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# Mathematician Montu

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Problem

Submissions

Discussions

Time Limit: C/C++ (1s) , Java (2s)

Memory Limit: 256MB

Montu is a student of a great mathematician. The mathematician has a subtask to complete his research. He has two numbers N and M. He wants to find out how many integers  $1 \le x \le N$  are there such that gcd(x, N) = M.

For example, N=20 and M=4. There are exactly 4 numbers upto 20 where:

$$gcd(4,20) = gcd(8,20) = gcd(12,20) = gcd(16,20) = 4.$$

He is very much busy with his research. As Montu is his student, he assigned the task to Montu. But Montu is stuck with this task and he wants your help.

# **Input Format**

The first line contains one integer T — the number of test cases.

First line of each test case contains two integers N and Q.

The next line contains Q integers each representing the value M.

# Constraints

$$1 \le T \le 100$$

$$1 \leq N \leq 10^{12}$$

$$1 \le Q \le 10^5$$

$$1 < M < 10^{12}$$

Sum of  $m{Q}$  over all testcases does not exceed  $m{10^6}$ .

 $Use\ faster\ I/O\ methods.$ 

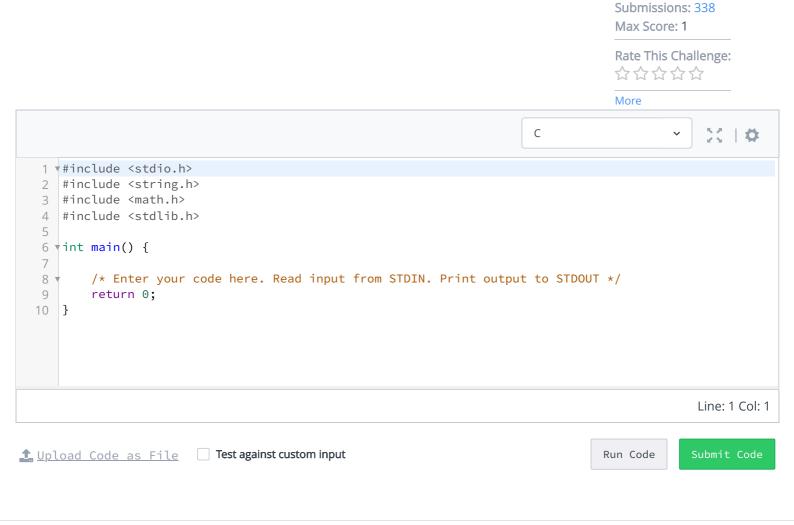
#### **Output Format**

For each testcase print Q space separated integers representing the answer for each query.

### Sample Input 0

# Sample Output 0

Case 1: 8 4 0 4 2 Case 2: 8 8 4 0 2 4



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