416. Partition Equal Subset Sum

Medium 7299 115 Add to List Share

Given a **non-empty** array `nums` containing **only positive integers**, find if the array can be partitioned into two subsets such that the sum of elements in both subsets is equal.

Example 1:

```
Input: nums = [1,5,11,5]
Output: true
Explanation: The array can be partitioned as [1, 5, 5] and [11].
```

Example 2:

```
Input: nums = [1,2,3,5]
Output: false
Explanation: The array cannot be partitioned into equal sum subsets.
```

Constraints:

- `1 <= nums.length <= 200`
- `1 <= nums[i] <= 100`

There are n elements in an array, we partitioning into two subSets. Then each element (:index) can be included either of one subSet but not in both the subSets:

So In a Equal Subset Sum partition.

If we find out 1st sub array sum, which is equals totalSum/2.

2nd sub array sum will obviously equals to totalSum/2.

nums : [1,5,11,5] :: sum:22

{SubArray1: 1,5,5} --> {SubArray2:11}
sum/2 ::11 --> sum/2::11

[1,5,11,5] can this be partitioned to two equal subset sum:

[1,5,5]sum:11 == [11]sum:11
11 = 11 True

[1,2,3,5] --> (X) Summation of input array is 11 :
If the sum is odd we can not make equal partitions.

[3,3,5,3] --> (X) False Sum : 14

[3,3] sum:6 --> [5,3] sum:8

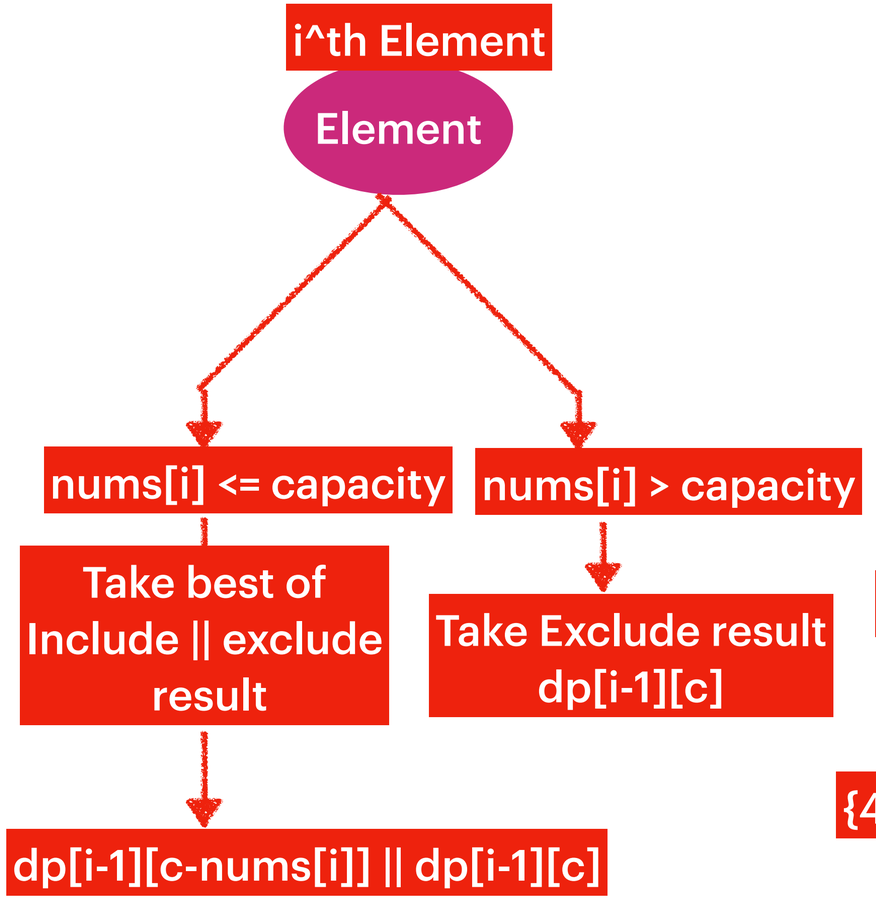
[3,3,3]sum:8 --> [5]sum:5

****

0	1	2
4	3	5

Total Sum = 12 , SubSetSum or Capacity = 6

Tabulation Approach : int[][] dp = new int[nums.length+1] [subSetSum+1]



		SubSetSum						
		0	1	2	3	4	5	6
{ }	0	True	False	False	False	False	False	False
{4}	1	True	False	False	False	True	False	False
{4,3}	2	True	False	False	True	True	False	False
{4,3,5}	3	True	False	False	True	True	True	False

[2,3]

