Tutorial -2  Dire -1  Void for (intn)  Int i = 1, ico;  Wille (i = n)  i = iti;  fit;  fit;  grad flowe -> i = 1+2  3rd flowe -> i = 1+2+3  4th fine -> i = 1+2+3+4  for ith fine -> i · (1+2+3+ - · +i) < n  = i / 2 n  flowe dependently = 0 (Jn)  Are the complexity = 0 (Jn)  Are the complexity = 0 (Jn)  Let T(n) denote the time longlexity of f(n)  for f(n+1) & f(n-2) the will be T(n+1) & T(n-2)  We have one were accounted acles for to som  B tent for nr1	Page:	
Void for (int n)  Int $j=1$ , i=0;  wwile (i=n)  (i=i+j;  j+t;  j+t;  3  Values after execution  If fine $\rightarrow$ i=1+2  3 rd fine $\rightarrow$ i=1+2  3 rd fine $\rightarrow$ i=1+2+3+4.  for itm fine $\rightarrow$ i((1+2+3+ -+i) < n  = i(i+t) < n  = i(i+t) < n  = i' < n  2  Recurrence Lebelton $f(n) - f(n-1) + f(n-2)$ let $T(n)$ denote the time complexity of $f(n)$ for $f(n+1)$ if $f(n-2)$ the will be $T(n+1)$ f $T(n-3)$ we have one more attention accledition to some	Tutorial -2	
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Int $j=1$ , $i=0$ ;  Wille ( $i< n$ )  ( $i=i+j$ )  ( $i+j$ )  (		
int j=1, i=0;  wwile (i=n)  (i=i+j;  j+t;  j  laturs ofter execution  1st fine -> i=1+2  3 rd fine -> i=1+2  3 rd fine -> i=1+2  4th time -> i=1+2+3+4  for ith fine -> i (1+2+3+4  for ith fine -> i (1+2+3+4  i(1+1) < n  i(1+	Void fon (intn)	
Wille (i < n)   (i = i+i)   (i+i)		
Wille (i < n)   (i = i+i)   (i+i)	Int j=1, i=0;	
Values Ofter execution  1st fine $\rightarrow$ $i=1+2$ 3rd fine $\rightarrow$ $i=1+2+3$ 4th time $\rightarrow$ $i=1+2+3+4$ for the fine $\rightarrow$ $i \cdot (1+2+3+4+1) < n$ $= i(i+1) < n$ $= i(i+1) < n$ $= i^2 < n$ Hence complexity $= 0$ (In)  X  Prove 2  Recurrence Lelation $f(n) \cdot f(n-1) + f(n-2)$ Let $T(n)$ denote the time complexity of $f(n)$ for $f(n+1) \neq f(n-2)$ the will be $T(n+1) \neq T(n-3)$ We have one more attention acclesion to som	Wwie (i an)	
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Values Ofter execution  1st fine $\Rightarrow$ $i=1$ $\Rightarrow$ not thue $\Rightarrow$ $i=1+2$ $\Rightarrow$ vol thue $\Rightarrow$ $i=1+2+3$ $\Rightarrow$ thus $\Rightarrow$ $=1+2+3+4$ for its time $\Rightarrow$ i $=(1+2+3+4)$ $\Rightarrow$ i $=($	1 = i+i; 5T+ (1-1) T= (1)	
Values Ofter execution  1st fine $\rightarrow$ $i=1$ $\rightarrow$ $\rightarrow$ $i=1+2$ $\rightarrow$	1++; 1+(1-1) Txs =	
Values Ofter execution  1st fine -> (=1  2nd thue -> (=1+2  3rd fine -> (=1+2+3+4  4th thue -> = 1+2+3+4  for the time -> (=(1+2+3++i) <n 1(1+1)="" <="" =="" n="" td=""><td>3</td><td></td></n>	3	
Just fine $\Rightarrow$ $i=1+2$ $3^{nd}$ fine $\Rightarrow$ $i=1+2$ $3^{nd}$ fine $\Rightarrow$ $i=1+2+3+4$ $4^{+n}$ fine $\Rightarrow$ $i=1+2+3+4$ for $i^{+n}$ fine $\Rightarrow$ $i\cdot (1+2+3+\dots+i)< n$ $=i(i+1)< n$ $=i^{2} < n$ $\Rightarrow$ $i=\sqrt{n}$ After complexity $=0$ ( $\sqrt{n}$ ) $=i^{2} < n$ $=i^{2} < n$ $=i^{2} < n$ $=i^{2} < n$ After complexity $=0$ ( $\sqrt{n}$ ) $=i^{2} < n$ After complexity $=i^{2} < i^{2} <$	Wing Burriand Juli talker & The	
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Just fine $\Rightarrow$ $i = 1+2$ $3^{vd}$ fine $\Rightarrow$ $i = 1+2+3+4$ $4^{th}$ time $\Rightarrow$ $i \cdot (1+2+3+4 - +i) < n$ for $(th)$ fine $\Rightarrow$ $i \cdot (1+2+3+4 - +i) < n$ $= i(1+i) < n$ $= i^2 < n - +i$ fine complexity $= 0$ (Jin)  Are larger fine $f(n) \cdot f(n-1) + f(n-2)$ Let $T(n)$ denote the line complexity of $f(n)$ for $f(n+1) \notin f(n-2)$ the will be $T(n+1) \notin T(n-3)$ We have one more attention addition to sum	1 st fine 1 -> 1 (= I 1) T x 3 x C = (1) T	
3rd fine $\Rightarrow$ $i = 1+2+3+4$ .  4th time $\Rightarrow$ $i = 1+2+3+4$ .  for ith time $\Rightarrow$ $i = (1+2+3+4+i) < n$ = $i(i+1) < n$ = $i(i+1) < n$ = $i^2 < n$ The complexity = $0$ (In)  **  **  **  **  **  **  **  **  **	2 nd fluce + 1= 1+2 TX	
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Fine complexity = 0 (Jn)  All of i = In  Home complexity = 0 (Jn)  Recurrence Lelation  I(n) = I(n-1) + I(n-2)  Let T(n) denote the time complexity of f(n)  for I(n-1) & I(n-2) time will be T(n-1) & T(n-2)  We have one more according addition to sum	= i(i+i) < n	
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Here complexity = 0 (Th)  Recurrence Lelation  f(n) = f(n-1) + f(n-2)  let T(n) denote the time complexity of f(n)  for f(n-1) & f(n-2) the will be T(n-1) & T(n-2)  We have one more attentions addition to sum	The state of the s	
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Recurrence Lelation $f(n) = f(n-1) + f(n-2)$ let $T(n)$ denote the time Complexity of $f(n)$ for $f(n+1)$ & $f(n-2)$ time will be $T(n+1)$ & $T(n-2)$ We have one more according addition to sum	Home complexity = 0 (Ti)	
Recurrence Lelation $f(n) = f(n-1) + f(n-2)$ let $T(n)$ denote the time Complexity of $f(n)$ for $f(n+1)$ & $f(n-2)$ time will be $T(n+1)$ & $T(n-2)$ We have one more according addition to sum	LACTE CONTRACTOR OF THE PROPERTY OF THE PROPER	
Recurrence Kelation $f(n) = f(n-1) + f(n-2)$ let $T(n)$ denote the line complexity of $f(n)$ for $f(n-1)$ & $f(n-2)$ the will be $T(n-1)$ & $T(n-2)$ We have one more stronger addition to sum	Direct ?	
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let T(n) denote the time Complexity of f(n)  for f(n1) & f(n-2) time will be T(n1) & T(n-2)  We have one more attention addition to sum  B result, for N71	1(u) = 1(u-1) + 1(u-2)	
for f(n+1) & f(n-2) time will be T(n+1) & T(n-2) We have one more officerouse addition to sum  B result, for N71	Det Till danate the Tenne Consolerity of line	
We have one more stronger addition to sum  B result, for N71	1 (1) allow time will be That 87	(u-2)
B result, for 172	for (MT) p (M-2) was assessed a oldi-Hon to su	m
Distill, for	de voule one prose	
	Preside, for	

