

29/9/28

Day  $\rightarrow$  L

Date 1/18

Number  $\rightarrow$  Pi

Agenda  $\rightarrow$  Work with 2-D Array

Reshape  $\rightarrow$  np.array = a  $\rightarrow$  1-D

Convert into  $\rightarrow$  a.reshape(num\_rows, num\_cols)

\*  $\Rightarrow$  Reshape only happen when all elements fits

1-D element < or > Space available after reshape  
 $\rightarrow$  Then reshape will not happen

for ex 1-D  $\rightarrow$  20 elements

$\therefore$  a.reshape(5, 4) | a.reshape(4, 5)

$\checkmark$  a.(10, 2) | (2, 10), etc

-1  $\rightarrow$  a.reshape(8, -1)

$\downarrow$   
auto calculate it

a.reshape(-1, 4)

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Date..... 1/1/23

a.reshape (-1, -1) → Ambiguity Error

len → col

①  $\begin{bmatrix} 1, 2, 3 \\ 4, 5, 6 \\ 7, 8, 9 \end{bmatrix}$

2

3

· 4  $\begin{bmatrix} 10, 11, 12 \end{bmatrix}$

10

$\rightarrow \text{len}(a) = \frac{\text{no of Rows}}{= 4}$

$\text{len}(a[0]) = \frac{\text{no of cols}}{= 4}$

⇒ Cells of every Row will be same  
because we are working with Matrices

Transpose →  $\begin{bmatrix} 1, 4, 7, 10 \\ 2, 5, 8, 11 \\ 3, 6, 9, 12 \end{bmatrix}$

row → cols

cols → rows

⇒ a.T

→ a[0] [1] ⇒ b[0, 1]  
rownum column

→ a[[0, 1, 2], [0, 1, 2]]

|   |   |   |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |

(0, 0) → 1

(1, 1) → 5

(2, 2) → 9

→ If index is not present  
then array

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Date: 10

2017.03 (test)

|   |   |   |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |

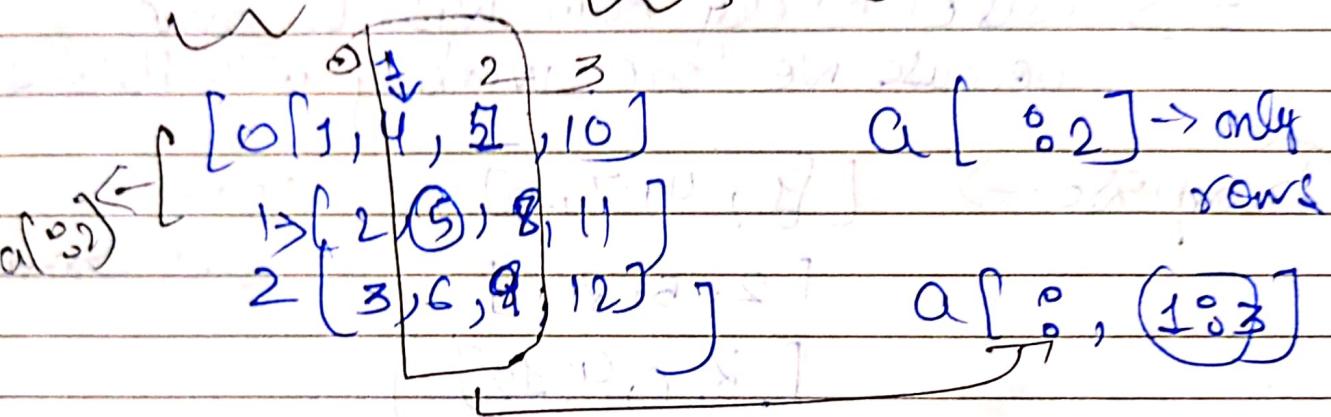
3x3

test [list(range(3)), list(range(2))]  
[0, 1, 2] [0, 1, 2]

↓ Modify

test [list(range(len(test))), list(range(len(test)))]

Slice on 2 array →



a [ : , : ] → end → exclusive  
start → inclusive → all

Index start end  
(inclusive) exclusive  
Row

a [ : , : ]  
Step size Step size

a [1 : 2, 1 : 3 : 2]

