ACM International Collegiate Programming Contest
ASIA Regional - Taejon

Problem B
Multiply
Input: mult.in

"$6 \times 9 = 42$" is not true for base 10, but is true for base 13. That is, $6_{(13)} \times 9_{(13)} = 42_{(13)}$ because $42_{(13)} = 4 \times 13^1 + 2 \times 13^0 = 54_{(10)}$.

You are to write a program which inputs three integers p, q, and r and determines the base B ($2 \le B \le 16$) for which $p \times q = r$. If there are many candidates for B, output the smallest one. For example, let $p = 11$, $q = 11$, and $r = 121$. Then we have $11_{(3)} \times 11_{(3)} = 121_{(3)}$ because $11_{(3)} = 1 \times 3^1 + 1 \times 3^0 = 4_{(10)}$ and $121_{(3)} = 1 \times 3^2 + 2 \times 3^1 + 1 \times 3^0 = 16_{(10)}$. For another base such as 10, we also have $11_{(10)} \times 11_{(10)} = 121_{(10)}$. In this case, your program should output 3 which is the smallest base. If there is no candidate for B, output 0.

Input
The input consists of T test cases. The number of test cases (T) is given in the first line of the input file. Each test case consists of three integers p, q, and r in a line. All digits of p, q, and r are numeric digits and $1 \le p, q, r \le 1,000,000$.

Output
Print exactly one line for each test case. The line should contain one integer which is the smallest base for which $p \times q = r$. If there is no such base, your program should output 0.

Sample Input (mult.in)	Output for the Sample Input
3 6 9 42 11 11 121 2 2 2	13 3 0