Cups

Nowadays, most measuring cups are made of perspex or platic and sport scales to comfortably measure any amount of liquid. But what if you are left with measuring cups without such scales? You do it in good old grandmother's style: by spilling.

The following three actions are permitted to achieve the desired amount of liquid:

- Filling a cup to the brim.
- Completely emptying a cup.
- Spilling the contents of one cup into another, until either the first cup is emptied or the second cup is filled.

Let's make an example! The recipe for the custard cream biscuits asks for 6 deciliters of milk, but you only have a cup of 9 deciliters and another of 4 deciliters. There are various ways to proceed. Here is the shortest of them all: (In the brackets the amount of milk in the first cup, followed by the amount in the second cup.)

- (0,0) Start with two empty cups.
- (9,0) Fill the larger cup to the brim.
- (5,4) Spill from the larger to the smaller cup.
- (5,0) Empty the smaller cup.
- (1,4) Spill from the larger to the smaller cup. . .
- (1,0) . . . then empty the latter completely.
- (0,1) Pouring the entire content of the larger cup to the smaller cup.
- (9,1) Fill the larger cup to the brim.
- (6,4) Spill from the larger to the smaller cup until it is filled up.

Now the larger cup contains the required 6 deciliters of milk and the biscuits are well one track. Nine actions were needed. But you could have done otherwise, for example: (0,0) (0,4) (4,0) (4,4) (8,0) (8,4) (9,3) (0,3) (3,0) (3,4) (7,0) (7,4) (9,2) (0,2) (2,0) (2,4) (6,0). But then it would have taken 16 actions. Because cooking is often causally related to hunger, one does not wish to waste time with fruitless splashing and thus prefers to take the shortest route. But what *is* the shortest route?

Input

The first line of the input specifies the desired amount of liquid V. The second line contains N the number of cups available. We have $2 \leq N \leq 3$. The third and last line finally contains the volumes a_i of the cups, each volume separated by a single space. Every cup holds at most 300 deciliter. The desired amount of liquid of course does not exceed the volume of the largest cup.

Output

Your program is to determine the shortest way to achieve the desired amount of liquid *in any cup*. It has to output the number of required actions on the first line, followed by an equal number of lines, each of which specifies the level of liquid in the cups. The format should be the same as in the example above. The order of the cups should be the same as in the input file.

If there is no way to achieve the desired amount of liquid, your program should output the three characters "`:-(`".

Limits

- Subtask 1: $N = 2, 1 \leq a_i \leq 16$, only number of actions required
- Subtask 2: $N = 2, 1 \leq a_i \leq 16$
- Subtask 3: $N = 3, 1 \leq a_i \leq 16$, only number of actions required
- Subtask 4: $N = 3, 1 \leq a_i \leq 16$
- Subtask 5: $N = 2, 1 \leq a_i \leq 300$, only number of actions required
- Subtask 6: $N = 2, 1 \leq a_i \leq 300$
- Subtask 7: $N = 3, 1 \leq a_i \leq 300$, only number of actions required
- Subtask 8: $N = 3, 1 \leq a_i \leq 300$
- Subtask 9: $2 \leq N \leq 3, 1 \leq a_i \leq 300$, only number of actions required
- Subtask 10: $2 \leq N \leq 3, 1 \leq a_i \leq 300$

In the odd subtasks you are not required to note the number of cups. You only have to output one line. The following lines will be ignored hence no harm to output the solution as well.

Examples

Input	Output
6 2 9 4	8 1

Input	Output
6 2 4 100	-1 1