Session2-Numpy (Arrays Part-2)

DAwP_S2_Numpy2_1thAgu22
Training Clarusway
Pear Deck - August 1, 2022 at 7:04PM

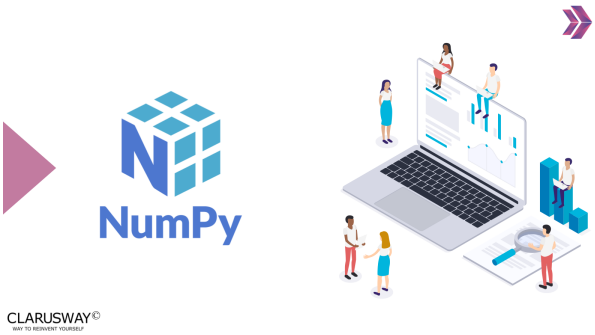
Part 1 - Summary

Use this space to summarize your thoughts on the lesson

Part 2 - Responses

Slide 1

Use this space to take notes:

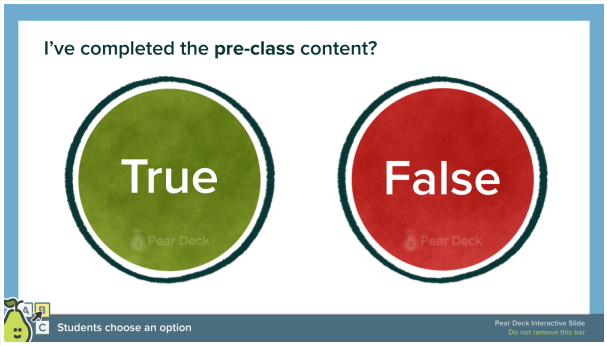
Slide 2


Use this space to take notes:

Slide 3
Table of Contents Concatenation/Splitting/Sorting of the Arrays Indexing of 1D Arrays Indexing of 2D Arrays Broadcasting Selection on a Condition NumPy Operations

Use this space to take notes:

Slide 4	Your Response
	You Chose

Slide 4	Your Response
	• **True** Other Choices • False

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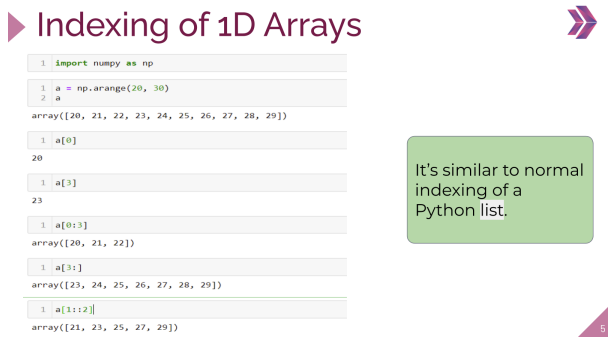
Slide 5


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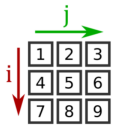
Slide 6

Indexing of 2D Arrays

```
import numpy as np

a2 = np.array([[1, 2, 3],
               [4, 5, 6],
               [7, 8, 9]])
```




```
print(a2[2, 1]) # 8
```

Notice the syntax - the **i** and **j** values are both inside the square brackets, separated by a comma (the index is actually a tuple **(2, 1)**, but tuple packing is used). The example picks row 2, column 1, which has the value 8. This compares with the syntax you might use with a 2D list (ie a list of lists):

We can index an element of the array using two indices - **i** selects the row, and **j** selects the column:

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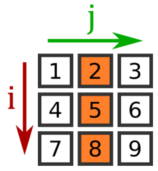
Indexing of 2D Arrays

```
print(a2[:, 1]) # [2, 5, 8]
```

We are skipping ahead slightly to slicing, later in this tutorial, but what this syntax means is:

- for the **i** value, take all values (**:** is a full slice, from start to end)
- for the **j** value take 1

Giving this array [2, 5, 8]:



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Slide 8	Your Response

Slide 8	Your Response
Slicing of 2D Arrays  What is the code? Students, write your response!	

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Slide 9

Slicing of 2D Arrays

The Answer

```
arr[1:,2:4]
```

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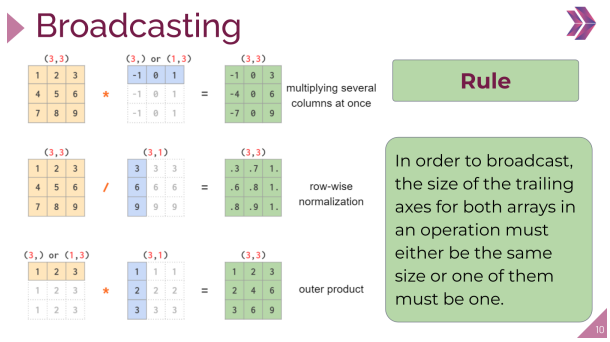

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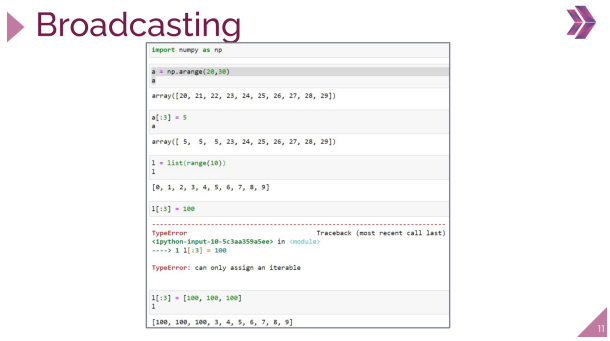

