Lab 4 C

Problem 1: Harsh and his Startup

Harsh and his colleagues want a Coworking space but they don't have enough money to rent one. So they called Alladin and asked for help. Alladin agreed but only if they could solve this puzzle.

Given an Interval [a, b] with a ≤ b, denoting the set of integers that lie between the values a and b. For example [3,5] denotes the set {3,4,5} while the interval [3, 3] denotes the set {3}.

Alladin says that an interval [a, b] is covered by an integer i, if i belongs to the set defined by [a, b]. For example interval [3, 5] is covered by 3 and so is the interval [3, 3].

Similarly, for set of intervals I and a set of integers S we can say that I is covered by S if for each interval [a, b] in I there is an integer i in S such that [a, b] is covered by i. For example, the set {[3, 5], [3, 3]} is covered by the set {3}. The set of intervals {[6, 9], [3, 5], [4, 8]} is covered by the set {4, 5, 8}. It is also covered by the set {4, 7}.

No Alladin wants for any set of intervals I, the size of the smallest set of Integers S that covers it.

Can you help Harsh ?

Input format:

- The first line contains a single integer N, giving the number of intervals in the input.
- This is followed by N lines, each containing two integers separated by a space describing an interval, with the first integer guaranteed to be less than or equal to the second integer.

Output format:

- Output a single integer giving the size of the smallest set of integers that covers the given set of intervals.

Constraints:

- $1 \le N \le 1000$
- $1 \le a \le b \le 1,000,000,000$

Example:

Sample Input:

```
3
6 9
3 5
4 8
```

Sample Output:

```
2
```

Explanation:

The set of intervals is {[6, 9], [3, 5], [4, 8]}. The smallest set of integers that covers these intervals is {4, 8}. Both integers 4 and 8 cover all the intervals:

- Interval [6, 9] is covered by 8.
- Interval [3, 5] is covered by 4.
- Interval [4, 8] is covered by both 4 and 8.

Hence, the size of the smallest set is 2.

Problem 2: Trouble with Candies

Aaditya is in a candy shop where the candies come in three vibrant colors: red (representing 0s), green (representing 1s), and blue (representing 2s). Unfortunately, the candies have been mixed up in a giant jar, and Aaditya cannot figure out how to sort them.

Your task is to help him sort this jar so that all the red candies (0s) come first, followed by the green ones (1s), and finally, the blue ones (2s). Think of it as arranging your favorite candies in a perfect rainbow order.

Input Format:

- The first line contains one integers: **N**
- Second line contains contains the values of all the candies seperated by space.

Output Format:

- A sorted List of the candies.

Constraints:

- 0 ≤ N ≤ 100000000

Example:

Input:

```
6
0 1 2 0 1 2
```
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Output:

```
0 0 1 1 2 2
```

Explanation:

We need to sort the candies

Note:

Take Care of the trailing space, i.e. Do not print the trailing white space.

Problem 3: Treasure Hunt in the Enchanted Forest

You find yourself in an enchanted forest that is mapped as a `2xN` grid, where each cell contains a hidden treasure. The forest begins at the top-left corner `(0,0)`, and your goal is to reach the bottom-right corner `(1,N-1)`. You can only move right or down on the grid.

Each cell contains a certain amount of treasure, represented by an integer value. Your challenge is to maximize the amount of treasure collected along the path from `(0,0)` to `(1,N-1)`.

Your task is to find the maximum amount of treasure you can get, given `N` and matrix of size `2*N`

Input:

- First line containing single integer, `N`
- Next 2 lines, each line contains `N` spaced integers

Output:

An integer which is the Max profit you can get.

Constraints:

- `1<=N<=1e6`
- `-1e9<=arr[i]<=1e9`

Good luck!

Example:

Input:

```
4
1 2 3 4
4 3 2 1
```

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Output:

```
11
```

Explanation:

you start from `(0,0)` then you move down to `(1,0)` and then keep moving right.

Submission Guidelines

- Do not rename any files given in the handout. Only write the code in the specified C files in the respective directories.