Problem J – Jaimina party invitations

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Jaimina is planning a party for her birthday. She will send physical invitations to all her friends, and to avoid wasting, she decided to make several invitations from each sheet of paper. For that, Jaimina makes cuts on the paper sheets satisfying three conditions:

- The cuts must be parallel to the sides of the sheets.
- All the resulting rectangles from a sheet must have the same dimensions.
- Jaimina will divide every sheet only by a number of rectangles that will be a power q of a prime number p.

Once she has the rectangles she will use for the invitations, she writes the message and decorates the perimeter of all the rectangles with colorful stripes.

Your task is helping her to know how many centimeters of stripes to buy. For this, you must consider that Jaimina will use as many sheets as different configurations are possible to create, so you must make sure that the stripes she buys will be enough to decorate all the resulting rectangles of all the different ways to convert the sheets into smaller rectangles with the mentioned conditions (each configuration is built exactly once).

We say two configurations are different if the dimensions of the resulting rectangles are distinct.

Input

The first line of the input contains an integer T ($1 \leq T \leq 1000$), representing the number of test cases that follows. Each of the next T lines describes a test case with four positive integers m, n, p and q separated by a space, where m and n represent the dimensions of the sheets of paper in centemeters ($1 \leq m \neq n \leq 10^{16}$), p ($1 \leq p \leq 10^{12}$) represents the prime number Jaimina has chosen to cut the sheets of paper and q ($1 \leq q \leq 10^{18}$) is the power she wants to use (i.e Jaimina wants to create p^q invitations from every single sheet).

Output

For each test case in the input, output a line containing an integer indicating the length of the stripes (in centimeters) that Jaimina needs. Because this number can be very large, output the remainder of dividing it by $10^9 + 7$.

Sample input 1	**Sample output 1**
4 10 12 5 1 2 5 2 2 1 8 3 2 700 1050 7 49	264 98 234 163939239