

Given two strings  $p$  and  $q$  return the length of the longest common subsequence. A common subsequence is a sequence of characters that appears in the same relative order in both strings but are not necessarily contiguous. Consider the following two strings:

$p$ : cbatsmt

$q$ : dcafste

The longest common subsequence is *cast*. Hence your algorithm should return 4 the length of this longest common subsequence.

|                | $j \rightarrow$ | d | c | a | f | s | t | e |
|----------------|-----------------|---|---|---|---|---|---|---|
| $i \downarrow$ |                 |   |   |   |   |   |   |   |
| c              |                 |   |   |   |   |   |   |   |
| b              |                 |   |   |   |   |   |   |   |
| a              |                 |   |   |   |   |   |   |   |
| t              |                 |   |   |   |   |   |   |   |
| s              |                 |   |   |   |   |   |   |   |
| m              |                 |   |   |   |   |   |   |   |
| t              |                 |   |   |   |   |   |   |   |

If  $T$  refers to the table above then to fill the table the algorithm states that:

if ( $p[i] == q[j]$ ):

$$T[i][j] = T[i-1][j-1] + 1$$

else:

$$T[i][j] = \max \{T[i-1][j], T[i][j-1]\}$$