Q: Given two sorted arrays. find the median of them.

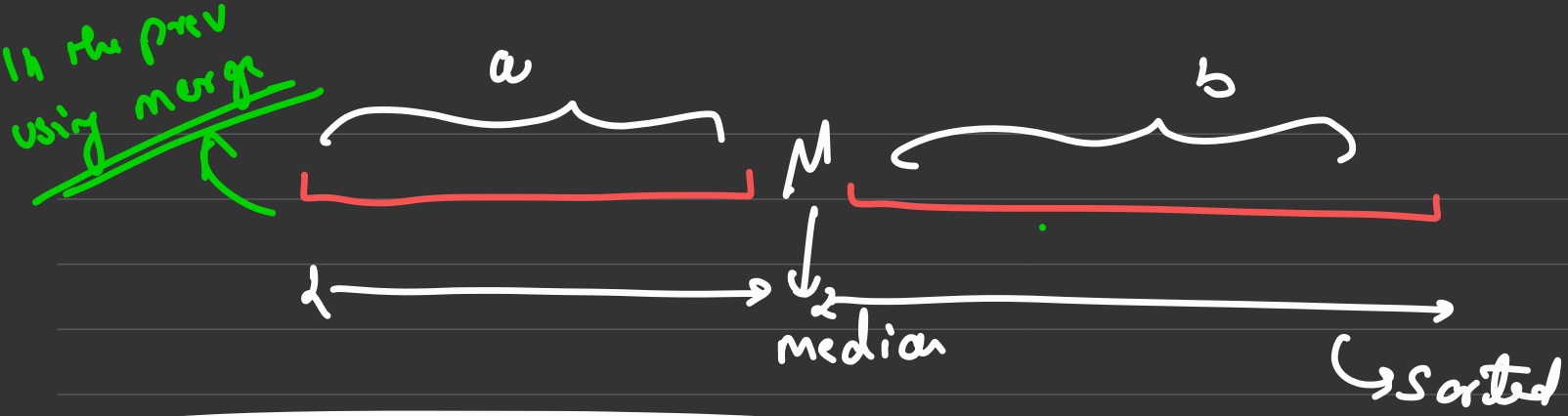
x = [2, 3, 5, 8]

y = [10, 12, 14, 16, 18, 20]

ans → (11)

