

F. Serval and Bonus Problem

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

Getting closer and closer to a mathematician, Serval becomes a university student on math major in Japari University. On the Calculus class, his teacher taught him how to calculate the expected length of a random subsegment of a given segment. Then he left a bonus problem as homework, with the award of a garage kit from IOI. The bonus is to extend this problem to the general case as follows.

You are given a segment with length l . We randomly choose n segments by choosing two points (maybe with non-integer coordinates) from the given segment equiprobably and the interval between the two points forms a segment. You are given the number of random segments n , and another integer k . The $2n$ endpoints of the chosen segments split the segment into $(2n + 1)$ intervals. Your task is to calculate the expected total length of those intervals that are covered by at least k segments of the n random segments.

You should find the answer modulo 998244353.

Input

First line contains three space-separated positive integers n , k and l ($1 \leq k \leq n \leq 2000$, $1 \leq l \leq 10^9$).

Output

Output one integer — the expected total length of all the intervals covered by at least k segments of the n random segments modulo 998244353.

Formally, let $M = 998244353$. It can be shown that the answer can be expressed as an irreducible fraction $\frac{p}{q}$, where p and q are integers and $q \not\equiv 0 \pmod{M}$. Output the integer equal to $p \cdot q^{-1} \pmod{M}$. In other words, output such an integer x that $0 \leq x < M$ and $x \cdot q \equiv p \pmod{M}$.

Examples

input	Copy
1 1 1	
output	Copy
332748118	
input	Copy
6 2 1	
output	Copy
760234711	
input	Copy
7 5 3	
output	Copy
223383352	
input	Copy
97 31 9984524	
output	Copy
267137618	

Note

Codeforces Round #551 (Div. 2)

Finished

Practice



→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++11 5.1.0

Choose file:

选择文件

 未选择任何文件

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

→ Problem tags

combinatorics math probabilities *2800
No tag edit access

→ Contest materials

- Announcement (en) ×
- Tutorial (en) ×

In the first example, the expected total length is $\int_0^1 \int_0^1 |x - y| \, dx \, dy = \frac{1}{3}$, and 3^{-1} modulo 998244353 is 332748118.

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