

Competitive Programming SS24

Submit until end of contest



Problem: creation (1.0 second timelimit)

You are thinking of creating an automated tool to build contests for you. You want to be able to specify the difficulty rating of the easiest and the hardest problem as well as the number of problems in the contest. Obviously you want at least one problem with the bounds given for the hardest and easiest problem. Since you have been doing competitive programming for quite some time for each difficulty rating you have an seemingly endless supply of problems.

Two contests are considered sufficiently distinct if there is a difficulty rating such that it occurs a different number of times in the two contests. You now wonder how many sufficiently distinct contests your program can generate given your constraints. Since this number can be quite large you just want its remainder $\text{mod } 10^9 + 7$ (a prime).

Input The first line contains t ($1 \leq t \leq 10^5$) the number of test cases.

In each of the next t lines there are three numbers l, h, n ($1 \leq l \leq h \leq 10^5, 2 \leq n \leq 10^5$) representing the lowest difficulty, the highest difficulty and the number of problems respectively.

Output For each test case print the number of sufficiently distinct contests your program can produce modulo $10^9 + 7$.

Sample input

```
5
1 3 2
1 3 3
1 5 4
2 2 222
1 2345 6789
```

Sample output

```
1
3
15
1
715170857
```

Sample explanation In the first sample there has to be exactly one problem with difficulties one and three respectively. There can be no sufficiently distinct contest.

In the second sample there has to be one problem with difficulty one and three respectively. The third problem can have difficulty one, two or three yielding 3 sufficiently distinct contests.

In the third sample you can choose the second easiest problem to have difficulty d_1 with $1 \leq d_1 \leq 5$. The second hardest problem then can have a difficulty d_2 with $d_1 \leq d_2 \leq 5$. Counting all possibilities yields 15.

In the fourth sample all problems have to be rated with difficulty 2, so there can be no two sufficiently different contests.