https://www.1point3acres.com/bbs/forum.php?mod=viewthread&tid=458054&extra=&highlight=wayfair%2Blabs%2BOA&page=1

1. bug fix

把一个if 改成while就可以了。很简单

You are given an implementation of a function:

```
def solution(A, B)
```

that, given a non-empty array A of N non-negative integers and a non-empty array B of M non-negative integers, returns the minimal value that occurs in both arrays. If there is no such value, the function should return −1.

For example, given arrays A and B such that:

```
A[0] = 1    B[0] = 4
A[1] = 3    B[1] = 2
A[2] = 2    B[2] = 5
A[3] = 1    B[3] = 3
            B[4] = 2
```

your function should return 2, since 2 is the minimal value which occurs in both arrays A and B (another value which occurs in both arrays is 3).

Given arrays A and B such that:

```
A[0] = 2    B[0] = 3
A[1] = 1    B[1] = 3
```

your function should return −1, since there is no value that occurs in both arrays.

The attached code is still **incorrect** on some inputs. Despite the error(s), the code may produce a correct answer for the example test cases. The goal of the exercise is to find and fix the bug(s) in the implementation. You can modify at most **two** lines.

2. Castle

Task English

Charlemagne, the King of Frankia, is considering building some castles on the border with Servia. The border is divided into N segments. The King knows the height of the terrain in each segment of the border. The height of each segment of terrain is stored in array A, with A[P] denoting the height of the P-th segment of the border. The King has decided to build a castle on top of every hill and in the bottom of every valley.

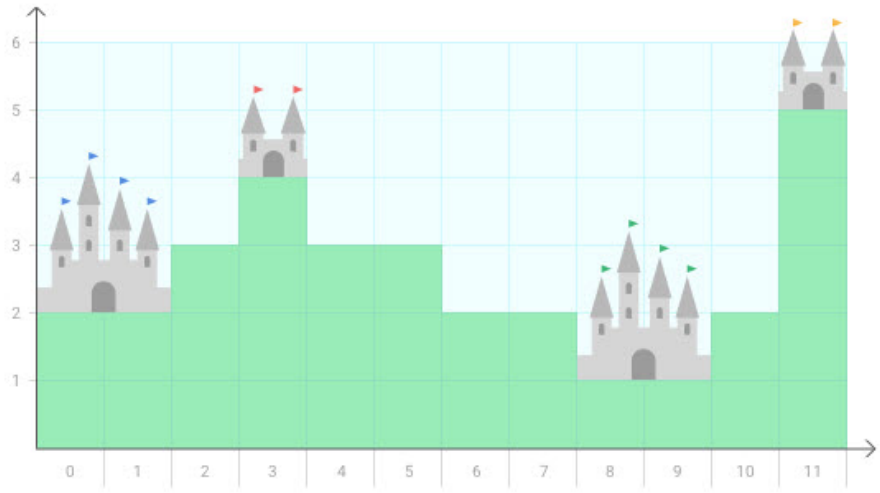
Let [P..Q] denote a group of consecutive segments from P to Q inclusive such that ($0 \le P \le Q \le N-1$). Segments [P..Q] form a hill or a valley if all the following conditions are satisfied:

- The terrain height of each segment from P to Q is the same (A[P] = A[P+1] = ... = A[Q]);
- If P > 0 then A[P−1] < A[P] (for a hill) or A[P−1] > A[P] (for a valley);
- If Q < N−1 then A[Q+1] < A[Q] (for a hill) or A[Q+1] > A[Q] (for a valley);

That is, a hill is higher than its surroundings and a valley is lower than its surroundings. Note that if the surroundings on either side of the hill or valley don't exist (i.e. at the edges of the area under consideration, where P = 0 or Q = N−1), then the condition is considered satisfied for that side of the hill/valley.

The king is wondering how many castles is he going to build. Can you help him?

For example, consider the following array A = [2, 2, 3, 4, 3, 3, 2, 2, 1, 1, 2, 5].



