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Numpy Tutorial

Agenda

- What is Numpy?
- Numpy v/s List
- Numpy Operations
- Numpy Special Functions

What is Numpy?

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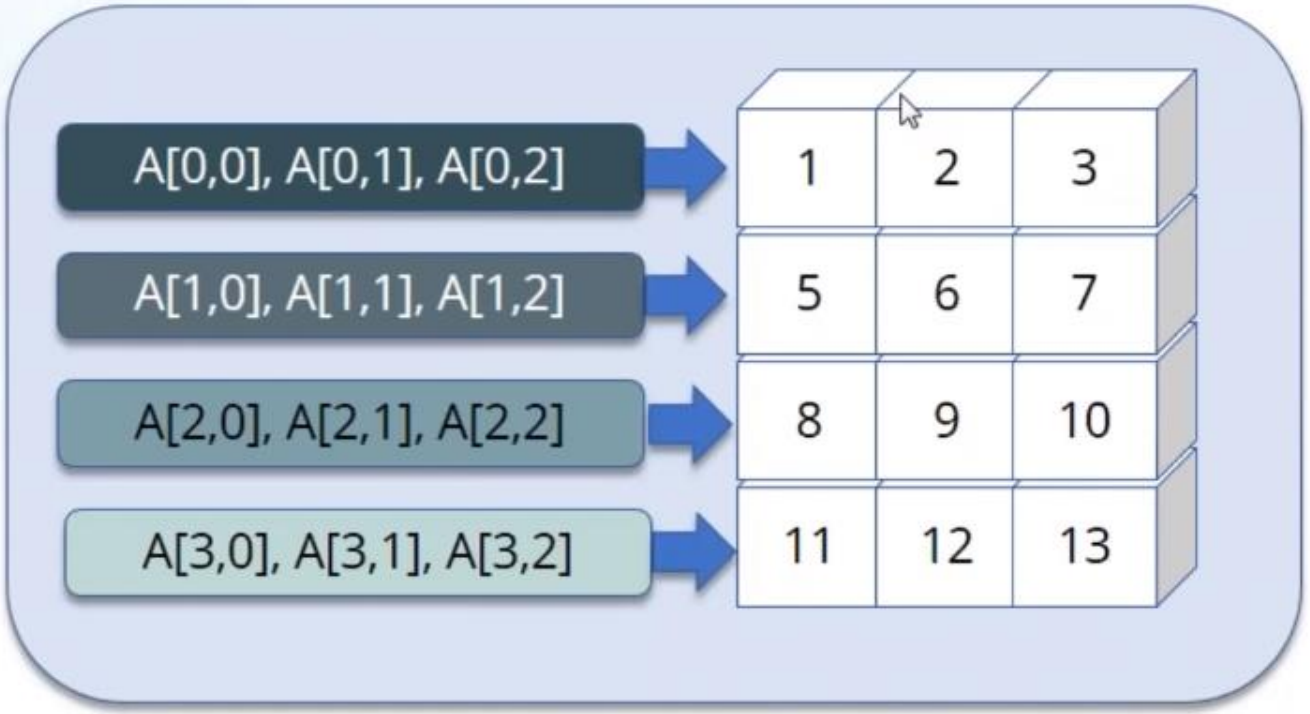
- Numpy is the core library for scientific computing in Python.
- It provides a high-performance multidimensional array object, and tools for working with these arrays.



Numpy v/s List

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Advantages of Numpy over List

Less Memory | Fast | Convenient

Numpy Operations

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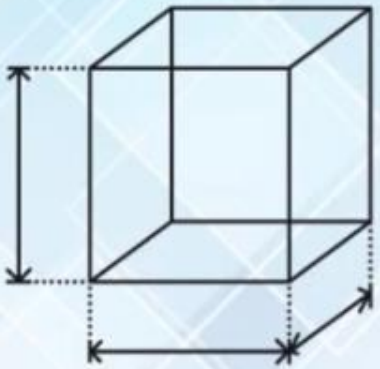
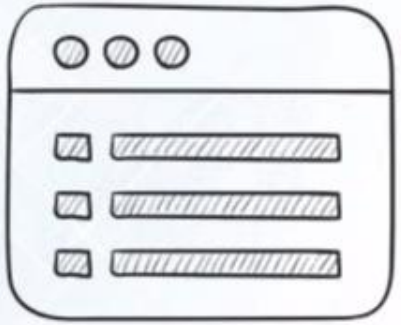
```
a = np.array ( [ (1,2,3) , (4,5,6) ] )
```



