```
Tutorial-4
Q1. T(n)=3T(n/2)+n2
     T(n) 2 at(n/b)+fln).
        a=3, b=2.
         C= LOg_3=1.58
          Nc = N 1.28.
        f(n) = n2
      By Lase 3: f(n) > n° => T(n) = 0 (f(n)) = 0 (n2).
    T(N) = 4T(n/2)+n2.
      T(n)= aT (n/b)+ f(n)
                           By case 2: T(h) z O(nclogn)
         az4, bz2
         C= log24=2.
                                        = 0 (n² logn).
03. T(n)=T(n/2)+2"
       T(n) = aT(n/b)+g(n)
a=1, b=2
            C= LOg_1=0.
            n° = n° = 1. => f(n) = 2n > 1.
               T(n) = \theta (2^n)
Qy. T(u)= 2" T(u/2)+n"
        a = 2", b=2
         Cz log22" = n.
               nez nn zfen).
              T(n)= O(nn logn)
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a=16, bz4. Cz Logy 16 = 2. n' = n2 > f(n). T(n) 20(n2). 07. T(n)=27(n/2)+ n/logn/88. T(n)=27(n/4)+n°.9 a=2, b=2 C= log 2=1 n° = n 7 fln). T(n)2 O(n) 29. T(n) = 0.5T(n/2)+1/n. T(n) = aT(n/b)+fcn). a = 0.5, b=2" C= LOg_ 0.5 = -1. nc= n-1= /n = f(n) T(n)= O(wgn/n) Q11. T(n) = 4T(n/2)+logn. n° 2 n° 7 fcn). T(n)20(n2). Q13 T(n)=3T(n/2)+n. a= 3, b=2 C2 log 32 1.58 n° 2 n° 587 fln) T(n) 2 O(n"58).

16/ (My)+n.

Q6. T(u)= 2T (42) + nlogn. a=2, b=2 Cz log_2 2 2 1 n° = n < flu). TCn)=20 (niog n). 0=2, 0=4. 0=109, 2=0.5 0=10T(n) 20 (n°'5). Q10. T(n)216T(M4)+n.1. az16, bz4. C = logy 16 = 2. n° = n2 < f(n). T(n) = O(n/). DIZ. T(n)= sget (n)T(n/2)+logn $a = n^{n/2}, b = 2$. $C = \log_2 n^{n/2} = 1/2 \log n$. $n^{c_2} n^{n/2 \log n} = 1/2 \log n$. T(n) = O(n/2logn) (14. TCn)=3T(n/3)+89ect(n). a=3, b=3 C= log3 3= 1 nczn'zfen). $T(n) \ge 0 Cn)$.

215.TCn)=4TCH2)+CN a=4, b=2 C = log 2 4= 2. nc= n2 > fcn). T(n) 20(n2). 917. T(n)28T(n/3)+n/2. a=3, b=3. Cz log33=1. n'= 'n7fln) T(n) = O(n) 09.7(n)=4T(n/2)+n/logn 0=4, b=2 Cz LOg2422. n° = n2 > flu) $T(n) = \theta(n^2).$ Q21. T(n)=7T(n/3)+n2 a=7, b=3. Cz LOg37 = 1.77. n° = n'177< fln) T(n)=0(m2).

Q16. T(n)= 3T (n/4)+nlogn. a=3, b=4'. Cz logy 3=0.79. n° 2 n° .79 (fu). T(n)= O(nlogn). Q18. TCn)= 6T(n/3)+n2logn a=6, b=3 Cz log36 = 1.63. n°= n1.63 < fln) T(n) = O(n2 wgn) 020. TCn) 264T(n/8)-n2logn 0264, b=8. C= log_64 = 2. n°z n²× fln) T(n) = 0 (n2 log 1/n). Q22. TCn)= T(1/2)+n(2-001 n) a=1, b=2, C=log_1=0. n'= n'= / (f(n). T(n) 20(n(2-can)).