

## Q longest Common Subsequence

Q Given two strings  $t_1$  &  $t_2$ , return the length of their longest common subsequence.

Eg:  $t_1 = \boxed{abcde}$   $t_2 = \boxed{ace}$

ans  $\rightarrow$  (3)

Eg:  $t_1 = abc$   
 $t_2 = def$   
 ans  $\rightarrow (0)$

$$S(abc) =$$
$$s(bc) = \begin{matrix} - & - \\ - & c \\ b & - \end{matrix}$$
$$s(abc) = \begin{cases} -s(bac) \\ a s(bac) \end{cases}$$

$\frac{b-c}{1}$   
 $c$   
 $b$   
 $bc$   
 $-$   
 $ac$   
 $ab$   
 $abc$   
 $a$

$$\underline{LCS}(s_1, s_2) = L(c_1, r_1, c_2, r_2)$$

$$\begin{aligned} & \rightarrow s(x_1) \times \dots \times s(x_2) \\ & \rightarrow s(x_1) \times c_2 \times s(x_2) \\ & \rightarrow c_1 \times s(x_1) \times \dots \times s(x_2) \\ & \rightarrow c_1 \times s(x_1) \times c_2 \times s(x_2) \end{aligned}$$

$$LCS(s_1, s_2) = \begin{cases} 1 + L(x_1, x_2) & c_1 = c_2 \\ \max(L(x_1, s_2), L(s_1, x_2)) & c_1 \neq c_2 \end{cases}$$

	a	b	c	d	-
a	3	2	1	1	0
e	2	2	1	1	0
b	2	2	1	1	0
d	1	1	1	1	0
-	0	0	0	0	0

$(cd)$      $(cd)$   
 $(d, cd)$

0-0-

↓ ↓

d cd

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The diagram shows the word 'dead' in red, circled in pink. To its left is the letter 'd' in red, also circled in pink. To the right of 'd' is the string 'ad' in green, underlined twice. Green arrows point from 'd' and 'ad' towards 'dead'.

Q Target sum subset

You are given  $n$  numbers and a target value.

Print true / false, if there is a subset of elements add up to target

Eg:

4	2	7	1	3
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ans → 7 + 3

target = 10

Eg: { 3, 34, 4, 12, 5, 2 } target = 9  
ans → true

{ 4, 5 }

{ 3, 4, 2 }

[illegible]

Handwritten notes illustrating the merge sort process:

- Initial array:  $(5, 2)$
- Splitting phase:  $[5, 2]$  splits into  $[5]$  and  $[2]$ .
- Merging phase:  $[5]$  and  $[2]$  merge back into  $[5, 2]$ .
- Final sorted array:  $(2, 5)$

Q 01 knapsack

Value	15	14	10	45	30
weight	2	5	1	3	4

$W = 7$ . 

0	0	0	0	0	0	0	0
<del>0</del>	8	15	15	15	15	15	15
0	0	15	15	15	15	15	29
0	10	15	25	25	25	25	29
3-45	0	10	15	45	55	60	70
9-30	0	10	15	45	55	60	75