- wtonas -2 T(n) = T(n-1) + T(n-2) + 1for  $n \ge 0$  & n = 1, n = 0 addition occurs

1. T(0) = T(1) = 0let T(n-1) = T(n-2) -6 pulling ( in ( ) Tin) = Tin-1)+11 = 2xT(n-1)+1 Vsing Backward Subsitution : T(u1) = 2xT(u-2)+1 T(n) = 2 x [2xT(n-2)+1]+1 = 4 xT (4-2)+3 We can Subsitute T(n-2)=2xT(n-3)+1 T(n) = \$ 8 xT (n-3) +1 General Egn.

(n-k) +(2k-1) - 3 for TO N-K=0  $\Longrightarrow$  K=NSubsituting & Value in 3 T(n) = 21x T(0) x 2n-1 = 2"12"-1 x Tin = 0 (2 K) Space Complexity = 0 (M)

Reason 2 The for Calls are execute Sequentially.

This execution go arantees that the Stuck

size will exceed the depth of (alls for 1st / (u-1) it

will create N Stack frames, the other of (u-2)

will create N/2. So the longestin N. Nus-3 i) 0 (n logn); # include < io stream) Using name space Stel; Put partie Hon [int arr C], int Start, int end) int first = arr [start];
int count = 0; for (int 12 (Start + 1); 12 = end; i++) 1 (ar[i] <= pivst)

