



ROW MAJOR AND COLUMN MAJOR (METHODS FOR ARRANGING 2-D ARRAY)

Row major order

- **row-major order** and **column-major order** describe methods for arranging multidimensional arrays in linear storage such as memory.
- The difference is simply that in row-major order, consecutive elements of the rows of the array are contiguous in memory; in column-major order, consecutive elements of the columns are contiguous.

- This array
$$\begin{bmatrix} 11 & 12 & 13 \\ 21 & 22 & 23 \end{bmatrix}$$

Would be stored as follows in the two orders:

- **Column-Major Order**
e.g. Fortran

Address	Value
0	11
1	21
2	12
3	22
4	13
5	23

- Row-Major Order**
e.g. C

Address	Value
0	11
1	12
2	13
3	21
4	22
5	23

Calculation of address of MultiDimensional Array

Column-major-→

$$\text{LOC}(A[j,k]) = \text{BASE}(A) + w[M(K-1) + (J-1)]$$

Row-Major

$$\text{LOC}(A[j,k]) = \text{BASE}(A) + w[N(j-1) + (k-1)]$$

Conclusion

- The difference between row-major and column-major order is simply that the order of the dimensions is reversed. Equivalently, in row-major order the rightmost indices vary faster as one steps through consecutive memory locations, while in column-major order the leftmost indices vary faster.