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Insextion Saxt	

9

Bost case -> elements are already in sorted order any are comparison in inner loop each time total of (n-1) Composisons

Time complexity gos best case is o (n)

Thexefoxe, Cn & n-1

C, < 1-1

n incorrers 1, 1 decorrers v, 1-1 1

So to 1- 1 would be min, when n=2

00 C1 E 1/2

Wast Case > Elements are present in reverse andar 

No. of composisons

(n-1)+(m+2)+----+(3)+(2)+(1)

n(n-1)

na-n

Time complexity for worst cose

T(m) = { T(n-1)+m ns)

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

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

T(n)= T(n-3)+ (n-2)+ (n-1) + p T(n)= T(1) +  $=0(n^2)$ complexity is o(n2)  $\frac{n(n-1)}{a} \leq can^2$  $\frac{n^2}{2} - \frac{n}{2} \leq \frac{c_{2}n^2}{2}$ ignosing lawer order teams

1) + ((a) + (i) +

-

Mas	9	e Sost
a collection of the same of th	4	The second secon

Best once - when loopest clanest of one of the sublists is analles that the first demont of the other sublist.

Recursione adotto for meage sout is

To best case - only are composition from other list is done in each merage safety is total of compositions one there.

Theodoxo,

T(n) = 27 (g) + g

T(n) = 2T(2T(n) + n) + n

T(n) = 2 (2 (2T (g) +g) +g) +g

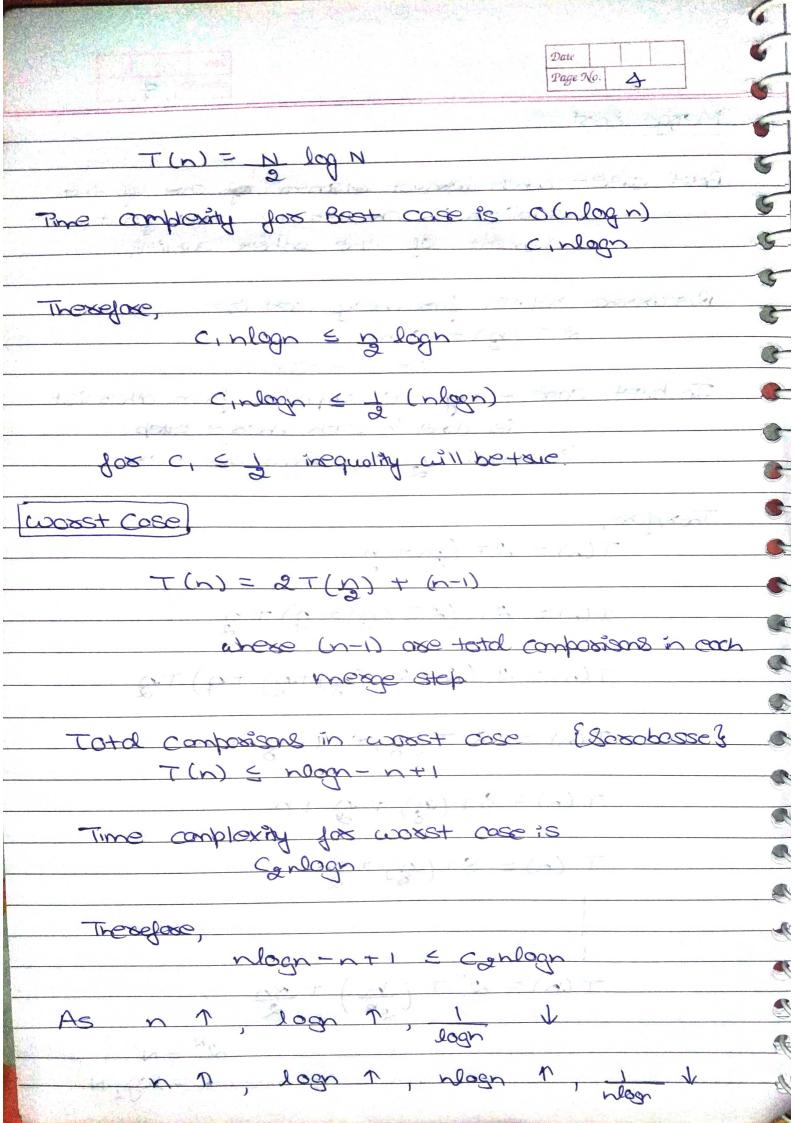
I(N) = 8 T(8)+4x8 Tn

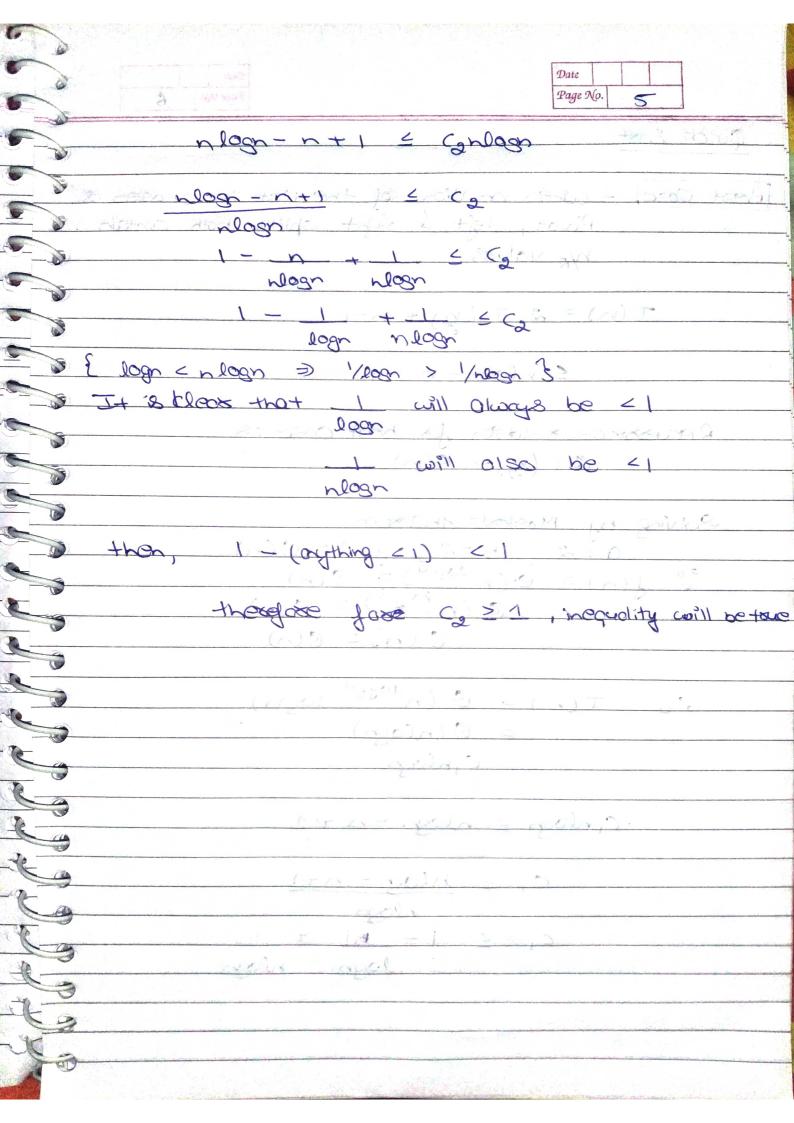
T(n) = 8T(g) + n +n

T (n) = 8T(g) +3K

 $T(n) = 2^{R}T(n) + kn$ 

2 = N N = 109, N





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Duick		and the		- (*)	

[Bost Case] - when median of the list is chasen as
Pivot, left & sight spits both contain

Ma values.