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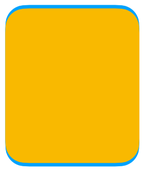
{2[0],3[1]}

dp[1][5] = dp[0][2] ; —-> dp[i-1][c-nums[i]]

dp[0][2] = true

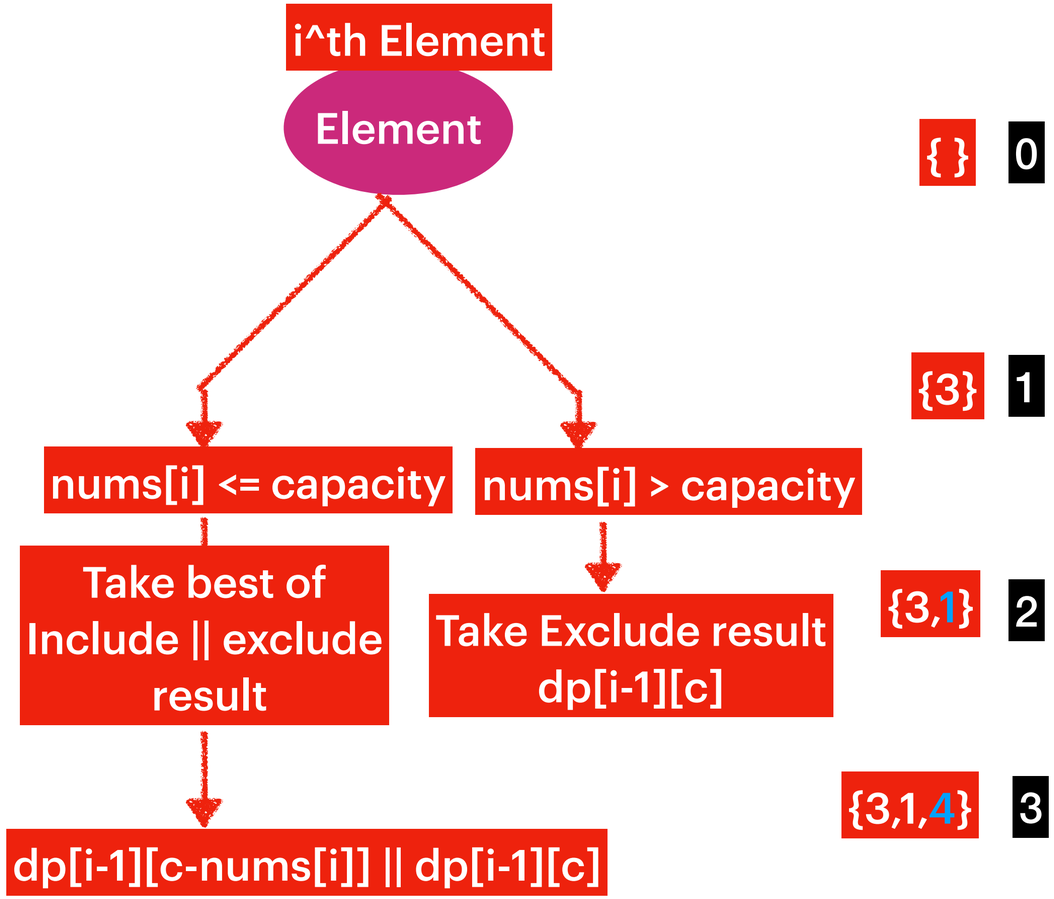
[2]



[2,3]

