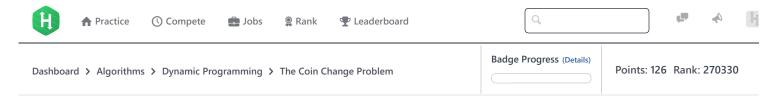
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The Coin Change Problem





You have m types of coins available in infinite quantities where the value of each coin is given in the array $C = [c_0, c_1, \dots, c_{m-1}]$. Can you determine the number of ways of making change for n units using the given types of coins? For example, if m=4, and C=[8,3,1,2], we can make change for n=3 units in three ways: $\{1,1,1\}$, $\{1,2\}$, and $\{3\}$.

Given n, m, and C, print the number of ways to make change for n units using any number of coins having the values given in C.

Input Format

The first line contains two space-separated integers describing the respective values of n and m.

The second line contains m space-separated integers describing the respective values of $c_0, c_1, \dots c_{m-1}$ (the list of distinct coins available in infinite amounts).

Constraints

- $1 \le c_i \le 50$
- $1 \le n \le 250$
- $1 \le m \le 50$
- Each c_i is guaranteed to be distinct.

Hints

- Solve overlapping subproblems using Dynamic Programming (DP): You can solve this problem recursively but will not pass all the test cases without optimizing to eliminate the overlapping subproblems. Think of a way to store and reference previously computed solutions to avoid solving the same subproblem multiple times.
- Consider the degenerate cases:
 - How many ways can you make change for **0** cents?
 - How many ways can you make change for > 0 cents if you have no coins?
- If you're having trouble defining your solutions store, then think about it in terms of the base case (n=0).
- The answer may be larger than a **32**-bit integer.

Output Format

Print a long integer denoting the number of ways we can get a sum of n from the given infinite supply of m types of coins.

Sample Input 0

4 3

1 2 3

Sample Output 0

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Explanation 0

There are four ways to make change for n = 4 using coins with values given by C = [1, 2, 3]:

- 1. {1, 1, 1, 1}
- 2. {1,1,2}
- 3. **{2,2}**
- 4. {1,3}

Thus, we print $\mathbf{4}$ as our answer.

Sample Input 1

```
10 4
2 5 3 6
```

Sample Output 1

5

Explanation 1

There are five ways to make change for n=10 units using coins with values given by C=[2,5,3,6]:

- 1. **{2, 2, 2, 2, 2}**
- 2. {2, 2, 3, 3}
- 3. **{2, 2, 6}**
- 4. {2, 3, 5}
- 5. **{5, 5**}

Thus, we print 5 as our answer.

```
f in
Submissions:37185
Max Score:60
Difficulty: Hard
Rate This Challenge:
☆☆☆☆☆
More
```

```
Current Buffer (saved locally, editable) & 49
                                                                                          Java 7
1 ▼ import java.io.*;
2 import java.util.*;
   import java.text.*;
3
   import java.math.*;
   import java.util.regex.*;
6
7 ▼ public class Solution {
8
9 ▼
        static long getWays(long n, long[] c){
10
            // Complete this function
11
12
13 ▼
        public static void main(String[] args) {
            Scanner in = new Scanner(System.in);
```

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```
15
             int n = in.nextInt();
16
             int m = in.nextInt();
17 ▼
             long[] c = new long[m];
18 ▼
             for(int c_i=0; c_i < m; c_i++){
19 ▼
                 c[c_i] = in.nextLong();
20
             // Print the number of ways of making change for 'n' units using coins having the values given by 'c'
21
22
             long ways = getWays(n, c);
23
         }
24
    }
25
                                                                                                                    Line: 1 Col: 1
<u>♣ Upload Code as File</u> Test against custom input
```

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