## DESIGN AND ANALYSIS OF ALGORITHMS TUTORIAL- 2 ellers to Super is the time Complexity of below reade and how? Void fun (int n) L int j=1, i=0; while (i<n) Time Complexity = 0 (Vn) Answer

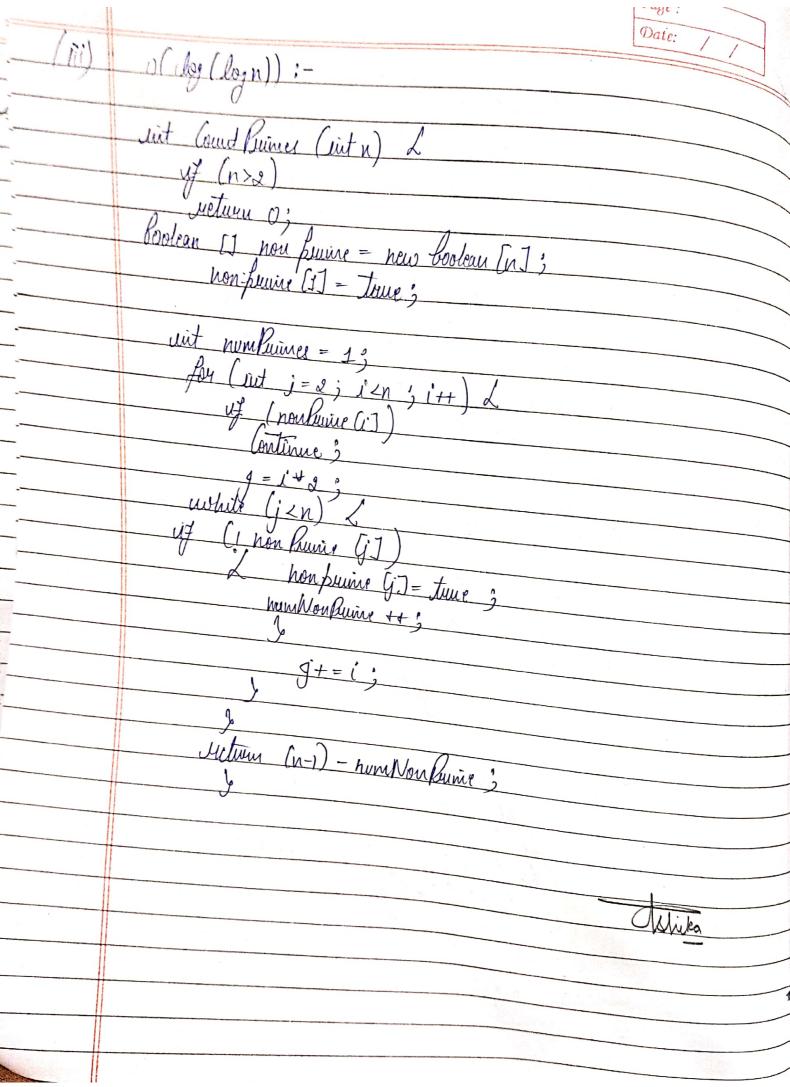
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Murs (20	White mountains welation for the nearestive function
	that fruits fibonacci doues down the recurrence relation.
The state of the s	to got time Complexity of the Byogham. What will be
A STATE OF THE STA	to get time Complexity of the buguan and why?
Market and the state of the sta	aprile congressing of weeks progress
	Recuvience Relation:
	F(n) = F(n-1) + F(n-2)
	Let T(n) devote ithe time Complexity of F(n)
-	Let T(n) denote the time Complexity of F(n) For F(n-1) and F(n-2) time will be T(n-1) and T(n-2)
	We have one more addition to dum our result
	Foy n>1
	$T(n) = \tau(n-1) + \tau(n-2) + 1 - (2)$
	for n-o and n-1, no addition occurs
	T(0) = T(1) = 0
	Let T(n-1) ≈ T(n-2) -(2)
	Patting (2) in (1)
- 18 18 1 No.	Putting (2) in (1) $T(n) = T(n-1) + T(n-1) + 1$
	= 2x7(n-1)+1
	Using Backward Dubtilution
	T(n-1) = 2xT(n-2)+1
	$T(n) = 2 \times \left[2 \times 7(n-2) + 1\right] + 1$
	=4x7(n-2)+3
	We can substitute 7(n-2) = 2x7 (n-3)+1
	T(n) = 8x7(n-3)+1
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	$T(n) = 2^{k} + T(n-k) + (2^{k}-1) - (30)$	
	for 7(0)	
	$h-k=0 \Rightarrow h=k$	
	Nubstituting Value in (39) $T(n) = 2^{n} \times T(0) + 2^{n} - 1$	_
	$T(h)' = 2^{h} \times T(0) + 2^{h} - 1$	
	$= 2^{h} + 2^{N} - 1$	
	$T(n) = O(2^n)$	
	Space Complexity >> 0 (N)	-
The state of the s		
of Control States	Kearne :-	
	The function calls are executed dequentially, sequential execution quarantees that the stack size will exceed the depth of Calls ForF(n-1) it will create N stack from the other F(n-2) will create N/2, do the dangest is N	
	everytian annualers that the stack size will exceed the detth	
	A Cally Forse(n-1) it will coverte N intack frame the other	
	Eln=2) will checile Ms do the donnext in M	
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n^3, log (logn) O(nlogn):-# include Liestream> using namespoce atd 3 cuit pastion (unt ws, int start, int end unt fivot = w [start]; for ( sint i = start; i <= end; i++ if (w [i] <= fivot) Count ++; suit first-md = start + Court; Denop (w Chevot-int]. w (Taut); unt v' = staut, j'= end; white (i'< Pivot - int fk j'>pivot-int) L while (wli] <= pivot) L while (w GT < pivot) Z

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	if (i < fivot-int bb > prot-int) L	-
	if (i < fivot-int bb > pivot-int) L swop (w [i++]; w [j']);	
	<i>f f</i>	
	return pivol-int 3	
	Void quick ( jut w [7] int start intend	) /
	Void quick ( sixt w [], sixt stant, sixt end if (start >= end)  return 2	
-	Metunu 2	,
	int P = position (w, start enel);	
	quicksout (w, want P-1);	
	queksort (in, PH, end);	
	J. Company of the com	
	uit mais ()	
	L uit w[] = L6,8,5,2,1 y	
	unt n=5;	
	quiksout ( ju, 0, n-1);	
	меtини 0;	
. ,		
(ii)	O(N <sup>3</sup> )-	
	uit main ()	
		,
	for (int 1=0; 1 <n; 1+t)="" <<="" th=""><th>•</th></n;>	•
	for ( int j=0; j <h; j++)="" l<="" th=""><th></th></h;>	
	for ( uit k = 0; k=n; k++) [	
	puit ( et + 17);	
	J. J.	4
	return o ;	Ishika E_IS
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". Dus 60	dolve the following curacumence relation $7(n) = 7(n/4)$ + $7(n/2) + (n^2)$
$\rightarrow$	$T(n) = T(n/4) + T(n/2) + Cn^2$
,	Using Master's Theorem  We can assume, $T(n/2) > = T(n/4)$
