Problem Měilì

Input file	`stdin`
Output file	`stdout`

We have two generators made by AI. One is wrong on one test, the other is wrong on another.

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The organizing committee decided to be very short, brief and terse with the statement of this problem, because of many obvious reasons.

We call an array of integer elements *chic* if the sum of its elements is even.

Consider $\nabla(N, M)$ = the number of arrays of N elements from $\{0, 1, \ldots, M\}$ such that the chosen array has an even number of *chic* subarrays.

Given N and M. compute

$$\sum_{i=0}^{M} \nabla(N, i) \mod 998244353.$$

Input

You will have to answer T tests. On the next T lines, you will be given two numbers, N and M, with their meaning explained above.

Output

You will have to print T integers – the answer for each case.

Restrictions

- $1 \le T \le 4$;
- $1 \le N \le 10^5$, for all tests;
- $1 \le M \le 10^9$, for all tests;
- A subarray of an array V with N elements is any contiguous subsequence of it (that is, of the form $V_l, V_{l+1}, \ldots, V_r$ for some l and r with $0 \le l \le r < N$).

#	Points	Restrictions
1	30	$N, M \leq 1\,000$
2	10	$M = 1$
3	60	No other restrictions

Examples

Input file	Output file	Explanations
2 1 3 2 3	4 0	There are $T = 2$ cases. For the first case, one can compute that $\nabla(1,0) = 0, \nabla(1,1) = 1, \nabla(1,2) = 1$ and $\nabla(1,3) = 2$. Thus, the sum is $(0 + 1 + 1 + 2) \bmod 998244353 = 4$. For the second case, it can be proven that there exist no arrays that satisfy the *chic* condition.