Array Construction

by allllekssssa

Problem Submissions Leaderboard Discussions Editorial

Professor GukiZ has hobby — constructing different arrays. His best student, Nenad, gave him the following task that he just can't manage to solve:

Construct an n-element array, A, where the sum of all elements is equal to s and the sum of absolute differences between each pair of elements is equal to k. All elements in A must be non-negative integers.

$$A_0 + A_1 + \ldots + A_{n-1} = s$$

$$\sum_{i=0}^{n-1} \sum_{j=i}^{n-1} | A_i - A_j | = k$$

If there is more then one such array, you need to find the lexicographically smallest one. In the case no such array A exists, print -1.

Note: An array, A, is considered to be lexicographically smaller than another array, B, if there is an index i such that $A_i < B_i$ and, for any index $j < i$, $A_j = B_j$.

Input Format

The first line contains an integer, q, denoting the number of queries.
Each of the q subsequent lines contains three space-separated integers describing the respective values of n (the number of elements in array A), s (the sum of elements in A), and k (the sum of absolute differences between each pair of elements).

Constraints

- $1 \leq q \leq 100$
- $1 \leq n \leq 50$
- $0 \leq s \leq 200$
- $0 \leq k \leq 2000$

Subtasks

For 10% of the maximum score:

- $1 \leq q \leq 10$
- $1 \leq n \leq 5$
- $0 \leq s \leq 10$
- $0 \leq k \leq 20$

For 50% of the maximum score:

- $1 \leq q \leq 10$
- $1 \leq n \leq 50$
- $0 \leq s \leq 100$
- $0 \leq k \leq 500$

Output Format

For each query, print n space-separated integers describing the respective elements of the lexicographically smallest array A satisfying the conditions given above. If no such array exists, print -1 instead.

Sample Input

```
1
3 3 4
```

Sample Output

```
0 1 2
```

Explanation

We have $q = 1$ query in which $n = 3$, $s = 3$, and $k = 4$. The lexicographically smallest array is $A = [0, 1, 2]$.

- The sum of array A's elements is $0 + 1 + 2 = 3 \equiv s$
- The absolute differences between each pair of elements are:
  $|A_0 - A_1| = 1$
  $|A_0 - A_2| = 2$
  $|A_1 - A_2| = 1$

  The sum of these absolute differences is $1 + 1 + 2 = 4 \equiv k$

As array A is both lexicographically smallest and satisfies the given conditions, we print its contents on a new line as `0 1 2`.

Submissions:400

Max Score:80
Difficulty: Advanced

Rate This Challenge:

More

Current Buffer (saved locally, editable)

Java 7

```
import java.io.*;
import java.util.*;
import java.text.*;
import java.math.*;
import java.util.regex.*;

public class Solution {

    public static void main(String[] args) {
        /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
    }
}
```

Line: 1 Col: 1

Upload Code as File Test against custom input Run Code Submit Code