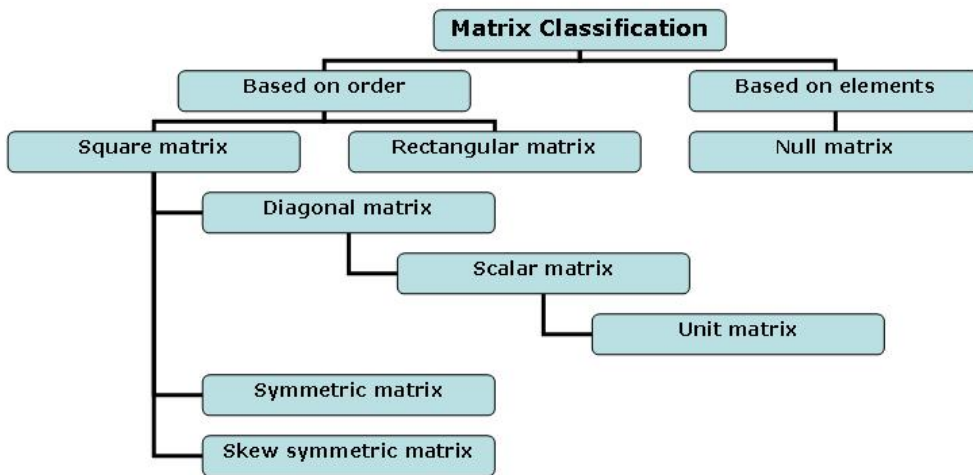


# Biology

## TYPES OF MATRICES

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### Column Matrix



A matrix is said to be a [column matrix](#) if it has only one column. In general,  $a = [a_{ij}]_{m \times 1}$  is a column matrix of order  $m \times 1$

$$A = \begin{pmatrix} -2 \\ 3 \\ 4 \end{pmatrix} \quad B = \begin{pmatrix} 7 \\ -2/5 \\ 0 \\ -7 \end{pmatrix}$$

For example:

Order of A is  $3 \times 1$  and that of B is  $4 \times 1$

### Row Matrix

A matrix is said to be a [row matrix](#) if it has only one row. In general,  $B = [b_{ij}]_{1 \times n}$  is a row matrix of order  $1 \times n$

For example:  $A = [2 \ 0 \ 5 \ -3]$       $B = [1/2 \ 0 \ 3 \ 6 \ 7]$

Here order of A is  $1 \times 4$  and that of B is  $1 \times 5$

### Square Matrix

A matrix whose numbers of columns are equal to number of rows is said to be a [square matrix](#). Thus an  $m \times n$  matrix is said to be a square matrix if  $m = n$  and is known as a square matrix of order 'n'.

$$A = \begin{pmatrix} 1 & 3 & -9 \\ -7 & 1 & -5 \\ 6 & 4 & 7 \end{pmatrix} \quad B = \begin{pmatrix} x & 1 \\ y & 1 \end{pmatrix}$$

For example:

Hence A is of order 3 and B is of order 2.

## Diagonal Matrix

A square matrix  $B = [b_{ij}]_{m \times m}$  is said to be a diagonal matrix if all its non [diagonal](#) elements are zero.

For example:

$$A = [6], B = \begin{pmatrix} -1 & 0 \\ 0 & -2 \end{pmatrix} C = \begin{pmatrix} -3 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 7 \end{pmatrix}$$

Hence the orders of A, B and C are 1, 2 and 3 respectively

## Scalar Matrix

A diagonal matrix is said to be a [scalar matrix](#) if its diagonal elements are equal.

That is  $b_{ij} = 0$ , when  $i \neq j$

$b_{ij} = k$ , when  $i = j$ , for some constant k

For example:

$$A = [9] \quad B = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} \quad C = \begin{pmatrix} \sqrt{5} & 0 & 0 \\ 0 & \sqrt{5} & 0 \\ 0 & 0 & \sqrt{5} \end{pmatrix}$$

Hence the order of A, B and C are 1, 2 and 3 respectively.

## Identity Matrix

A square matrix in which elements in the diagonal are all 1 and rest all are zero is called an [identity matrix](#). In other words, the square matrix A =

$$[a_{ij}]_{n \times n} \text{ is an identity matrix, if } a_{ij} = \begin{cases} 1, & \text{if } i = j \\ 0, & \text{if } i \neq j \end{cases}$$

For example: [1]  $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$   $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$  are identity matrices of order 1, 2 and 3 respectively.

## Zero Matrix

A matrix is said to be a zero matrix if all its entries are zero. Another name for [zero matrix](#) is null matrix. It is denoted by 0.

For example:

$$[0] \quad \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix} \quad \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

The orders of the above matrices are 1 x 1, 2 x 2 and 2 x 3 respectively.

Now try it yourself! Should you still need any help, [click here](#) to schedule live online session with e Tutor!

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## Reference Links:

- [http://simple.wikipedia.org/wiki/Matrix\\_\(mathematics\)#One\\_column\\_matrix](http://simple.wikipedia.org/wiki/Matrix_(mathematics)#One_column_matrix)
- [http://en.wikipedia.org/wiki/Row\\_matrix](http://en.wikipedia.org/wiki/Row_matrix)
- <http://www.britannica.com/EBchecked/topic/561660/square-matrix>
- [http://en.wikipedia.org/wiki/Diagonal\\_matrix](http://en.wikipedia.org/wiki/Diagonal_matrix)
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