4 Given, T(n) = 2T (n/2) + n2 13 (20) (30) (a) To at memoral metaly voing Master Theorem, aza, b=2, k=2, P=0 [Comparing with at (Mb)+2/19) Herre, f(n) = nk logpn] i. T(n) = O(n2); [sirice loga Kh and p≥o] Therefore, the correct case complexity will be O(n2). [0<9 bru[] \dob' some] (n) (m)0=pHixolqmos smill of town, (E) P M's monogall makeny grown, might u+(e/u) 7. = 1/(u) 1. += N, D=q, &=d, L=D, +b [089 pro 47 898] : (10)0 = (10)1. (n) O et phisalquiso smit sit , storsault

(ena)