

13157 Prime Distance

You have an empty $1 \times n$ grid. The cells of the grid are indexed from 1 to n from left to right. You have to put m identical coins in the grid. A cell can contain zero or more coins. If you pick a pair of cells each containing at least one coin, the distance between the cells must be a prime number.

How many ways you can place the coins? As the number can be large, find answer modulo $10^9 + 7$. Two ways are different if there is at least one cell which contains different number of coins.

The distance between two cells indexed i, j is $|i - j|$.

Input

The first line contains T ($1 \leq T \leq 2000$) (the number of test cases). Each of the next T lines contains two integers n ($1 \leq n \leq 10^5$) and m ($1 \leq m \leq 10^5$) separated by a single space.

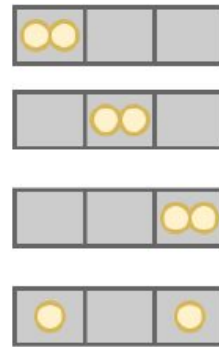
Output

For each case, print the case number and the answer modulo $10^9 + 7$.

Hint:

In the first case, you can put both coins in cell 1, 2 or 3. Or you can put a coin in cell 1 and put another coin in cell 3. See picture.

Note that in the 2nd case putting 3 coins in cell 1, 3, 5, is not valid, because the distance between cell 5 and cell 1 is a non-prime.



Sample Input

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2
3 2
6 3
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Sample Output

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Case 1: 4
Case 2: 24
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