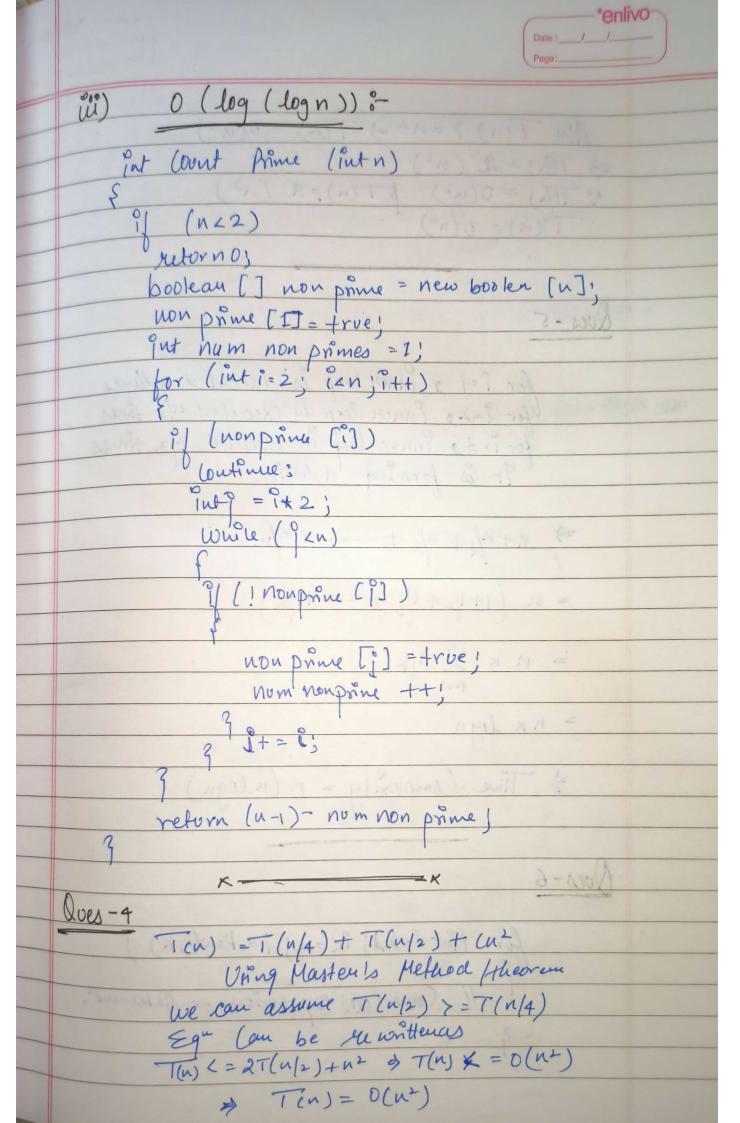
Count ++; Put ploot - nd = Start + County Swap [ar[pivot-nd], ar[start]);
int i = Start, j= end j-: (84)) while [i < pivot-nd \$\$ j> pivot-nd) Wuile (arr[i] <= pivot) wwie (arr[i] > pisot) ?»

Swap (av [it1]) ar[i-1); reform plood\_ ind) Void quick (Put arr[], int (tant, but end) of (Start ) - end) Put p = partition (arr, start, and); return! quick sort (arr, start, D-1); quick sort (arr, PH, end); 11 +837 = an (int main () The Topole = C' intar([] = \$6,8,5,2,13] Put n=S; quick sort (arr, 0, n+1); return of ast took = has took to 0 (N3) ;- hospital2 = 1 while [ i = pivot and \$\$ for (int i=0; ikn ) itt) {

for (int i=0; ikn ) itt) {

for (int k=0; kkn; ktt) {

print f (\*x\*); 277 refurno: 2



Also T(n) >= n2 => T(n) = 0(n2)  $= \frac{1}{2} \frac{$ T(n) = 0 (n2) MON DEMME [II] = true!

Mon Demme [II] = true!

Out my m non primes = 1; Ques - 5 for i=1 , inner loop is executed u/2 times
for i=2, inner loop is executed u/2 times
for i=3, inner loop is executed u/3 times
1+ is forming a series => n+1/2+1/3+ ----+n/n = u (1+1/2+1/3+-++/u). = N × Z 1/K 1 mile man = n x logn => Time Complexity = 0 (n logn) Dues-6 1 (Same O(1) expression or Statement.

with iferation i takes values for 2nd Hereation -> 2k for 3rd Hereation -> (2k) iteration \_ gx log x (log(x)) " last turn must be less than or equal to n COUNTRY TO SEE TOUR +000 Brown Therescoperate faces occupate the Children was CARROLL OF LOS 2+ logx (log(k)) = 2 logn = n Each iferation taxes Constant time or Total iteration = 0 (log (log (u)) encoloring Longe (not)e noty

He we split in this Lecurrence Kelation -> T(n)=T(qn)+T(n/10)10(n) unere 1st branch is of size 90/10 & second Solving the above using recursion true approach

Calculating Values

At 1st level, value = 11

At 2nd level, value = 9n/10 + n/10 = n Value remains fatore at all levels 1.e u

Time Complexity = Summation of values

= O(u x log10/g u) [upperbond

= R (ulog10 u) [lower bound]

-> O(u logn) f- work Ques -8 Considering large value of in's 1 L log (logn) L Tlog(n) K logn
L log2n L 2 (logn) K u K
n (logn) L 2n K 4n L log (n)
L n² L N L 2²²n

	Date://
_	
_	() 96 2 loggn < log 2n 2 5n  n (logon) 2 n (logon) 4 log (n!) 2 8 n 2 7 n 3  Z n! 2 8 2n
_	n (logon) < n(logn) < log (n1) < 8 n < 2703
	Luj 6820.
1	
1	
1	
1	
1	