

1 Col/Row major

$$\begin{array}{c}
 i \setminus j \quad 0 \quad 1 \quad 2 \quad 3 \\
 0 \quad \left(\begin{array}{cccc} 0 & 1 & 2 & 3 \end{array} \right) \\
 1 \quad \left(\begin{array}{cccc} 4 & 5 & 6 & 7 \end{array} \right) \\
 2 \quad \left(\begin{array}{cccc} 8 & 9 & 10 & 11 \end{array} \right) \\
 3 \quad \left(\begin{array}{cccc} 12 & 13 & 14 & 15 \end{array} \right) \\
 4 \quad \left(\begin{array}{cccc} 16 & 17 & 18 & 19 \end{array} \right)
 \end{array}
 \underbrace{\hspace{10em}}_{\text{row-major order}}
 \quad
 \begin{array}{c}
 i \setminus j \quad 0 \quad 1 \quad 2 \quad 3 \\
 0 \quad \left(\begin{array}{cccc} 0 & 5 & 10 & 15 \end{array} \right) \\
 1 \quad \left(\begin{array}{cccc} 1 & 6 & 11 & 16 \end{array} \right) \\
 2 \quad \left(\begin{array}{cccc} 2 & 7 & 12 & 17 \end{array} \right) \\
 3 \quad \left(\begin{array}{cccc} 3 & 8 & 13 & 18 \end{array} \right) \\
 4 \quad \left(\begin{array}{cccc} 4 & 9 & 14 & 19 \end{array} \right)
 \end{array}
 \underbrace{\hspace{10em}}_{\text{column-major order}}$$

2 Cache aware data storage

$$\begin{array}{c}
 \mathbf{C} = \mathbf{A} \times \mathbf{B} \\
 \\
 \begin{array}{c}
 i \setminus j \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \\
 0 \quad \left(\begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \end{array} \right) \\
 1 \quad \left(\begin{array}{ccccc} 5 & 6 & 7 & 8 & 9 \end{array} \right) \\
 2 \quad \left(\begin{array}{ccccc} 10 & 11 & 12 & 13 & 14 \end{array} \right) \\
 3 \quad \left(\begin{array}{ccccc} 15 & 16 & 17 & 18 & 19 \end{array} \right)
 \end{array}
 \underbrace{\hspace{10em}}_{\text{matrix A row-major}}
 \times
 \begin{array}{c}
 i \setminus j \quad 0 \quad 1 \quad 2 \quad 3 \\
 0 \quad \left(\begin{array}{cccc} 0 & 5 & 10 & 15 \end{array} \right) \\
 1 \quad \left(\begin{array}{cccc} 1 & 6 & 11 & 16 \end{array} \right) \\
 2 \quad \left(\begin{array}{cccc} 2 & 7 & 12 & 17 \end{array} \right) \\
 3 \quad \left(\begin{array}{cccc} 3 & 8 & 13 & 18 \end{array} \right) \\
 4 \quad \left(\begin{array}{cccc} 4 & 9 & 14 & 19 \end{array} \right)
 \end{array}
 \underbrace{\hspace{10em}}_{\text{matrix B column-major}}
 \end{array}$$