Problem E. Zero

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

An integer sequence $a_1, a_2, \cdots, a_n$ is called a zero sequence if and only if it satisfies the following conditions:

- For $i = 1, 2, \cdots, n-1$, $a_i \neq a_{i+1}$.
- The binary XOR sum of $a_1, a_2, \cdots, a_n$ is 0, i.e.,

$$\bigoplus_{i=1}^{n} a_i = 0$$

Given n and m, find the number of zero sequences of length n where each element is chosen from the set $\{0, 1, 2, \cdots, 2^m - 1\}$.

Input

The first line contains a positive integer T ($1 \leq T \leq 10^4$), indicating the number of test cases.

For each test case, one line contains two integers n, m ($1 \leq n \leq 10^9, 0 \leq m \leq 10^9$), representing the length of the sequence and the binary length of the sequence elements, respectively.

Output

For each test case, output one integer representing the answer modulo 998244353.

Example

standard input	standard output
5 1 3 2 3 3 3 4 3 5 3	1 0 49 392 2401