

Problem 5

Die Hard Problem

Assume you are given a set of receptacles of integer capacity c_1, c_2, \dots, c_n .

e.g.: 3, 5, 7, 11

These receptacles can contain water up to their capacity. Let x_i be the content of receptacle i .

Consider the following rules:

- Any receptacle can be filled with water or just emptied in a big sink:

`empty(i) { $x_i = 0$; }`

`fill(i) { $x_i = c_i$ }`

- Pick two receptacles i and j of capacities c_i and c_j . Then you can pour one receptacle into the other until either the source is empty or the recipient is full:

```
pour(i,j)
{
     $y_j = c_j - x_j$ ;
    if (  $x_i \leq y_j$  ) {
         $x_j = x_j + x_i$ ;
         $x_i = 0$ ;
    }
    else {
         $x_j = c_j$ ;
         $x_i = x_i - y_j$ ;
    }
}
```

After a finite number of applications of those rules each receptacle will contain an integer amount of water between 0 and its capacity. The total amount of water in the system will then be: $x_1 + x_2 + \dots + x_n$.

Write a program that takes as input a sequence of integer capacities and a quantity to achieve and determines, if it exists, a sequence of operations (empty, fill, pour) that leaves the system with an amount of water equal to the given quantity.

Input

Input will consist of a series of arguments, the first of which being the quantity to achieve q where $0 \leq q \leq c_1 + c_2 + \dots + c_n$. The remaining arguments will be the integer capacities of the receptacles c_1, c_2, \dots, c_n .

Output

Output should consist of a sequence of operations as defined above.

Sample input

```
diehard.exe 4 3 5
```

Sample output

```
fill(2)
pour(2,1)
empty(1)
pour(2,1)
fill(2)
pour(2,1)
```