$$A \in {\mathcal{B}_8}^{m \times n}, \quad B \in {\mathcal{B}_8}^{p \times q}$$

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}, \quad B = \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1q} \\ b_{21} & b_{22} & \dots & b_{2q} \\ \dots & \dots & \dots & \dots \\ b_{p1} & b_{p2} & \dots & b_{pq} \end{bmatrix}$$

$$A \overset{f()}{\to} B$$

$$\text{Case } 0 : (m < q) \wedge (n < p)$$

$$B = \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1q} \\ b_{21} & b_{22} & \dots & b_{2q} \\ \dots & \dots & \dots & \dots \\ b_{p1} & b_{p2} & \dots & b_{pq} \end{bmatrix} = \begin{bmatrix} a_{11} & a_{21} & \dots & a_{m1} & b_{1(m+1)} & \dots & b_{1q} \\ a_{12} & a_{22} & \dots & a_{m2} & b_{2(m+1)} & \dots & b_{2q} \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ a_{1n} & a_{2n} & \dots & a_{mn} & b_{n(m+1)} & \dots & b_{nq} \\ b_{(n+1)1} & b_{(n+1)2} & \dots & b_{(n+1)m} & b_{(n+1)(m+1)} & \dots & b_{(n+1)q} \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ b_{p1} & b_{p2} & \dots & \dots & \dots & \dots & b_{pq} \end{bmatrix}$$

$$\text{Case } 1 : (n \geq p) \wedge (m < q)$$

$$B = \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1q} \\ b_{21} & b_{22} & \dots & b_{2q} \\ \dots & \dots & \dots & \dots \\ b_{p1} & b_{p2} & \dots & b_{pq} \end{bmatrix} = \begin{bmatrix} a_{11} & a_{21} & \dots & a_{m1} & b_{1(m+1)} & \dots & b_{1q} \\ a_{12} & a_{22} & \dots & a_{m2} & b_{2(m+1)} & \dots & b_{2q} \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ a_{1n} & a_{2n} & \dots & a_{mn} & b_{n(m+1)} & \dots & b_{nq} \end{bmatrix}$$

$$\text{Case } 2 : (n < p) \wedge (m \geq q)$$

$$B = \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1q} \\ b_{21} & b_{22} & \dots & b_{2q} \\ \dots & \dots & \dots & \dots \\ b_{p1} & b_{p2} & \dots & b_{pq} \end{bmatrix} = \begin{bmatrix} a_{11} & a_{21} & \dots & a_{q1} \\ a_{12} & a_{22} & \dots & a_{q2} \\ \dots & \dots & \dots & \dots \\ a_{1n} & a_{2n} & \dots & a_{qn} \\ b_{(n+1)1} & b_{(n+1)2} & \dots & b_{(n+1)q} \\ \dots & \dots & \dots & \dots \\ b_{p1} & b_{p2} & \dots & b_{pq} \end{bmatrix}$$

$$\text{Case } 3 : (n \geq p) \wedge (m \geq q)$$

$$B = \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1q} \\ b_{21} & b_{22} & \dots & b_{2q} \\ \dots & \dots & \dots & \dots \\ b_{p1} & b_{p2} & \dots & b_{pq} \end{bmatrix} = \begin{bmatrix} a_{11} & a_{21} & \dots & a_{q1} \\ a_{12} & a_{22} & \dots & a_{q2} \\ \dots & \dots & \dots & \dots \\ a_{1n} & a_{2n} & \dots & a_{qp} \end{bmatrix}$$