3. binomial coefficient

The *binomial coefficient* B(N, K) is defined for integers N and K such that $0 \leq K \leq N$ as follows:

- B(N, K) = factorial(N) / (factorial(K) * factorial(N−K))
- factorial(0) = 1
- factorial(L) = 1 * 2 * 3 * ... * (L−1) * L if L > 0

For example, B(5, 3) = 10, because:

```
B(5, 3) = factorial(5) / (factorial(3) * factorial(2))
        = (1*2*3*4*5) / ((1*2*3) * (1*2))
        = 120 / (6 * 2)
        = 120 / 12
        = 10
```

Write a function:

```
def solution(N, K)
```

that, given two integers N and K, returns the value of B(N, K).
The function should return −1 if the result exceeds 1,000,000,000.
The function should return −1 if the result is undefined.

For example, given N = 5 and K = 3 the function should return 10, as explained above.
Given N = 40 and K = 20, the function should return −1, because B(40, 20) exceeds 1,000,000,000 (indeed, B(40, 20) = 137,846,528,820).
Given N = 3 and K = 5, the function should return −1, because the result is undefined.

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4. 灯泡题

Task

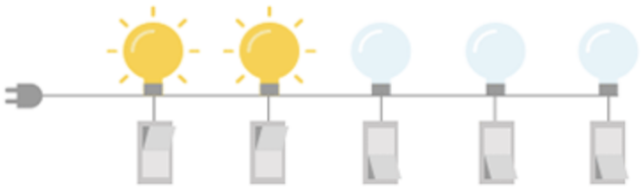
There are N bulbs, numbered from 1 to N, arranged in a row. The first bulb is plugged into the power socket and each successive bulb is connected to the previous one (the second bulb to the first, the third bulb to the second, etc.).

Initially, all the bulbs are turned off. At moment K (for K from 0 to N−1), we turn on the A[K]-th bulb. A bulb shines if it is on and all the previous bulbs are turned on too.

Write a function `solution` that, given an array A of N different integers from 1 to N, returns the number of moments for which every turned on bulb shines.

Examples:

1. Given A=[2, 1, 3, 5, 4], the function should return 3.



- At the 0th moment only the 2nd bulb is turned on, but it does not shine because the previous one is not on.
- At the 1st moment two bulbs are turned on (1st and 2nd) and both of them shine.
- At the 2nd moment three bulbs are turned on (1st, 2nd and 3rd) and all of them shine.
- At the 3rd moment four bulbs are turned on (1st, 2nd, 3rd and 5th), but the 5th bulb does not shine because the previous one is not turned on.
- At the 4th moment five bulbs are turned on (1st, 2nd, 3rd, 4th and 5th) and all five of them shine.

There are three moments (1st, 2nd and 4th) when every turned on bulb shines.

2. Given A=[2, 3, 4, 1, 5], the function should return 2 (at the 3rd and 4th moment every turned on bulb shines).

3. Given A=[1, 3, 4, 2, 5], the function should return 3 (at the 0th, 3rd and 4th moment every turned on bulb shines).

Write an **efficient** algorithm for the following assumptions:

- N is an integer within the range [1.. 100,000]
- the elements of A are all distinct
- each element of array A is an integer within the range [1..N]

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5. Binary String to zero

以string形式给了一个non-negative integer的二进制,可以进行两种运算，如果奇数就减一，如果偶数就除二，直到结果为0，问一共需要多少次运算

A non-negative integer variable V is given. There are two actions available that modify its value:

- if V is odd, subtract 1 from it;
- if V is even, divide it by 2.

These actions are performed until the value of V becomes 0.

For example, if V initially contains value 28, it will become 0 after seven steps:

- V contains value 28, which is even: divide by 2 and obtain 14;
- V contains value 14, which is even: divide by 2 and obtain 7;
- V contains value 7, which is odd: subtract 1 and obtain 6;
- V contains value 6, which is even: divide by 2 and obtain 3;
- V contains value 3, which is odd: subtract 1 and obtain 2;
- V contains value 2, which is even: divide by 2 and obtain 1;
- V contains value 1, which is odd: subtract 1 and obtain 0.

Write a function:

```
class Solution { public int solution(String S); }
```

that, given a zero-indexed string S consisting of N characters containing a binary representation of the initial value of variable V, returns the number of steps after which the value of V will become 0, as described above.

