




HW10

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HW10

Find the most similar keyword!

- Implement the LCS algorithm for keywords
- Add each keyword into an array/linked list
- Given a string s , output the keyword k , such that k 's value and s have the longest common sequence among all the added keywords.

Requirements

- Maintain a keyword list, and implement the **LCS algorithm**
- For the list structure, you can
 - Use `java.util.ArrayList`
 - Or develop it by yourself

Operations

operations	description
add(Keyword k)	Insert a keyword k to an array
find(String s)	Find and output the most similar keyword by using the LCS algorithm

Keyword

- A keyword is a tuple of **[String *name*, Integer *count*]**
 - For example:

```
{  
    name: "Fang",  
    count: 3  
}
```
- A keyword should output in format **[name,count]** :
 - **[Fang,3]**

I/O Example: add

- To do: Insert a keyword [k,c] to the list
- Input:
 - Token1 : a constant “add”
 - Token2 : keyword name **k**
 - Token3 : keyword count **c**
 - EX: **add Fang 3**

I/O Example: find

- To do: Find and output the most similar keyword by using the LCS algorithm
- Input:
 - Token1 : a constant “find”
 - Token2 : a string **s**
 - EX: **find NTU**
- Output:
 - If list is empty, then output “InvalidOperation”:
InvalidOperation
 - If it is legal:
NTU: [NCCU, 2]

Input file

- You need to read the sequence of operations from a txt file
- The format is firm
- Raise an exception if the input does not match the format

```
add Fang 3
add Yu 5
add NCCU 2
add UCSB 1
add Management 4
add Information 5
find NTU
find Manager
```


LCS

An LCS Algorithm

Algorithm LCS(X,Y):

Input: Strings X and Y with n and m elements, respectively

Output: For $i = 0, \dots, n-1$, $j = 0, \dots, m-1$, the length $L[i, j]$ of a longest string that is a subsequence of both the string $X[0..i] = x_0x_1x_2\dots x_i$ and the string $Y[0..j] = y_0y_1y_2\dots y_j$

for $i = 0$ to $n-1$ **do**

$L[i, -1] = 0$

for $j = 0$ to $m-1$ **do**

$L[-1, j] = 0$

for $i = 0$ to $n-1$ **do**

for $j = 0$ to $m-1$ **do**

if $x_i = y_j$ **then**

$L[i, j] = L[i-1, j-1] + 1$

else

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

return array L

LCS

		0	1	2	3	4
			F	A	N	G
0		X	X	X	X	X
	0	0	0	0	0	0
1	N	X	↑ 0	↑ 0	↖ 1	← 1
	0					
2	T	X	↑ 0	↑ 0	↑ 1	↑ 1
	0					
3	U	X	↑ 0	↑ 0	↑ 1	↑ 1
	0					

		0	1	2
			Y	U
0		X	X	X
	0	0	0	0
1	N	X	↑ 0	↑ 0
	0			
2	T	X	↑ 0	↑ 0
	0			
3	U	X	↑ 0	↖ 1
	0			

		0	1	2	3	4
			N	C	C	U
0		X	X	X	X	X
	0	0	0	0	0	0
1	N	X	↖ 1	← 1	← 1	← 1
	0					
2	T	X	↑ 1	↑ 1	↑ 1	↑ 1
	0					
3	U	X	↑ 1	↑ 1	↑ 1	↖ 2
	0					

		0	1	2	3	4
			U	C	S	B
0		X	X	X	X	X
	0	0	0	0	0	0
1	N	X	↑ 0	↑ 0	↑ 0	↑ 0
	0					
2	T	X	↑ 0	↑ 0	↑ 0	↑ 0
	0					
3	U	X	↖ 1	← 1	← 1	← 1
	0					

LCS

		0	1	2	3	4	5	6	7	8	9	10
		M A N A G E M E N T										
0		X 0	X 0	X 0	X 0	X 0	X 0	X 0	X 0	X 0	X 0	X 0
1	M	X 0	↖ 1 0	← 1	← 1	← 1	← 1	← 1	↖ 1	← 1	← 1	← 1
2	A	X 0	↑ 1	↖ 2 0	← 2	↖ 2	← 2	← 2	← 2	← 2	← 2	← 2
3	N	X 0	↑ 1	↑ 2	↖ 3 0	← 3	← 3	← 3	← 3	← 3	↖ 3	← 3
4	A	X 0	↑ 1	↖ 2	↑ 3	↖ 4 0	← 4	← 4	← 4	← 4	← 4	← 4
5	G	X 0	↑ 1	↑ 2	↑ 3	↑ 4	↖ 5 0	← 5	← 5	← 5	← 5	← 5
6	E	X 0	↑ 1	↑ 2	↑ 3	↑ 4	↑ 5	↖ 6 0	← 6	↖ 6	← 6	← 6
7	R	X 0	↑ 1	↑ 2	↑ 3	↑ 4	↑ 5	↑ 6	↑ 6	↑ 6	↑ 6	↑ 6

Output

```
NTU: [NCCU,2]  
Manager: [Management,4]
```


Bonus HW

- Write the reflection on
12/11 資管專題發表會

- File Name:

HW{**date**_IDnumber}.pdf

ex:HWBonus_111306XXX.pdf

NCCU MIS

2023
國立政治大學資訊管理學系
專題發表會

12.11 商學院一樓 國際會議廳
上午場 9:00 - 12:30
下午場 13:30 - 17:30

最佳人氣獎一人兩票
報到後採實體投票

國立政治大學資訊管理學系
專案發表會時程

■ 上午場

- 9:00 入場
- 9:20 開場
- 9:30 Personabot - 個性化 AI
- 9:50 SmartRetail - AI 賦能的實體店面體驗:讓線下如同線上零售
- 10:10 Habit Rabbit - 習慣免, 你的專屬習慣 tool
- 10:30 SignLink: 混合實境於金融服務之應用
- 10:50 探討生成式人工智慧於會計業文字客服之應用
- 11:10 TixToken-代幣化售票系統
- 11:30 捍衛讀識 - 封包俠
- 11:50 Swap 一拍即合
- 12:10 iMagicNation 互動式 AI 教科書

■ 12:30 午餐時間

■ 下午場

- 13:30 邊緣人工智慧於協助視障者之漸進式網頁應用.
- 13:50 TeaJourney - 大學生全新品茶體驗
- 14:10 Aquarium - 生活習慣養成 App
- 14:30 GasGuard - 計畫配送瓦斯管理 App
- 14:50 「政」在漫遊: 室內平面圖路徑規劃
- 15:10 Holoyoi 混合實境於色覺辨識障礙輔助應用
- 15:30 Trans Voxia, Speech to Speech Converter
- 15:50 偵碳 - 農場碳排放源自動辨識系統
- 16:30 休息、外場開票
- 17:00 頒獎

主辦單位: MIS 政治大學資訊管理學系

Notice

- Remind to send your GitHub link and contact information via Google form

<https://forms.gle/p8g6rXU7NmDTGKLi6>

- Keep maintaining your GitHub!
- The make-up section in WM5 will open soon, only can get 4 out of 5 for late homework. The group that didn't upload the proposal to WM5 should also hand-in in the make-up section.