Pouring Water … again…

The classical "**water pouring**" problem is defined as follows:

You are given 2 empty containers having capacities of ***x*** and ***y*** *units respectively* *(1 ≤* ***x, y*** *≤150). You are required to use the two containers to measure exactly* ***z*** units *(0 ≤* ***z*** *≤ 150) of water, by filling / disposing water, or pour water among the two containers. Several rules apply:*

- *When filling water (from water source) to a container, you have to either fill the container up to its maximum capacity, or until the water source is running out of water, whichever happen first.*

- *When disposing water from a container (not pouring it to another container), you have to completely empty the container. Water disposed is not recyclable.*

- *When pouring water from one container to another, you have to fill it up to a point that either the receiving container is full, or the source container is empty, whichever happen first.*

- *The problem is considered solved if exactly* ***z*** *liter of water is found in either container.*

To make the problem more interesting *(?)*, the original problem is changed slightly by imposing a maximum limit of water (***cap***) available from the water source.
(*0 ≤* ***cap*** *≤1000).*

Input Format

Input file contains a sequence of test cases and terminated by end-of-file. There are four integers on each line: **x, y**, **z** and **cap**, representing the capacities of the containers, the target amount, and the amount of water supply respectively. You may assume the test file contains no more than 200 test cases.

Sample Input

5 3 4 99
6 3 4 99

Output Format

The program should output one single integer for each case, followed by newline character. If the target amount (**z**) is achievable, the output number should be the minimum number of pouring steps. If the target amount is not achievable, output -1.

Sample Output

6

-1