Soltution

First, we concatenate the input strings to create one string S. Now we want to obtain the answer iteratively; meaning that at first, we want to calculate the first character of the answer, then the second character, and so on.

In the process of calculating the i-th character, we will keep a DP array $dp[N][2]$, which $dp[j][0]$ is 1 if there is a way of achieving the first i characters of the answer by the first j characters of S. $dp[j][1]$ means if we can achieve the i first characters of the answer by the first j characters of S, and use character $S[j]$ too. To calculate the i-th character of the answer, we iterate from 'a' to 'z' to find out in which case we have an answer, and the first feasible character will be the i-th character.

Note that in order to calculate the DP array, we should consider that the total size of the answer has to be equal to k, and the remaining unused strings in $dp[j][x]$ have to satisfy the length condition.