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Date... (12.1)

$$\text{Ques} \rightarrow a = [1, 2, 3, 4, 5, 6]$$

Place it  
6 [:: -2]

$$b = [3, 7, 6]$$

$\uparrow$   $\downarrow$   
 $-2$

$$\Rightarrow a = [1, 2, 3, 6, 8]$$

Facing Indexing  $\rightarrow$

$$a < 6$$

$$[T, T, T]$$

$\uparrow$   $\downarrow$   
 $T, F, T$

$\rightarrow a[a < 6] \rightarrow$  It will give 1-D list which satisfy  $a < 6$

Aggregate functions ->

axis  $\rightarrow$  1

|      |               |
|------|---------------|
| axis | [1, 4, 7, 10] |
|      | [2, 5, 8, 11] |
| 0    | [3, 6, 9, 12] |

Col-wise sum

$$\text{np.sum}(a, axis=0)$$

Row wise sum

$$\text{np.sum}(a, axis=1)$$

$\rightarrow$  NumPy has Q-Qolo all type math function or module. So, no need to use math module.

`np.sqrt()`, `np.max()`, `np.min()`,  
`np.mean()`

$\rightarrow$  In 2-D sum all the Matrix  
 $\Rightarrow \text{np.sum}(a)$

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Date 27

## Logical Functions

Any vs All

Any → If one of condition get true it will return True, it is a type of OR functionality.

e.g.  $a = [1, 2, 3, 4, 5]$

$a \geq 5 \rightarrow [F, F, F, F, T]$   
Overall → True

All → If one of the condition get false, it will return false, it is a type of AND functionality

Where → If of SQL/Excel

where (condition, value\_if\_true, value\_if\_false)

e.g.  $b = [1, 2, 3, 4, 5]$

$b = \text{where } (b > 3, b * 0.1, b)$

$\hookrightarrow b \rightarrow [1.0, 2.0, 3.0, 0.4, 0.5]$

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## Data Case Study

Date 18/3

Data → Fitbit

↓  
Load file link

data = np.loadtxt('60fit.txt', dtype='float')

Exploratory Analysis (EDA) → Understand the Data

- i) Looking at Data
- ii) what kind of Dataset
- iii) What kind of work I analysis I want to do with Data?
- iv)

① → Want all dates of data  
[0] → values of all Rows

(M-1) → Transpose → Then get first Row

(M-2) → data [0, 0]  
↓ All the Rows → 1st Column

Destructuring / unpack → data\_T = data.T

date, stepcount, mood, calories, hoursOfSleep, activity  
status = data\_T

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H/Ws Can you figure out if there is correlation b/w step count & mood?

step count, mood, hours of sleep = data

destructing

will give ans  
of T/F

a = np.mean (step count [mood == "happy"])

↳ ans is T/F value  
which be mean or Not

b = np.mean (step count [mood == "sad"])

c = np.mean ((step count [mood ==  
"neutral"]))  
Convert it to int (astype(int))

Q2 → Step count > 3000 → find what percentage  
my mood happy?

all mood after 3000 step = mood [stepcount > 3000]  
only Happy mood = all mood after 3000 / all mood = 6 Happy

percentage = len(Only Happy mood) / len(mood)

percentage & low

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## Assignment

Date... 18/6

(1) → what about code?

If  $arr \leq 0.6$ 

else

Not

satisfy

→ value of an array  
with more than  
one element is ambiguous. Use  
any in this

Cannot use if

because truth

of an array

option 2) → The code will throw ValueError,  
and np.max() should be used to get  
the required output.

(2) → what will be printed?

$$a) x \rightarrow [P_{200}, 200, 200], \quad V \rightarrow .[200, 300, 400]$$

$$[300, 300, 300] \quad V[\cdot, \text{None}] \rightarrow [200]$$

$$[400, 400, 400] \quad [300]$$

$$(x | V[\cdot, \text{None}])[[1][1]]$$

$$x / V[\cdot, \text{None}] \rightarrow$$

$$(x | V[\cdot, \text{None}])[[1][1]] > 10$$

|               |               |               |
|---------------|---------------|---------------|
| $200/200$     | $200/200$     | $200/200$     |
| $\frac{1}{1}$ | $\frac{1}{1}$ | $\frac{1}{1}$ |
| $300/300$     | $300/300$     | $300/300$     |
| $\frac{1}{1}$ | $\frac{1}{1}$ | $\frac{1}{1}$ |
| $400/400$     | $400/400$     | $400/400$     |

