Permutation Equations

Let N be a positive integer. Let's define a mapping f on the set of permutations of integers from 1 to N, inclusive. Let $x = (x[1], ..., x[N])$ be a permutation of integers from 1 to N, inclusive. We define the permutation $y = (y[1], ..., y[N])$ as follows.

- $y[1] = 1$.
- For $i > 1$ we consider number $z = x[y[i-1]]$.
  - If z does not equal any of the numbers $y[1], ..., y[i-1]$ then we set $y[i] = z$.
  - Otherwise $y[i]$ is defined as the smallest integer from 1 to N (inclusive) that does not equal any of the numbers $y[1], ..., y[i-1]$.

We consider permutation y as an image of x when mapping f is applied to x. That is, we set $f(x) = y$.

Denote by $g(y)$ the number of solutions of the equation $f(x) = y$. That is, $g(y)$ is the number of permutations x of integers from 1 to N, inclusive, such that $f(x) = y$.

Challenge
For the given non-negative integers L and R, find the number of permutations y of integers from 1 to N, inclusive, such that $L \le g(y) \le R$. Since this number can be quite large output it modulo ($10^9 + 7$).

Input Format
The first line contains an integer T denoting the number of test cases. T test cases follow.
Each test case consists of one line which contains three space-separated integers N, L and R.

Output Format
For each test case, output a single line containing P *mod* (10^9+7), where P is the required number of permutations.

Constraints

$1 \le T \le 1000$
$1 \le N \le 200,000$
$0 \le L, R \le 10^{18}$

Sample Input

```
4
2 0 0
3 2 2
3 0 10
10 2 1
```

Sample Output

```
1
1
```

```
6
0
```

Explanation

Example case 1. The only permutation y for which equation $f(x) = y$ has no solutions is $y = (2, 1)$.

Example case 2. The only permutation y for which equation $f(x) = y$ has 2 solutions is $y = (1, 3, 2)$. The solutions are $x = (3, 2, 1)$ and $x = (3, 1, 2)$.

Example case 3. For all 6 permutations y of numbers $\{1, 2, 3\}$ we have $0 \le g(y) \le 10$.

Example case 4. Be careful, L could be greater than R. In this case the answer is zero.