For example, given string S = "011100" the function should return 7, because string S represents the number 28 and 28 becomes 0 after seven steps, as explained above.

Write an **efficient** algorithm for the following assumptions:

- N is an integer within the range [1..1,000,000];
- string S consists only of the characters "0" and/or "1";
- the binary representation is big-endian, i.e. the first

6. 天际线+水平粉刷

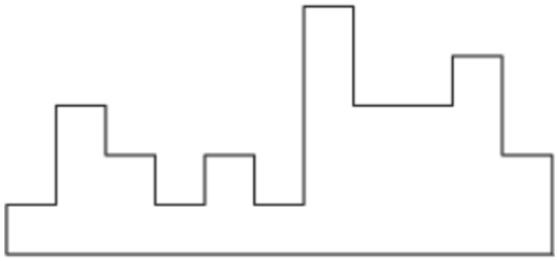
给你一个array，index 代表楼， values 代表楼的高度。横着每刷一次可以刷那一层相连的所有楼层，问最少画多少下可以刷完所有楼的面积。地里也有人面道了这个题。

Your room is being decorated. On the largest wall you would like to paint a skyline. The skyline consists of rectangular buildings arranged in a line. The buildings are all of the same width, but they may have different heights. The skyline shape is given as an array A whose elements specify the heights of consecutive buildings.

For example, consider array A such that:

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

The shape specified by this array is represented by the figure below.



You would like to paint the skyline using continuous horizontal brushstrokes. Every horizontal stroke is one unit high and arbitrarily wide. The goal is to calculate the minimum number of horizontal strokes needed. For example, the above shape can be painted using nine horizontal strokes.

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新鲜wayfair labs在线测试
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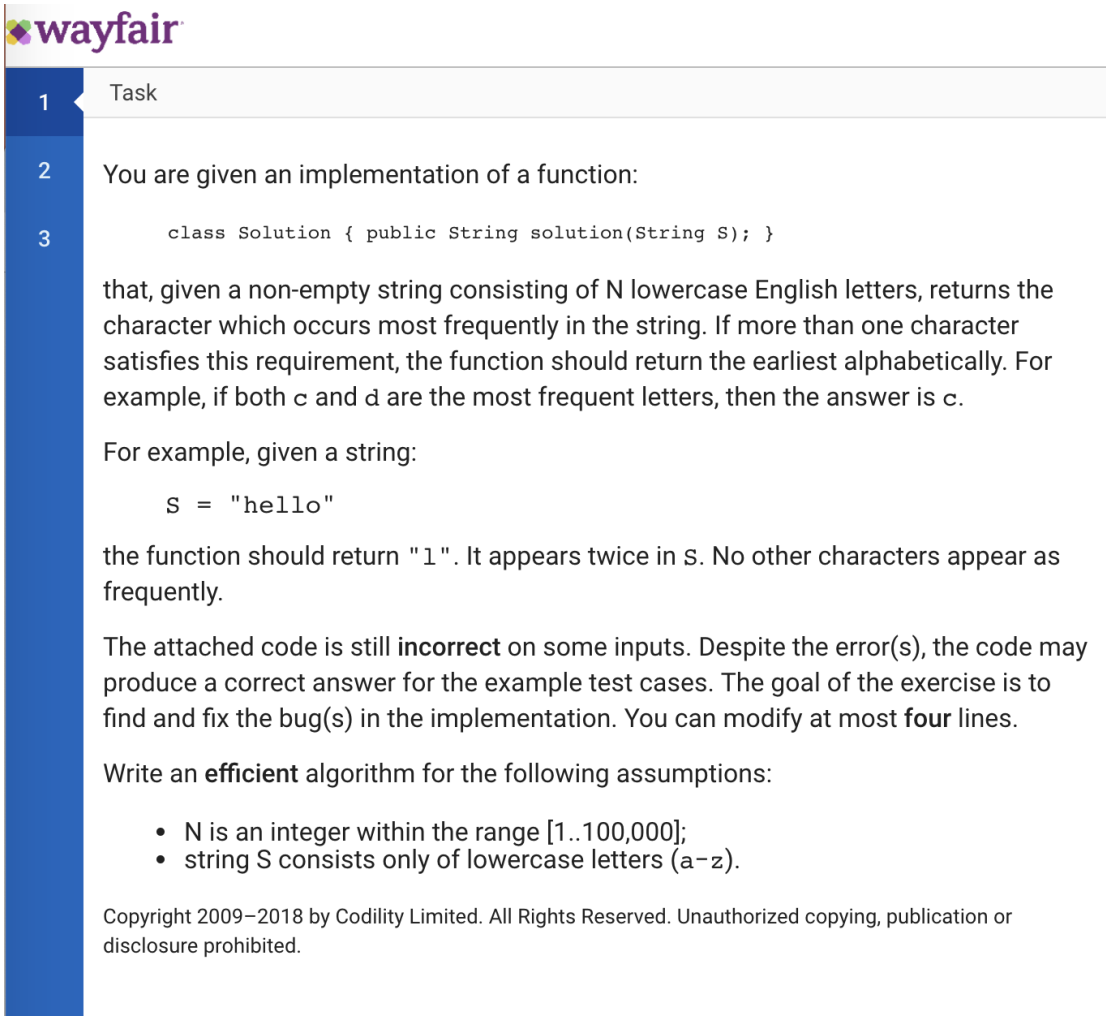
- 纯debug：most frequent char in string，提一句，debug点在于要求返回earliest char alphabetically

