



HW10

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HW10

HW10(Due on Dec. 10)

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	0				
2	T	X	↑ 0	↑ 0	↑ 1	↑ 1
	0	0				
3	U	X	↑ 0	↑ 0	↑ 1	↑ 1
	0	0				

		0	1	2
			Y	U
0		X	X	X
	0	0	0	0
1	N	X	↑ 0	↑ 0
	0	0		
2	T	X	↑ 0	↑ 0
	0	0		
3	U	X	↑ 0	↖ 1
	0	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	0				
2	T	X	↑ 1	↑ 1	↑ 1	↑ 1
	0	0				
3	U	X	↑ 1	↑ 1	↑ 1	↖ 2
	0	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	0				
2	T	X	↑ 0	↑ 0	↑ 0	↑ 0
	0	0				
3	U	X	↖ 1	← 1	← 1	← 1
	0	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
12/12 資管專題發表會 or
12/22 演講
- File Name:
HW{date_IDnumber}.pdf
ex:
HW1212_110306XXX.pdf
HW1222_110306XXX.pdf

最佳人氣獎一人一票，報到後採實體投票



國立政治大學資訊管理學系
專題發表會

2022 年 12 月 12 日
商學院一樓 國際會議廳

上午場 9:00 - 12:30 13:30 - 17:30 下午場

MiS 主辦單位：政治大學資訊管理學系

主辦單位：電算中心、資訊管理學系
協辦單位：金融科技研究中心

INTERESTING AI TOPICS

including transfer learning, signature process and GANs and show how they are used in Operations Research, medical data test, and financial data analysis.

講者
Professor Xin Guo
Coleman Fung Chair Professor in Financial Modeling
Dept of IEOR, UC Berkeley, CA

時間
2022/12/22 (四)
13:10 - 16:00

報名連結



主講者會保留一小時左右進行座談互動，歡迎踴躍提問（包括出國申請類似Berkeley學校等Q&A）。

地點
電算中心一樓會議廳

Notice

- Remind to send your GitHub link and contact information via Google form
<https://forms.gle/L1ve3bTjiecEdwNb8>
- 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.