

Incyde

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 1024 megabytes

Vanessa has n memories about humanity, numbered $0, 1, \dots, n - 1$, arranged in this order on a circle. *Vanessa* divides them into m contiguous intervals, computes the sum S_i of the elements in each interval, and defines the weight of the division as the greatest common divisor of all the S_i .

Through the Eye of *Horus*, *Vanessa* sees all $\binom{n}{m}$ possible divisions, but she cannot endure so many memories. You need to help her calculate the **product** of the weights of all divisions. Since the answer may be large, output it modulo $10^9 + 123$.

Recall that a positive integer is a common divisor of a set S if and only if it divides every element of S .

Input

This problem contains multiple test cases.

The first line contains a positive integer T ($1 \leq T \leq 100$), representing the number of test cases.

For each test case, the only line contains two integers n, m ($2 \leq m \leq n \leq 10^{12}$).

Output

For each test case, output one line containing an integer representing the answer.

Example

standard input	standard output
8	108
4 2	400
5 2	895412257
10 3	711051382
2026 1018	1
1000000123 114514	52312939
2000000247 1000000123	472236908
67325072148 1145141919	0
999000122877 1997	

Note

For the first test case, the weights of all six divisions are listed below:

- $\gcd(0, 1 + 2 + 3) = 6$
- $\gcd(0 + 1, 2 + 3) = 1$
- $\gcd(0 + 1 + 2, 3) = 3$
- $\gcd(1, 2 + 3 + 0) = 1$
- $\gcd(1 + 2, 3 + 0) = 3$
- $\gcd(2, 3 + 0 + 1) = 2$

Therefore, the answer is $6 \cdot 1 \cdot 3 \cdot 1 \cdot 3 \cdot 2 = 108$.