3145. Find Products of Elements of Big Array

Description

A **powerful array** for an integer `x` is the shortest sorted array of powers of two that sum up to `x`. For example, the powerful array for 11 is `[1, 2, 8]`.

The array `big_nums` is created by concatenating the **powerful** arrays for every positive integer `i` in ascending order: 1, 2, 3, and so forth. Thus, `big_nums` starts as `[1, 2, 1,2, 4, 1,4, 2,4, 1,2,4, 8, ...]`.

You are given a 2D integer matrix `queries`, where for `queries[i] = [from_i, to_i, mod_i]` you should calculate `(big_nums[from_i] * big_nums[from_i + 1] * ... * big_nums[to_i]) % mod_i`.

Return an integer array `answer` such that `answer[i]` is the answer to the `i^th` query.

Example 1:

Input: queries = [[1,3,7]]

Output: [4]

Explanation:

There is one query.

`big_nums[1..3] = [2,1,2]`. The product of them is 4. The remainder of 4 under 7 is 4.

Example 2:

Input: queries = [[2,5,3],[7,7,4]]

Output: [2,2]

Explanation:

There are two queries.

First query: `big_nums[2..5] = [1,2,4,1]`. The product of them is 8. The remainder of 8 under 3 is 2.

Second query: `big_nums[7] = 2`. The remainder of 2 under 4 is 2.

Constraints:

- `1 <= queries.length <= 500`
- `queries[i].length == 3`
- `0 <= queries[i][0] <= queries[i][1] <= 10^15`
- `1 <= queries[i][2] <= 10^5`