```
1.) void fun (intn)
     t=i+j; -duality particular in L.P. = (20)
  while (i < n)
     ゴナナ!
   Time complexity - Ol squt n).
1 st time = l=1
and time = i = 3 (i = 1 + 2).
3 nd time i = 6 (i=1+2+3).
nm time = i = i (i+1) = x2 < n
             x = sqrt(n).
                           Let 7(0)=1.
2.)
  * fib(m) = fib(n-1) + fib(n-1)
    fiben):
                      OUT PR BU A - IT IN
       if n <= 1
         outwer 1
      secturen fib (n-1) + fib(n-2).
  Time complenity: -
    T(n) = T(n-1)+T(n-2)+C
         = 2 T(n-2)+C
   T(n-2) = 2* (T2(n-2-2)+c)+c.
       = 2* (2T(n-2)+6)+C
          = 4T (n-2)+3C.
   T (n-4) = 2* (4T(n-2)+3C)+C
            = 07(n-3)+7C
            = 9 Kx T (n-K)+(2K-1) C
```

```
n-4x=0=> n= k => K=n
 T(m) = 2" * T(0) + (2"-1)C
        = 2" + 1 + 2" C - C
       = 27,
        =0(2n).
space Complenity: - space is proportional to the marin
um depth of the occursion bue.
         Hence the space complexity of Fibonacci
         vucuraine to OCN).
  Fi F2
                        mate delmarage emar
 Muge Sort -nlogn.
 for time complexity: - n3
 We can use them nested loops
   for cint i = 0', i < n', i++).
     { for (int j = 0; j < n; j++).
      · ( for lint k = 0; k < n; K++)
            some OLI) enpecosions
I for time complexity - log ( log n).
    for lint i = 2; i < n; i = power(i,j)
       " some our empression
      where K is constant.
```

```
for time complexity n log n
  int fun ( int n)
    d for (i=1', i <=n', i++)
        far(j=1',j=n',j+=i
                              ( some O(1) enpression
                     by the world to be the party of the principle
                      a used instances the late section
    T(n) = 2 T(n/2) + cn2
                            THE WAY WAY
   using master 's method
  T(n) = aT(n/b) + fn.
   azlibzlic=logo
       c = log_2^2 = 1
                            Media 1 to miles n.
       f(n)>nc
                          THE STREET WAR WITH
      T(n)=0(f(n)).
                      A TANK TO SELECT MANUFACTURE AND THE
      =70(n^2).
                      if the man is the distribution
 face i=1 → j=1,2,3,4 - - - - n ( ocum for ntimes)
Q:-5
for i = 2 →j = 11315 - - - - - Locum for n/2 ames)
for i = 3 - j = 1,4,7 - - - - Loren for n/3 times)
   T(n)= n+n|2+n|3+n|4+--
        n(1+1/2+1/3+1/4+---).
         nj" 1/2 => nj"dn/x => log x]"
        T.C = n log n
Q:-6. for first eteration i = 2
         second eteration i=2°K
         third iteration i= (2k) k = 2k
         non iteration i = 2R loop endo at 2t = n
apply log n = log 2 = ki = log n => i = log of log n).
```

```
99 to 1 in Quick Sort
 when privat is either from front are end always
   60 T(n) = T (99 n/100) + T(n/100) + O(n)
      T(n) = T (99n/100) + T (n/100) + O(n)
 T(99)2 xn) T(99n 100)2 T(99n 1002)
       n = (99)100) x
       log n = K log 99/100
           R = Logn
                100
       . TC = n * Log 100 | 99 (n).
Jus! - 0
  a.) 100 < log log b) < log 2n < log n < log n!
 くれしれLogn にn2 とまれく+れとまれしまかかくかり
6.)
```