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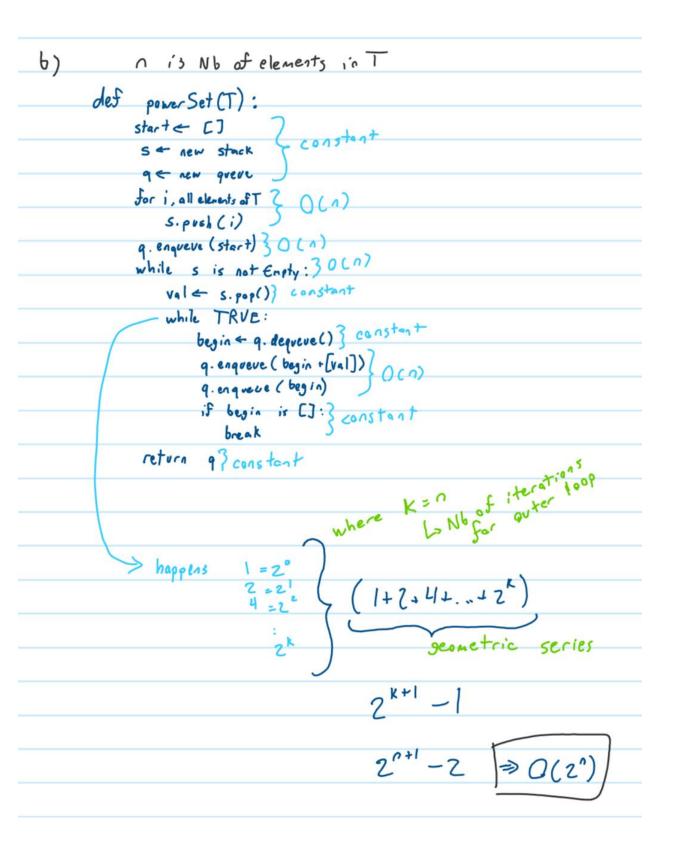
Assignment 1 – Theory Questions

<u>Q1</u>

```
a) def generate Recursively (n):
         arr = new in+[n]
         for i, O to n-1:
             arr(i) = i+1
         Recursive P(arr, n) -> calling recursively
    def Recursive P (arr, n):
        if n is 1:
             print (arr)
             return
        for i, 0 to n-1: -> O(1)
   ronstant = arr. swap (i, n-1)
            Recursive P(arr, n-1) -> O(n)
    constants acr. Swap (i, n-1)
           \Rightarrow O(n) * O(n) \Rightarrow O(n^2)
```

```
b) def generate Iterative (n):
                         SI = new Stack(n) // Stacks with
                         SZ = new Stack Cn)
                                                      length n
                         for i, o to n:
                                s2. push (i+1)
                          iterative P (s1, s2, n) -> will deminate
                        iterative P( s 1, sz, n):
                   def
                          for i, 1 to n! : > 0(n!)
                               temp & i% o } constant
                               if 1%2 = 0:
                                  while st is not Empty: -> o(1)
                                      if tem = 0:
                                         va = 51.70p()
                                       else:
                                       52. push (51. pop())
(n!)(n)
\Rightarrow O(n(n!))
                                     52. push (val)
                                     print(52)
                                else:
                                   while s2 is not Empty: -> 0(1)
                                       if temp = 0:
                                          val = 52. 70p()
                                       else:
                                          temp=temp-1
                                        S1. push (S2. pap())
                                      51.7 ush (val)
                                      print (s1)
```

```
a)
      power Set (T):
      start = [] // Engty Set
       S = new stack
       q < new queve
      for i, all elements of T // Puts all the numbers
          S. push (i) from 1 to 1 into stack
      q. enqueve (start)
      while s is not Empty:
          val = s.pop() // element to add this iteration
         while TRVE:
               begin < q. dequeve()
               q. enqueue (begin + [val]) // concetinating starting set
like a
do while
                                           and value to add
               q. enqueve (begin) ~
               if begin is []: | Keeps previously found set
                   break
       return
```



⇒
$$\log \log n \le \sqrt{n} \le n \log n \le \sqrt{2} \le$$

 $2^{\log n} \le \binom{n}{2} \le 2^n \le n^4 + \log^2 n \le$
 $n! + n \le n^n \le 2^{2^n} \le 2^{n!} + n^2$.