1725. Number of Sets of K Non-Overlapping Line Segments

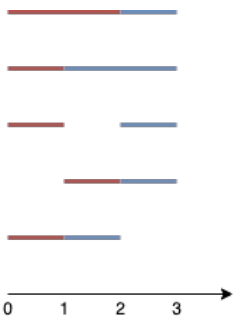
Difficulty : Medium

https://leetcode.com/problems/number-of-sets-of-k-non-overlapping-line-segments

Given `n` points on a 1-D plane, where the `i`th point (from `0` to `n-1`) is at `x = i`, find the number of ways we can draw **exactly** `k` **non-overlapping** line segments such that each segment covers two or more points. The endpoints of each segment must have **integral coordinates**. The `k` line segments **do not** have to cover all `n` points, and they are **allowed** to share endpoints.

Return *the number of ways we can draw* `k` *non-overlapping line segments.* Since this number can be huge, return it **modulo** `10`^{9} `+ 7`.

Example 1:




```
Input: n = 4, k = 2
Output: 5
Explanation: The two line segments are shown in red and blue.
The image above shows the 5 different ways {(0,2),(2,3)}, {(0,1),(1,3)}, {(0,1),(2,3)}, {(1,2),(2,3)}, {(0,1),(1,2)}.
```

Example 2:

```
Input: n = 3, k = 1
Output: 3
Explanation: The 3 ways are {(0,1)}, {(0,2)}, {(1,2)}.
```

Example 3:

```
Input: n = 30, k = 7
Output: 796297179
Explanation: The total number of possible ways to draw 7 line segments is 3796297200. Taking this number modulo 10^9 + 7 gives us 796297179.
```

Constraints:

- `2 <= n <= 1000`
- `1 <= k <= n-1`