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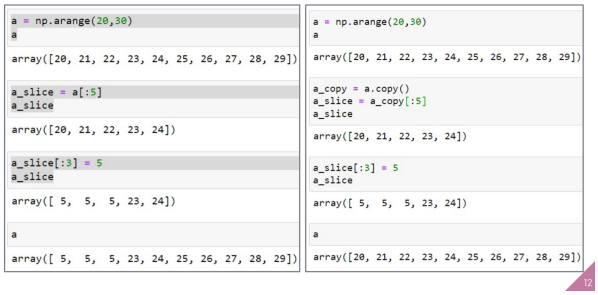
Broadcasting



```
a = np.arange(20,30)
a
```

```
array([20, 21, 22, 23, 24, 25, 26, 27, 28, 29])
```

```
a_slice = a[:5]
a_slice
```

```
array([20, 21, 22, 23, 24])
```

```
a_slice[:3] = 5
a_slice
```

```
array([ 5,  5,  5, 23, 24])
```

```
a
```

```
array([ 5,  5,  5, 23, 24, 25, 26, 27, 28, 29])
```

```
a = np.arange(20,30)
a
```

```
array([20, 21, 22, 23, 24, 25, 26, 27, 28, 29])
```

```
a_copy = a.copy()
a_slice = a_copy[:5]
a_slice
```

```
array([20, 21, 22, 23, 24])
```

```
a_slice[:3] = 5
a_slice
```

```
array([ 5,  5,  5, 23, 24])
```

```
a
```

```
array([20, 21, 22, 23, 24, 25, 26, 27, 28, 29])
```

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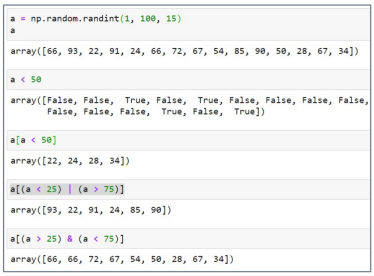
Selection on a Condition



```
a = np.random.randint(1, 100, 15)
a
```

```
array([66, 93, 22, 91, 24, 66, 72, 67, 54, 85, 90, 50, 28, 67, 34])
```

```
a < 50
```

```
array([False, False,  True, False,  True, False, False, False, False,
       False, False, False,  True, False,  True])
```

```
a[a < 50]
```

```
array([22, 24, 28, 34])
```

```
a[(a < 25) | (a > 75)]
```

```
array([93, 22, 91, 24, 85, 90])
```

```
a[(a > 25) & (a < 75)]
```

```
array([66, 66, 72, 67, 54, 50, 28, 67, 34])
```

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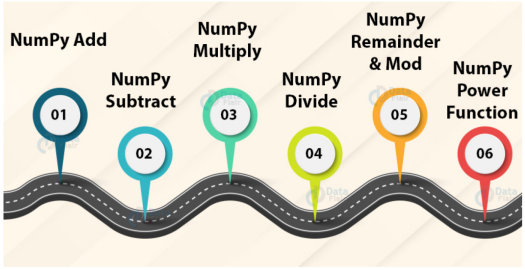
NumPy Operations



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NumPy Operations

Arithmetic Operations & Universal Array Functions

`a = np.array([10,20,30,40])` `b = np.array([5,5,5,5])`	`a2 = np.array([4,9,16,25])` `b2 = np.array([2,2,2,2])`

Addition
`np.add(a,b) = a+b`
`=[15,25,35,45]`
	Square Root
	`np.sqrt(a2)`
	`=[2,3,4,5]`

Subtraction
`np.subtract(a,b) = a-b`
`=[5,15,25,35]`
	Power
	`np.power(a2,b2)`
	`=[16,81,256,625]`

Multiplication
`np.multiply(a,b) = a*b`
`=[50,100,150,200]`
	Mod/Remainder
	`np.mod(a2,b2) = np.remainder(a2+b2)`
	`=[0,1,0,1]`

Division
`np.divide(a,b) = a/b`
`=[2,4,6,8]`
	Exponential
	`np.exp([1, 3, 5])`
	`=[2.71828183  20.08553692  148.4131591 ]`

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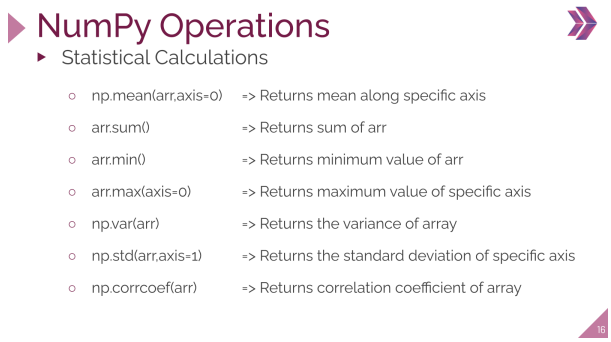

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Slide 17

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Slide 18	Your Response

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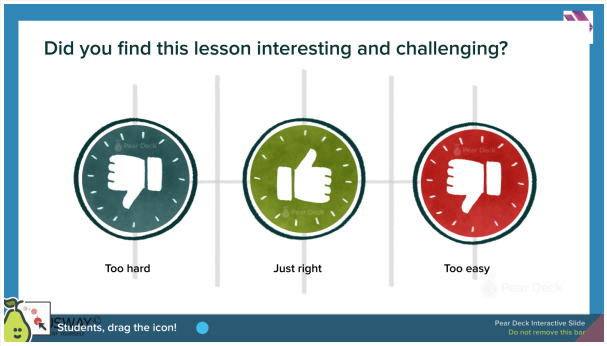	

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