# NUMPY BASICS
## NUMERICAL PYTHON

*Prepared by:*
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# NumPy Basics

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Install and update NumPy

```python
1  #%pip install numpy --upgrade
```
Python

Install and update scipy

```python
1  #%pip install scipy --upgrade
```
Python

```python
1  # imports and packages
2  import numpy as np
3  from scipy import stats
```
Python

## 1D Array

```python
1  # 1-dimensional array
2  array_a = np.array([1,2,3])
3  array_a
```
⊞ Open 'array_a' in Data Wrangler
Python

```python
1  # size of an array
2  np.shape(array_a)
```
Python

```python
1  # 1-dimensional array
2  array_b = np.array([4,5,6])
3  array_b
```
⊞ Open 'array_b' in Data Wrangler
Python

## 2D Array

```python
1  # 2-dimensional array
2  my_array = np.array([[1,2,3],[4,5,6]])
3  my_array
```
⊞ Open 'my_array' in Data Wrangler
Python

```python
1  # size of matrix
2  np.shape(my_array)
```
Python

```python
1  # transpose of a matrix
2  t_array = my_array.T
3  t_array
```
⊞ Open 't_array' in Data Wrangler
Python

```python
1  # size of matrix
2  np.shape(t_array)
```
Python

# Measures of Central Tendency

## Fruit Price List

```python
# fruit price list dataset
fruits = np.array([120,60,85,150,200])
fruits
```
[ ] Open 'fruits' in Data Wrangler                                        Python

```python
# mean
fruits_mean = np.mean(fruits)
fruits_mean
```
[ ]                                                                       Python

```python
# median
fruits_median = np.median(fruits)
fruits_median
```
[ ]                                                                       Python

```python
# sort
fruits_sorted = np.sort(fruits)
fruits_sorted
```
[ ] Open 'fruits_sorted' in Data Wrangler                                 Python

```python
# mode
stats.mode(fruits)
```
[ ]                                                                       Python

## Voltage Response

```python
# voltage response dataset
voltage = np.array([
    [1,2,3,4,5,6,7,8],
    [12,5,9.1,3.3,24,18.5,15.2,np.nan],
    [2.8,4.5,6,9,11.7,14.8,17.3,20]
])
voltage
```
[ ] Open 'voltage' in Data Wrangler                                       Python

# Measures of Variability

## Exam Performance

```python
# exam performance dataset
grade = np.array([3.5,6.7,7,7.4,7.8,8.2,8.5,8.8,9,9.1,9.4,9.8])
grade
```
[ ] Open 'grade' in Data Wrangler                                         Python

## Ice Cream Price List

```python
# ice cream price list dataset
price = np.array([
    [3.5,4,3.75,4.25,3.9,4.1,3.6,4.5,3.8,4.15],
    [203,232,217.5,246.5,226.2,237.8,208.8,261,220.4,240.7]
])
price
```
[ ] Open 'price' in Data Wrangler                                         Python

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## Pooled Standard Deviation

```python
# battery life dataset
battery = np.array([
    ['A','A','A','A','A','B','B','B','B','B','C','C','C','C','C'],
    [12.5,12.8,12.7,13.3,12.6,13.5,14.1,13.9,14.3,13.7,11.8,11.9,12.1,12.2,11.6]
])
battery
```

[ ] ❖ Open 'battery' in Data Wrangler                                                    Python