PAINLESS

MaxNonoverlappingSegments

START

Find a maximal set of non-overlapping segments.

Programming language: C++

Located on a line are N segments, numbered from 0 to N − 1, whose positions are given in zero-indexed arrays A and B. For each I (0 ≤ I < N) the position of segment I is from A[I] to B[I] (inclusive). The segments are sorted by their ends, which means that B[K] ≤ B[K + 1] for K such that 0 ≤ K < N − 1.

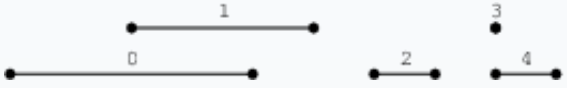
Two segments I and J, such that I ≠ J, are *overlapping* if they share at least one common point. In other words, A[I] ≤ A[J] ≤ B[I] or A[J] ≤ A[I] ≤ B[J].

We say that the set of segments is *non-overlapping* if it contains no two overlapping segments. The goal is to find the size of a non-overlapping set containing the maximal number of segments.

For example, consider arrays A, B such that:

```
A[0] = 1    B[0] = 5
A[1] = 3    B[1] = 6
A[2] = 7    B[2] = 8
A[3] = 9    B[3] = 9
A[4] = 9    B[4] = 10
```

The segments are shown in the figure below.



The size of a non-overlapping set containing a maximal number of segments is 3. For example, possible sets are {0, 2, 3}, {0, 2, 4}, {1, 2, 3} or {1, 2, 4}. There is no non-overlapping set with four segments.

Write a function:

```
int solution(vector<int> &A, vector<int> &B);
```

that, given two zero-indexed arrays A and B consisting of N integers, returns the size of a non-overlapping set containing a maximal number of segments.

For example, given arrays A, B shown above, the function should return 3, as explained above.

Assume that:

- N is an integer within the range [0..30,000];
- each element of arrays A, B is an integer within the range [0..1,000,000,000];
- A[I] ≤ B[I], for each I (0 ≤ I < N);
- B[K] ≤ B[K + 1], for each K (0 ≤ K < N − 1).

Complexity:

- expected worst-case time complexity is O(N);
- expected worst-case space complexity is O(N), beyond input storage (not counting the storage required for input arguments).

Elements of input arrays can be modified.

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