

What's Next

According to Wikipedia, an arithmetic progression (AP) is a sequence of numbers such that the difference of any two successive members of the sequence is a constant. For instance, the sequence 3, 5, 7, 9, 11, 13 ... is an arithmetic progression with common difference 2. For this problem, we will limit ourselves to arithmetic progression whose common difference is a non-zero integer.

On the other hand, a geometric progression (GP) is a sequence of numbers where each term after the first is found by multiplying the previous one by a fixed non-zero number called the common ratio. For example, the sequence 2, 6, 18, 54 ... is a geometric progression with common ratio 3. For this problem, we will limit ourselves to geometric progression whose common ratio is a non-zero integer.

Given three successive members of a sequence, you need to determine the type of the progression and the next successive member.

Input

Your program will be tested on one or more test cases. Each case is specified on a single line with three integers ($-10,000 < a_1, a_2, a_3 < 10,000$) where a_1, a_2 , and a_3 are distinct.

The last case is followed by a line with three zeros.

Output

For each test case, your program must print a single line of the form:

XX v

where XX is either AP or GP depending if the given progression is an Arithmetic or Geometric Progression. v is the next member of the given sequence. All input cases are guaranteed to be either an arithmetic or geometric progressions.

Example

Input:

4 7 10

2 6 18

0 0 0

Output:

AP 13

GP 54