

NumPy

NumPy (Numerical Python) is a fundamental Python library for numerical and scientific computing. It provides support for large, multi-dimensional arrays and matrices, along with a collection of mathematical functions to operate on these arrays. NumPy is a cornerstone library in the Python data science ecosystem and is used extensively in fields like data analysis, machine learning, and scientific research.

Function	Description	Example
np.array()	Create a NumPy array from a Python list.	<code>np.array([1, 2, 3])</code>
np.zeros(shape)	Create an array filled with zeros.	<code>np.zeros((2, 3))</code>
np.ones(shape)	Create an array filled with ones.	<code>np.ones((3, 2))</code>
np.empty(shape)	Create an empty array without initialising values.	<code>np.empty((2, 2))</code>
np.arange(start, stop, step)	Create an array with a range of values.	<code>np.arange(0, 10, 2)</code>
np.linspace(start, stop, num)	Create an array with evenly spaced values.	<code>np.linspace(0, 1, 5)</code>
np.eye(N)	Create a 2D identity matrix of size N.	<code>np.eye(3)</code>
np.random.rand(shape)	Generate random numbers from a uniform distribution.	<code>np.random.rand(2, 2)</code>
np.random.randn(shape)	Generate random numbers from a standard normal distribution.	<code>np.random.randn(2, 2)</code>
np.shape(arr)	Get the dimensions of the array.	<code>arr.shape</code>
np.dtype(arr)	Get the data type of array elements.	<code>arr.dtype</code>

np.size(arr)	Get the total number of elements in the array.	arr.size
arr[index]	Access elements of the array by index.	arr[2]
arr[start:stop]	Slice the array from start to stop.	arr[1:4]
arr[condition]	Select elements based on a condition.	arr[arr > 2]
np.mean(arr)	Calculate the mean of array elements.	np.mean(arr)
np.median(arr)	Calculate the median of array elements.	np.median(arr)
np.sum(arr)	Calculate the sum of array elements.	np.sum(arr)
np.max(arr)	Find the maximum element in the array.	np.max(arr)
np.min(arr)	Find the minimum element in the array.	np.min(arr)
np.std(arr)	Calculate the standard deviation of array elements.	np.std(arr)
np.var(arr)	Calculate the variance of array elements.	np.var(arr)
np.dot(a, b)	Compute the dot product of two arrays (matrix multiplication).	np.dot(arr1, arr2)
np.transpose(arr)	Transpose the array (swap rows and columns).	np.transpose(matrix)
np.reshape(arr, shape)	Change the shape of the array.	np.reshape(arr, (2, 3))

np.concatenate((arr1, arr2), axis)	Concatenate arrays along a specified axis.	np.concatenate((arr1, arr2), axis=0)
np.split(arr, num)	Split an array into multiple sub-arrays.	np.split(arr, 3)
np.sort(arr)	Sort the array in ascending order.	np.sort(arr)
np.unique(arr)	Find unique elements in the array.	np.unique(arr)
np.argmax(arr)	Find the index of the maximum element.	np.argmax(arr)
np.argmin(arr)	Find the index of the minimum element.	np.argmin(arr)