

# 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, marks]` indicates that there are `counti` questions of the `ith` type, and each one of them is worth `marks` 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:\*\***

$* \ 1 \leq \text{target} \leq 1000$   $* \ n == \text{types.length}$   $* \ 1 \leq n \leq 50$   $* \ \text{types}[i].length == 2$   $* \ 1 \leq \text{count}_i, \text{marks}_i \leq 50$

## 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:
```