

UPCOMING  
CHALLENGES:CURRENT  
CHALLENGES:  
Indeed Prime  
Challenge

Scandium 2016

PAST CHALLENGES

  
Indeed Prime 2  
Indeed Prime

Calcium 2015

Kalium 2015

Argon 2015

Chlorum 2014

Sulphur 2014

Phosphorus  
2014

Silicium 2014

Aluminium 2014

PAINLESS

## StoneWall

START

Cover "Manhattan skyline" using the minimum number of rectangles.

Programming language: Solution to this task can be found at [our blog](#).

You are going to build a stone wall. The wall should be straight and  $N$  meters long, and its thickness should be constant; however, it should have different heights in different places. The height of the wall is specified by a zero-indexed array  $H$  of  $N$  positive integers.  $H[I]$  is the height of the wall from  $I$  to  $I+1$  meters to the right of its left end. In particular,  $H[0]$  is the height of the wall's left end and  $H[N-1]$  is the height of the wall's right end.

The wall should be built of cuboid stone blocks (that is, all sides of such blocks are rectangular). Your task is to compute the minimum number of blocks needed to build the wall.

Write a function:

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

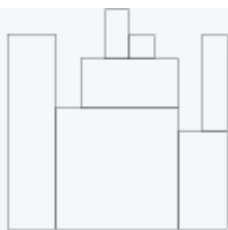
that, given a zero-indexed array  $H$  of  $N$  positive integers specifying the height of the wall, returns the minimum number of blocks needed to build it.

For example, given array  $H$  containing  $N = 9$  integers:

$H[0] = 8$	$H[1] = 8$	$H[2] = 5$
$H[3] = 7$	$H[4] = 9$	$H[5] = 8$
$H[6] = 7$	$H[7] = 4$	$H[8] = 8$

the function should return 7. The figure shows one possible arrangement of seven blocks.

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



Assume that:

- $N$  is an integer within the range  $[1..100,000]$ ;
- each element of array  $H$  is an integer within the range  $[1..1,000,000,000]$ .

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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<b>Sigma 2012</b>
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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