Assignment 1 of CISC 3000

ZHANG HUAKANG

January 21, 2022

1

- $T(n) = 3n^2 + 5n \log_2 n = O(n)$. False
- $T(n) = 4^{\log_2 n} + \sqrt{n} = \Omega(n^2)$. True
- $T(n) = 3n^2 + 9n = O(n^3)$. True
- $T(n) = 4(\log_2 n)^5 + 5\sqrt{n} + 10 = \Theta(\sqrt{n})$. False
- $T(n) = (\log_2 n)^{\log_2 n} + n^4 = \Theta(n^4)$. True

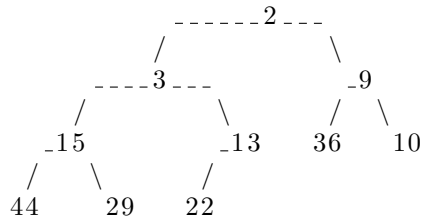
2

Algorithm 1: Sum of three(A, K)

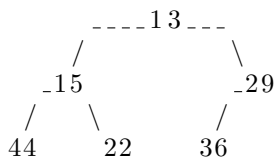
let $n \leftarrow |A|$ and assume $A = \{a_1, a_2, ..., a_n\}$.
for $i == 1, 2, ..., n-2$ **do**
    $j \leftarrow i + 1$ and $k = n$.
    while $k > j$ **do**
        if $a_i + a_j + a_k = K$ **then**
            Output: (i, j, k)
        else if $a_i + a_j + a_k < K$ **then**
            $j \leftarrow j + 1$
        else if $a_i + a_j + a_k > K$ **then**
            $k \leftarrow k - 1$
Output: do not exist

3

3.1

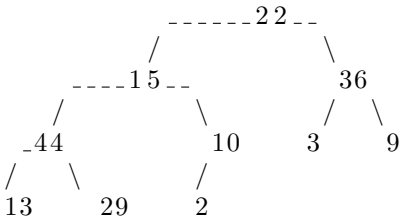


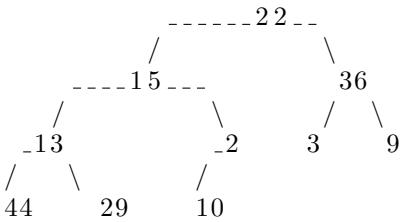
3.2

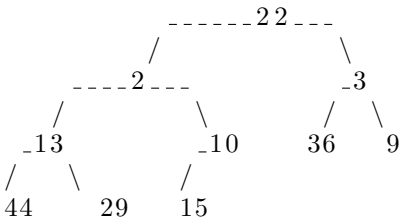


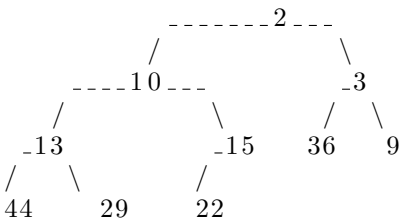
4

4.1

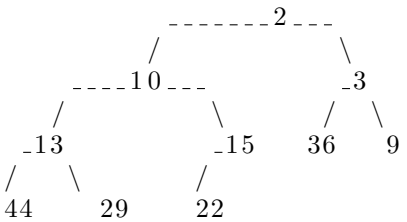

22
15
36
44
10
3
9
13
29
2

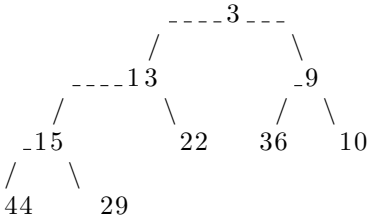

22
15
36
13
2
3
9
44
29
10

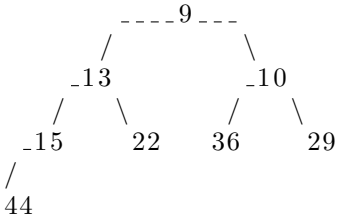

22
2
3
13
10
36
9
44
29
15

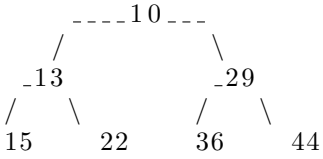

2
10
3
13
15
36
9
44
29
22

4.2


2
10
3
13
15
36
9
44
29
22


3
13
9
15
22
36
10
44
29


9
13
10
15
22
36
29
44


10
13
29
15
22
36
44