Problem J. Disbalance

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	512 mebibytes

Scientists discovered a new bacteria species that reproduces in a peculiar way. When there's x bacteria in one room, each minute they perform a telepathic communication, upon which one of them is selected to divide. The probability of each particular bacteria being selected is equal to $1/x$.

Scientists became interested in how well this division strategy is balanced. They placed n Petri dishes in a room, each dish with exactly 1 bacteria. After each divide, coefficient d was calculated in the following way. If the number of bacteria in one of the dishes was higher than in all other dishes combined, d was set to the difference between these two quantities. Otherwise, d was set to 0. Formally, if there are $a_1 \geq a_2 \geq \ldots \geq a_n$ bacteria in the dishes, then $d = \max(a_1 - a_2 - \ldots - a_n, 0)$.

Find the expected value of the sum of k numbers: the values of d after the first, second, ..., k-th minute of this study. It is possible to write the answer in the form $\frac{p}{q}$, where p and q are relatively prime integers and $q \not\equiv 0 \pmod{998\,244\,353}$. Output such integer r that $r \cdot q \equiv p \pmod{998\,244\,353}$.

Input

The first line contains an integer t, the number of test cases ($1 \leq t \leq 3 \cdot 10^5$).

Each of the following t lines describes one test case and contains two integers n and k ($1 \leq n, k \leq 10^6$).

It is guaranteed that the sum of all n and all k in all test cases is at most $2 \cdot 10^6$.

Output

For each test case, print a single line with a single integer r such that $r \cdot q \equiv p \pmod{998\,244\,353}$, where $\frac{p}{q}$ is the expected value of the sum of k numbers: the values of d after the first, second, ..., k-th minute of the study.

Example

standard input	*standard output*
8 1 1 1 2 2 1 2 2 3 1 3 2 3 3 4 3	2 5 1 332748120 0 499122177 299473307 598946612