

Python Cheat Sheet: NumPy

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Name	Description	Example
a.shape	The shape attribute of NumPy array a keeps a tuple of integers. Each integer describes the number of elements of the axis.	a = np.array([[1,2],[1,1],[0,0]]) print(np.shape(a)) # (3, 2)
a.ndim	The ndim attribute is equal to the length of the shape tuple.	print(np.ndim(a)) # 2
*	The asterisk (star) operator performs the Hadamard product, i.e., multiplies two matrices with equal shape element-wise.	a = np.array([[2, 0], [0, 2]]) b = np.array([[1, 1], [1, 1]]) print(a*b) # [[2 0] [0 2]]
np.matmul(a,b), a@b	The standard matrix multiplication operator. Equivalent to the @ operator.	print(np.matmul(a,b)) # [[2 2] [2 2]]
np.arange([start,]stop, [step,])	Creates a new 1D numpy array with evenly spaced values	print(np.arange(0,10,2)) # [0 2 4 6 8]
np.linspace(start, stop, num=50)	Creates a new 1D numpy array with evenly spread elements within the given interval	print(np.linspace(0,10,3)) # [0. 5. 10.]
np.average(a)	Averages over all the values in the numpy array	a = np.array([[2, 0], [0, 2]]) print(np.average(a)) # 1.0
<slice> = <val>	Replace the <slice> as selected by the slicing operator with the value <val>.	a = np.array([0, 1, 0, 0, 0]) a[::2] = 2 print(a) # [2 1 2 0 2]
np.var(a)	Calculates the variance of a numpy array.	a = np.array([2, 6]) print(np.var(a)) # 4.0
np.std(a)	Calculates the standard deviation of a numpy array	print(np.std(a)) # 2.0
np.diff(a)	Calculates the difference between subsequent values in NumPy array a	fibs = np.array([0, 1, 1, 2, 3, 5]) print(np.diff(fibs, n=1)) # [1 0 1 1 2]
np.cumsum(a)	Calculates the cumulative sum of the elements in NumPy array a.	print(np.cumsum(np.arange(5))) # [0 1 3 6 10]
np.sort(a)	Creates a new NumPy array with the values from a (ascending).	a = np.array([10,3,7,1,0]) print(np.sort(a)) # [0 1 3 7 10]
np.argsort(a)	Returns the indices of a NumPy array so that the indexed values would be sorted.	a = np.array([10,3,7,1,0]) print(np.argsort(a)) # [4 3 1 2 0]
np.max(a)	Returns the maximal value of NumPy array a.	a = np.array([10,3,7,1,0]) print(np.max(a)) # 10
np.argmax(a)	Returns the index of the element with maximal value in the NumPy array a.	a = np.array([10,3,7,1,0]) print(np.argmax(a)) # 0
np.nonzero(a)	Returns the indices of the nonzero elements in NumPy array a.	a = np.array([10,3,7,1,0]) print(np.nonzero(a)) # [0 1 2 3]