Problem 2528: Maximize the Minimum Powered City

Problem Information

Difficulty: Hard
Acceptance Rate: 62.12%
Paid Only: No
Tags: Array, Binary Search, Greedy, Queue, Sliding Window, Prefix Sum

Problem Description

You are given a **0-indexed** integer array `stations` of length `n`, where `stations[i]` represents the number of power stations in the `ith` city.

Each power station can provide power to every city in a fixed **range**. In other words, if the range is denoted by `r`, then a power station at city `i` can provide power to all cities `j` such that `|i - j| <= r` and `0 <= i, j <= n - 1`.

* Note that `|x|` denotes **absolute** value. For example, `|7 - 5| = 2` and `|3 - 10| = 7`.

The **power** of a city is the total number of power stations it is being provided power from.

The government has sanctioned building `k` more power stations, each of which can be built in any city, and have the same range as the pre-existing ones.

Given the two integers `r` and `k`, return _the**maximum possible minimum power** of a city, if the additional power stations are built optimally._

Note that you can build the `k` power stations in multiple cities.

Example 1:

Input: stations = [1,2,4,5,0], r = 1, k = 2 **Output:** 5 **Explanation:** One of the optimal ways is to install both the power stations at city 1. So stations will become [1,4,4,5,0]. - City 0 is provided by 1 + 4 = 5 power stations. - City 1 is provided by 1 + 4 + 4 = 9 power stations. - City 2 is provided by 4 + 4 + 5 = 13 power stations. - City 3 is provided by 5 + 4 = 9 power

stations. - City 4 is provided by 5 + 0 = 5 power stations. So the minimum power of a city is 5. Since it is not possible to obtain a larger power, we return 5.

Example 2:

Input: stations = [4,4,4,4], r = 0, k = 3 **Output:** 4 **Explanation:** It can be proved that we cannot make the minimum power of a city greater than 4.

Constraints:

* `n == stations.length` * `1 <= n <= 105` * `0 <= stations[i] <= 105` * `0 <= r <= n - 1` * `0 <= k <= 109`

Code Snippets

C++:

```
class Solution {
public:
long long maxPower(vector<int>& stations, int r, int k) {

}
};
```

Java:

```
class Solution {
public long maxPower(int[] stations, int r, int k) {

}
}
```

Python3:

```
class Solution:
def maxPower(self, stations: List[int], r: int, k: int) -> int:
```