

The 2021 Freshman Programming Contest

Hunan University



Problem E

Rain_w and Calculate

Time Limit: 1 second Memory Limit: 256 MB

Description

Rain_w doesn't like calculate. So, she wants you to help her with some questions. Firstly, Rain_w will give you an integer k and an integer q . Then she will ask you q questions. For the i -th question, she will give you two integers l_i and r_i , then you should help her to calculate $\sum_{s=l_i}^{r_i} s^k$. Because this number may be too large, she wants you to output this answer **module 998244353**. Please help her!

Input

The first line contains two integers $k(1 \leq k \leq 10^9)$, $q(1 \leq q \leq 10^5)$ separated by space.
Next q lines, the i -th line contains two integers $l_i, r_i(1 \leq l_i \leq r_i \leq 10^7)$ separated by space, described the i -th question.

Output

Your output should contain q lines. For the i -th line, you should output an integer in range $[0, 998244353)$, which is the answer of $\sum_{s=l_i}^{r_i} s^k \pmod{998244353}$.

Sample Input

Output for Sample input

2 5	285
1 9	90
2 6	1645
8 17	9025
95 95	725632098
9999999 10000000	