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Define different Asymptotic notation with example.

Asymptotic notations are set of mathematical tools

used to describe the behaviour of functions as their
input size approach infinity. They are often used to analyze the time and space complexity of algorithms.

There are three main type of asymptotic rotation:

O big a notation (0): This notation provides an upper bound on the growth nate of a function. It represents the worst case running time of an algorithm which is the maximum amount of time it could take to complete for example we say that the algorithm has a time complexity of O(n), we mean that the algorithm's running time grows at most linearly with the size of input.

for (int i = 1; i < = n; i + t) \leq sum t = i

2) Ourga Notation: This notation provides a lerver bound on the growth rate of a function of the sepresents the best-case running time of an alguerthm, which is the minimum amount of time it could take to complete. For example if we say that an algorithm has a time complexity of 52(n)

we mean that the algorithm's running time grows at least linearly with the size of upulting 3 Theta notation (0) This notation provides both Ineta notation (b) thus notation provides both an upper and a lever bound an the grenith rate of a function of represent the average case musing time of algorithm, which is the expected amount of time it would take to complete.

For example, if we say that an algorithm has a time camplexity of DCn; we much that algorithm's ounning time greens timely with solve of its imput and these are two faster and ended and ended and these are two faster. and solower greath rates. It wo hound will Ex def bubble sort (rich) ill no leverages - Dieder materials of for i in range (n) for jun vangell(n-j+r) ig list Cide List Estild, le neturn list 197 The ang. - case time complexity

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What should be the time complexity for Ci= 1 to an inverse in the contract E 2 2002, rostoor of Alter May Tay Toi The time complexity of the loop william for (1=1 ton) { = 1 + 2; Can be determined by counting the mucher of iteration that the loop will execute Here the value of it is being denoted in each iteration, loop torningte when it because > n. $2^{k} = n$ ' k = log(Cu)Time complexity = 0 clogn) TCn) = {3T(n-1) y u>0, otherwise 13 The time complexity of Recursive function can be determined by analyzing the number of function call it makes as a function of the input size 'n Each call to T (n) results 3 calls to T (n-1) until n healter O, at which point the function return 1. This can become represented using tree T cn) T6-1) TCn-1) TCn-1) T(n-2) T(n-2) T(n-2) T(n-2) T(n-2) T(n-2).... The height of tree is u, at even level there are 3 modes The total no of the calls is 3? Time complexity O(3n)

Q4.) T (n) = \(\geq 27 (n-1)-1 \) if n >0, otherwise 13 T(0)=1 T(1)=2T(0)-1=1T(2) = 2T(1) - 1 = 1and moran for hard the service that is it visca constant Time complexity = O(1) Os. What should be time complexity of int i=1, s=1; while (S < -n) S3 ((1), n/213) 11 (Mirriques 2016 2014) The time complexity of the given while is O(sqrt(n)) The loop iterates until the value of 3 become greater than in, At each iteration is intremented by 1. and s is opplated to stip the humber of iterations u 12+1-2(n-s) >0, this can be solved by Quadratic formula.

Q6. Void functions (int n) & 1 (1- a) 1 (3 = (1) + 1)	0
int 1, court = 0;	
for (i=1; i+i<=n; i+t) (a) 1 = (1) 1	
cout ++ 1=1-(1) 1== (c) T	
3	
Ans. The time complexity of the given function is O (sgrt (n)). Therefore loop is iterates from I to i int a <=n The loop will execute for a	
O (sgrt (n)). Therefore loop interates from 1	-1
to i in a con The loop will execute for a	rll_
values of i from 1 to the largest integer less the	m
or equal to the square (Host of in 12 19 1900) shell	*
Q7. void function (int m) & sait of blunds tolar	
unt 1, 1, K, court = 0;	
for (1 = n/2; i <= n; i+) (n > 2) alula	
for $(j=1, j=n, j=j+2)$	
for $(k=1, k=n, k=k+2)$	
2 Court ++ 1 + 2 = 2	
And Time and will in an allow (p.)	
Ans. Time complexity is OCH2log(n),	ر مراد و
rariable i , and k the first loop take his	temp
The second loop iterates over the variable of	
to n in paret of 2, which takes log 2 Cm	
iteration The third loop iterates over the voria	ble
k from 1 to n in paser of 2, which als	
log Z(n) iteration.	

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Qe.	Function (intin) of her a colored
2	y (n == 1) without find out with the
inter in the	tolog distriction is a horal set toll property
	Stricter and and the subject of
	for Co = 6 touch sund behaved is da
	E puint f ("*"); 3
	function (n-3);}
	The function is a recursive functions that is
	called with argument n-3, it contains two nested
	mal iterate over the variable i and i. The
	outer loop iterate n times and juner loops also
	Hercete u times.
	n x n times. At each recursive call the value
	of n is decreased by 3. The function will be called
	Time complexity is O(n2 (n/3)?).
	MITE COMPLEXITY IS OCH 2 Ch13 Y).
Qq.	void function (int n) {
,	for (i=1 ton)
	\mathcal{E} for $(\hat{j}=1,\hat{j}\leq n,\hat{j}=\hat{j}+1)$
	printf ("x")

Qa. void function (unt » fer (i=1 ton) \mathcal{E} for $c_j = 1$; j < = n; print f (" *")

This function consist of two nested loop that iterate over the variable i and i the counter loop Herate over n times and inner loop iterate ni times n+n/2 +n/3 + +1, This is no harmonic series

log (n) + 0.57 + 2+0(1)n)

Time complexity is O (nlog (n)).

Q10.	For the function, no and en. What is the asympton
	notation His those function
	Assumed that KZZI GOOD CZI WILL CARROLLIS.
	out the value of c and not for which relation ho
Sol	nk = 0 (cn) as n approaches infinity
	he is bounded above by
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	\$ (E-0) - 5 train
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