problem 11
Chinese Remainder Theorem
7 points

You march into the next tent and quickly see many integers covering the walls, in an elegant calligraphy. A large portrait of the Chinese mathematician Sun Tzu decorates one wall. The one word "Remainders" is the title for a set of instructions:

In the third-century AD, Sun Tzu proposed a very powerful theorem, where numbers are represented as a set of simultaneous remainders. For example, if we use the base divisors 3, 5, and 7, we can uniquely identify any integer from 0 to 104 using only the remainders from those divisors. This is called "modulo arithmetic", where only the remainder is important to keep.

For example, when divided by [3, 5, 7], we represent a number as a set of remainders (x, y, z):

- the number 4 becomes (1, 4, 4).
- the number 20 becomes (2, 0, 6).
- the number 47 becomes (2, 2, 5).

The power of the theorem is made obvious when arithmetic is performed.

- For addition: 20 + 47 would be considered as (2, 0, 6)+(2, 2, 5) = (4, 2, 11), which becomes (1, 2, 4) when we divide by the original bases. And the number 67 = (1, 2, 4).
- Similarly for multiplication: 4 x 20 becomes (1, 4, 4) x (2, 0, 6) = (2, 0, 24), which reduces to (2, 0, 3) = 80.
- The operations can be performed on the smaller remainders and still represent the right answer for larger numbers.

The theorem works for any set of divisors [a, b, c] which are mutually prime (a, b, and c don't share common factors.) Your program will not need to do arithmetic, but will only need to identify the number represented by a set of remainders.

Input

Each line of input holds six integers "a b c x y z" separated by spaces. Each is less than 1000. The last line of input will be six -1s.

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3 5 7 2 0 6
7 15 16 3 2 1
23 49 96 3 30 77
127 541 59 17 120 15
21 23 40 0 0 0
-1 -1 -1 -1 -1 -1
```

Output

For each line, you must print the lowest positive integer N that meets the requirements:

- remainder(N/a) = x
- remainder(N/b) = y
- remainder(N/c) = z

N will have at most 6 digits.

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20
17
98765
999888
19320
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