

Day_1 Data Structure And Algorithms

Topics Covered:-

Fibonacci Numbers

Greatest Common Divisior

Big-O-Notation

Leetcode Problems:-

Problem: 509 https://leetcode.com/problems/fibonacci-number/

Problem: 1979 https://leetcode.com/problems/find-greatest-common-divisor-

of-array/description/

	Data ostructure And Algorithems
1	Day-1. & Ist Parety. Date 25th Pege
-14	[O, N=0 ,
	Fibernacci Numbers! Fn= 1, n=1.
	Robbit Copulation!
	if noti
	else
	hotun FibRours (n-1) + FibRours (n-2)
	Running Time? Therefore Ten) > For
	- (n) = { 4
	times. From sorwer.
	Tones. From solver.
	(Better Algorithm) Running Time
	Create on array F[0n] Ty-2n+2. Bo T(100)-202
	F[0] ~ 0
/	F[L] + 1
	for i from a to n:
	F[i] < F[i-1] + F[i-2]
The stand	neturn F[n]
0.2	
tt	Guealest Common Divisor
	o largest no. that divides (a.b.)
	+x (10,4) -> 2 GCDX
	best to some of (a, b) Runtine: approximately (a+b)
	for a prom 1 to a+b: · row slow for sodigit numb
	if d/a end d/b: . Rewedon Algorithm.
	best to dester Algorithm).
	horiso hest
	Key temma: hervin a
,	her a' be the tremainder when a't the tremainder when a
	a d is divided by b then is divided by b
	ged (a,b): ged (a',b)-ged (b,a') herwin Rusidaes (b,a')
	d'alvoles a and b if and only if it

7	O Date Page
#	Compung Run Time:
Tie.	-) Hard Depends on fine details of purguent, computer works
9	Sdea! Basic
	All of these usual con multiply huntime by large) cons
	So measure suntine in a way teach ignorus constant multiple
	-> Censider asymptotic huntime.
	Approximate Runkine n2 27
	toput sixe n niogn no a:
24	7=20 Isec Isec Isec Isec
	7-50 I sec I sec 13 day
	7: 10 + sec 1 sec 1 sec 4:103 year
	7=106 + sec + sec 17min
	7-109 1 sec 30 sec 30 years
	5030
	(रेक्ट्रिक्ट राम् रमर्गाकुम रमर्ग्यम)
	Big - O notwoon:
	Defination;
	Fing- O (gins) if there exist constant N and a so that
	Fing- O(gind) if there exist constant Nond e so that
	Fing. O (gind) if there exist constant N and a so that for all $n \ge 10$, Fing $\le c \cdot gen$ * St classify growth rate:
	Fing. O(gins) if there exist constant N and a so that for all n > 10, Fin < c. gen) I st classify growth hate: * Using Big-0-loses important information
	Fing. O(gins) if there exist constant N and a so that for all n > 10, Fin < c. gen) I st classify growth hate: * Using Big-0-loses important information
	Fing- O(gin)) if there exist consent Nond a so that for all n > 10, Fing < 0. gin) * It closely growth hate: * Using Big-0-loses important information about constant multiples. * 1319-0- is only asymptotic.
	Fing- O(gind) if there exist consent Nond a so that for all n > 10, Fing < c. ging * It closely growth hate: * Using Big-O-loses important information about constant much ples. * 1319-0- is only asymptotic * common huter.
	Fing- O(gind) if there exist consent Nond a so that for all n > N, Fing < C. gin) * It closely growth hote: * Using Brig-O-loses impositiont information about constant multiples. * 1319-0- is only asymptotic temmon hubs: * Multipleconve constants can be smithed.
	Fing- O(gins) if there exist consent Nond a so that for all n > 10, Fing < C. gins * It closely growth hate: * Using Big-O-loses important information about constant much ples. * 1319-O- is only asymptotic * common hutes: * Hulliphiconve consents can be omitted: # 13 = O(n3) , n3 - O(n3)
	Fing- O(gins) if there exist constant Nond a so that for all n > 10, Fin > C. gin I st closely growth sate: * Using Big-O-loses important information about constant much ples: * tag-O- is only asymptotic * temmon suits: * Hultiplicative constants can be omitted: # n3: O(n3), n3 - O(n3) na(nb pr O(a(b))
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	Fing- O(gind) if there exist consent Nond e so that for all n > 10, fin) < c. gin) * It classify growth hote: * Using Brig-O-loses impositiont information about constant much ples: , * 1319-0- is only asymptotic tommon hutes: * Muchiphicotive constants can be omitted: # n3 = O(n3) , n3 - O(n3) na (nb pr O(a (b)) na (nb (a (a (b))): na (nb (a (a (b))):
	Fing- O (gind) if there exist constant N and a so that for all $n \ge 10$, fing & c. ging) I st classify growth note: * Using Brig-O-loses important information about constant much ples: * Using Drig-O- is only asymptotic * Common nuts: * Muchiphiconve constants can be omitted: # $n^3 = O(n^3)$, $n^3 = O(n^3)$ * $n^2 < n^6$ ($n^2 > n^3 > n$
	Fing. O (gind) if there exist constant Nend e so that for all $n \ge 10$, Fing $\le C \cdot ging$ I st closely growth hote: * Using Big-O-loses imposition information about constant multiples: * High-O- is only asymptotic * Common hote: * Hushipliconve constants con be omitted: # 13 = O(n3) , n3 - O(n3) * na (nb pr O 1 a x b: n= O(n2) . Vn = O(n) * na (nb (a) b): * na (nb (a) b): (logn) a (nb (a, b): (logn) a (nb (a, b):
	Fing. O (gind) if there exist consent Nond a so that for all n > 10, fing < c. ging) I st classify growth hat: * Using Brig-O-loses impositiont information about constant multiples. * touristicative consents can be omitted: * The production of the constants are the constant of th
	Fing- O (gind) if there exist constant N and a so that for all $n \ge 10$, fing & c. ging) I st classify growth note: * Using Brig-O-loses important information about constant much ples: * Using Drig-O- is only asymptotic * Common nuts: * Muchiphiconve constants can be omitted: # $n^3 = O(n^3)$, $n^3 = O(n^3)$ * $n^2 < n^6$ ($n^2 > n^3 > n$

