**Numpy**

* **Numpy stands for numerical python.**
* **Numpy is very important because it is mostly used in data science industries.**
* **In numpy we deal wih most arrays and matrix.**
* **Np.array()-converts the list in to arrays**
* **Data are present in dimension like 1-D ,2-D,3-D,4-D…etc , so numpy is used for representing the dimensionality data .**
* **We can represent the data up to max 3 -D DATA only.**
* **Function like array(),asarray(),asanyarray() convert the list into arrays.**
* **Matrix is a two-dimensional dataset; it is subset of array.**
* **Since matrix is a subset of array so if we convert the matrix in to array then there will be no changes seen , because since matrix is a subset of an array so by default matrix is an array only and if we convert again by using the three functions then there will be no changes seen.**
* **In arrays there is changes seen in the all the variables if we try to change the values of an array, if variables are derived from initial variables then if one variables changes the array then It will automatically change the previous variables value with the same array result of newer variable.**
* **This is known as swallow copy.**

**For example:**

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* **If we want to allocate the same list to another variables then instead of doing this (b=a) do b=np.copy(a), so this copy function will create the another container by copying the list value from original container and allocate that variable to this new container , so the previous container value doesn’t get changed upon updating the newer list.**

**This is known as deep copy.**

* **From function ():**

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* **Fromiter():- this function is used for iterating the generator function**

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* **Fromstring():-This function is used for converting the string to array based on the separator.**

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* **Ndim():- this is used for finding the dimensions of the array.**
* **Shape():-shape represents the no of rows and no of columns.**
* **Array.size:- this represents the size of the elements.**
* **Difference between list and array is that list can contain multiple data types where else array consist of only one datatype.**
* **Normally range function can traverse the value of integer only it cant do of floating number like for I in range(2.3,4.6):**
* **So In numpy there is a function known as np.arange() this function can traverse over integer values as well as floating numbers, In this we can provide jump of the number**

**For example😉 :-**

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* **Linspace():- This function in numpy generates the number which are coming in the range given by the user according to no of units mentioned by the user.**

**For example:-**

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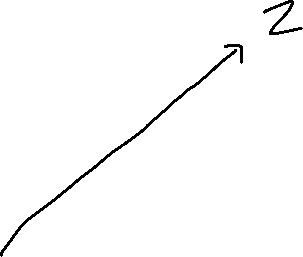
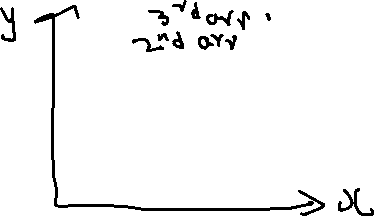
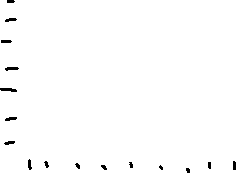
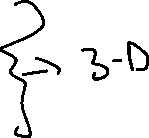
* **3-D (dimensional ) syntax is np.array(no of matrix, no of rows , no of columns)**

**For example:-**

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**Diagram of three diamnesional**



* In four dimensions there is no of 3 -d dimensions
* Empty function in numpy creates the empty array

For example:-

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* **Eye() function creates the identity matrix just give the no of diagonal elements which consists of 1 so if I write 3 so it will contain three 1 one’s diagonal elements**
* **Log space():- this function in numpy find the logs of numbers given in range according to the size as well as the base we can adjust .**
* **For example:-**

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* **Np.random.randn():-This numpy function generates the random number By giving the no of rows and columns.It generates that data who average value is zero and has standard normal deviation means S.D =1,Retrurns the sample form standard Normal distribution table.**

**For example:-**

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* **Np.random.rand():-This numpy function generates the random number same like in random.randn(), but it generates the data randomly but is average or mean values is not zero.**

**For example:-**

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* **Np.random.randint():-This numpy function generates the random number same like the above function but it gives integer number.**

**For example:-**

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We can save this random number to csv format



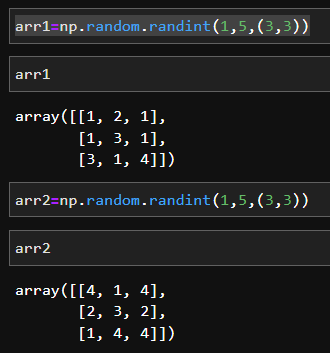
* Arr.reshape():-This numpy function basically reshapes the given data generated by random

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Description automatically generated with medium confidenceSome operations:-

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Some operation related on this last one photo.

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For matrix multiplication we will use @ symbol whereas for index multiplication we use \* symbol.

One dimension cannot be transposed

For example:-

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* **Arr.Flatten()** function basically converts any array dimension to one dimensions.
* **np.expand\_dims()** functions basically converts any dimensions to one higher dimensions.

For example if I have an array of one dimensions so if I use np.expand\_dims() then its dimensions will be increased by one.

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* **np.squeeze():-This function will squeeze the dimensions of array into one lesser dimension.**

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* **np.repeat():-**This function repeats the elements according to the number given by user

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* **np.roll():- This function rolls the elements according to the number given by the user**

**for example:-**

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* **np.diag():- this function makes the array elements as diagonal elements.**

**For example:-**

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* **some binary operations:-**

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* **NumPy – string operations**

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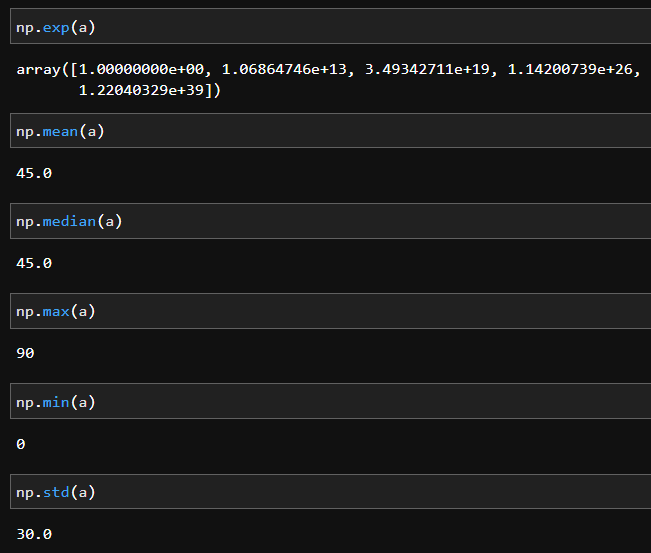
Some examples:-

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* Numpy – mathematical Functions

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* **Sort -searching and counting functions**

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Byte -swapping

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Swallow copy and de copy , in swallow copy both the arrays value changes when one value changes in it where else in de copy if one array values Is changed then it will not afftect the other array value.

So array.view() functions is same like swallow , where else copy functions acts like decopying .

**In numpy there Is a library of matrix which generates the matrix.**

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Linear – Algebra

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