Discrete Math Problem

Given N, M and K (1 <= N, M <= 100^200 and 1 <= K <= 16) which

N = a + b
M = a^2 + b^2 - (2^K - 2) * a * b

with a > 0, b > 0 and gcd(a, b) = 1.

Your task is to find gcd(N, M).

Input

The input file consists of several data sets. The first line contains the number of data sets T (1 <= T <= 10000). The following T lines describe the data sets, one triple (N, M, K) for each.

Output

For each data test in the input write the gcd(N, M).

Example

Input:
2
648570884104668119354133 42064419170831084540306523305823558543832885746 5
8017723549 59173349743176010825 9

Output:
1
1

Note: For the first trio a = 6485708841046681193541 26 and b = 7.
For the second a = 8016478423 and b = 1245126.