

1048 Longest String Chain

Dynamic Programming Approach

eg:

["a", "b", "ba", "bca", "bda", "bdca"]

Given list of strings

step 1 Sort them in increasing order
of their lengths

step 2
create a $dp[]$ array of $len = len(words)$

step 3
Find word/words of maximum length
set $dp[]$ of that words = 1

Example
dp

"a"	"b"	"ba"	"bca"	"bda"	"bdca"
					1

$$dp[x] = \max \left(1 + dp[y] \right)$$

\uparrow say word[x] is of length 2 \uparrow word[y] of length 3

\rightarrow if inserting one char in word[x] makes word[x] = word[y]

$$dp[x] = \max \left(1 + dp[z], 1 \right)$$

for all z where
 $\text{len}(\text{word}(z)) = x + 1$
 and this condition is satisfied

don't forget this
 as this single element can also be the answer

EXAMPLE

	"a"	"b"	"ba"	"bca"	"bda"	"bdca"
dp	4	4	3	2	2	1
	0	1	2	3	4	5

$$dp(4) = \max \left(1 + dp(5), \right)_{b \leq a} = 2$$

$$dp(3) = \max \left(1 + dp(5), \right)_{b \leq a} = 2$$

$$dp(2) = \max \left(\begin{matrix} 1 + dp(3), \\ 1 + dp(4), \\ 1 \end{matrix} \right)_{\substack{b \leq a \\ b \leq a}} = 3$$

$$dp(1) = \max \left(1 + dp(2) \right)_{b \leq a} = 4$$

$$dp(0) = \max \left(1 + dp(2) \right)_{b \leq a} = 4$$

return max(dp)