Q1] Use Strassen's algorithm to compute matrix product of following matrices

$$A = \begin{bmatrix} 4 & 3 \\ 5 & 6 \end{bmatrix} \quad , \quad B = \begin{bmatrix} 3 & -2 \\ -4 & 2 \end{bmatrix}$$

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$P = (A_{11} + A_{22})(B_{11} + B_{22}) = (10)(5) = 50$

$Q = (A_{21} + A_{22}) B_{11} = (11)(3) = 33$

$R = A_{11} (B_{12} - B_{22}) = (4)(-4) = -16$

$S = A_{22} (B_{21} - B_{11}) = (6)(-7) = -42$

$T = (A_{11} + A_{12}) B_{22} = (7)(2) = 14$

$U = (A_{21} - A_{11})(B_{11} + B_{12}) = (1)(1) = 1$

$V = (A_{12} - A_{22})(B_{21} + B_{22}) = (-3)(-2) = 6$

$C_{11} = P + S - T + V = 50 + (-42) - 14 + 6 = 0$

$C_{12} = R + T = -16 + 14 = -2$

$C_{21} = Q + S = 33 + (-42) = -9$

$C_{22} = P + R - Q + U = 50 + (-16) - 33 + 1 = 2$

$\therefore A = \begin{bmatrix} 4 & 3 \\ 5 & 6 \end{bmatrix}, \quad B = \begin{bmatrix} 3 & -2 \\ -4 & 2 \end{bmatrix} = C \begin{bmatrix} 0 & -2 \\ -9 & 2 \end{bmatrix}$