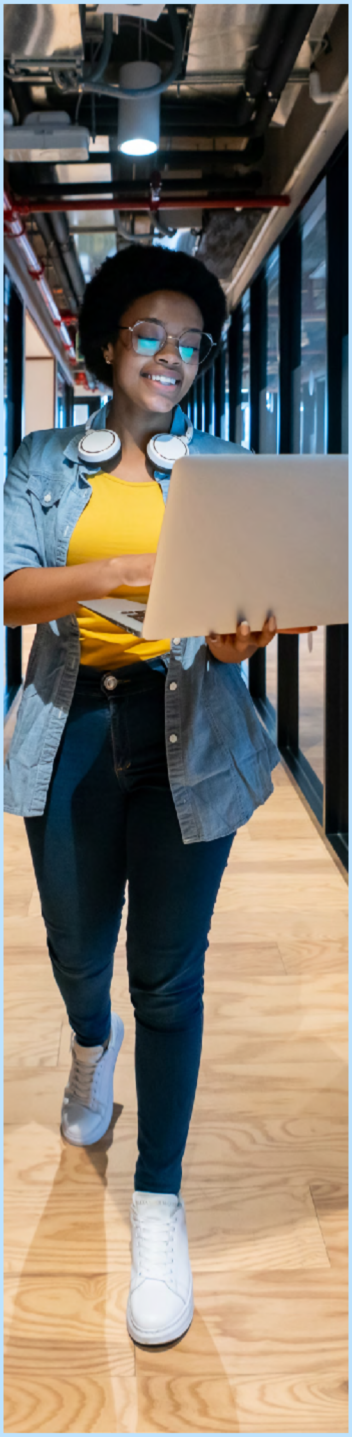
Specialist Programmer-2024
SAMPLE QUESTIONS



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Sample-1: Easy

You are given a binary string **S**.

You can perform the following operations on **S** any number of times (possibly zero):

- Select an index **i** such that **S[i]** is **equal to 1** and **S[i+1]** is **equal to 0** for **0 ≤ i < len(S) -1**.
- Remove exactly one of the character from **S**.

Find the **smallest string S** that you can get after performing operations on **S**.

Note:

- If there are multiple smallest strings possible then return the string which is lexicographically smallest.

Constraints

- $1 <= \text{len(s)} <= 10\text{^}5$
- $1 <= A[i] <= 10\text{^}5$

Sample Input 1

0000111111

Sample output 1

0000111111

Explanation-1

Here, S = "0000111111" We cannot perform any operation on S so it remains unchanged

Sample Input 2

1111111

Sample output 2

1111111

Explanation 2

Here, S = "1111111" There exists no 0 in S so we can not perform any operation on S. Hence, S is equal to "1111111".
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Sample Input 3

110

Sample output 3

0

Explanation 3

Here, S = "110" We can perform two operations on S as :- 1. Select the index 1 and 2 and remove the character at index 1. Then S becomes "10". 2. Select the index 0 and 1 and remove the character at index 0. Then S becomes "0". Hence, S after performing operations is equal to "0"

Sample 2: Medium

You are given a tree consisting of **N** nodes.

You are also given two arrays **A** and **P** of size **N** each, where the value **A[i]** denotes the value written on the **i**[th] node and the value **P[i]** denotes that there is an edge between the node **i** and **P[i]**.

We say that an edge is considered **good**, if after deleting this edge (this will result in formation of 2 trees), the values in each of the nodes of the trees are distinct.

Find the **total number of good edges present in tree**.

Input Format

1. The first line contains an integer, N, denoting the number of elements in A.
2. Each line i of the N subsequent lines (where $0 \le i < N$) contains an integer describing A[i].
3. Each line i of the N subsequent lines (where $0 \le i < N$) contains an integer describing P[i].

Constraints

- $1 <= N <= 10^5$
- $1 <= A[i] <= 10^5$
- $1 <= P[i] <= 10^5$

Sample Input-1:

2 1 1 0 1

Sample output-1:

1

Explanation-1:

```
Given N = 2, A = [1, 1], P = [0, 1] The only
edge between the node 1 - 2 is good. Hence,
the answer is equal to 1.
```

Sample Input-2:

4 1 2 3 4 0 1 2 3

Sample output-2:

3

Explanation-2:

Given N = 4, A = [1, 2, 3, 4], P = [0, 1, 2, 3] All of edges 1 - 2, 3 - 2, 3 - 4 are good edges. Hence, the answer is equal to 3.

Sample Input-3:

6 1 1 2 3 2 3 0 1 2 3 4 5

Sample output-3:

0

Explanation-3:

```
Given N = 6, A = [1, 1, 2, 3, 2, 3], P = [0, 1, 2,
3, 4, 5] None of the edges are good. Hence, the
answer is equal to 0.
```

Sample 3 : Hard

You are given 2 arrays A and B, each of size N.

You are now standing at index N and want to move to index 1 by performing the following operation one or more times until you reach index 1:

Let's say that the element you are currently standing on is i.

Choose index j such that 1 ≤ j < i.

For each element between i and j, the cost of passing through it will be B[j] and the cost of standing at index j will be A[j].

Find the minimum cost to move from index N to index 1. Since, the answer can be very large return it modulo 10^9+7.

Input Format

1. The first line contains an integer, N, denoting the number of elements in A and B.
2. Each line i of the N subsequent lines (where 1 ≤ i ≤ N) contains an integer describing A[i].
3. Each line i of the N subsequent lines (where 1 ≤ i ≤ N) contains an integer describing B[i].

Constraints

- $2 <= N <= 10^5$
- $1 <= A[i] <= 10^9$
- $1 <= \mathrm{B}[i] <= 10^9$

Sample Input-1:

```
5
5
5
1
4
2
5
4
1
5
1
```

Sample output-1:

13

Sample Explanation - 1:

Given N = 5, A = [5, 5, 1, 4, 2], B = [5, 4, 1, 5, 1]. We can perform the following operations as: 1. In first move we can move from index 5 to index 2 with cost 3. 2. In second move we can move from index 2 to index 1 with cost 10. Hence, total cost is equal to 3 + 10 = 13

Sample input-2:

6
5
4
2
4
4
1
1
1
4
3
3
4

Sample output-2:

10

Sample Explanation - 2:

Given N = 6, A = [5, 4, 2, 4, 4, 1], B = [1, 1, 4, 3, 3, 4]. By performing only one move we can directly move from index 6 to index 1 with a minimum cost of 10. Hence, the minimum cost is equal to 10.

Sample Input-3:

2
1
1
1
1

Sample output-3:

2

Sample Explanation - 3:

Given N = 2, A = [1, 1], B = [1, 1]. We can perform the following operations as: 1. In first move we can move from index 2 to index 1 with a cost of 2. Hence, the minimum cost is equal to 2.

For more information, contact askus@infosys.com