6

5

0

5

5

0

1

3/2

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

Enlogn-n+1

Remissere soldish for bost case 18

Solving by Moster's thoroan 0 = 2, b = 2, f(n) = O(n)  $0 (n^{10959}) = O(n)$   $0 (n^{10959}) = O(n)$ 

O(n) = O(n)

 $\frac{1}{2} = O(n \log 6^{\alpha} \log n)$   $= O(n \log n)$ 

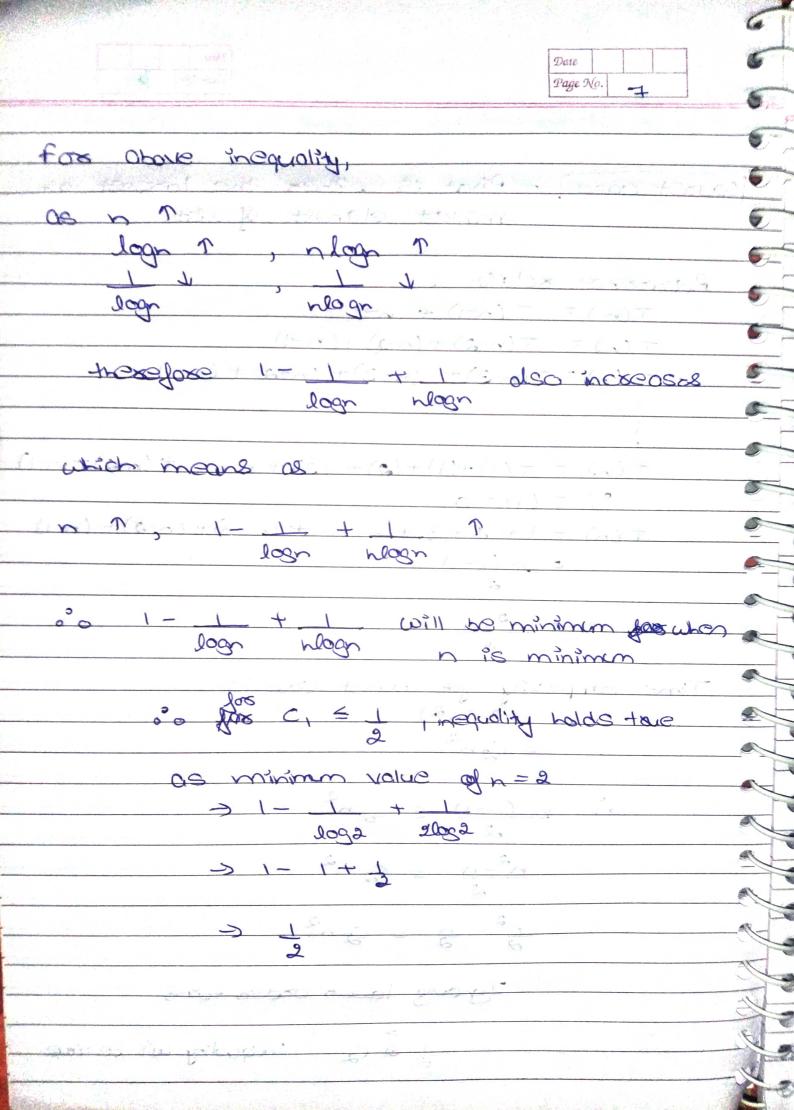
C, nlogn

· Cynlogn < nlogn - n + 1

 $C_1 \leq \frac{n\log n - n+1}{n\log n}$ 

C, < 1 - 1 + 1

logn nlogn



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1 & Ca , Propudity will be true

MINIST SHOP POT [wasst case] - Pivot is either the lassest or anallost element of list. Racussage solotion is T(n) = T (n-D + n-1) 3 T(n) = T(n-2) + (n-1) + (n-1) 0 T (n) = T (n-3) + (n-3) + (n-1) T(n) = T(1) + (1) + (2) + (3) + --- + (n-2) + (n-1)0=(1) T. 0° 9 T(n) = 1 + 2 + 3 + - - - + (n-3) + (n-2) + (n-1) = n (n-1) 5 Time complexity for worst cose is (na) 2  $\frac{n^2-n}{2} \leq c_2 n^2$ n2 - n < Gn2 Ignoring laws ander toms