

UPCOMING
CHALLENGES:CURRENT
CHALLENGES:

Scandium 2016

PAST CHALLENGES


Indeed Prime
Challenge
Indeed Prime 2
Indeed Prime

Calcium 2015

Kalium 2015

Argon 2015

Chlorum 2014

Sulphur 2014

Phosphorus
2014

Silicium 2014

Aluminium 2014

RESPECTABLE

Flags

START

Find the maximum number of flags that can be set on mountain peaks.

Programming language: C++ ▼

A non-empty zero-indexed array A consisting of N integers is given.

A *peak* is an array element which is larger than its neighbours. More precisely, it is an index P such that $0 < P < N - 1$ and $A[P - 1] < A[P] > A[P + 1]$.

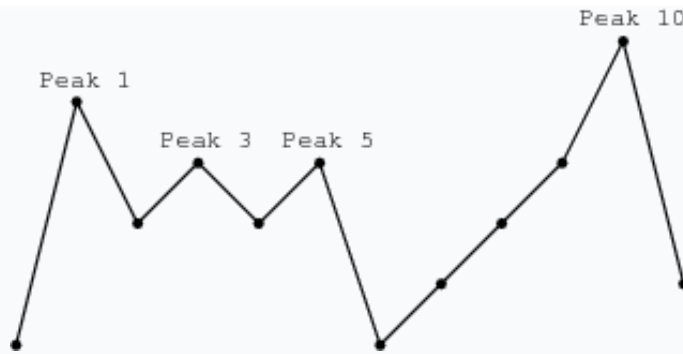
For example, the following array A :

```
A[0] = 1
A[1] = 5
A[2] = 3
A[3] = 4
A[4] = 3
A[5] = 4
A[6] = 1
A[7] = 2
A[8] = 3
A[9] = 4
A[10] = 6
A[11] = 2
```

has exactly four peaks: elements 1, 3, 5 and 10.

You are going on a trip to a range of mountains whose relative heights are represented by array A , as shown in a figure below. You have to choose how many flags you should take with you. The goal is to set the maximum number of flags on the peaks, according to certain rules.

Magnesium 2014
Natrium 2014
Neon 2014
Fluorum 2014
Oxygenium 2014
Nitrogenium 2013
Carbo 2013
Boron 2013
Beryllium 2013
Lithium 2013
Helium 2013
Hydrogenium 2013
Omega 2013
Psi 2012
Chi 2012
Phi 2012
Upsilon 2012
Tau 2012



Flags can only be set on peaks. What's more, if you take K flags, then the distance between any two flags should be greater than or equal to K . The distance between indices P and Q is the absolute value $|P - Q|$.

For example, given the mountain range represented by array A , above, with $N = 12$, if you take:

- two flags, you can set them on peaks 1 and 5;
- three flags, you can set them on peaks 1, 5 and 10;
- four flags, you can set only three flags, on peaks 1, 5 and 10.

You can therefore set a maximum of three flags in this case.

Write a function:

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

that, given a non-empty zero-indexed array A of N integers, returns the maximum number of flags that can be set on the peaks of the array.

For example, the following array A :

```
A[0] = 1
A[1] = 5
A[2] = 3
A[3] = 4
A[4] = 3
A[5] = 4
A[6] = 1
A[7] = 2
A[8] = 3
A[9] = 4
A[10] = 6
A[11] = 2
```

the function should return 3, as explained above.

Assume that:

- N is an integer within the range $[1..400,000]$;
- each element of array A is an integer within the

range [0..1,000,000,000].

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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Sigma 2012

Rho 2012

Pi 2012

Omicron 2012

Xi 2012

Nu 2011

Mu 2011

Lambda 2011

Kappa 2011

Iota 2011

Theta 2011

Eta 2011

Zeta 2011

Epsilon 2011

Delta 2011

Gamma 2011

Beta 2010

Alpha 2010

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Contact us:

For customer support queries:

UK +44 (0) 208 970 78 68

US 1-415-466-8085
support@codility.com

For sales queries:

UK +44 (0) 208 970 78 67

US 1-415-466-8085
sales@codility.com

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