	Equation can be new witten as '- $T(n) \leq 2T(n/2) + Cn^2$ $\Rightarrow T(n) \leq 0 (n^2)$ $T(n) = 0(n^2)$
	$T(n) = O(n^{2})$ $T(n) > = Cn^{2} \Rightarrow T(n) > O(n^{2})$ $\Rightarrow T(n) = -Q(n^{2})$
	$7(n) = 2(n^2)$ $7(n) = 0(n^2) \text{ and } 7(n) = 2(n^2)$ $7(n) = 0(n^2)$
	Thinks
	•
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	(what schould be the Time complexity (int i=2; i'= pow (i;k))	of Joy
	// Dome O(1) expuesions	
Mahadasas Mahadasasasasasasasasasasasasasasasasasas	where k is a Constant	
-		
	> for (int=2 3 1'<=n 3 1' = Pow (1',k)	
	J. done O(1) expuess	
-	with iterations i Take Values	
	for 2 uteration -> 2	
	for 2 " ulcration -> (2k)k  for n steriotion -> 2k land (la)	
	for 1st interaction > 2  for 2 interaction > 2  for 2 interaction > 2  for 3 interaction > 2  for n iteration > 2  // Joy n iterations -> 2  // Jast it in must be less ithan an equal of the second o	L to u
	Each stension takes Constant time  i Total stension = log (log(n))	
	". Total stevation = las (la ())	
	Time Carellente Co (1)	
	Time Complexity - O(log(log(n)))	
		dehita
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Lunge	what is the time Complexity of following function func ()?
	For (int i=1 : i<=n ? in)
	for (int i=1; i<=n; j++)  I for (int j=1; j <n; <math="" j+="1)">\mathcal{L}  I Some O(1) took</n;>
	Jy & Mone O(1) tack
	N
	For J=9 unier loop is executed n times:
	For i=2, inner cloop is executed n times:  For i=2, unier loop is executed 1/2 times  For i=2, unier loop is executed 1/3 times
	It is forming a clouis:-  n + n/2 + n/3 + + n/n
	$n \left( \frac{1+1+1}{2} ++1 \right)$
	$= \sum_{K=2}^{n} \frac{1}{K}$
	$= \frac{1}{10000000000000000000000000000000000$
	=> h x log h
	Three Complexity = 0 (ndogn)
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Ulus (30	White a vicavioure victation when quick short
	repeatedly divided the army in to two parts up 99%
And the second second	and 17. Down the time Complexity on the Case.
The state of the s	all the David One June Osuparily an our case.
Annual Commence of Commence of the Commence of	Alow othe reconsion tree while downing there completely
THE RESIDENCE AND THE PROPERTY ASSESSMENT OF THE PARTY	Out fuid the difference in light of both the
Performance was a few processors of the second state of the second	Octraine fants What do you understand by this analysis?
	J Part
	N
	1/10 n 9/10 n -> n
	$\frac{10 \text{ N}}{10 \text{ N}} = \frac{910 \text{ N}}{10 \text{ N}}$
	$\frac{9}{100}$ $\frac{9}{100}$ $\frac{9}{100}$ $\frac{9}{100}$
	100 100
	81n 129n >n
	7000 (000
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	If use aplit in this.
	Fearmence relation T(n) = 7(on) + 7(n) + 0(n)  where first brough is of in the constant of the
	(in) +olu)
	without first brouds in of its an
-	custing first brouds is of size 900 and drewnon
	one is h
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	deluning the ober wing vecusion dun+ appendix
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	(At yet level value = n		
	At god level, value = n At god level, Value = 9n + n = n		
	10 lo	-	
	Value remains some at all levels i.e. n		
	Chine Memary James at the Livers I'C. M		
	P. 0111 1 + 1/111		
	Time Compexity = Summation of Values = o(nx log n) (Upper bound	<u>( )</u>	
	= 0/ Nx log n   Cupper Societ	)	
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	= 2 (n log v) (lower bown		
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	= O (n logh) Annol		
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