$$b) b = [[0], [10], [0]]$$

$$b = \begin{pmatrix} 0 \\ 10 \\ 0 \end{pmatrix}$$

$$a = (10, 11, 12)$$

$$a = [10, 11, 12]$$

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Date... (186)

$$\begin{bmatrix} 0 \\ 10 \\ 20 \end{bmatrix} + \begin{bmatrix} 10 \\ 20 \\ 30 \end{bmatrix} \text{ (row)} = \begin{bmatrix} 10 & 11 & 12 \\ 20 & 21 & 22 \\ 30 & 31 & 32 \end{bmatrix}$$
$$(p+q) [1] \rightarrow 21$$

option ①  $\rightarrow a \rightarrow 100$

option ③  $\rightarrow b \rightarrow 21$

③  $\rightarrow$  Batchmode's code  $\rightarrow$

$$a \rightarrow \begin{bmatrix} 16 & 5 \\ 8 & 1 & 6 \\ 33 & 1 \end{bmatrix} \rightarrow \text{Transpose} \rightarrow \begin{bmatrix} 16 & 81 & 33 \\ 5 & 6 & 1 \\ 2 & 3 \end{bmatrix}$$

↓ reshape

a.toflatten()

hook hii same  
array

Option ①  $\rightarrow [16 81 33 5 6 1]$

④  $\rightarrow$  The Mask

mask  $\rightarrow$  arr > 40

filtered array = arr[mask]

⑤  $\rightarrow$  Indeiced array

$$a \rightarrow \begin{bmatrix} 34 & 28 & 55 \\ 8 & 36 & 3 \\ 77 & 87 & 19 \end{bmatrix} \rightarrow \text{Transpose} \rightarrow \begin{bmatrix} 34 & 8 & 27 \\ 28 & 56 & 97 \\ 55 & 3 & 19 \end{bmatrix} \rightarrow \text{Spiral}$$

Date: 18-7

50/123

option 3 → 56

## A Additional Problems →

1) → one for all

$$\text{mask} = (\text{arr}[0] == 0) \& (\text{arr} > k) \\ ((\text{arr}[1] == 0) \& (\text{arr} > k)) \circ \text{all}()$$

$$\text{result} = \text{np.all}(\text{mask})$$

2) → Extract sub array

1D Index → Last 3 Column

| Index | Value | Index | Value | Index | Value |
|-------|-------|-------|-------|-------|-------|
| 1     | 0     | 2     | -5    | 3     |       |
| 2     | 1     | 3     | -4    | 4     |       |
| 3     | 0     | 4     | -3    | 5     |       |
| 4     | 3     | 5     | -2    | 6     |       |
| 5     | 4     | 6     | -1    | 7     |       |

⇒ Also Reverse  
the Row

H-1 i) arr [3:0:-1, -3:]

(ii) row\_arr = arr[1:4]

col\_arr = row\_arr[:, 0:-3]

result = col\_arr [0:-1, 0]

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③  $\Rightarrow$  Transpose Restaked

|   |    |
|---|----|
| 6 | 28 |
| 8 | 56 |
| 4 | 19 |

Transpose  
done

|    |    |    |
|----|----|----|
| 6  | 8  | 7  |
| 28 | 56 | 19 |
|    |    |    |

$\downarrow$  Restake (S.G)

6 8 7 28 56 19

④  $\Rightarrow$  Order Order Order

Reverse an array

|   |   |   |
|---|---|---|
| 0 | 1 | 2 |
| 3 | 4 | 5 |
| 6 | 7 | 8 |

Reverse  
Column

|   |   |   |
|---|---|---|
| 2 | 1 | 0 |
| 5 | 4 | 3 |
| 8 | 7 | 6 |

arr [0, 3:-1]

⑤  $\Rightarrow$  Rotate the array (Rotate by  $90^\circ$ )

First Transpose the Reverse of

$a = \text{Matrix}$

$b = a^T$

$c = b[0, 0:-1]$

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