
K-th element

P63584_en

Examen final d'Algorísmia, FME (2015-01-16)

Using the definitions

```
typedef vector<int> VI;  
typedef vector<VI> VVI;
```

implement a function

```
int k_esim(int k, const VVI& V);
```

to return the k -th global element (starting at one) of the elements in the vector of vectors V . Let $n = V.size()$. For every $0 \leq i < n$, $V[i]$ is sorted increasingly. Furthermore, there are no repeated elements in V .

For example, if $k = 5$, $n = 3$, and the three vectors are

```
V[0] [ 1 | 2 | 10 | 15 ]  
V[1] [-5 | -3 | 12 ]  
V[2] [ 0 | 3 | 4 | 6 | 20 ]
```

then the answer is 2, which is the fifth smallest element inside all the vectors.

Let $m = \sum_0^{n-1} V[i].size()$. Assume that k is between 1 and m , that n is between 2 and 500, and that some $V[i]$ can be empty. If needed, you can implement auxiliar procedures. Take into account that, for the "large" test cases, $k = \Theta(n)$ and $m = \Theta(n^2)$. The expected solution in this cas has cost $\Theta(n \log n)$.

Observation

You only need to submit the required procedure; your main program will be ignored.

Problem information

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