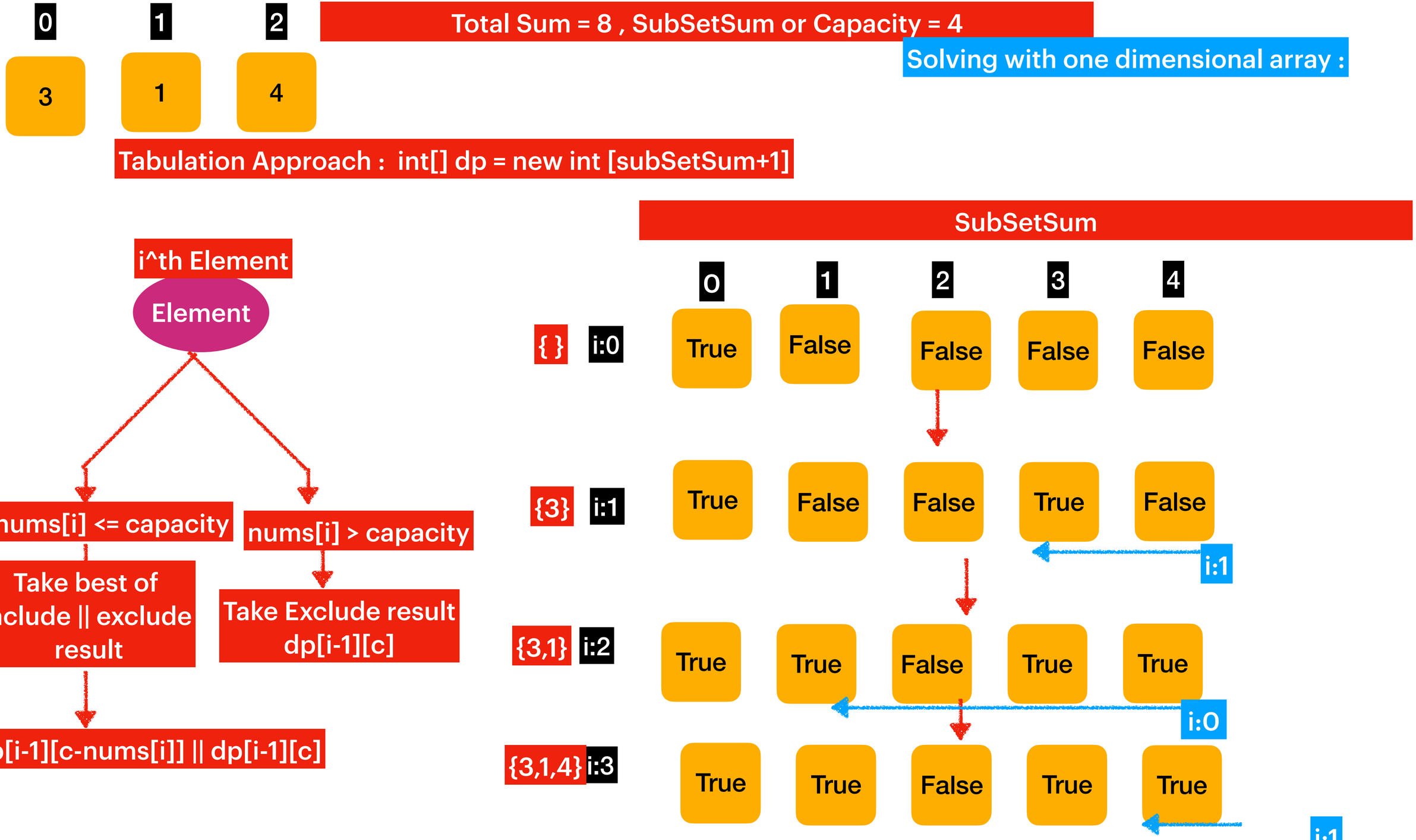
Total Sum = 8 , SubSetSum or Capacity = 4

Tabulation Approach : int[][] dp = new int[nums.length+1] [subSetSum+1]



SubSetSum

		0	1	2	3	4
{ }	0	True	False	False	False	False
{3}	1	True	False	False	True	False
{3,1}	2	True	True	False	True	True
{3,1,4}	3	True	True	False	True	True


0
1
2
3
1
4
Total Sum = 8 , SubSetSum or Capacity = 4
Solving with one dimensional array :
Tabulation Approach : int[] dp = new int [subSetSum+1]
i^th Element
Element
nums[i] <= capacity
nums[i] > capacity
Take best of Include || exclude result
Take Exclude result dp[i-1][c]
dp[i-1][c-nums[i]] || dp[i-1][c]
SubSetSum
0
1
2
3
4
{ }
i:0
True
False
False
False
False
{3}
i:1
True
False
False
True
False
i:1
{3,1}
i:2
True
True
False
True
True
i:0
{3,1,4}
i:3
True
True
False
True
True
i:1

494. Target Sum

Medium 6691 256 Add to List Share

You are given an integer array `nums` and an integer `target`.

You want to build an **expression** out of nums by adding one of the symbols `'+'` and `'-'` before each integer in nums and then concatenate all the integers.

- For example, if `nums = [2, 1]`, you can add a `'+'` before `2` and a `'-'` before `1` and concatenate them to build the expression `"+2-1"`.

Return the number of different **expressions** that you can build, which evaluates to `target`.

Example 1:

