

### 5.2.4 Longest Common Subsequence of Two Sequences

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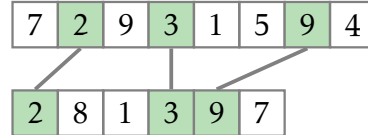
#### Longest Common Subsequence of Two Sequences Problem

Compute the maximum length of a common subsequence of two sequences.

**Input:** Two sequences.

**Output:** The maximum length of a common subsequence.

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Given two sequences  $A = (a_1, a_2, \dots, a_n)$  and  $B = (b_1, b_2, \dots, b_m)$ , their common subsequence of length  $p$  is a set of  $p$  indices

$$1 \leq i_1 < i_2 < \dots < i_p \leq n,$$

$$1 \leq j_1 < j_2 < \dots < j_p \leq m.$$

such that

$$a_{i_1} = b_{j_1},$$

$$a_{i_2} = b_{j_2},$$

$$\vdots$$

$$a_{i_p} = b_{j_p}.$$

The longest common subsequence is a common subsequence of the maximal length among all subsequences.

The problem has applications in data comparison (e.g., `diff` utility, merge operation in various version control systems), bioinformatics (finding similarities between genes in various species), and others.

**Input format.** First line:  $n$ . Second line:  $a_1, a_2, \dots, a_n$ . Third line:  $m$ . Fourth line:  $b_1, b_2, \dots, b_m$ .

**Output format.**  $p$ .

**Constraints.**  $1 \leq n, m \leq 100$ ;  $-10^9 \leq a_i, b_i \leq 10^9$  for all  $i$ .

**Sample 1.**

Input:

```
3
2 7 5
2
2 5
```

Output:

```
2
```

A common subsequence of length 2 is (2, 5).

**Sample 2.**

Input:

```
1
7
4
1 2 3 4
```

Output:

```
0
```

The two sequences do not share elements.

**Sample 3.**

Input:

```
4
2 7 8 3
4
5 2 8 7
```

Output:

```
2
```

One common subsequence is (2, 7). Another one is (2, 8).