Da 8 MCM Format

→ Matrix Chain Multiplication

$p_0 \quad p_1 \quad p_2 \quad p_3$

$3 \times 2 \quad 2 \times 4 \quad 4 \times 5$

$A_1 \quad A_2 \quad A_3$

→ Total element = $(3 \times 2) + (2 \times 4) + (4 \times 5)$

$p_0 \quad p_1 \quad p_2$ → Total element $\{(p_0 \times p_1) + (p_1 \times p_2)\}$

$3 \times 2 \quad 2 \times 4$

Also $p_0 \quad p_1 \quad p_2 \quad p_3$ → Total element $\{p_0 \times p_1 \times p_2 + p_0 \times p_2 \times p_3\}$

$3 \times 2 \quad 2 \times 4 \quad 4 \times 5$

→ Matrix Multiplication number is more responsible to change as p_0 p_1

$p_0 \quad p_1 \quad p_2 \quad p_3$

$3 \times 2 \quad 2 \times 4 \quad 4 \times 5$

Total element $\{(p_0 \times p_1 \times p_2) + (p_0 \times p_2 \times p_3)\}$

$p_0 \quad p_1 \quad p_2 \quad p_3$

$3 \times 2 \quad 2 \times 4 \quad 4 \times 5$

$A_1 \quad A_2 \quad A_3$

$(A_1 A_2) A_3$ → $(3 \times 2 \times 4) + (3 \times 4 \times 5)$

$A_1 (A_2 A_3)$ → $(2 \times 4 \times 5) + (3 \times 2 \times 5)$

Hence, Using Dynamic Programming

Step: $p_0 \quad p_1 \quad p_2 \quad p_3 \quad p_4$

$3 \times 2 \quad 2 \times 4 \quad 4 \times 5 \quad 5 \times 6$

$A_1 \quad A_2 \quad A_3 \quad A_4$

$(A_1 A_2) A_3 A_4$ → $(3 \times 2 \times 4) + (3 \times 4 \times 5) + (3 \times 5 \times 6)$

$A_1 (A_2 A_3) A_4$ → $(2 \times 4 \times 5) + (3 \times 2 \times 5) + (3 \times 5 \times 6)$

$A_1 A_2 (A_3 A_4)$ → $(2 \times 4 \times 5) + (3 \times 2 \times 5) + (3 \times 5 \times 6)$

$A_1 (A_2 A_3 A_4)$ → $(2 \times 4 \times 5) + (2 \times 5 \times 6) + (3 \times 2 \times 6)$

$A_1 A_2 A_3 A_4$ → $(2 \times 4 \times 5) + (2 \times 5 \times 6) + (2 \times 4 \times 6)$

$A_1 A_2 A_3 A_4$ → $(2 \times 4 \times 5) + (2 \times 5 \times 6) + (2 \times 4 \times 6)$

Matrix: $\begin{array}{c|cccc} & 1 & 2 & 3 & 4 \\ \hline 1 & 0 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 \\ 3 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 0 \end{array}$

$\begin{array}{c|cccc} & 1 & 2 & 3 & 4 \\ \hline 1 & 0 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 \\ 3 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 0 \end{array}$

Matrix: $\begin{array}{c|cccc} & 1 & 2 & 3 & 4 \\ \hline 1 & 0 & 0 & 0 & 0 \\ 2 & 0 & 0 & 0 & 0 \\ 3 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 0 & 0 \end{array}$

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