7. Bug fix - most frequently occurred char



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Task

You are given an implementation of a function:

```
class Solution { public String solution(String S); }
```

that, given a non-empty string consisting of N lowercase English letters, returns the character which occurs most frequently in the string. If more than one character satisfies this requirement, the function should return the earliest alphabetically. For example, if both `c` and `d` are the most frequent letters, then the answer is `c`.

For example, given a string:

```
S = "hello"
```

the function should return `"l"`. It appears twice in `S`. No other characters appear as frequently.

The attached code is still **incorrect** on some inputs. Despite the error(s), the code may produce a correct answer for the example test cases. The goal of the exercise is to find and fix the bug(s) in the implementation. You can modify at most **four** lines.

Write an **efficient** algorithm for the following assumptions:

- N is an integer within the range [1..100,000];
- string S consists only of lowercase letters (`a-z`).

8. distance sum

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Task

Let A be a non-empty array consisting of N integers. A *sum-distance* of a pair of indices (P, Q), for $0 \leq P \leq Q < N$, is the value A[P] + A[Q] + (Q − P).

For example, for the following array A:

```
A[0] =  1
A[1] =  3
A[2] = -3
```

there are the following pairs of indices: (0, 0), (1, 1), (2, 2), (0, 1), (1, 2), (0, 2), for each of which the sum-distance is defined as follows:

- for (0, 0) it is A[0] + A[0] + (0 − 0) = 1 + 1 + 0 = 2,
- for (1, 1) it is A[1] + A[1] + (1 − 1) = 3 + 3 + 0 = 6,
- for (2, 2) it is A[2] + A[2] + (2 − 2) = (−3) + (−3) + 0 = −6,
- for (0, 1) it is A[0] + A[1] + (1 − 0) = 1 + 3 + 1 = 5,
- for (1, 2) it is A[1] + A[2] + (2 − 1) = 3 + (−3) + 1 = 1,
- for (0, 2) it is A[0] + A[2] + (2 − 0) = 1 + (−3) + 2 = 0.

Write a function:

```
class Solution { public int solution(int[] A); }
```

that, given an array A consisting of N integers, returns the maximal sum-distance value for this array.

For example, given the following array A:

```
A[0] =  1
A[1] =  3
A[2] = -3
```

the function should return 6, as explained above.

Given the following array A:

```
A[0] = -8
A[1] =  4
A[2] =  0
A[3] =  5
A[4] = -3
A[5] =  6
```

the function should return 4 + 6 + (5 − 1) = 14.

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Bug Fix

- Top K frequent words
- Smallest common numbers of two sorted array

Wayfair Lab OA
https://www.1point3acres.com/bbs/forum.php?mod=viewthread&tid=480947

(出处: 一亩三分地)

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