Find the dimension of the array

```
print(a.ndim)
```

Dimensions = 2



Find the byte size of each element

```
print(a.itemsize)
```

Byte size = 4

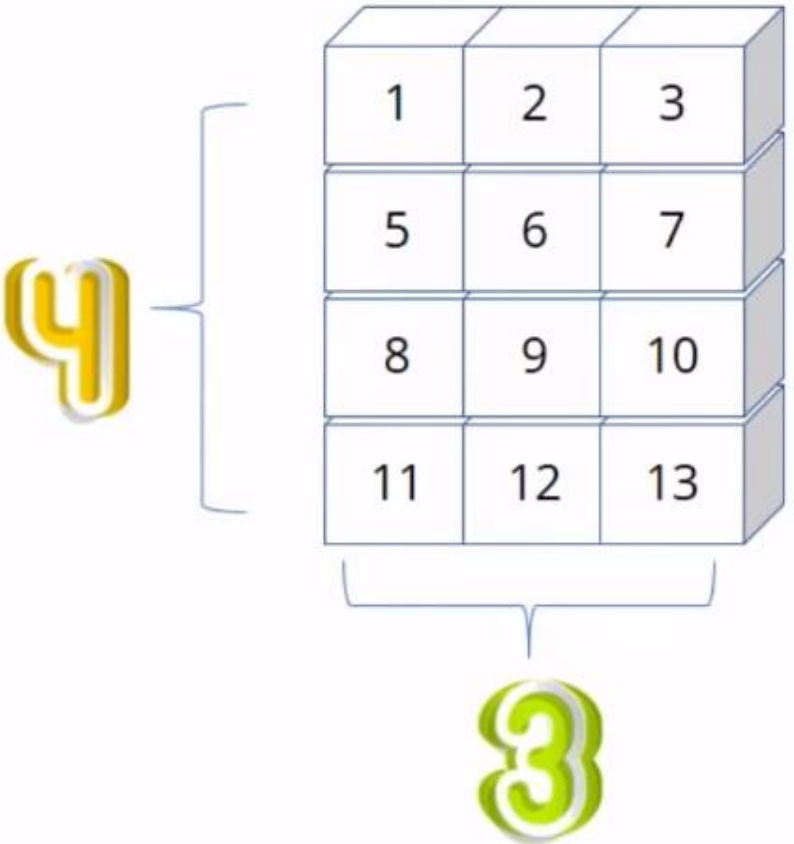
Find the data type of the elements

```
print(a.dtype)
```

Data type = int32

Numpy Operations

Find the size of an array



Find the shape of an array

Numpy Operations

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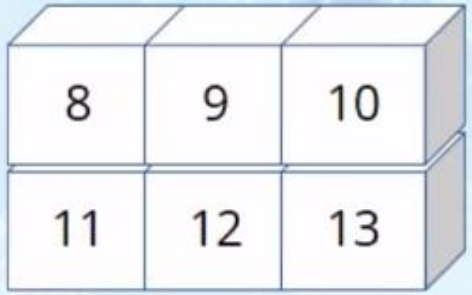
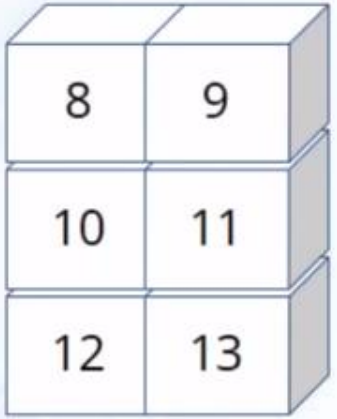
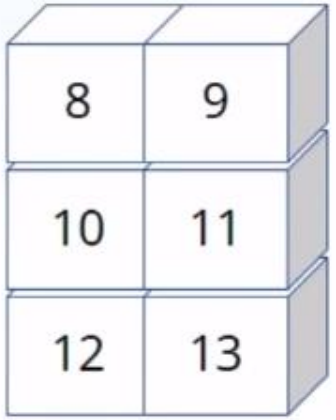




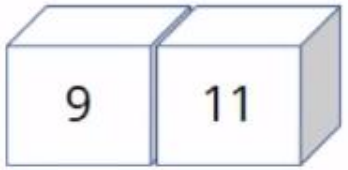
Reshape

a = a.reshape(3,2)



Slicing

a[1 , :2] 1st row, 2nd col
uptill 3rd element



Numpy Operations

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a = np.array([1,2,3,4])

a.min() a.max() a.sum()