We can use merge operation → Sorted array

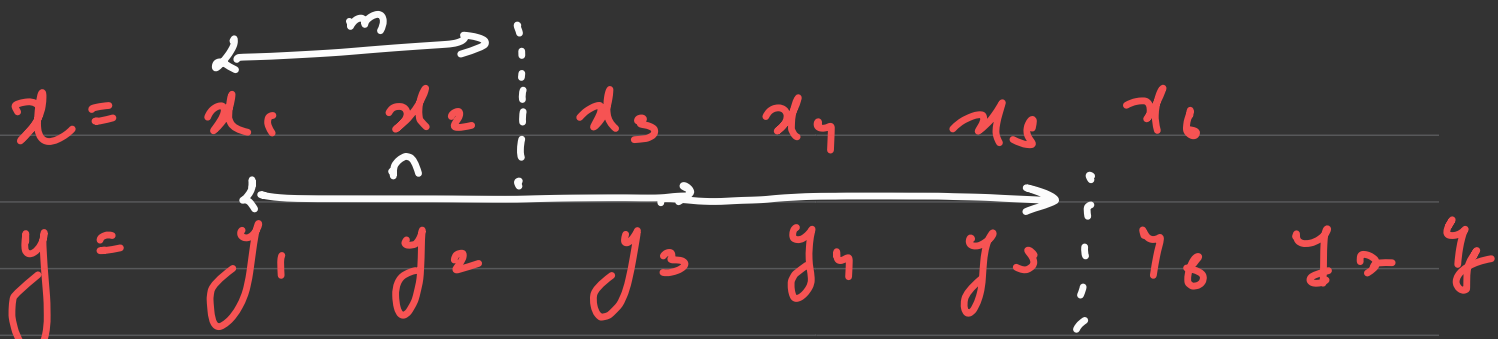
$O(x+y)$

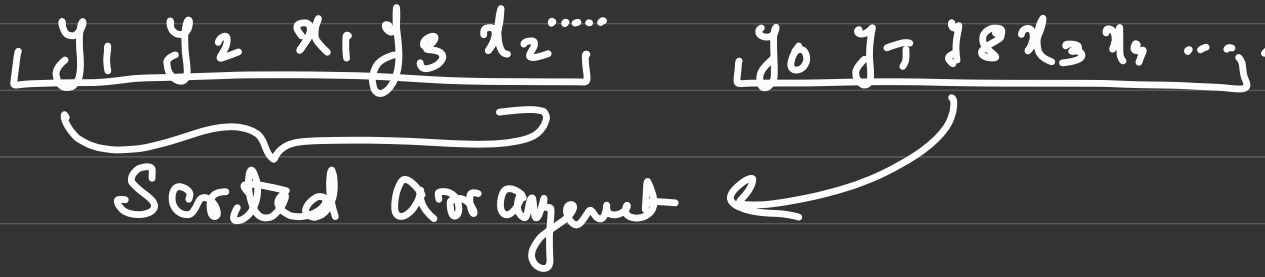


$$len(a) == len(b)$$

$a = [\ \_\_\_\_\_\ x \ \_\_\_\_\_\ y\ ]$ → Sorted arrangement

$b = [\ \_\_\_\_\_\ x \ \_\_\_\_\_\ y\ ]$

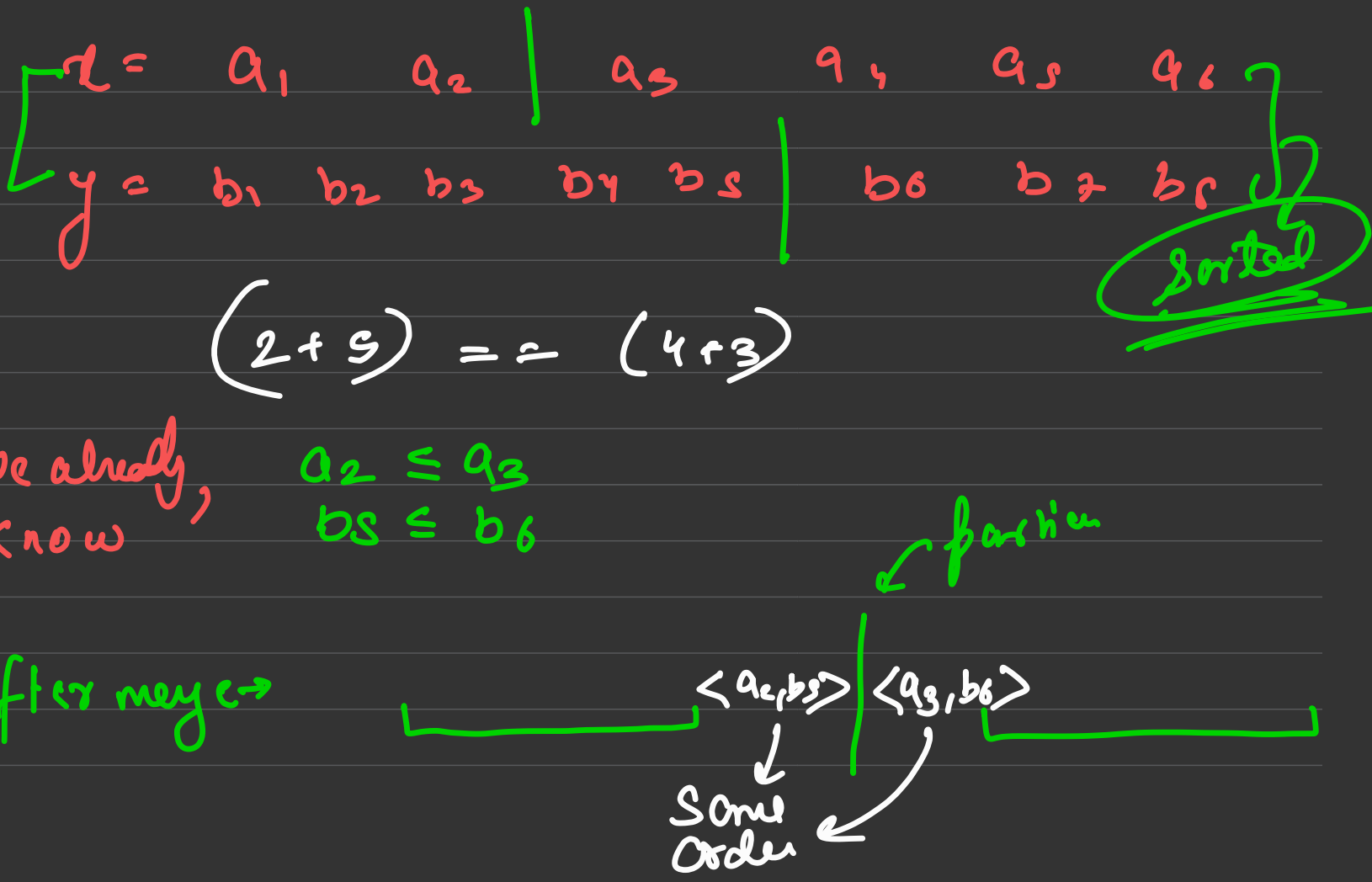




$(m+n) == (x-m) + (y-n)$

→ median → $(x+y+1)//2 = m+n$

(1) If we know partition limit in one array we can calc the partition limit of second array.


x = a1 a2 | a3 a4 a5 a6
y = b1 b2 b3 b4 b5 | b6 b7 b8
Sorted
(2+5) == (4+3)
we already know, a2 ≤ a3
b5 ≤ b6
partition
after merge →
<a2,b5> | <a3,b6>
same order

In what condition, the split we made in prev example, will give you modern

$a_2 \leq a_3$ ✓ already

$b_5 \leq b_6$ ✓ already

$a_2 \leq b_6$

$b_3 \leq a_3$

→ need to satisfy

What if they are not then

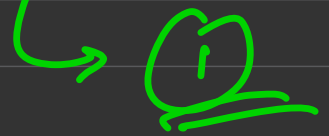
either $a_2 \neq b_6$ → we need to move partition of x on left side.

or

$b_5 \neq a_3$ → we need to move partition of x on right side.

Q) You have N no. in an array of N length. You pick any 3 elements at random. If you are not able to make a triangle with sides equal to the elements you picked, you win. Count the no. of ways to choose 3 no, that you always win. (Also consider degenerate triangles)

4 2 10



Sum of a & < 3^{rd} ←

Brute force → try to make all possible triplets → $O(n^3)$

{a, b, c}

Sorted → $[a_1\ a_2\ a_3\ \dots\ a_n]$

$O(n \log n)$

pick a triplet $[a_i\ a_j\ a_k]$

$a_i + a_j < a_k$

a_k is the first element greater than x (upper bound)

x

count the comb which do cannot make a triangle

if a_i and a_j is already decided. → we can find a_k for them.

$O(n \log n + n^2 \log n) < O(n^3)$

