

LO-8

a) $MC(i, j) \rightarrow$ Min No. of multiplications for Matrix multiplication among matrices $A_i \dots A_j$ (sequence)

(b) $MC(i, j) = \begin{cases} 0 & \text{if } i=j \\ \min_{i \leq k < j} \{ MC(i, k) + MC(k+1, j) + p_{i-1} p_k p_j \} \end{cases}$

(c) $p_0 \ p_1 \ p_2 \ p_3 \ p_4$
 $2 \ 5 \ 5 \ 1 \ 4$

$MC(1, 2) = MC(1, 1) + MC(2, 2) + p_0 p_1 p_2 = 50$

$MC(2, 3) = MC(2, 2) + MC(3, 3) + p_1 p_2 p_3 = 25$

$MC(3, 4) = 0 + 0 + p_2 p_3 p_4 = 20$

$MC(1, 3) = \min \begin{cases} MC(1, 2) + MC(3, 3) + p_0 p_2 p_3 \\ MC(1, 1) + MC(2, 3) + p_0 p_1 p_3 \end{cases}$
 $= \min \begin{cases} 35 \\ 60 \end{cases} \quad \underline{35} \quad (k=1)$

$MC(2, 4) = \min \begin{cases} MC(2, 2) + MC(3, 4) + p_1 p_2 p_4 \\ MC(2, 3) + MC(4, 4) + p_1 p_3 p_4 \end{cases}$
 $= \min(120, 45) \quad \underline{45} \quad (k=3)$

$MC(1, 4) = \begin{cases} MC(1, 1) + MC(2, 4) + p_0 p_1 p_4 \\ MC(1, 2) + MC(3, 4) + p_0 p_2 p_4 \\ MC(1, 3) + MC(4, 4) + p_0 p_3 p_4 \end{cases}$
 $= \underline{43} \quad (k=3)$
 $(A_1)(A_2 A_3)(A_4)$

i \ j	1	2	3	4
1	0	50 ⁽¹⁾	35 ⁽¹⁾	43 ⁽³⁾
2		0	25 ⁽²⁾	45 ⁽³⁾
3			0	20 ⁽³⁾
4				0