

Assignment #2

마감: 4/13 (수) 23:59

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1. 행렬들의 곱인
- $A_1 \times A_2 \times A_3 \times A_4 \times A_5$
- 를 계산하는 최적 순서와 m, s 값을 구하세요. (60pt)

< A_1, A_2, A_3, A_4, A_5 > = <(10x4), (4x5), (5x20), (20x2), (2x50)>

$$m[3,4] = m[3,3] + m[4,4] + p_1 p_2$$

m	1	2	3	4	5
1	0				
2	200	0			
3	/200	400	0		
4	320	240	200	0	
5	/320	640	700	2000	0

s	1	2	3	4	5
1					
2	1				
3	/	2			
4	/	2	3		
5	4	4	4	4	

$$\text{최적 순서: } ((A_1(A_2(A_3A_4)))A_5)$$

2. 문자열 'COMP319' 와 'KNUCOM19'의 LCS를 구하세요. (40pt)

		K	N	U	C	O	M	1	9
C	a	0	0	0	0	0	0	0	0
	0	0↑	0↑	0↑	1↖	1←	1←	1←	1←

O	n	0↑	0↑	0↑	1↑	2↖	2↖	2↖	2↖
M	a	0↑	0↑	0↑	1↑	2↖	3↖	3↖	3↖
P	a	0↑	0↑	0↑	1↑	2↑	3↑	3↑	3↑
3	a	0↑	0↑	0↑	1↑	2↑	3↑	3↑	3↑
1	a	0↑	0↑	0↑	1↑	2↑	3↑	4↖	4↖
9	a	0↑	0↑	0↑	1↑	2↑	3↑	4↑	5↖

($\therefore \text{LCS} = \langle C, O, M, I, 9 \rangle$)

- 끝 -

```
from pprint import pprint

def LCS_Length(X,Y):
    m = len(X)
    n = len(Y)
    b = [[0]*(m+1) for i in range(n+1)]
    c = [[0]*(m+1) for i in range(n+1)]
    for j in range(1,n+1):
        for i in range(1,m+1):
            if(X[i-1]==Y[j-1]):
                c[j][i] = c[j-1][i-1]+1
                b[j][i] = "."
            elif(c[j][i-1]<=c[j-1][i]):
                c[j][i] = c[j-1][i]
                b[j][i] = "+"
            else:
                c[j][i] = c[j][i-1]
                print("(",i,j,")",c[j][i-1],c[j-1][i])
                b[j][i] = "<"
    return b,c

def Print_LCS(b,X,i,j):
    if i==0 or j==0:
        return
    if b[j][i] == ".":
        Print_LCS(b,X,i-1,j-1)
        print(X[i-1],end="")
    elif b[j][i] == "+":
        Print_LCS(b,X,i,j-1)
    else: Print_LCS(b,X,i-1,j)
```

```
X = "KNUCOM19"
Y = "COMP319"
b,c = LCS_Length(X,Y)
pprint(b)
print("-----")
pprint(c)
print("-----")
Print_LCS(b,X,len(X),len(Y))
print()
```

```
[[0, 0, 0, 0, 0, 0, 0, 0, 0],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑'],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑'],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑'],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑'],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑'],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑'],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑'],
 [0, '↑', '↑', '↑', '↑', '↑', '↑', '↑', '↑']]
```

```
[[0, 0, 0, 0, 0, 0, 0, 0, 0],
 [0, 0, 0, 0, 1, 1, 1, 1, 1],
 [0, 0, 0, 0, 1, 2, 2, 2, 2],
 [0, 0, 0, 0, 1, 2, 3, 3, 3],
 [0, 0, 0, 0, 1, 2, 3, 3, 3],
 [0, 0, 0, 0, 1, 2, 3, 3, 3],
 [0, 0, 0, 0, 1, 2, 3, 4, 4],
 [0, 0, 0, 0, 1, 2, 3, 4, 5]]
```

COM19

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