UVa Online Judge

1550 Coin Exchange

Let $a_1, a_2, \ldots, a_n$ be n relatively prime positive integers. A positive integer k has a representation by $a_1, a_2, \ldots, a_n$ if there exist non-negative integers $x_1, x_2, \ldots, x_n$ such that $k = x_1a_1 + x_2a_2 + \cdots + x_na_n$. The linear Diophantine problem of Frobenius is to determine the largest integer $g(a_1, a_2, \ldots, a_n)$ with no such representation.

The linear Diophantine problem of Frobenius has very practical application. It is equivalent to the problem of coin exchange. Given sufficient supply of coins of denominations $a_1, a_2, \ldots, a_n$, determine the largest amount which cannot be formed by means of these coins.

Mathematical problems, such as this, are usually difficult to solve. We shall consider a simple case in which $n = 2$. In addition to $g(a_1, a_2)$, we shall also want to find $n(a_1, a_2)$ the number of positive integers that cannot be represented by a_1 and a_2.

Write a program to compute $g(a_1, a_2)$ and $n(a_1, a_2)$. The following theorem may help you in designing your program.

> **Theorem:** A positive number $k = qa_1 + r$, $0 < r < a_1$, can be represented by $a_1, a_2, \ldots, a_n$ if and only if $k \geq t_r$, where t_r is the smallest positive integer which has the same residue r modulo a_1 and can be represented by $a_2, a_3, \ldots, a_n$.

Input

The input file will consist of one or more cases. Each case contains two positive integers a_1 and a_2 in a line. The product of a_1 and a_2 is less than 2^{32}. A line containing two zeros follows the last case, and terminates the input file.

Output

For each case a_1 and a_2 in the input file, the output file should contain a line with two numbers $g(a_1, a_2)$ and $n(a_1, a_2)$ separated by a blank.

Sample Input

```
3 5
23 20
0 0
```

Sample Output

```
7 4
417 209
```