$$M[i,j] = \min_{i \le k \le j-1} \left(M[i,k] + M[k+1,j] + d_{i-1} d_k d_j \right)$$

4×2 , 2×3 , 3×1 , 1×2 , 2×2 , 2×3

d_0	d_1	d_2	d_3	d_4	d_5	d_6
4	2	3	1	2	2	3

M[i,j]

	2	3	4	5	6
1	24	14	22	26	36
2	0	6	10	14	22
3	0	0	6	10	19
4	0	0	0	4	10
5	0	0	0	0	12

K

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

- $M[1,2] = \min_{1 \le k \le 1}$ ①

$(M[1,1] + M[2,2] + d_0 d_1 d_2) = 0+0+24 = 24$

- $M[2,3] = \min_{2 \le k \le 2}$

$M[2,2] + M[3,3] + d_1 d_2 d_3 = 6$

- $M[1,3] = \min_{1 \le k \le 2}$

$M[1,1] + M[2,3] + d_0 d_1 d_3$ → 0+6+8 = 14 (k=1, M[i,j]=14)

$M[1,2] + M[3,3] + d_0 d_2 d_3$ → 24+0+12 = 36

] → 둘 중 작은 거

- $M[2,4] = \min_{2 \le k \le 3}$

k=2 $M[2,2] + M[3,4] + d_1 d_2 d_4 = 0+6+12 = 18$

k=3 $M[2,3] + M[4,4] + d_1 d_3 d_4 = 6+0+4 = 10$

- $M[3,5] = 3 \le k \le 4$

k=3 $M[3,3] + M[4,5] + d_2 d_3 d_5 = 0+4+6 = 10$ k=3

k=4 $M[3,4] + M[5,5] + d_2 d_4 d_5 = 6+0+12 = 18$ M[3,5] = 10

- $M[4,6] = 4 \le k \le 5$

k=4 $M[4,4] + M[5,6] + d_3 d_4 d_6 = 12+6 = 18$

k=5 $M[4,5] + M[5,5] + d_3 d_5 d_6 = 4+6 = 10$

- $M[1,4] = 1 \le k \le 3$

k=1 $M[1,1] + M[2,4] + d_0 d_1 d_4 = 0+10+16 = 26$

k=2 $M[1,2] + M[3,4] + d_0 d_2 d_4 = 24+6+24 = 54$

k=3 $M[1,3] + M[4,4] + d_0 d_3 d_4 = 14+0+8 = 22$

$M[2,5] = \min_{2 \le k \le 4}$

$k=2$ $M[2,2] + M[3,5] + d_1 d_2 d_5 = 0+10+16 = 26$

$k=3$ $M[2,3] + M[4,5] + d_1 d_3 d_5 = 6+4+4 = 14$

$k=4$ $M[2,4] + M[5,5] + d_1 d_4 d_5 = 10+0+8 = 18$

$M[3,6]$ $3 \le k \le 5$

$k=3$ $M[3,3] + M[4,6] + d_2 d_3 d_6 = 0+10+9 = 19$

$k=4$ $M[3,4] + M[5,6] + d_2 d_4 d_6 = 6+12+12 = 30$

$k=5$ $M[3,5] + M[6,6] + d_2 d_5 d_6 = 10+0+18 = 28$

$M[1,6]$ $1 \le k \le 5$

$k=1$ $M[1,1] + M[2,6] + d_0 d_1 d_6 = 22+24$

$k=2$ $M[1,2] + M[3,6] + d_0 d_2 d_6 = 24+19+36$

$k=3$ $M[1,3] + M[4,6] + d_0 d_3 d_6 = 14+10+12 = 36$

$k=4$ $M[1,4] + M[5,6] + d_0 d_4 d_6 = 22+12+24$

$k=5$ $M[1,5] + M[6,6] + d_0 d_5 d_6 = 26+6+24$

$M[i,j]$

	2	3	4	5	6
1	24	14	22	26	36
2	0	6	10	14	22
3	0	0	6	10	19
4	0	0	0	4	10
5	0	0	0	0	12

k

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

$(M_1 \times (M_2 \times M_3)) \times ((M_4 \times M_5) \times M_6)$

목적지 1,6 복원

연습문제

6-1 (1)

$M[i,j] = \min_{i \le k \le j-1} (M[i,k] + M[k+1,j] + d_{i-1} d_k d_j)$

6-2 (2)

$d_0 = 5$ $d_1 = 2$ $d_2 = 4$ $d_3 = 3$ $d_4 = 1$ $d_5 = 3$

연습문제

6-1 (1)

$M[i,j] = \min_{i \le k \le j-1} (M[i,k] + M[k+1,j] + d_{i-1} d_k d_j)$

6-2 (2)

$d_0 = 5 \quad d_1 = 2 \quad d_2 = 4 \quad d_3 = 3 \quad d_4 = 1 \quad d_5 = 3$

$M[i,j]$ (i 행, j 열)

i \ j	2	3	4	5
1	40	54	30	45
2	0	24	20	26
3	0	0	12	24
4	0	0	0	9

K

	2	3	4	5
1	1	1	1	4
2	0	2	2	4
3	0	0	3	4
4	0	0	0	4

$M[1,3] \quad 1 \le j \le 2$

$K=1 \quad M[1,1] + M[2,3] + d_0 d_1 d_3 = 24 + 30 = 54$

$K=2 \quad M[1,2] + M[3,3] + d_0 d_2 d_3 = 40 + 30 = 70$

$M[2,4] \quad 2 \le j \le 3$

$K=2 \quad M[2,2] + M[3,4] + d_1 d_2 d_4 = 0 + 12 + 8 = 20$

$K=3 \quad M[2,3] + M[4,4] + d_1 d_3 d_4 = 24 + 0 + 15 = 39$

$d_0 d_5 = 15$

$M[1,5] \quad 1 \le k \le 4$

$K=1 \quad M[1,1] + M[2,5] + d_0 d_1 d_5 = 26 + 30$

$K=2 \quad M[1,2] + M[3,5] + d_0 d_2 d_5 = 40 + 24 + 0$

$K=3 \quad M[1,3] + M[4,5] + d_0 d_3 d_5 = 54 + 9 + 45$

$K=4 \quad M[1,4] + M[5,5] + d_0 d_4 d_5 = 30 + 0 + 15 = 45$

$(M_1 \times (M_2 \quad (M_3 \quad M_4)) \times M_5$

$(1,5) \rightarrow (1,4) \rightarrow (2,4)$

4 1 2

4에서 갈라짐 1에서 2에서 갈라짐 $\Rightarrow$ K값에서 갈라짐