Problem B

Better than Bitcoin

Time Limit: 1.5 seconds

Alice and Bob have decided to invent a new cryptocurrency based on prime numbers, called the *Internet's Coolest PrimeCoin*. This is an absolutely fabulous idea, and there is no way that it could possibly go wrong.

As a reminder, a prime number is an integer *greater than* 1 that has no divisors other than 1 and itself. *In modern mathematics,* 1 *is not considered a prime number.*

After several months' worth of computations and shameless abuse of *the cloud*, Alice and Bob have finally managed to compute the first n prime numbers. These prime numbers shall serve as the basis of the cryptocurrency's Proof of Work... somehow. We don't know the details.

Anyway! Now we must decide who gets to keep each of these first n primes. For each prime, you must either give it to Alice or give it to Bob. Don't throw any away; they worked hard for those! We want to distribute the primes such that the total value that Alice and Bob each receive is *proportional* to the effort that each one contributed to the project.

Let A be the sum of the primes given to Alice, and let B be the sum of the primes given to Bob. Alice and Bob decided that it would be fair to divvy up the total value in a ratio of $p : q$. Thus, some distribution of primes will be considered *fair* if $A : B = p : q$. Because they're feeling extra cute today, p **and** q **are also guaranteed to be prime numbers**.

Given n, p, and q, *count* the number of different ways to fairly distribute the first n prime numbers between Alice and Bob. Two distributions are considered different if there was a prime number that was given to Alice in one, but to Bob in the other. The answer can be huge, so we only ask you to output the answer modulo 1169996969. Also, there will be T independent test cases per file.

Input Format

Input begins with a line containing the positive integer T.

Then, T lines follow. Each line contains the three space-separated integers n, p, and q, meaning that for this test case, the first n prime numbers must be distributed between Alice and Bob with total values in a $p : q$ ratio.

Constraints

- $1 \leq T \leq 10^5$
- $2 \leq n \leq 2000$
- $2 \leq p, q \leq 30$
- p and q are prime

Output Format

For each test case, output a single integer, the number of ways to fairly distribute the first n prime numbers between Alice and Bob. Since these answers can be quite large, you only need to output them modulo 1169996969.

Sample Input 1	Sample Output 1
2 3 7 7 8 2 5	2 4

Sample Input 2	Sample Output 2
3 1859 19 7 1967 2 17 2000 29 29	213519321 1086566377 0

Explanation

The first three prime numbers are $\{2,3,5\}$. To distribute these with a $7:7$ ratio, we can give $\{2,3\}$ to Alice and $\{5\}$ to Bob, *or* we can give $\{5\}$ to Alice and $\{2,3\}$ to Bob.

The first eight prime numbers are $\{2,3,5,7,11,13,17,19\}$. To distribute these with a $2:5$ ratio, we can...

- Give $\{3,19\}$ to Alice and $\{2,5,7,11,13,17\}$ to Bob.
- Give $\{5,17\}$ to Alice and $\{2,3,7,11,13,19\}$ to Bob.
- Give $\{2,3,17\}$ to Alice and $\{5,7,11,13,19\}$ to Bob.
- Give $\{2,7,13\}$ to Alice and $\{3,5,11,17,19\}$ to Bob.