	X Big - O - in Purches
	operation Runtime.
- 03	testi en orray f (0n) o(n)
	f[0] < 0 011)
	E[1] + 1 0(1)
	for i from 2 to n: hop O(n) times
	F(i) + F(i-1) + F[(-2] O(n)
	Heturn Fini O(1)
	(16Haz: 0(1) +013) +013) + 0(1) -0(1) +0(1) = 0(1)
	fractive Question
7	Order the given function by increasing guester Lete
>	F(1): n3 F(2) = no-3 F(3) = n . F(4) = m . F(4) = n
A	5 these functions are all polynomial function of n
	For polynomial function na the growth mate thouses
	as the exponent a increases
	and the second s
	order: 10-3 < n0-5 < n2 n1 5 < n2 < n3
14.75	PROPERTY OF SERVICE SALES AND AND ADDRESS OF SERVICE SALES AND ADDRESS OF SERVICE SALES AND ADDRESS OF SALES AND A
@2	F(1): 37 F(2) = n logan f(3): logan f(3) = n
	f(5) - n 2-34 f(6) = n 0-5 f(2) > 4 n
	frg - 1 (6) = 1 (7) = 7
	The state of the s
Any	Fit = 37: Exponential growth
	Frey: nlog_n: slightly fester than I mean gerowth
	F(3) - log 4 n: hegarithmic growth
	faz - n honor growth
	fes). 1 2321, polynomial growth with apponent 2-321
1 1 1 1	FIG): n2. Quadrote queloth
	FIT) - nos: quanth with the square root of n:
	F(8) 47: Exponential quewith fester reson 37
	Ordu
1 2 3 3	109+ nx nost nx nloggn x no x n 2 x 32 x 37 x+79