

[CS 11] Prac 10i – Weakest Link

Problem Statement

Steve has just learned how to make chainmail armor, and he now wants to make one.

He needs several *chains* to make chainmail armor, so he went to the local *chain store* to buy some. The chain store sells chains in a weird way. First, they display n *links* in a row in front of their store. Then, to buy a chain, you select a *contiguous* subsequence of the links. The store will make copies of those links for you and turn them into a chain. You then pay with cash—credit cards are not accepted.

More formally, if we number the links 1 to n from left to right, then you buy a chain by selecting two links i and j with $1 \leq i \leq j \leq n$, and the store will make a chain out of copies of links i to j , inclusive.

Thus, you can buy $n(n + 1)/2$ distinct chains from the store. Steve went ahead and bought exactly one of each distinct chain, so he now has $n(n + 1)/2$ chains.

However, he soon realized that this was a bad idea—most of the chains are weak, because a chain is only as strong as its *weakest* link! More formally, if link i has a strength of s_i , then the strength of the chain formed from links i to j is the minimum among s_i, s_{i+1}, \dots, s_j .

What is the strength of the k th strongest chain in Steve's collection?

Task Details

Your task is to implement a function called `kth_strongest_chain`. This function has two positional arguments:

- the first is the `int` k ;
- the second is a `tuple`/`list` of n `int`'s representing the strength values (" s_i " above).

The function must return an `int` denoting the strength of the k th strongest chain.

Restrictions

(See 10a for more restrictions)

For this problem in particular:

- The following symbols are allowed: `map`, `filter`.
- The following import is allowed: `cache` and `lru_cache` from `functools`.
- The source code limit is 1000.

Example Calls

Example 1 Function Call

```
kth_strongest_chain(3, (4, 6, 6, 9, 2, 0, 1, 6))
```

Example 1 Return Value

```
6
```

Example 2 Function Call

```
kth_strongest_chain(1, (4, 6, 6, 9, 2, 0, 1, 6))
```

Example 2 Return Value

```
9
```

Example 3 Function Call

```
kth_strongest_chain(11, [4, 6, 6, 9, 2, 0, 1, 6])
```

Example 3 Return Value

```
4
```

Constraints

- The function `kth_strongest_chain` will be called at most 60,000 times.
- The sum of n s across all calls will be $\leq 250,000$.
- $1 \leq n \leq 250,000$
- $1 \leq k \leq n(n + 1)/2$
- Each strength value is an integer between 0 and 10^{10} .

Scoring

- You get 55 🍷 points if you solve all test cases where:
 - $n \leq 50$
 - The sum of the n s across all calls is 500.
- You get 50 🍷 points if you solve all test cases where:
 - $n \leq 4,000$
 - The sum of the n s across all calls is 8,000.
- You get 65 🍷 points if you solve all test cases.

Clarifications

No clarifications have been made at this time.

Report an issue

Submit solution

[CS 11]

Practice 10

My submissions

✓ Points: 170 (partial)

⌚ Time limit: 8.0s

📄 Memory limit: 1G

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➤ Problem type

▼ Allowed languages NONE, py3