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## K-th element

P63584\_en

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

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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
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$V[1]$ 

-5	-3	12
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$V[2]$ 

0	3	4	6	20
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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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