- Strassen'in Algoritması -

$$\underbrace{\begin{bmatrix} 1 & 0 & 2 & 1 \\ 4 & 1 & 1 & 0 \\ 0 & 1 & 3 & 0 \\ 5 & 0 & 2 & 1 \end{bmatrix}}_{A} * \underbrace{\begin{bmatrix} 0 & 1 & 0 & 1 \\ 2 & 1 & 0 & 4 \\ 2 & 0 & 1 & 1 \\ 1 & 3 & 5 & 0 \end{bmatrix}}_{B} \Rightarrow \underbrace{\left[\begin{array}{cc|cc} 1 & 0 & 2 & 1 \\ 4 & 1 & 1 & 0 \\ \hline 0 & 1 & 3 & 0 \\ 5 & 0 & 2 & 1 \end{array}\right]}_{A} * \underbrace{\left[\begin{array}{cc|cc} 0 & 1 & 0 & 1 \\ 2 & 1 & 0 & 4 \\ \hline 2 & 0 & 1 & 1 \\ 1 & 3 & 5 & 0 \end{array}\right]}_{B}$$

$$A11 = \begin{bmatrix} 1 & 0 \\ 4 & 1 \end{bmatrix} \quad B11 = \begin{bmatrix} 0 & 1 \\ 2 & 1 \end{bmatrix}$$

$$\Downarrow \qquad\qquad \Downarrow$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \qquad \begin{bmatrix} e & f \\ g & h \end{bmatrix}$$

$P1 = a*(f-h)$
$P2 = h*(a+b)$
$P3 = e*(c+d)$
$P4 = d*(g-e)$
$P5 = (a+d)*(e+h)$
$P6 = (b-d)*(g+h)$
$P7 = (a-c)*(e+f)$

$$\Rightarrow \begin{bmatrix} P6+P5+P4-P2 & P1+P2 \\ P3+P4 & P1+P5-P7-P3 \end{bmatrix}$$

$$A_{11} * B_{11} = \begin{bmatrix} 0 & 1 \\ 2 & 5 \end{bmatrix}$$

$$\underbrace{A12 = \begin{bmatrix} 2 & 1 \\ 1 & 0 \end{bmatrix} \quad B12 = \begin{bmatrix} 0 & 1 \\ 0 & 4 \end{bmatrix}}_{A_{11} * B_{12} = \begin{bmatrix} 0 & 4 \\ 0 & 1 \end{bmatrix}} \qquad \underbrace{A21 = \begin{bmatrix} 0 & 1 \\ 5 & 0 \end{bmatrix} \quad B21 = \begin{bmatrix} 2 & 0 \\ 1 & 3 \end{bmatrix}}_{A_{21} * B_{11} = \begin{bmatrix} 1 & 3 \\ 10 & 0 \end{bmatrix}} \qquad \underbrace{A22 = \begin{bmatrix} 3 & 0 \\ 2 & 1 \end{bmatrix} \quad B22 = \begin{bmatrix} 1 & 1 \\ 5 & 0 \end{bmatrix}}_{A_{22} * B_{22} = \begin{bmatrix} 3 & 3 \\ 7 & 2 \end{bmatrix}}$$

$C11 = A_{11} * B_{11} + A_{12} * B_{21}$
$C12 = A_{11} * B_{12} + A_{12} * B_{22}$
$C21 = A_{21} * B_{11} + A_{22} * B_{21}$
$C22 = A_{21} * B_{12} + A_{22} * B_{22}$

$$C11 = \begin{bmatrix} 0 & 1 \\ 2 & 5 \end{bmatrix} + \begin{bmatrix} 5 & 3 \\ 2 & 0 \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 4 & 5 \end{bmatrix}$$
$$C12 = \begin{bmatrix} 0 & 1 \\ 0 & 8 \end{bmatrix} + \begin{bmatrix} 7 & 2 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 3 \\ 1 & 9 \end{bmatrix}$$
$$C21 = \begin{bmatrix} 2 & 1 \\ 0 & 5 \end{bmatrix} + \begin{bmatrix} 6 & 0 \\ 5 & 3 \end{bmatrix} = \begin{bmatrix} 2 & 4 \\ 0 & 11 \end{bmatrix}$$
$$C22 = \begin{bmatrix} 0 & 4 \\ 0 & 5 \end{bmatrix} + \begin{bmatrix} 3 & 3 \\ 7 & 2 \end{bmatrix} = \begin{bmatrix} 3 & 7 \\ 7 & 7 \end{bmatrix}$$

$$“ \quad C = \begin{bmatrix} 5 & 4 & 7 & 3 \\ 4 & 5 & 1 & 9 \\ 8 & 1 & 3 & 7 \\ 5 & 8 & 7 & 7 \end{bmatrix} \quad ”$$

$$\boxed{T(n) = 7T(n/2) + n^2}$$

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