Card Deck

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

There are 10^{100} cards numbered from 1 to 10^{100}, stacked so that card i is the i-th card from the top. There is one empty bag. You will perform the following operation exactly M times:

> Look at the top K cards, choose any number of them (possibly zero) and put those chosen cards into the bag. Return the unchosen cards to the top of the deck in their original relative order.

After all M operations, consider every possible set of cards that could be in the bag. Compute the sum of the sizes of those sets, then output that sum modulo 998244353.

You are given T test cases. For each test case, output the required value.

Input

The input is given in the following format:

```
T
case_1
⋮
case_T
```

Each test case is given as:

```
K M
```

- All input values are integers.

- $1 \le T \le 10^5$.

- $1 \le K < 998244353$.

- $1 \le M < 998244353$.

Output

Output T lines. On the i-th line, print the answer for the i-th test case.

Example

standard input	standard output
3 2 1 3 2 20250308 410338673	4 81 509595821

Note

In the first example, the possible sets of cards in the bag are $\{\}, \{1\}, \{2\}, \{1, 2\}$, and the sum of their sizes is 4.