Numpy Operations

a.sum(axis = 0)

Sum of axis 0: [30, 33]

Sum of axis 1: [17, 21, 25]

a.sum(axis = 1)

Numpy Operations

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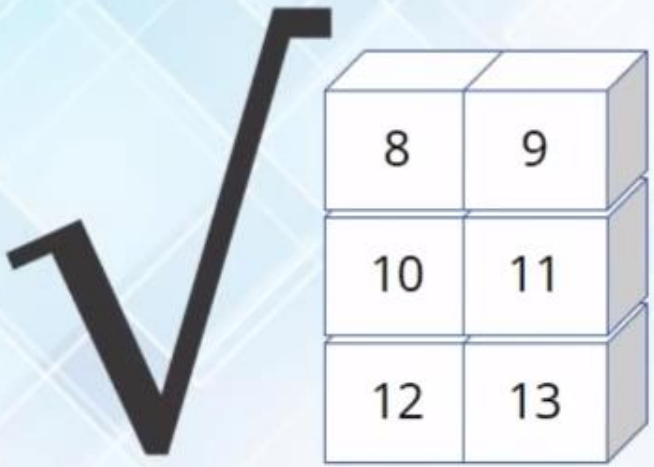
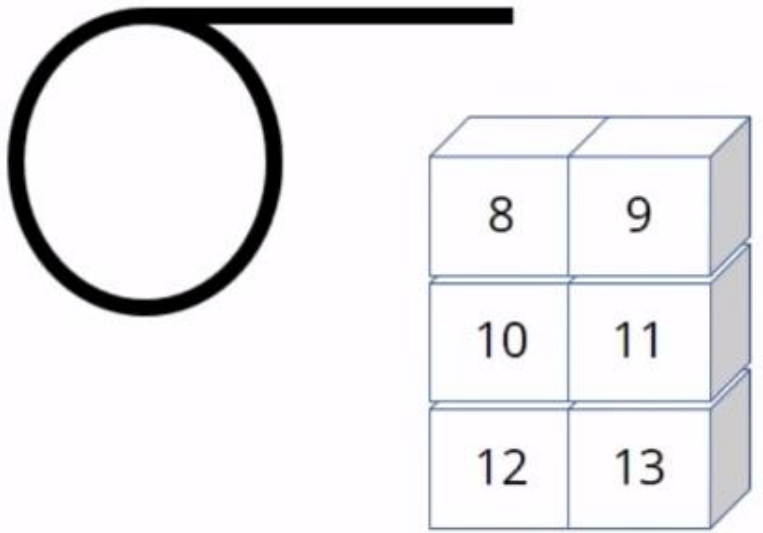
```
a = np.array( [
                (8,9),
                (10,11),
                (12,13)
                ] )
```



