**Problem Name:** Target Sum Pairs I

**Topics:**

**Companies:**

**Level:** Easy

**Language:** C++

**Problem Statement**:

**Input Format:**

**Output Format**

**Constraints:**

**Examples:**

**Brute force Solution:**

**Explanation:**

For brute force, one can reduce time complexity from O(2^n) to O(2^(n/2)) by means of meet-in-the-middle optimization as follows.  
Split the generating sequence in half. Subtract one half from both sides of equation and generate all possible new target values on the right-side counting occurrences of the values.  
The answer is a total number of occurrences of the new target values that equal to the ones generated on the left side using the other half of the sequence.

**Code:**

**Time Complexity**:

**Space Complexity:**

**Optimized Solution:**

**Explanation:**

We have nums=[1,2,3,4,5] and S=3 for example. There is a solution 1-2+3-4+5=3. After moving nums in negative to the right side, it becomes 1+3+5=3+2+4. Each side is half of sum(nums)+S. This means we can turn this into a knapsack problem with sacks=nums and target\_sum=(sum(nums)+S)/2. In this example sacks=[1,2,3,4,5] and target\_sum=9. [1,3,5] is one of the solutions.

**Code:**

**Time Complexity**:

**Space Complexity**