FSM FATİH SULTAN MEHMET VAKIF ÜNİVERSİTESİ	Mühendislik Fakültesi Bilgisayar Mühendisliği Programı **BLM19307E Algorithm Analysis & Design Lab Work**	Adı Soyadı: Notu:

Lab 3: Analysis of Recursive Algorithms

Algorithm: Secret(x)
// Input: x is a non-negative integer
// Output: ?
if x = 1:
    return 1
else
    return Secret(x - 1) + x*x*x

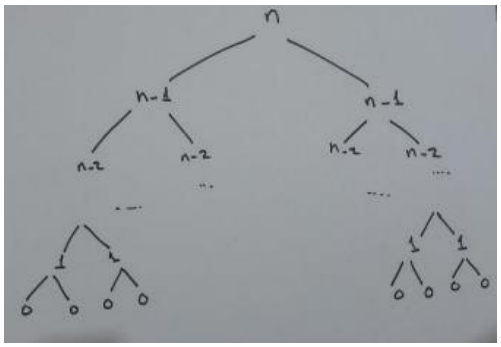
Step 1: What is the output of this algorithm? What does it compute? (10p)

Girilen sayı 1 ise, 1 döndürür. Girilen sayı 2 ise; sayının küpünü alıp bir önceki adım ile toplar.
Output:0

Step2: Set up a recurrence relation for the number of multiplications made by the algorithm and solve it (25p).

F(n)=F(n-1) +n^3 n>=1,
Size=n
Basic operation= multiplication
O(n)
S(1)=0
S(n)=S(n-1) +2
=S(n-2) +2+2
.
=S(1)+2.(n-1)
=2n-2

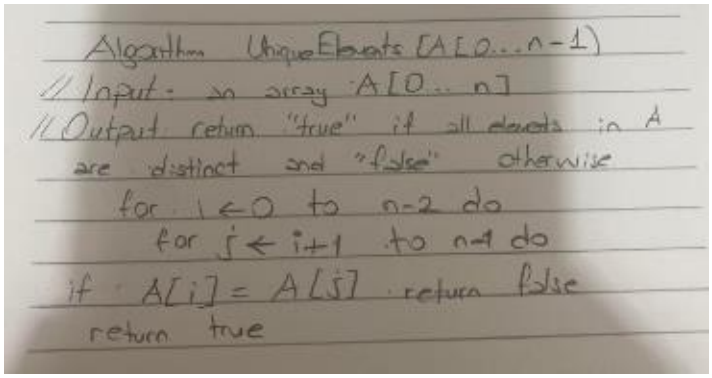
Step3: Draw a tree of recursive calls for this algorithm and count the number of calls made by the algorithm (25p).



Step4: Is it a good algorithm for solving this problem? Why? Explain it (20p).

Karmaşıklık O(n) olur.

Step5: Design a non-recursive algorithm? Write the pseudo-code of this algorithm and the time efficiency class that this algorithm belongs to (use Non-recursive analysis)? (20p).



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Algorithm UniqueElements[A[0...n-1)
// Input: an array A[0..n]
// Output: return "true" if all elements in A
are distinct and "false" otherwise
    for i ← 0 to n-2 do
        for j ← i+1 to n-1 do
if A[i] = A[j] return false
return true
```

Time efficiency:O(n^2)