Finding the square root

```
np.sqrt(a)
```



Finding the Standard Deviation

```
np.std(a)
```

Numpy Operations

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a

8	9
10	11
12	13

a + b

b

8	9
10	11
12	13

8	9
10	11
12	13

8	9
10	11
12	13

8	9
10	11
12	13

8	9
10	11
12	13

8	9
10	11
12	13

8	9
10	11
12	13

Numpy Special Functions

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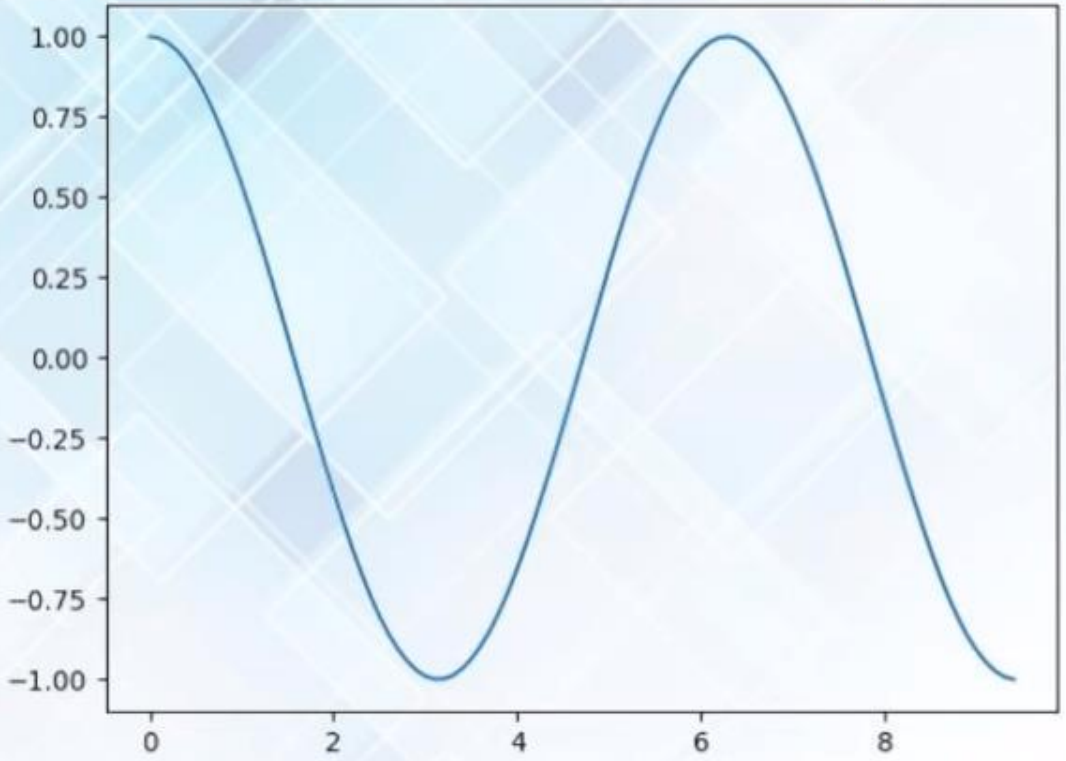
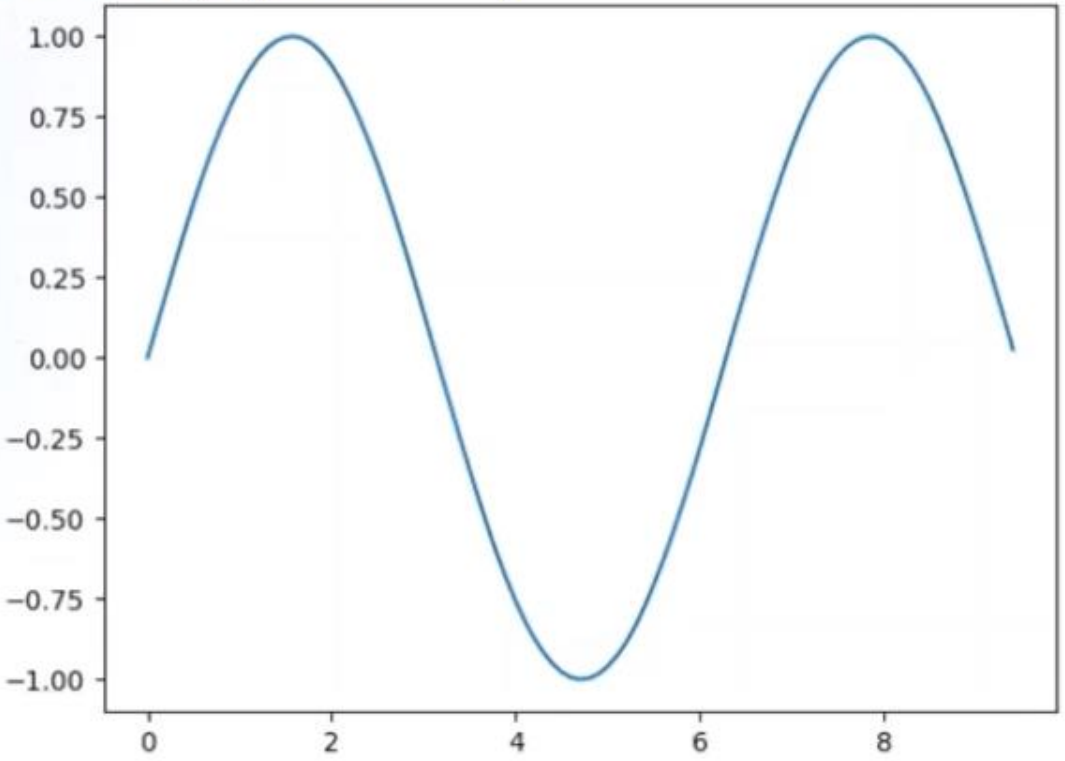
x = np.arange (0, 3*np.pi , 0.1)



Cosine Function

y = np.cos(x)



Sine Function

y = np.sin(x)

Numpy Special Functions

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```
a = np.array([
        (7,8,6),
        (2,3,4)
        ])
```

Exponential Function

np.exp(a)

Logarithmic Function

np.log(a)