2188. Minimum Time to Finish the Race

Description

You are given a **0-indexed** 2D integer array `tires` where `tires[i] = [f_i, r_i]` indicates that the `i^th` tire can finish its `x^th` successive lap in `f_i * r_i^(x-1)` seconds.

- For example, if `f_i = 3` and `r_i = 2`, then the tire would finish its `1^st` lap in `3` seconds, its `2^nd` lap in `3 * 2 = 6` seconds, its `3^rd` lap in `3 * 2^2 = 12` seconds, etc.

You are also given an integer `changeTime` and an integer `numLaps`.

The race consists of `numLaps` laps and you may start the race with **any** tire. You have an **unlimited** supply of each tire and after every lap, you may **change** to any given tire (including the current tire type) if you wait `changeTime` seconds.

Return *the **minimum** time to finish the race.*

Example 1:

```
Input: tires = [[2,3],[3,4]], changeTime = 5, numLaps = 4
Output: 21
Explanation:
Lap 1: Start with tire 0 and finish the lap in 2 seconds.
Lap 2: Continue with tire 0 and finish the lap in 2 * 3 = 6 seconds.
Lap 3: Change tires to a new tire 0 for 5 seconds and then finish the lap in another 2 seconds.
Lap 4: Continue with tire 0 and finish the lap in 2 * 3 = 6 seconds.
Total time = 2 + 6 + 5 + 2 + 6 = 21 seconds.
The minimum time to complete the race is 21 seconds.
```

Example 2:

```
Input: tires = [[1,10],[2,2],[3,4]], changeTime = 6, numLaps = 5
Output: 25
Explanation:
Lap 1: Start with tire 1 and finish the lap in 2 seconds.
Lap 2: Continue with tire 1 and finish the lap in 2 * 2 = 4 seconds.
Lap 3: Change tires to a new tire 1 for 6 seconds and then finish the lap in another 2 seconds.
Lap 4: Continue with tire 1 and finish the lap in 2 * 2 = 4 seconds.
Lap 5: Change tires to tire 0 for 6 seconds then finish the lap in another 1 second.
Total time = 2 + 4 + 6 + 2 + 4 + 6 + 1 = 25 seconds.
The minimum time to complete the race is 25 seconds.
```

Constraints:

- `1 <= tires.length <= 10^5`
- `tires[i].length == 2`
- `1 <= f_i, changeTime <= 10^5`
- `2 <= r_i <= 10^5`
- `1 <= numLaps <= 1000`