

Quiz5

2021年5月13日 8:58

(1) (a) $opt[k] = \min (opt(s) + c[s, k]),$

s is the post that make the recurrence least.

$$\begin{aligned} opt[4] &= \min ((1 \rightarrow 2, 2 \rightarrow 3, 3 \rightarrow 4), (1 \rightarrow 3, 3 \rightarrow 4), (1 \rightarrow 2, 2 \rightarrow 4), (1 \rightarrow 4)) \\ &= \min ((15+12), (30+12), (15+30), 40) \\ &= 37 \end{aligned}$$

(b) Since each $opt[k]$ is a sum from previous $opt(s)$ and $c[s, k]$, then we just need to find which two value equals to 14

$k=4$ sequence.

We find it's equal $opt(3) + c(3, 4) \rightarrow 3 \rightarrow 4$

$opt(3) = opt(2) + c(2, 3) \rightarrow 2 \rightarrow 3$

$opt(2) = c(1, 2) \rightarrow 1 \rightarrow 2$

Thus generate $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

k	1	2	3	4
opt	0	15	27	37
sequence	-	1, 2	1, 2, 3	1, 2, 3, 4

2. (a)

	0	1	2	3
0	1	0	0	0
1	1	1	0	0
2	1	2	1	0
3	1	3	3	1
4	1	4	6	4
5	1	5	10	5

orange is initial value.

fill the column from top to bottom

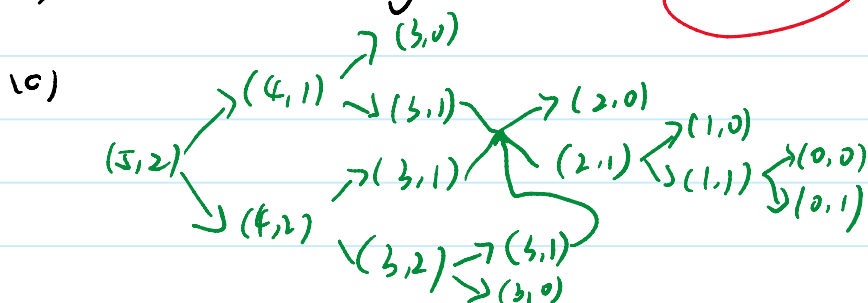
each row filled from right to left

← each row filled from right to left

(a) $c_i = C_{i+1} + C_i$

First fill rows, then columns.
(top to bottom) (right to left)

(b) The bottom right cell as circled (5,3)



$$10 = 4 + 6 = (1+3) + (3+3) = (1+(1+2)) + ((1+2)+(1+2)) \\ = (1+(1+(1+1))) + ((1+(1+1)) + (1+(1+1)))$$

Write the path in table.

(3) (a) $V(2,9) = \max(V(1,9), v_2 + V(1,9-4)) = 5 + 3 = 8$
Therefore select from (1,5)

(b) $V(3,9) = \max(V(2,9), v_3 + V(2,9-5)) = 8 + 5 = 13$
 $V(2,4) = \max(V(1,4), v_2 + V(1,0)) = 4$

Need (2,4), (1,4)

(c) $V(4,9) = \max(V(3,9), v_4 + V(3,9-6)) = 13$
remaining same

Need (3,9), (2,4), (1,4)

(d) $V(5,9) = \max(V(4,9), v_5 + V(4,9-7)) = 13$
remaining same

$$(n) \quad U(5,9) = \max(U(4,7), v_5 + U(4,7-1)) = 17$$

remaining same

$$\text{Need } (4,9), (3,9), (2,4), (1,4)$$

(e) object 3 and 1

$$(f) \quad 3+5=8$$

$$(4) \quad (a) \quad (2,4)$$

$$m(i,j) = \min(m(i,k) + m(k+1,j) + p_i \times p_k \times p_j) \quad i \leq k \leq j$$

$$m(2,4) = \min \begin{cases} m(2,3) + m(4,4) + 5 \times 10 \times 20 = 1250 + 1000 = 2250 \\ m(2,2) + m(3,4) + 5 \times 25 \times 20 = 7500 \end{cases}$$

$$m(2,4) = 2250$$

$$1.b) \quad m(1,4) = \min \begin{cases} m(1,1) + m(2,4) + 12 \times 5 \times 20 = 2250 + 1200 = 3450 \\ m(1,2) + m(3,4) + 12 \times 25 \times 20 = 1500 + 5000 + 6000 = 12500 \\ m(1,3) + m(4,4) + 12 \times 10 \times 20 = 1800 + 2400 = 4200 \end{cases}$$

$$m(1,4) = 3450.$$

$$(c) \quad A_1((A_2 \ A_3) \ A_4)$$