

2638. Count the Number of K-Free Subsets Premium

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You are given an integer array `nums`, which contains **distinct** elements and an integer `k`.

A subset is called a **k-Free** subset if it contains **no** two elements with an absolute difference equal to `k`. Notice that the empty set is a **k-Free** subset.

Return *the number of **k-Free** subsets of* `nums`.

A **subset** of an array is a selection of elements (possibly none) of the array.

Example 1:

Input: `nums = [5,4,6]`, `k = 1`
Output: `5`
Explanation: There are 5 valid subsets: `{}`, `{5}`, `{4}`, `{6}` and `{4, 6}`.

Example 2:

Input: `nums = [2,3,5,8]`, `k = 5`
Output: `12`
Explanation: There are 12 valid subsets: `{}`, `{2}`, `{3}`, `{5}`, `{8}`, `{2, 3}`, `{2, 3, 5}`, `{2, 5}`, `{2, 5, 8}`, `{2, 8}`, `{3, 5}` and `{5, 8}`.

Example 3:

Input: `nums = [10,5,9,11]`, `k = 20`
Output: `16`
Explanation: All subsets are valid. Since the total count of subsets is $2^4 = 16$, so the answer is 16.



Constraints:

- `1 <= nums.length <= 50`
- `1 <= nums[i] <= 1000`
- `1 <= k <= 1000`



Seen this question in a real interview before? 1/5

Yes No

Accepted **4K** | Submissions **8.5K** | Acceptance Rate **46.7%**



 Topics 

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 Hint 1 


Split all numbers into several groups, with each group being an arithmetic sequence with a common difference of k.

 Hint 2 

How many K-free subsets are there for each group? This can be solved by dp: `dp[i] = dp[i-1] + dp[i-2]`, meaning if we choose `i`th element, we cannot choose `(i-1)`th; otherwise we can choose `(i-1)`th element.

 Hint 3 

After solving the problem for every group, the final result is just the product of the sub-problems.

 Discussion (11) 