

2526. Longest Increasing Subsequence II

Difficulty : Hard

<https://leetcode.com/problems/longest-increasing-subsequence-ii>

You are given an integer array `nums` and an integer `k`.

Find the longest subsequence of `nums` that meets the following requirements:

- The subsequence is **strictly increasing** and
- The difference between adjacent elements in the subsequence is **at most** `k`.

Return *the length of the **longest subsequence** that meets the requirements*.

A **subsequence** is an array that can be derived from another array by deleting some or no elements without changing the order of the remaining elements.

Example 1:

Input: `nums = [4,2,1,4,3,4,5,8,15]`, `k = 3`

Output: 5

Explanation:

The longest subsequence that meets the requirements is `[1,3,4,5,8]`.

The subsequence has a length of 5, so we return 5.

Note that the subsequence `[1,3,4,5,8,15]` does not meet the requirements because `15 - 8 = 7` is larger than 3.

Example 2:

Input: `nums = [7,4,5,1,8,12,4,7]`, `k = 5`

Output: 4

Explanation:

The longest subsequence that meets the requirements is `[4,5,8,12]`.

The subsequence has a length of 4, so we return 4.

Example 3:

Input: `nums = [1,5]`, `k = 1`

Output: 1

Explanation:

The longest subsequence that meets the requirements is `[1]`.

The subsequence has a length of 1, so we return 1.

Constraints:

- $1 \leq \text{nums.length} \leq 10^5$
- $1 \leq \text{nums}[i], k \leq 10^5$