Random Mex

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

Repeat the following operation N times: select an integer between 0 and $M-1$ uniformly at random. These selections are independent.

Let A_i be the integer selected in the i-th operation. Calculate the expected value of $\mathrm{mex}(A_1, A_2, \ldots, A_N)$ and output it modulo 998244353. Here, $\mathrm{mex}(A_1, A_2, \ldots, A_N)$ denotes the smallest non-negative integer not present in $A_1, A_2, \ldots, A_N$.

Definition of expected value modulo 998244353:

It can be proven that expected value sought in this problem will always be a rational number. Also, in the constraints of this problem, it is guaranteed that when the sought expected value is expressed in the form of an irreducible fraction $\frac{y}{x}$, x is not divisible by 998244353. In this case, there exists a unique $0 \leq z < 998244353$ satisfying $y \equiv xz \pmod{998244353}$, so output z.

Input

The input is given from Standard Input in the following format:

T
case_1
case_2
$\vdots$
case_T

Each case is given in the following format:

N M

- $1 \leq T \leq 3 \times 10^5$
- $1 \leq N, M \leq 8000$
- All input values are integers.

Output

For each test case, output a single integer — the answer to the test case modulo 998244353.

Example

standard input	standard output
4 3 2 1 1 20 23 8000 8000	374341634 1 111675632 994279778

Note

In the first test case, possible A's are $(0,0,0), (0,0,1), (0,1,0), (0,1,1), (1,0,0), (1,0,1), (1,1,0)$ and $(1,1,1)$. The corresponding values of mex are $1, 2, 2, 2, 2, 2, 2$ and 0. So the expected value is $\frac{13}{8}$.