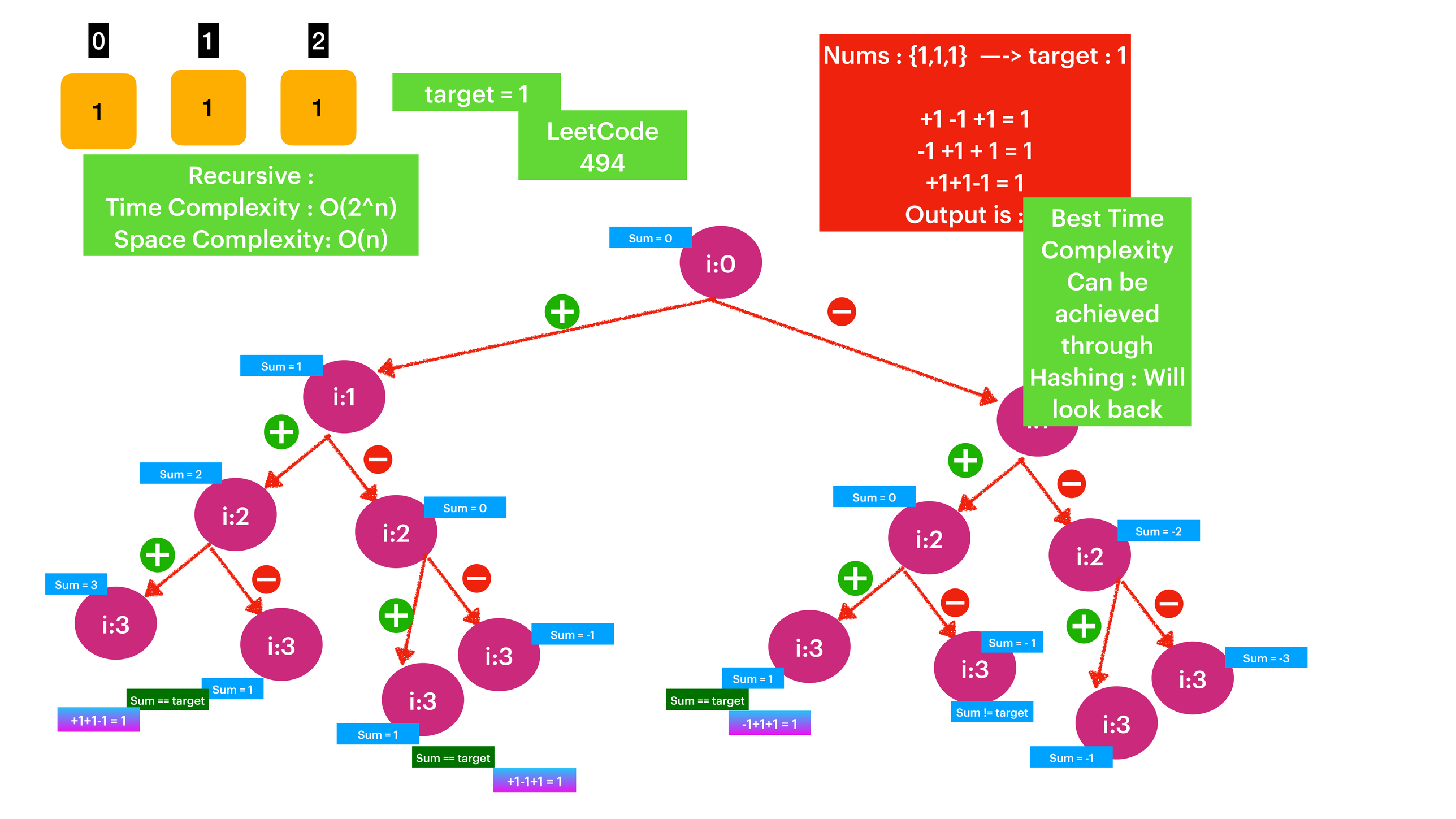
```
Input: nums = [1,1,1,1,1], target = 3
Output: 5
Explanation: There are 5 ways to assign symbols to make the
sum of nums be target 3.
-1 + 1 + 1 + 1 + 1 = 3
+1 - 1 + 1 + 1 + 1 = 3
+1 + 1 - 1 + 1 + 1 = 3
+1 + 1 + 1 - 1 + 1 = 3
+1 + 1 + 1 + 1 - 1 = 3
```

Example 2:

```
Input: nums = [1], target = 1
Output: 1
```

Constraints:

- `1 <= nums.length <= 20`
- `0 <= nums[i] <= 1000`
- `0 <= sum(nums[i]) <= 1000`
- `-1000 <= target <= 1000`


0
1
2
1
1
1
target = 1
LeetCode
494
Recursive :
Time Complexity : O(2^n)
Space Complexity: O(n)
Nums : {1,1,1} —-> target : 1
+1 -1 +1 = 1
-1 +1 + 1 = 1
+1+1-1 = 1
Output is :
Best Time Complexity Can be achieved through Hashing : Will look back
Sum = 0
i:0
Sum = 1
i:1
Sum = 2
i:2
Sum = 0
i:2
Sum = 3
i:3
i:3
Sum = 1
Sum == target
+1+1-1 = 1
i:3
Sum = -1
i:3
Sum = 1
Sum == target
+1-1+1 = 1
Sum = 0
i:2
Sum = -2
i:2
i:3
Sum = 1
Sum == target
-1+1+1 = 1
i:3
Sum = - 1
Sum != target
i:3
Sum = -3
i:3
Sum = -1