$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{21} & a_{22} & a_{23} \end{bmatrix} \xrightarrow{V} \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \\ b_{31} & b_{32} \end{bmatrix} \xrightarrow{J} \underbrace{J}_{3xJ}$$

$$A \times B = \begin{bmatrix} a_{11} & b_{11} + a_{12} & b_{21} + a_{13} & b_{31} \\ a_{21} & b_{11} + a_{22} & b_{21} + a_{23} & b_{31} \end{bmatrix} \xrightarrow{A_{11} b_{12} + A_{12} b_{22} + a_{23} b_{32}} \underbrace{J}_{2xJ}$$

$$A_{21} b_{11} + a_{22} b_{21} + a_{23} b_{31} \xrightarrow{A_{21} b_{12} + a_{22} b_{22} + a_{23} b_{32}} \underbrace{J}_{2xJ}$$

$$A_{31} b_{11} + a_{32} b_{31} \xrightarrow{A_{31} b_{32} + a_{32} b_{32} + a_{33} b_{32}} \underbrace{J}_{2xJ}$$

$$A_{31} b_{11} + a_{32} b_{31} \xrightarrow{A_{31} b_{32} + a_{32} b_{32} + a_{33} b_{32}} \underbrace{J}_{2xJ}$$

$$A_{31} b_{12} + a_{32} b_{31} \xrightarrow{A_{31} b_{32} + a_{32} b_{32} + a_{33} b_{32}} \underbrace{J}_{2xJ}$$

$$A_{31} b_{12} + a_{32} b_{31} \xrightarrow{A_{32} b_{32} + a_{32} b_{32} + a_{33} b_{32}} \underbrace{J}_{2xJ}$$

$$A_{31} b_{11} + a_{32} b_{21} + a_{32} b_{31} \xrightarrow{A_{31} b_{32} + a_{32} b_{32} + a_{33} b_{32}} \underbrace{J}_{2xJ}$$

$$A_{31} b_{12} + a_{32} b_{31} \xrightarrow{A_{32} b_{32} + a_{33} b_{32}} \underbrace{J}_{3xJ}$$

$$A_{31} b_{12} + a_{32} b_{32} + a_{33} b_{32} \xrightarrow{J}_{3xJ}$$

$$A_{31} b_{12} + a_{32} b_{32} + a_{33} b_{32}$$

$$A_{32} b_{31} \xrightarrow{J}_{3xJ} \underbrace{J}_{3xJ} \xrightarrow{J}_{3xJ}$$

$$A_{31} b_{32} + a_{33} b_{32} \xrightarrow{J}_{3xJ}$$

$$A_{32} b_{31} \xrightarrow{J}_{3xJ} \underbrace{J}_{3xJ} \xrightarrow{J}_{3xJ}$$

$$A_{31} b_{32} + a_{32} b_{32} \xrightarrow{J}_{3xJ}$$

$$A_{32} b_{32} \xrightarrow{J}_{3xJ} \xrightarrow{J}_{3xJ}$$

= 2 \* 3 \* 2 = 12. (by formulae).

 $A_1 = 2 \times 3$   $A_2 = 3 \times 4$   $A_3 = 4 \times 2$ . Minimum multiplication to find AIA2A3.

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(A1.A2) . A3

A1 (A2. A3).

Revelling Dimension 2x4

Cost = 2 \* 4 \* 2 = 16

Cost Dimenion 2+3-2=12 CO EN =

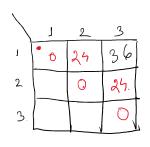
.. Told were operations = 24+16=40 . .. Told are = 24+12=36. Minm multiplication ops = min(option 1, option 2)

= 36/

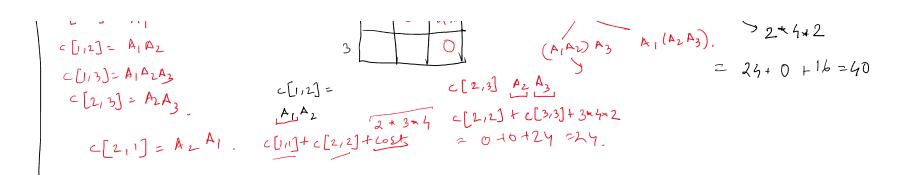
 $A_1 = 2 \times 3$   $A_2 = 3 \times 4$   $A_3 = 4 \times 2$ . Minimum multiplication to find AIA2A3.

$$C[1/1] = A_1$$

$$C[1/2] = A_1 A_2$$



 $A_{1} = 2 \times 3 \qquad A_{2} = 3 \times 4 \qquad A_{3} = 4 \times 2.$   $A_{1} (A_{2}A_{3}).$  C[1/3] = C[1/2] + C[3,3] + C[2/3] += 11. n. 16-12



 $A_{1}(A_{2}A_{3}A_{4}) \qquad (A_{1}A_{2})(A_{3}A_{4}) \qquad (A_{1}A_{2}A_{3})A_{4}$   $A_{1}(A_{2}A_{3}A_{4}) \qquad (A_{2}A_{3})A_{4}$   $A_{2}(A_{3}A_{4}) \qquad (A_{2}A_{3})A_{4}.$