

Matrix-Multiply (A, B)

For $i \leftarrow 1$ to $\text{rows}[A]$

For $j \leftarrow 1$ to $\text{columns}[B]$

$C[i, j] \leftarrow 0$

For $k \leftarrow 1$ to $\text{columns}[A]$

$C[i, j] \leftarrow C[i, j] + \underline{A[i, k] \cdot B[k, j]}$

Return (C).

If A is $p \times q$
B is $q \times r$,

M-M(A, B) takes $p \cdot q \cdot r$ multiplications.

Example

M_1 20×10

M_2 10×50

M_3 50×5

M_4 5×30

of multiplications

$(M_1(M_2(M_3 M_4)))$

28500

$(M_1((M_2 M_3) M_4))$

10000

$((M_1 M_2)(M_3 M_4))$

47500

$((M_1(M_2 M_3)) M_4)$

6500

$((M_1 M_2) M_3) M_4$

18000