

Problem 2585: Number of Ways to Earn Points

Problem Information

Difficulty: Hard

Acceptance Rate: 59.20%

Paid Only: No

Tags: Array, Dynamic Programming

Problem Description

There is a test that has n types of questions. You are given an integer `target` and a **0-indexed** 2D integer array `types` where `types[i] = [counti, marksi]` indicates that there are `counti` questions of the `i`th type, and each one of them is worth `marksi` points.

Return the number of ways you can earn **exactly** `target` points in the exam. Since the answer may be too large, return it **modulo** $10^9 + 7$.

Note that questions of the same type are indistinguishable.

* For example, if there are 3 questions of the same type, then solving the 1st and 2nd questions is the same as solving the 1st and 3rd questions, or the 2nd and 3rd questions.

Example 1:

Input: `target = 6, types = [[6,1],[3,2],[2,3]]` **Output:** 7 **Explanation:** You can earn 6 points in one of the seven ways: - Solve 6 questions of the 0th type: $1 + 1 + 1 + 1 + 1 + 1 = 6$ - Solve 4 questions of the 0th type and 1 question of the 1st type: $1 + 1 + 1 + 1 + 2 = 6$ - Solve 2 questions of the 0th type and 2 questions of the 1st type: $1 + 1 + 2 + 2 = 6$ - Solve 3 questions of the 0th type and 1 question of the 2nd type: $1 + 1 + 1 + 3 = 6$ - Solve 1 question of the 0th type, 1 question of the 1st type and 1 question of the 2nd type: $1 + 2 + 3 = 6$ - Solve 3 questions of the 1st type: $2 + 2 + 2 = 6$ - Solve 2 questions of the 2nd type: $3 + 3 = 6$

Example 2:

****Input:**** target = 5, types = [[50,1],[50,2],[50,5]] ****Output:**** 4 ****Explanation:**** You can earn 5 points in one of the four ways: - Solve 5 questions of the 0th type: $1 + 1 + 1 + 1 + 1 = 5$ - Solve 3 questions of the 0th type and 1 question of the 1st type: $1 + 1 + 1 + 2 = 5$ - Solve 1 questions of the 0th type and 2 questions of the 1st type: $1 + 2 + 2 = 5$ - Solve 1 question of the 2nd type: 5

****Example 3:****

****Input:**** target = 18, types = [[6,1],[3,2],[2,3]] ****Output:**** 1 ****Explanation:**** You can only earn 18 points by answering all questions.

****Constraints:****

* `1 <= target <= 1000` * `n == types.length` * `1 <= n <= 50` * `types[i].length == 2` * `1 <= counti, marksi <= 50`

Code Snippets

C++:

```
class Solution {
public:
    int waysToReachTarget(int target, vector<vector<int>>& types) {

    }
};
```

Java:

```
class Solution {
    public int waysToReachTarget(int target, int[][] types) {

    }
}
```

Python3:

```
class Solution:
    def waysToReachTarget(self, target: int, types: List[List[int]]) -> int:
```