Petya has the word t, he wants to make the word p from it. Petya begins to delete the letters in a certain order, which is described as a permutation of indices of the letters of the word t: $a_1 \ldots a_{|t|}$. Note that after deleting a letter, the numbering does not change.

His brother Vasya is afraid that Petya may delete too many letters, so he will not get the word p in the end. Vasya's task is to stop his brother at some point and finish deleting himself in such a way, that the resulting word will be p. Since Petya likes this activity, Vasya wants to stop him as late as possible. Your task is to tell how many letters Petya can delete out before Vasya stops him.

It is guaranteed that the word p can be obtained by deleting letters from t.

Input

The first and second lines of the input file contain the words t and p, respectively. Words consist of lowercase letters of the Latin alphabet ($1 \le |p| < |t| \le 200\,000$).

The next line contains the permutation $a_1 \ldots a_{|t|}$ of letter indices, which specifies the order in which Petya deletes the letters of the word t ($1 \le a_i \le |t|$, all a_i are different).

Output

Print one number, the maximum number of letters that Petya can delete.

Example

input	
ababcba abb 5 3 4 1 7 6 2	Copy
output	
3	

this no. denotes the max deletions pet ya will do.

deletions are done in a specific order

new_str
old_str

mid = 4

abababcba

[5, 3, 4, 1]

new → bba

mid = 3

new → abba

dest → abb

dest → abb

whether new_str has dest string as a

Subsequence

2 pointer

a → x y a b x y z

i

O(n+m)

b → x a y

$10^3 + \log 10^5$

$\log(t-p) \times (t + t+p) \rightarrow O((\log(t-p))(t+t))$